SAS® 9.3 Intelligence Platform

Middle-Tier Administration Guide

Third Edition

SAS® Documentation

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What’s New

What's New in Middle-Tier Administration for the SAS 9.3 Intelligence Platform

Overview

The SAS 9.3 middle-tier software has the following changes and enhancements:

- SAS Middle Tier Supported on 64-Bit Systems Only
- SAS BI Web Services for .NET Is No Longer Shipped
- Web Application Logging with Log4j
- Changes to the Audit Service
- New Configuration Scripting Tools
- Predefined Role for SAS Comment Manager
- New SAS Logon Manager Security Policy to Disable Concurrent Logon Sessions
- Documentation Enhancements

SAS Middle Tier Supported on 64-Bit Systems Only

The SAS 9.3 middle-tier software is supported on 64-bit operating systems only.

SAS BI Web Services for .NET Is No Longer Shipped

SAS has discontinued the SAS BI Web Services for .NET product. Customers that used the functionality provided by this application are encouraged to transition to the SAS BI Web Services for Java product.

Web Application Logging with Log4j

In the SAS 9.2 release, logging for the SAS Web applications was performed with a logging service. For the SAS 9.3 release, logging is performed with log4j. Logging configuration is performed in two ways. First, each Web application reads a log4j configuration file. Second, some Web applications enable dynamic logging changes that can be set in the SAS Web Administration Console.

Changes to the Audit Service

In the SAS 9.2 release, audit records could be stored to a log file or to a database. In the SAS 9.3 release, all SAS deployments are configured to use the SAS Web Infrastructure Platform database. The SAS 9.3 release also has an update to the SAS Web Administration Console to display user-level audit information.

New Configuration Scripting Tools

For the SAS 9.3 release, the SAS middle-tier software includes a configuration scripting tool for each of the three supported Web applications servers. The primary purpose of the configuration scripting tools is to support configuring a Web application server for sites that do not permit running the SAS Deployment Wizard on a middle-tier machine.

In the first maintenance release of SAS 9.3, the syntax for invoking a single command on JBoss and WebSphere Application Server changed. In addition, the commands or operations are no longer pre-production status.

Predefined Role for SAS Comment Manager

In the SAS 9.2 release, editing and deletion capabilities in the SAS Comment Manager were accomplished by creating a role and assigning users to that role. In SAS 9.3, users requiring these capabilities should be assigned to a new predefined role, Comments:Administrator.

New SAS Logon Manager Security Policy to Disable Concurrent Logon Sessions

For the SAS 9.3 release, SAS Logon Manager can be configured to prevent concurrent logon sessions. This option might be attractive for deployments in highly regulated environments.

Documentation Enhancements

- In the second maintenance release of SAS 9.3, information about the Web application start-up sequence is enhanced. For deployments that use IBM WebSphere Application Server, there is a sequence for five applications, but the remaining Web applications can be started in any sequence.
- In the second maintenance release of SAS 9.3, procedural information about configuring third-party vendor software such as HTTP servers and proxy plug-ins is removed. Documentation that describes the procedural steps is provided at `http://support.sas.com/thirdpartysupport`.
- In the first maintenance release of SAS 9.3, the configuration scripting tools chapter is enhanced to include more procedural information. Step-action procedures that describe how to run the tools to configure the middle-tier software are new.
- In the first maintenance release of SAS 9.3, procedural information about configuring Secure Sockets Layer (SSL) is removed. Documentation that describes the procedural steps is provided at `http://support.sas.com/thirdpartysupport`.
- SAS Logon Manager is documented in its own chapter. New configuration steps are provided for configuring custom logon, log off, and time-out messages. More information is provided about configuring HTTP session time-out intervals.
- The configuration steps for rebuilding and redeploying the SAS Web applications has been revised. More information about when the Web application server can be running, or must be stopped, is provided.
- Information about configuring the JGroups bind address has been added. This information was previously provided by SAS Technical Support in a SAS Note.

Recommended Reading

- *SAS Intelligence Platform: Overview*
- *SAS Intelligence Platform: System Administration Guide*
- *SAS Intelligence Platform: Security Administration Guide*
- *SAS Management Console: Guide to Users and Permissions*
- *SAS Integration Technologies: Overview*
- SAS offers instructor-led training and self-paced e-learning courses to help you administer the SAS Intelligence Platform. For more information about the courses available, see support.sas.com/admintraining.

For a complete list of SAS books, go to support.sas.com/bookstore. If you have questions about which titles you need, please contact a SAS Book Sales Representative:

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Working in the Middle-Tier Environment

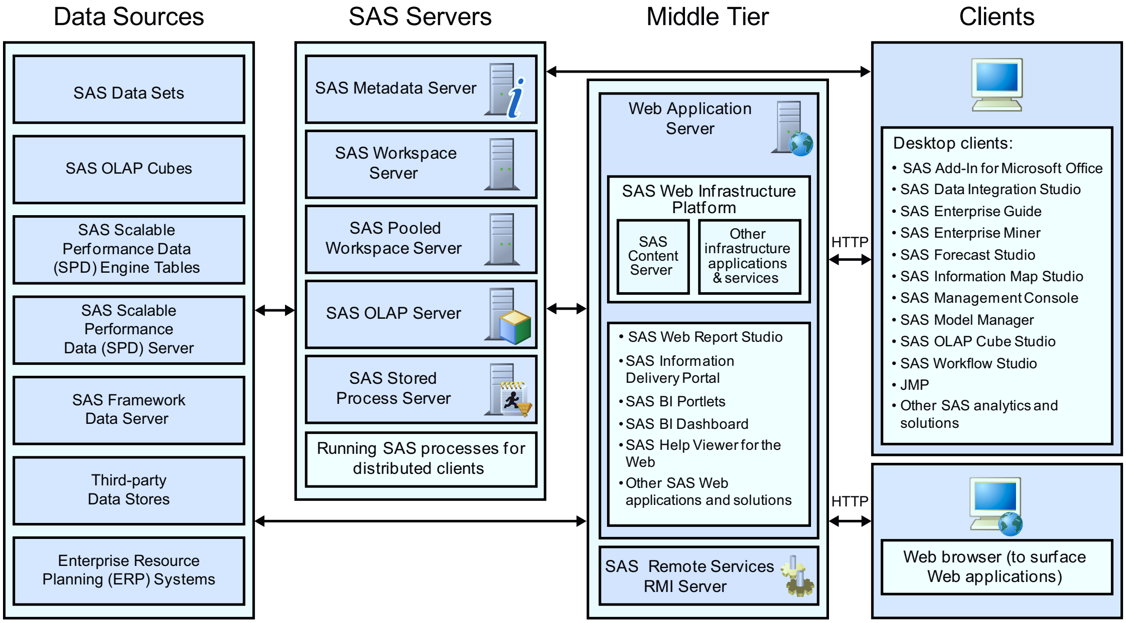
Understanding the Middle-Tier Environment

The middle tier of the SAS Intelligence Platform enables users to access intelligence data and functionality with a Web browser. This tier provides Web-based interfaces for report creation and information distribution, while passing analysis and processing requests to the SAS servers.

The middle tier of the SAS Intelligence Platform provides an environment for running applications such as SAS Web Report Studio and SAS Information Delivery Portal. These applications run in a Web application server and have a graphical user interface that users navigate with a Web browser. These applications rely on servers on the SAS server tier to perform SAS processing, including data query and analysis.

The following figure shows how the middle tier interacts with the other tiers of the SAS Intelligence Platform. For a description of these components, see *SAS Intelligence Platform: Overview*.

Figure 1.1 *Architecture of the SAS Intelligence Platform*


Data Sources
SAS Servers
Middle Tier
Clients
SAS Data Sets
SAS OLAP Cubes
SAS Scalable Performance Data (SPD) Engine Tables
SAS Scalable Performance Data (SPD) Server
SAS Framework Data Server
Third-party Data Stores
Enterprise Resource Planning (ERP) Systems
SAS Metadata Server
SAS Workspace Server
SAS Pooled Workspace Server
SAS OLAP Server
SAS Stored Process Server
Running SAS processes for distributed clients
Web Application Server
SAS Web Infrastructure Platform
SAS Content Server
Other infrastructure applications & services
• SAS Web Report Studio
• SAS Information Delivery Portal
• SAS BI Portlets
• SAS BI Dashboard
• SAS Help Viewer for the Web
• Other SAS Web applications and solutions
SAS Remote Services RMI Server
HTTP
HTTP
Desktop clients:
• SAS Add-In for Microsoft Office
• SAS Data Integration Studio
• SAS Enterprise Guide
• SAS Enterprise Miner
• SAS Forecast Studio
• SAS Information Map Studio
• SAS Management Console
• SAS Model Manager
• SAS OLAP Cube Studio
• SAS Workflow Studio
• JMP
• Other SAS analytics and solutions
Web browser (to surface Web applications)

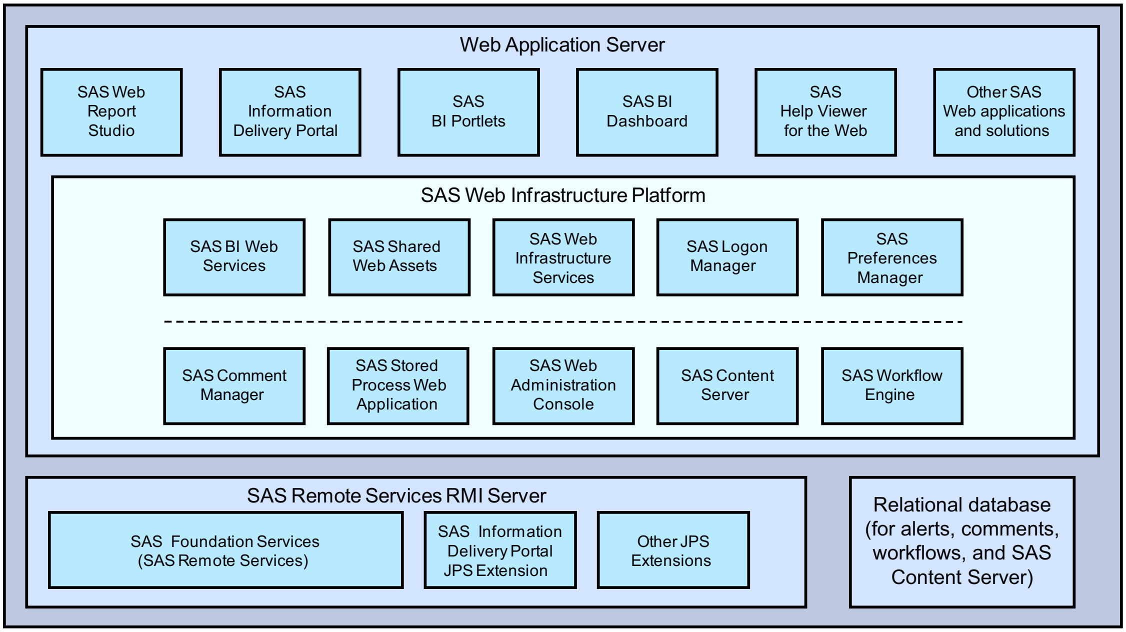
The middle tier includes the following software elements:

- a Web application server
- a Java Development Kit
- SAS Web applications, which can include SAS Web Report Studio, the SAS Information Delivery Portal, the SAS BI Dashboard, and other SAS products and solutions
- the SAS Web Infrastructure Platform, which includes the SAS Content Server and other infrastructure applications and services
- a Java remote method invocation (RMI) server, which provides access to SAS Foundation Services and associated extension services

The SAS Intelligence Platform architecture provides the flexibility to distribute these components according to your organization's requirements. For small implementations, the middle-tier software, SAS Metadata Server, and other SAS servers, such as the SAS Workspace Server and SAS Stored Process Server, can all run on the same machine. In contrast, a large enterprise might have multiple servers and a metadata repository that are distributed across multiple platforms. The middle tier in such an enterprise might distribute the Web applications to many Web application server instances on multiple machines.

The following figure illustrates the middle-tier components:

Figure 1.2 Middle-Tier Components


Web Application Server
SAS Web Report Studio
SAS Information Delivery Portal
SAS BI Portlets
SAS BI Dashboard
SAS Help Viewer for the Web
Other SAS Web applications and solutions
SAS Web Infrastructure Platform
SAS BI Web Services
SAS Shared Web Assets
SAS Web Infrastructure Services
SAS Logon Manager
SAS Preferences Manager
SAS Comment Manager
SAS Stored Process Web Application
SAS Web Administration Console
SAS Content Server
SAS Workflow Engine
SAS Remote Services RMI Server
SAS Foundation Services (SAS Remote Services)
SAS Information Delivery Portal JPS Extension
Other JPS Extensions
Relational database (for alerts, comments, workflows, and SAS Content Server)

Third-Party Software Components

Web Application Server

The Web application server provides the execution environment for the SAS Web applications. The following third-party servers are supported:

- JBoss Application Server
- IBM WebSphere Application Server
- Oracle WebLogic Server

For information about the supported versions of these products and supported platforms, see the SAS third-party Web page at `http://support.sas.com/resources/thirdpartysupport/v93`.

The following applications and services run in the Web application server environment:

- applications and services that are part of the SAS Web Infrastructure Platform
- the SAS Web Report Studio, SAS Information Delivery Portal, SAS BI Dashboard, and SAS Help Viewer for the Web applications

Depending on which products and solutions you have purchased, your site might have additional Web applications.

Java Development Kit

If you are using JBoss or WebLogic Server, a Java Development Kit (JDK) must be installed for compiling the SAS Web applications. WebSphere Application Server is shipped with a JDK. For information about the supported versions of the JDK, see the SAS third-party Web site at `http://support.sas.com/resources/thirdpartysupport/v93`.

SAS Web Infrastructure Platform

The SAS Web Infrastructure Platform is a collection of services and applications that provide common infrastructure and integration features for the SAS Web applications.

Services and Applications in the SAS Web Infrastructure Platform

Services and applications in the Web Infrastructure Platform provide the following benefits:

- consistent installation, configuration, and administration tasks for Web applications
- consistent user interactions with Web applications, such as logon
- integration among Web applications as a result of sharing common resources

The following services and applications are included in the SAS Web Infrastructure Platform:

Table 1.1 Services and Applications in the SAS Web Infrastructure Platform

Application or Service	Features
SAS BI Web Services for Java	Can be used to enable your custom applications to invoke and obtain metadata about SAS Stored Processes. Web services enable distributed applications that are written in different programming languages and that run on different operating systems to communicate using standard Web-based protocols. The most common protocol is the Simple Object Access Protocol (SOAP). The SAS BI Web Services for Java interface is based on the XML For Analysis (XMLA) Version 1.1 specification.
SAS Content Server	Stores digital content (such as documents, reports, and images) that can be created and used by the SAS Web applications.
SAS Logon Manager	Provides a common user authentication mechanism for SAS Web applications. It displays a dialog box for user ID and password entry, authenticates the user, and launches the requested application. SAS Logon Manager supports a single sign-on authentication model. When this model is enabled, it provides access to a variety of computing resources (including servers and Web pages) during the application session without repeatedly prompting the user for credentials. You can configure SAS Logon Manager to display custom messages and to specify whether a logon dialog box is displayed when users log off.
SAS Preferences Manager	Provides a common mechanism for managing preferences for SAS Web applications. The application enables administrators to set default preferences for how locale, theme, alert notification, time, date, and currency are displayed. In the SAS Information Delivery Portal, users can view the default settings and update their individual preferences.
SAS Shared Web Assets	Contains graph applet JAR files that are shared across SAS Web applications. They display graphs in stored processes and in the SAS Stored Process Web application.

Application or Service	Features
SAS Stored Process Web Application	Provides a mechanism for Web clients to run SAS Stored Processes and return the results to a Web browser. The SAS Stored Process Web application is similar to the SAS/IntrNet Application Broker, and has similar syntax and debug options. Web applications can be implemented using the SAS Stored Process Web application, the Stored Process Service API, or a combination of both. Here is how the SAS Stored Process Web Application processes a request: 1 A user enters information in an HTML form using a Web browser and then submits it. The information is sent to a Web server, which invokes the first component, the SAS Stored Process Web application. 2 The Stored Process Web application accepts data from the Web server, and contacts the SAS Metadata Server for retrieval of stored process information. 3 The stored process data is then sent by the Stored Process Web application to a stored process server via the object spawner. 4 The stored process server invokes a SAS program that processes the information. 5 The results of the SAS program are sent back through the Web application and Web server to the Web browser.

Application or Service	Features
SAS Web Administration Console	Provides features for monitoring and administering middle-tier components. This browser-based interface enables administrators to perform the following tasks: ■ Monitor users who are logged on to SAS Web applications, and send e-mail to them. ■ View user-level audit information such as the number of users, successful logons, unsuccessful logons, and find the time of a user's last logon. ■ Use the Restart Wizard to send e-mail to users to log off within a specified deadline, log the users off after the deadline, and prevent new users from logging on to SAS Web applications before the deadline. ■ Use the Quiesce System feature to allow existing users to stay logged on, and quiesce the system by preventing new users from logging on to SAS Web applications. ■ Create, delete, and manage permissions for folders on the SAS Content Server ■ View configuration information for each middle-tier component.
SAS Web Infrastructure Platform Services	Provides a common infrastructure for SAS Web applications. The infrastructure supports activities such as auditing, authentication, configuration, status and monitoring, e-mail, theme management, and data sharing across SAS Web applications.
SAS Workflow	Provides the Web services that implement workflow management. The SAS Workflow services are used by SAS applications and solutions for tightly integrated workflow management.

In the middle tier, the SAS Web Infrastructure Platform plays an important and critical role with a collection of middle-tier services and applications that provide basic integration services.

In the Web application server, two sets of services are available to all SAS Web applications:

- SAS Foundation Services

- SAS Web Infrastructure Platform Services

SAS Foundation Services

The SAS Foundation Services is a set of core infrastructure services that enables Java programmers to write distributed applications that are integrated with the SAS platform. This suite of Java application programming interfaces provides core middleware infrastructure services. These services include the following:

- client connections to SAS Application Servers
- dynamic service discovery
- user authentication
- profile management
- session management
- activity logging
- metadata and content repository access
- connection management
- WebDAV service

Extension services for information publishing, event management, and SAS Stored Process execution are also provided. All of the SAS Web applications that are described in this document use the SAS Java Platform Services. If you have correctly installed and configured the Web applications, the platform services are defined in your SAS metadata repository.

You can verify this metadata in the SAS Management Console. Depending on the Web applications that were installed, the SAS Portal Local Services (used by the SAS Information Delivery Portal) are displayed in the SAS Management Console.

In addition, other applications and portlets might have deployment of their own local services.

SAS Web Infrastructure Platform Services

The SAS Web Infrastructure Platform Services provide common infrastructure and integration features that can be shared by any SAS application. Here is a description of the features:

- Audit provides a single, common auditing capability.
- Authentication is a common method for authenticating middle-tier applications. A corresponding Web service provides connectivity based on WS security standards for Web service clients.
- Configuration is a standard way to define, store, and retrieve configuration information for SAS applications.
- Directives provide application integration so that SAS applications can share intelligence and data. Applications can link to one another without requiring specific information about a particular deployment location.
- Mail is a single, common mechanism for Simple Mail Transfer Protocol (SMTP)-based mail.
- Status and monitoring is a collective set of services providing information about the configured or functioning system.
- Comment service enables users to add comments, with or without an attachment. This feature enables the capture of human intelligence and supports collaborative decision making related to business data.
- Alerts service enables users to register to receive time-sensitive, action-oriented messages when a specified combination of events and conditions occurs. Alerts can be sent to the user's e-mail address or displayed in the SAS Information Delivery Portal.
- Themes provide access to theme definitions for presentation assets used in Web applications.
- SAS Workflow Services enable applications to interact with business processes that run in the SAS Workflow Engine.

- Registry provides access to services for desktop clients; a client needs to know only a single endpoint to determine other required locations.

SAS Workflow

SAS Workflow provides services that work together to model, automate, integrate, and streamline business processes. It provides a platform for more efficient and productive business solutions. SAS Workflow is used by SAS solutions that benefit from business process management.

SAS Workflow Studio is a desktop client application that is used to design and deploy workflows. The SAS middle tier hosts the workflow engine and the workflow services.

For deployments that use the default SAS Web Infrastructure Platform database provided by SAS Framework Data Server, there is a limitation on the number of groups and roles that SAS Workflow user can belong to. Users of SAS Workflow, and SAS solutions that use SAS Workflow, are limited to being members of 26 roles and groups. Attempting to assign more than 26 roles and groups to a user can cause queries to fail in the SAS Framework Data Server.

For deployments that use WebSphere Application Server and have a SAS solution, such as SAS Enterprise Case Management, that uses SAS Workflow, change the following settings to improve performance:

1 Increase the memory settings in the JVM options:

   a Select **Servers** ▶ **Server Types** ▶ **WebSphere application servers** and then select **SASServer1**. If SASWorkflow9.3 is deployed on a different server, then select that server instance instead.

   b Select **Java and Process Management** ▶ **Process definition** and then click **Java Virtual Machine**. In the Generic JVM arguments field, change the settings to the following values:

   ```
   -Xms4096m -Xmx4096m -Xss512k
   ```

   Remove the -Xmso JVM option if it is present.

2 Set optimistic locking and increase the connection pool size for the SharedServices data source:

a Select **Resources** ▶ **JDBC** ▶ **Data sources** and then select **SharedServices**.

b Click **Custom properties** and then click **New**. Enter the following settings:

Name: `webSphereDefaultIsolationLevel`

Value: `2`

Type: `java.lang.String`

c Select **SharedServices** from the breadcrumb at the top of the page and then select **Connection pool properties**. Change the values for the following settings:

Maximum connections: `100`

Minimum connections: `1`

3 Increase the settings for JMS connection pooling:

a Select **Resources** ▶ **JMS** ▶ **Queue connection factories** and then select **SASQueueConnectionFactory**.

b Click **Connection pool properties**. Change the values for the following settings:

Maximum connections: `50`

Minimum connections: `10`

SAS Content Server

The SAS Content Server is part of the SAS Web Infrastructure Platform. This server stores digital content (such as documents, reports, and images) that is created and used by SAS Web applications. For example, the SAS Content Server stores report definitions that are created by users of SAS Web Report Studio, as well as images and other elements that are used in reports. A process called content mapping ensures that report content is stored using the same folder names, folder hierarchy, and permissions that the SAS Metadata Server uses to store corresponding report metadata.

In addition, the SAS Content Server stores documents and other files that are to be displayed in the SAS Information Delivery Portal or in SAS solutions.

To interact with the SAS Content Server, client applications use Web-based Distributed Authoring and Versioning (WebDAV) based protocols for access, versioning, collaboration, security, and searching. Administrative users can use the browser-based SAS Web Administration Console to create, delete, and manage permissions for folders on the SAS Content Server. Administrative users can also search the SAS Content Server by using industry-standard query syntax, including XML Path Language (XPath) and DAV Searching and Locating (DASL).

SAS Web Applications

The SAS Web applications described in this section have user interfaces that are used by people other than administrators. These applications require a Web browser on each client machine and run in a Web application server that is installed on a middle-tier machine. These applications communicate with the user by sending data to and receiving data from the user's Web browser. For example, these applications display a user interface by sending HTML that includes HTML forms, Java Applets, or Adobe Flash content. The user can interact and submit input to the application by sending an HTTP response, usually by clicking a link or submitting an HTML form.

SAS Web Report Studio

SAS Web Report Studio is a Web application that anyone can use to view, interact with, create, and distribute public and private reports. Reports can be scheduled to run unattended on a recurring basis and then distributed using e-mail. SAS Web Report Studio requires the SAS BI Report Services (which includes the report output generation tool) and the SAS BI Report Services Configuration (which creates libraries used by the SAS Web Report Studio).

SAS Information Delivery Portal

The SAS Information Delivery Portal is a Web application that enables you to aggregate data from a variety of sources and present the data in a Web browser. The Web browser content might include the output of SAS Stored Processes, links to Web addresses, documents, syndicated content from information providers, SAS Information Maps, SAS reports, and Web applications. The portal also provides a secure environment for sharing information with users.

Using the portal, you can distribute different types of content and applications as appropriate to internal users, external customers, vendors, and partners. You can use the portal along with the Publishing Framework to perform the following tasks:

- Publish content to SAS publication channels or WebDAV repositories
- Subscribe to publication channels
- View packages published to channels

The portal's personalization features enable users to organize information about their desktops in a way that makes sense to them.

For more information, see the SAS Information Delivery Portal Help, which is available from within the product.

SAS BI Dashboard

SAS BI Dashboard 4.3 enables users to create, maintain, and view dashboards to monitor key performance indicators that convey how well an organization is performing. SAS BI Dashboard 4.3 includes an easy-to-use, drag and drop interface for creating dashboards that include graphics, text, colors, and hyperlinks. The application leverages Flash in the Rich Internet Application (RIA) architecture.

The Dashboard Viewer enables users to:

- Interact with data through interactive highlighting
- Quickly get to a subset of data through prompts and filters

Dashboards can link to:

- SAS reports and analytical results
- Scorecards and objects associated with solutions such as SAS Strategy Management
- Stored Processes
- Indicators
- Virtually any item that is addressable by a Uniform Resource Identifier (URI)

With the ability to save favorite dashboards and add comments, users can collaborate and easily access dashboards with customized information. All content is displayed in a role-based, secure, customizable, and extensible environment.

SAS Documentation for the Web

Your installation can include the SAS Help Viewer for Midtier Applications. SAS Help Viewer for Midtier Applications enables users to view and navigate SAS online Help in the various SAS Web applications. This component combines the help viewer with the help content for various SAS Web applications and creates an EAR file that can be deployed on a Web application server. Users access the help contents for each application through the help menu that is provided with each SAS Web application.

The SAS Help Viewer for Midtier Applications also provides an administrative interface that is used to view the status of the documentation products. Administrators can use this interface to determine whether the documentation products were installed correctly, or whether there was a configuration problem. The administration interface is available from **`http://`*`server`*`:`*`port`*`/SASWebDoc`**.

SAS BI Portlets

The SAS BI Portlets are based on JSR 168 and are available with SAS Enterprise Business Intelligence Server. These portlets are seamlessly integrated into the SAS Information Delivery Portal. SAS BI Portlets enable users to access, view, or work with content items that reside in either the SAS metadata server or the SAS Content Server.

Starting the Web Applications

Main Steps for Starting the Web Applications

To start the Web applications, follow these steps:

1 Start the SAS servers and services in the correct order. For more information about the sequence, see “Overview of Server Operation” in *SAS Intelligence Platform: System Administration Guide*.

2 Start a browser session and point the browser to the Web application that you want to access. For the correct URL, see the `Instructions.html` document, which resides in the `Documents` subdirectory of your configuration directory. The exact URL varies with the Web application server that you are using and the configuration that you have defined for your environment.

3 Log on to the Web application. For instructions about logging on to a Web application, see the online Help that is provided with the application.

Deploying and Starting Web Applications in the Correct Order

The SAS Deployment Wizard deploys SAS Web applications to the Web application server. However, you can also deploy Web applications manually from the Web application server. The Web applications are in the ***SAS-config-dir*****\Lev1\Web\Staging** directory.

There is no required start-up order for deploying the Web applications to JBoss or WebLogic Server. Although you can deploy and start the Web applications in any order of your choice, it is recommended that you follow the sequence used for WebSphere Application Server. For WebSphere Application Server, the sequence for starting the first five Web applications is important because the start-up sequence matters between these five Web applications. The recommended sequence for 1 to 5 can be used directly as the number to enter in the **Startup order** field for WebSphere Application Server.

1. SAS Web Application Themes (`sas.themes.ear`)
2. SAS Web Infrastructure Platform Services (`sas.wip.services9.3.ear`)
3. SAS Web Infrastructure Platform Applications (`sas.wip.apps9.3.ear`)
4. SAS Content Server (`sas.wip.scs9.3.ear`)
5. SAS Information Delivery Portal 4.3 (`sas.portal4.3.ear`)

The remaining Web applications can be deployed or started in any order, including starting them before the applications in the previous list.

2

Best Practices for Configuring Your Middle Tier

Best Practices for Middle-Tier Configuration

This chapter provides sample middle-tier topologies and guidelines for achieving better efficiency and performance with the middle-tier components in the SAS Intelligence Platform. The middle tier provides an environment for running the following SAS Web clients:

- SAS Information Delivery Portal
- SAS Web Report Studio
- SAS BI Dashboard

Configuration instructions vary depending on the Web application server installed at your site. For configuration instructions that pertain to the topics discussed in this chapter, see the following third-party vendor Web sites:

- JBoss Application Server: `http://www.jboss.org/docs`
- IBM WebSphere Application Server: `http://www.ibm.com/support/documentation/us/en`
- Oracle WebLogic Server: `http://www.oracle.com/technology/documentation/index.html`

For deployments that use WebSphere Application Server, if you want to configure the middle-tier environment manually, then configure a separate cell for the SAS Web applications. The SAS Web applications make use of resources that are configured at the cell level. Configuring a separate cell avoids interference between the SAS Web applications and other Web applications.

For deployments that use WebLogic Server, if you want to configure the middle-tier environment manually, then configure a separate domain for the SAS Web applications. The SAS Web applications make use of resources that are configured at the domain level. Configuring a separate domain avoids interference between the SAS Web applications and other Web applications.

For deployments that use JBoss, if you want to configure the middle-tier environment manually, then configure separate Web application server instances for the SAS Web applications. Do not deploy the SAS Web applications to Web application server instances that are used for other Web applications. Likewise, do not deploy other Web applications to the Web application server instances that are used for the SAS Web applications.

Sample Middle-Tier Deployment Scenarios

Overview of Middle-Tier Deployment Scenarios

This section describes sample topologies for the middle-tier components. These sample topologies can help you design a middle-tier configuration that meets the needs of your organization with regard to performance, security, maintenance, and other factors.

As with all tiers in the SAS Intelligence Platform, deployment of the middle tier involves careful planning. When you design and plan the middle tier, you must balance performance requirements against a number of other criteria. To understand these criteria and to evaluate sample deployment scenarios, see the following subsections:

- "Scenario 1: Web Applications Deployed in a Single Web Application Server" on page 22
- "Scenario 2: Static Content Deployed in a Reverse Proxy" on page 25
- "Scenario 3: Web Applications Deployed across a Web Application Server Cluster" on page 28
- "Additional Considerations for a Deployment" on page 33

The topologies that are presented here range from simple to complex. Scenario 1 represents the deployment that results from using the SAS Deployment Wizard to configure the Web application server and deploy the SAS Web applications. Scenarios

2 and 3 provide advanced features, such as greater security and efficiency, but require more effort to implement and to maintain.

All scenarios include the SAS server tier. The server tier consists of a SAS Metadata Server that resides on a dedicated machine. The server tier also includes additional systems that run various SAS Application Servers, including SAS Workspace Servers, SAS Pooled Workspace Servers, SAS Stored Process Servers, and SAS OLAP Servers.

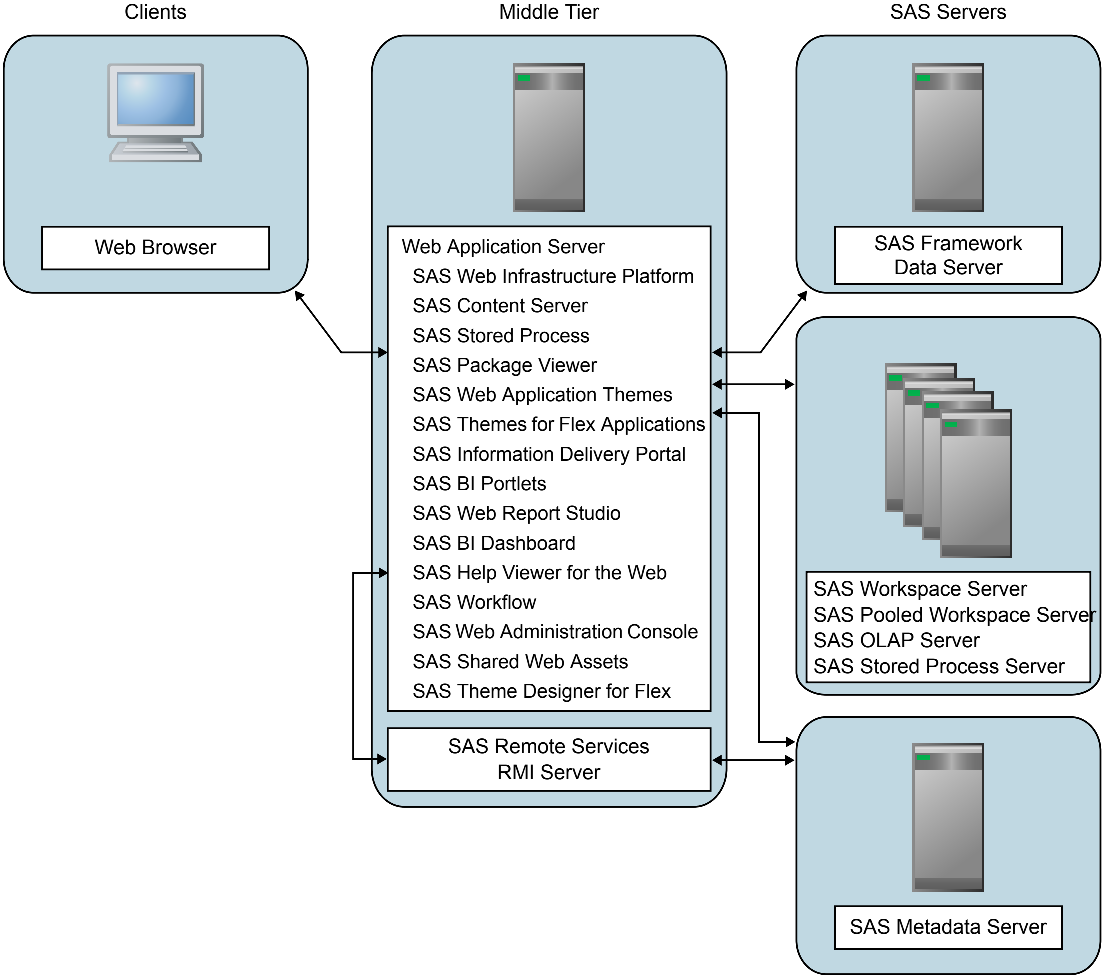
Scenario 1: Web Applications Deployed in a Single Web Application Server

Overview

Scenario 1 illustrates the most basic topology. All of the SAS middle-tier components are installed on a single system. All the SAS Web applications run in a single Web application server. The SAS Remote Services application is also installed on the same middle-tier server, but runs as a server application outside the Web application server.

The following figure illustrates the topology for Scenario 1.

Figure 2.1 *Scenario 1: Middle-Tier on a Single System*


Clients
Middle Tier
SAS Servers
Web Browser
Web Application Server
SAS Web Infrastructure Platform
SAS Content Server
SAS Stored Process
SAS Package Viewer
SAS Web Application Themes
SAS Themes for Flex Applications
SAS Information Delivery Portal
SAS BI Portlets
SAS Web Report Studio
SAS BI Dashboard
SAS Help Viewer for the Web
SAS Workflow
SAS Web Administration Console
SAS Shared Web Assets
SAS Theme Designer for Flex
SAS Remote Services RMI Server
SAS Framework Data Server
SAS Workspace Server
SAS Pooled Workspace Server
SAS OLAP Server
SAS Stored Process Server
SAS Metadata Server

Here are the advantages and disadvantages of this topology:

Table 2.1 Scenario 1 Advantages and Disadvantages

Topic	Advantages	Disadvantages
Security	None	The SAS Web applications are exposed to attacks from Web clients. If SSL is enabled, the middle-tier server has the computational load of encrypting data, in addition to the load of hosting the SAS Web applications.
Scalability	None	This topology does not support hundreds of concurrent users.
Availability	None	This topology has no provision for planned or unplanned down time.
Maintainability	The SAS Deployment Wizard can automate the configuration and deployment. This topology is simple to maintain and is ideal for development environments where frequent changes might be required.	None

Further Considerations for Scenario 1

As the maintainability advantages in the previous table indicates, scenario 1 is easy to implement. This middle-tier topology can be completely installed and configured by the SAS Deployment Wizard. SAS provides another topology that can be completely installed and configured by the SAS Deployment Wizard, yet provides better scalability and performance.

A variation of this scenario is to use the SAS Deployment Wizard to distribute the SAS Web applications across two Web application server instances (managed servers) on the same middle-tier server. This distribution of Web applications is different from clustering in that there is still only one instance of each application. By distributing the applications to two managed servers, this alternative configuration allows more memory availability for the applications deployed on each managed server and also increases the number of users that can be supported. Some SAS Solutions are configured with multiple servers by the SAS Deployment Wizard automatically. However, you can choose to configure multiple managed servers by running the wizard with the custom prompting level and selecting this feature.

Scenario 2: Static Content Deployed in a Reverse Proxy

This sample topology delivers static HTML content to clients from an HTTP server that is configured as a reverse proxy. This strategy reduces the work load on the Web application server. Examples of HTTP servers that can be configured as reverse proxies are Apache HTTP Server and Microsoft Internet Information Services (IIS).

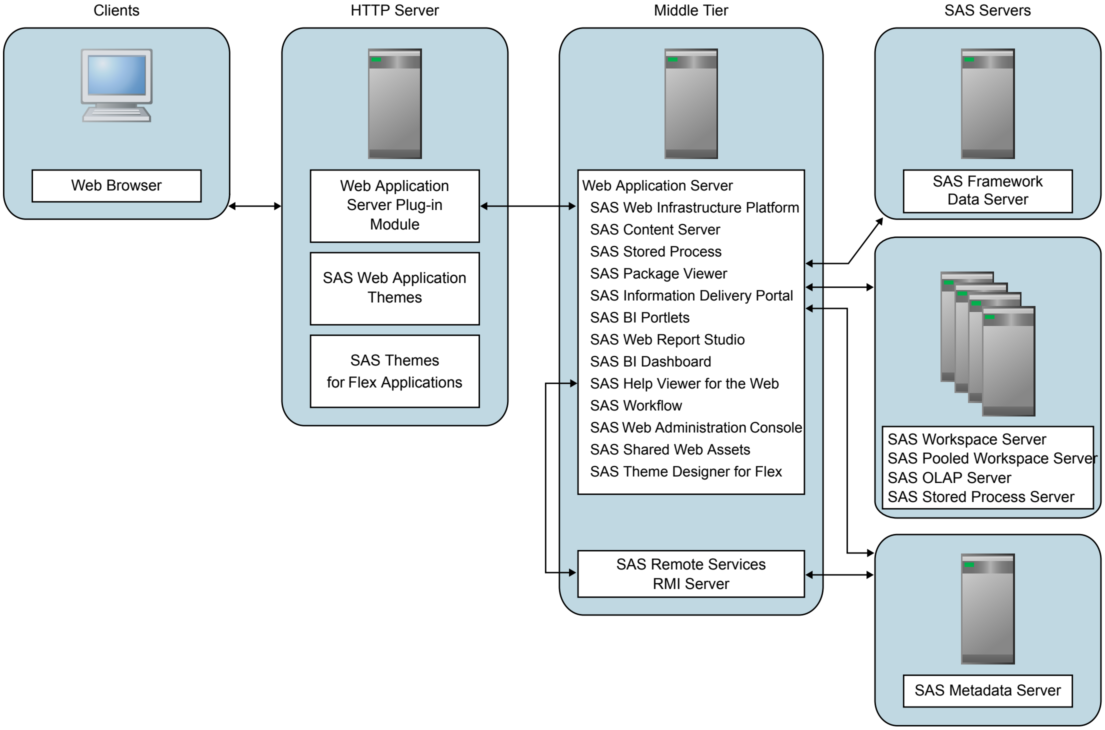
When a browser makes a request for a SAS Web application, a part of the request is for static content such as HTML files, images, cascading style sheets, and JavaScript scripts. The SAS Themes Web application provides this static content. For Web applications that use Flex, there is static content that is provided by SAS Themes for Flex Applications. In this scenario, the static content for SAS Themes and SAS Themes for Flex Applications is unpacked and delivered by the reverse proxy. The reverse proxy simply returns the requested content to the browser, and the browser displays the document.

Note: If you unpack and deploy the static content on the reverse proxy, then you must redeploy this content if you later install a SAS software upgrade or apply maintenance that includes new files for the static content.

If the reverse proxy can be configured to cache content, then the performance improvement is even greater. The portion of the request that is for dynamic content still requires some type of data manipulation by the SAS Web applications and the Web application server must perform that work before returning the requested page.

The following figure illustrates the topology for scenario 2.

Figure 2.2 Scenario 2: Using a Reverse Proxy


Clients
HTTP Server
Middle Tier
SAS Servers
Web Browser
Web Application Server Plug-in Module
SAS Web Application Themes
SAS Themes for Flex Applications
Web Application Server
SAS Web Infrastructure Platform
SAS Content Server
SAS Stored Process
SAS Package Viewer
SAS Information Delivery Portal
SAS BI Portlets
SAS Web Report Studio
SAS BI Dashboard
SAS Help Viewer for the Web
SAS Workflow
SAS Web Administration Console
SAS Shared Web Assets
SAS Theme Designer for Flex
SAS Remote Services RMI Server
SAS Framework Data Server
SAS Workspace Server
SAS Pooled Workspace Server
SAS OLAP Server
SAS Stored Process Server
SAS Metadata Server

In a typical configuration, the HTTP server is configured with a module or plug-in that enables the reverse proxy function of communicating with the Web application server. By having the reverse proxy as the single point of contact for browser requests, the Web application server is not directly exposed to clients. The reverse proxy provides a layer of security for the SAS Web applications.

Although this topology must be manually configured and maintained, here are the advantages and disadvantages of this topology:

Table 2.2 *Scenario 2 Advantages and Disadvantages*

Topic	Advantages	Disadvantages
Security	The reverse proxy provides a layer of security. The network on the middle-tier server can be configured to reject HTTP packets that do not originate from the reverse proxy. SSL can be enabled on the client side of the reverse proxy without affecting the work load on the Web application server or the performance of the SAS Web applications. The Web application server and SAS Web applications can be configured to perform Web authentication for single sign-on to SAS Web applications and other Web resources in the network.	Adding firewalls to the network is a good next step.
Performance	Response time is improved because processing static content is offloaded from the Web application server to the reverse proxy.	As with scenario 1, all of the SAS Web applications are deployed to a single Web application server instance. However, a second managed server instance can be configured, as mentioned in the scenario 1 section.
Scalability	There are no advantages in this scenario, but the topology provides an upward path to clustering Web application servers.	This topology does not support hundreds of concurrent users.
Availability	None	This topology has no provision for planned or unplanned down time.

Topic	Advantages	Disadvantages
Maintainability	The SAS Deployment Wizard can still automate the configuration and deployment of the Web application server and the SAS Web applications.	After manual or automatic installation and configuration with the SAS Deployment Wizard, there are manual steps to perform. The reverse proxy must be configured with the connection information for the SAS Web applications.

For instructions about how to configure an HTTP server as a reverse proxy for SAS Web applications deployed on JBoss, WebSphere Application Server, or WebLogic Server, see the SAS third-party Web site at `http://support.sas.com/resources/thirdpartysupport/v93`.

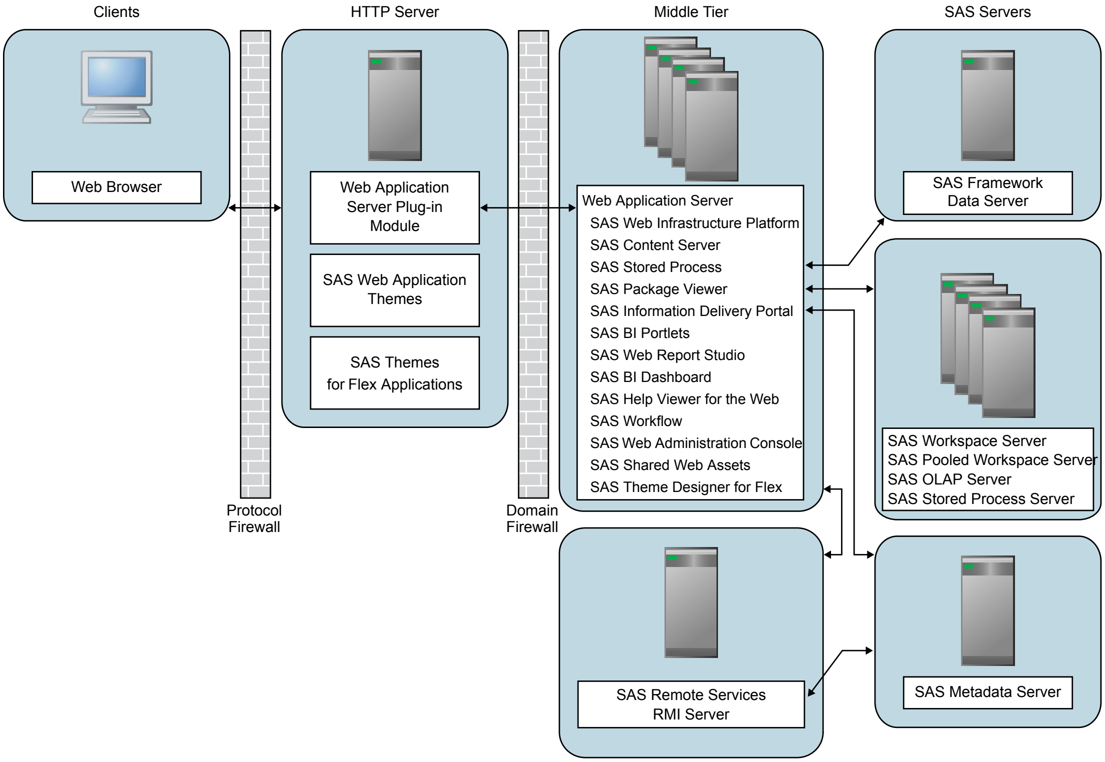
Scenario 3: Web Applications Deployed across a Web Application Server Cluster

Overview

The sample topology in scenario 3 includes a cluster of Web application servers in a network that implements a secure demilitarized zone (DMZ).

The following figure illustrates the topology for scenario 3. Note that the Web application servers and SAS Web applications are distributed across multiple middle-tier machines.

Figure 2.3 *Scenario 3: Clustered Web Application Servers and a Demilitarized Zone*


Clients
HTTP Server
Middle Tier
SAS Servers
Web Browser
Web Application Server Plug-in Module
SAS Web Application Themes
SAS Themes for Flex Applications
Protocol Firewall
Domain Firewall
Web Application Server
SAS Web Infrastructure Platform
SAS Content Server
SAS Stored Process
SAS Package Viewer
SAS Information Delivery Portal
SAS BI Portlets
SAS Web Report Studio
SAS BI Dashboard
SAS Help Viewer for the Web
SAS Workflow
SAS Web Administration Console
SAS Shared Web Assets
SAS Theme Designer for Flex
SAS Framework Data Server
SAS Workspace Server
SAS Pooled Workspace Server
SAS OLAP Server
SAS Stored Process Server
SAS Remote Services RMI Server
SAS Metadata Server

Note: As indicated in the figure, if you configure a cluster of Web application servers, then you must deploy all the SAS Web applications to each node in the cluster. Each node must be configured identically.

In the figure, note that the SAS Remote Services application resides on a machine that is separate from the cluster of Web application servers. This separation serves to illustrate that the SAS Remote Services application is a server application that does not participate in clustering. The SAS Remote Services Application could just as well reside on any one of the machines in the cluster.

Although this topology requires manual configuration and greater maintenance than the topologies in the previous scenarios, here are the advantages and disadvantages of this topology:

Table 2.3 *Scenario 3 Advantages and Disadvantages*

Topic	Advantages	Disadvantages
Security	The SAS Web applications and the Web application server cluster are protected by the DMZ. The Web application server and SAS Web applications can be configured to perform Web authentication for single sign-on to SAS Web applications and other Web resources in the network.	None
Performance	Response time is improved because processing static content performed by the reverse proxy and because of the greater computing capacity of the Web application server cluster.	None
Scalability	Once the cluster of Web application servers is established, additional managed servers can be added to the cluster to support larger numbers of concurrent users.	None
Availability	Clustering provides fault isolation that is not possible with a single Web application server. If a node in the cluster fails, then only the users with active sessions on that node are affected. You can plan downtime for maintenance by taking managed servers offline. New requests are then directed to the SAS Web applications deployed on the remaining nodes while maintenance is performed.	None

Topic	Advantages	Disadvantages
Maintainability	Configuration and deployment of the first Web application server and the SAS Web applications can still be automated with the SAS Deployment Wizard. This first Web application server can be cloned to speed the creation of the cluster.	The reverse proxy must be configured with the connection information for the SAS Web applications. Creating the Web application server cluster requires additional configuration.

Understanding Clusters

In order to provide greater scalability, availability, and robustness, WebLogic Server, WebSphere Application Server, and JBoss support some form of clustering. With clustering, multiple Web application server instances participate in a load-balancing scheme to handle client requests. Workload distribution is usually managed by the same application server plug-in module that enables the use of a reverse proxy for static content.

The Web application server instances (managed servers) in a cluster can coexist on the same machine (vertical clustering), or the managed servers can run on a group of middle-tier server machines (horizontal clustering). The SAS Web applications can be deployed on both vertical and horizontal clusters.

A different approach to load distribution involves merely deploying individual SAS Web applications on separate, non-clustered Web application servers. Though this approach reduces the memory load for any given server, a clustering strategy is preferable. Deployment is easier to manage with a cluster because all machines and server instances are identically configured. Furthermore, Web application servers provide deployment management services that facilitate management of a cluster. It is relatively easy to add additional nodes and increase the size of the cluster.

Requirement for Session Affinity

For SAS Web applications to be deployed into a clustered environment, the Web application servers must implement session affinity. *Session affinity* is an association between a Web application server and a client that requests an HTTP session with that server. This association is known in the industry by several terms, including session affinity, server affinity, and sticky sessions. With session affinity, once a client has been assigned to a session with a Web application server, the client remains with that server for the duration of the session. By default, session affinity is enabled in WebSphere Application Server and WebLogic Server.

Although WebSphere Application Server, WebLogic Server, and JBoss provide the ability to migrate HTTP sessions from one server to another, the SAS Web applications do not support this capability. Business intelligence sessions often contain large data elements, such as results sets from ad hoc queries, reporting, and analytical tasks, that cannot be migrated easily among Web application servers.

Understanding Demilitarized Zones

Many organizations use a series of firewalls to create a demilitarized zone (DMZ) between their servers and the client applications. A DMZ provides a network barrier between the servers and the clients. A DMZ provides this protection whether the clients reside within the organization's computing infrastructure (intranet) or reside outside the organization on the Internet.

In the previous figure, the outer firewall that connects to the public network is called the domain firewall. Typically, only the HTTP (80) and HTTPS (443) network ports are open through this firewall. Servers that reside directly behind this firewall are exposed to a wide range of clients through these limited ports, and as a result the servers are not fully secure.

An additional firewall, the protocol firewall, is configured between the non-secure machines in the DMZ and the machines in the secure middle-tier network. The protocol firewall has additional network ports opened. However, the range of IP addresses that are allowed to make connections is typically restricted to the IP addresses of the servers that reside in the DMZ.

The DMZ usually contains HTTP servers, reverse proxies, and load-balancing software and hardware. Do not deploy Web application servers or any SAS servers that handle important business logic, data, or metadata in the DMZ.

If your applications are accessed by clients through the Internet, then you should include a DMZ as part of your deployment in order to safeguard critical information. For deployments on a corporate intranet, you might want to implement a DMZ as an additional layer of security.

Additional Considerations for a Deployment

Load-Balancing Software and Hardware for the HTTP Servers

In scenario 3, the Web application servers are clustered to balance the load and to provide increased availability. While this scenario provides redundancy for the application servers, the HTTP server that is deployed as a reverse proxy remains a potential bottleneck and single point of failure. To improve availability and increase capacity, you can distribute HTTP traffic across multiple reverse proxies by placing load-balancing software or hardware in front of those servers. A single load-balancing component can accept client HTTP requests and distribute those requests across a cluster of reverse proxies.

A number of vendors sell load-balancing software and hardware products for HTTP servers, including IBM, Cisco, and Nortel. If you are interested in this type of load-balancing, you can explore the product lines for these and other vendors.

Secure Sockets Layer

If you are moving sensitive information across the Internet, then you might want to use HTTPS and Secure Socket Layer (SSL) to encrypt your communication links. SSL uses Public Key Cryptography, which is based on the implementation of a public and private key pair. Each of your servers that handles encrypted communications manages certificates that contain both the private key and the public key. A description of how Public Key Cryptography and SSL work is beyond the scope of this document. However, there are many good sources for that information.

Here are some factors to consider when determining whether and how to use SSL:

- Which links do you want to encrypt? In the figures shown for the various scenarios, each arrow represents a potential communications link that might be encrypted. You should consider encrypting the following:
    - Encrypt any data that is capable of moving across the public Internet. If connections to your site go through a virtual private network (VPN), then those connections are already encrypted. Otherwise, traffic to and from your site is open to packet analysis by Internet users.

  - Encrypt all traffic that moves between the client and your HTTP server that resides in the DMZ.

  - Always encrypt traffic that is used to transmit credit card numbers, Social Security numbers, and any other sensitive information.

  To achieve strong security, encrypt links all the way to the Web application server. If you are concerned about internal packet analysis, you can encrypt everything. However, total encryption comes with a cost, as explained in the remaining considerations.

- Some load-balancing schemes might rely on packet content for routing. When that is the case, encryption can impede the work that is performed by load-balancing software or hardware because encryption renders the packet content undecipherable.

- Cryptography requires resource-intensive computation, and this resource requirement typically reduces the amount of traffic that your servers are able to handle.

- The certificates that are used with SSL expire at fixed intervals. When a user's certificate expires, the user must obtain a new certificate before logging on to your applications. If you want a highly available system, then you should prepare for certificate renewal in advance to avoid unexpected downtime.

- You must decide whether to use certificates that are generated by a Certification Authority (CA), or whether self-signed certificates are adequate for your application. Self-signed certificates can save you money, but you are responsible for managing their distribution to clients.

Web Authentication

By default, SAS Web applications use the form-based authentication that is provided by the SAS Logon Manager Web application. When credentials are provided to the SAS Logon Manager Web application, the credentials are sent to the SAS Metadata Server for authentication. The metadata server then authenticates the credentials against its authentication provider. The default provider is the host operating system.

As an alternative, you can configure the SAS Web applications to authenticate on the middle tier. When users log on to a SAS Web application, the Web application server handles the initial authentication. In this configuration, the Web application server's JAAS login module authentication provider verifies the user's identity. Then, the SAS Logon Manager Web application makes a trusted user connection to the metadata server to check that the authenticated user has a SAS identity in metadata.

Performing Web authentication facilitates single sign-on. Most likely, your organization has several applications behind a common set of reverse proxy and HTTP servers. By having a common server handle authentication, users do not need to re-authenticate for access to each application.

For more information, see the following topics:

- For a detailed explanation of different types of authentication, see “Authentication Mechanisms” in the *SAS Intelligence Platform: Security Administration Guide*.
- For information about setting up the middle-tier applications to use Web authentication, see the SAS third-party Web site at `http://support.sas.com/resources/thirdpartysupport/v93`.
- For information about achieving a single sign-on approach to authentication, see “Using Single Sign-On among Web Applications” on page 44 .

Heap Size for SAS Remote Services Application

Middle-tier applications use the SAS Remote Services application to pass session and user context between Web applications. The SAS Remote Services application enables the user to pass seamlessly through to the target without the requirement for a separate logon.

During installation, the SAS Deployment Wizard enables you to specify the desired initial and maximum heap size for the SAS Remote Services application by using the JVM option format. You must run the SAS Deployment Wizard at the Custom prompting level to set these values.

JVM options of the SAS Remote Services application are set to handle a moderately high number of concurrent users. For a very large number of concurrent users and a distributed topology, you should tune the JVM options to accommodate the deployment.

If you use the Windows service, you can increase the initial and maximum heap size of the SAS Remote Services application. Edit the `wrapper.conf` file located in the *SAS-config-dir*`\Lev1\Web\Applications\RemoteServices` directory.

Alternatively, you can add the recommended JVM options to one of the following scripts:

- On Windows:

  SAS-config-dir`\Lev1\Web\Applications\RemoteServices\RemoteServices.bat`

- On UNIX and z/OS:

  SAS-config-dir`/Lev1/Web/Applications/RemoteServices/RemoteServices.sh`

Tuning the Web Application Server

In addition to specifying Java Virtual Machine options, you can improve the performance of SAS Web applications by configuring other aspects of your Web application server's behavior. For example, two obvious ways to improve the performance of any Web application are:

- to limit the frequency with which servers check for updated JavaServer Pages and servlets

- to make sure that the server can create sufficient threads to service incoming requests

SAS provides a set of JVM option settings in the Instructions.html file that is generated by the SAS Deployment Wizard. Use those settings as a starting point for your tuning. In addition, SAS provides additional tuning information in *SAS 9.3 Web Applications: Tuning for Performance and Scalability* that is available with the Web application server documentation at

`http://support.sas.com/resources/thirdpartysupport/v93`.

Configuring a Cluster of Web Application Servers

Cluster configuration varies widely between Web application server vendors. Consult your vendor's documentation for configuration instructions. Note, however, that you must deploy all the SAS Web applications to all nodes of the cluster. For a visual representation, see “Scenario 3: Web Applications Deployed across a Web Application Server Cluster” on page 28 .

It is possible to configure a cluster that consists of just one node. You might set up a single-node cluster when your sole objective is to route browser requests to an HTTP server instead of to the Web application server. For this configuration, you set the address of the single-node cluster equal to the address of the HTTP server.

Configuring HTTP Sessions in Environments with Proxy Configurations

Resolve HTTP Session Requests in a Secure Environment

SAS Web Report Studio 4.3 uses absolute URL addresses that must be associated with the correct HTTP session. The SAS Logon Manager knows only the address that is stored in metadata, and the SAS Logon Manager redirects requests to that location.

If that address differs from the URL specified by the user, then the user's session is not tracked correctly. (For example, suppose the user specifies the internal address `http://shortname/application` instead of the external address `http://shortname.example.com/application`.)

When SAS Web Report Studio receives an HTTP request, the request is redirected to the SAS Logon Manager. The SAS Logon Manager authenticates the request, and redirects it back to SAS Web Report Studio.

An exception applies to this process if your environment has any front-end processor (for example, Apache, Web clustering, IBM Tivoli Access Manager WebSEAL, or CA SiteMinder) configured. In these scenarios, or if a reverse proxy is configured with WebSEAL, the HTTP session request comes via an internal address. For example, the request might come via `http://host:port/application` instead of an external address `http://proxiedhost/application`. This sequence of events triggers a redirection filter, which typically sends the request to a location in the metadata where the request format is expected in the form of `shortname.example.com`. However, the redirection filter is not required because the proxy sends the request to the same location, and the same address is always used.

To ensure successful resolution of HTTP session requests in a secure environment (any environment with a front-end processor), the redirection filter must be disabled for SAS Web Report Studio. In addition, it is highly recommended that you disable this filter for all SAS applications.

To disable the redirection filter for all SAS Web applications, follow these steps:

1 In SAS Management Console, navigate to **Plug-ins** ▶ **Application Management** ▶ **Configuration Manager** ▶ **SAS Application Infrastructure Properties** and right-click to display the SAS Application Infrastructure Properties dialog box.

2 Click the **Advanced** tab.

3 Click **Add** to display the Define New Property Window.

4 Enter the property name as shown, and specify the property value:

   Property Name: `App.RedirectionFilterDisabled`

   Property Value: `True`

5 Click **OK** to exit the Define New Property window.

6 Click **OK** to exit the SAS Application Infrastructure Properties dialog box.

7 To enable this change to go into effect, restart your Web application server.

Using an HTTP Server to Serve Static Content

Your middle-tier deployment can use an HTTP server to handle requests for the static content in the SAS Themes Web application. This HTTP server can be configured as a proxy to forward requests for dynamic content to your Web application server, or the content can be deployed on a standard HTTP server. This strategy makes efficient use of the HTTP server, and enables the Web application server to devote its resources to dynamic content. The performance benefits are particularly notable for large-scale deployments that include a cluster of Web application servers. For an overview of this configuration, see “Sample Middle-Tier Deployment Scenarios ” on page 21 .

For information about using the SAS Web applications with an HTTP server, see `http://support.sas.com/thirdpartysupport`.

Using a Proxy Plug-in between the Web Application Server and the HTTP Server

WebLogic Server, WebSphere Application Server, and JBoss provide plug-in modules that enable integration with an HTTP server, such as Apache HTTP Server or Microsoft Internet Information Services (IIS).

The plug-ins are useful for either or both of the following:

- to forward requests for dynamic content to the Web application server or servlet container. In this scenario, the HTTP server handles all the static content and relies on the Web application server for dynamic content.
- to forward requests and distribute those requests among a cluster of Web application servers using a load-balancing algorithm.

For information about using the SAS Web applications with a proxy plug-in, see `http://support.sas.com/thirdpartysupport`.

Using Apache Cache Control for Static Content

To avoid sending unnecessary requests to the server each time a client requests a static content item, you can configure Apache HTTP Server to set cache time-out values for static content.

Typically, after a browser initially downloads a static resource from the HTTP server, the browser sends a conditional HTTP GET request each time the browser encounters that resource again. For example, when a browser first downloads a SAS Web Report Studio logo image, the browser stores a local copy of the image. For each subsequent page that references the logo, the browser requests that the image be sent again if the image has been modified since the previous download. This sequence occurs for every static element and can result in large numbers of HTTP requests. Because the static content for is not modified often, most of these requests are unnecessary.

When you specify a cache time-out for each static element, clients (browser, proxy, or server cache) can avoid sending unnecessary requests to the HTTP server in order to check the validity of the content. When the browser first accesses a static element, the browser stores that element locally for the duration of the time-out value that is configured. During this time, subsequent queries to the HTTP server are suppressed for that element. The browser resumes queries as appropriate when the time-out period elapses within the session.

You can configure Apache HTTP Server to set cache time-out values for static content. This is true whether Apache HTTP Server is configured to serve that static content or is merely a reverse proxy to your Web application server.

3

Middle-Tier Security

Middle-Tier Security

To determine how to implement middle-tier security, you should consider your organization's internal security policies, the security mechanisms that are in place in your environment, the types of users who need to access the Web applications, and the types of content that you plan to make available.

Important concepts and tasks concerning middle-tier security are as follows:

- Authentication. For a detailed discussion of different types of authentication and configuration guidelines, see "Authentication Mechanisms" in the *SAS Intelligence Platform: Security Administration Guide*. For information about configuring Web authentication for JBoss, IBM WebSphere, or Oracle WebLogic, see `http://support.sas.com/resources/thirdpartysupport/v93/`.
- SAS Anonymous Web User. See "Using the SAS Anonymous Web User with SAS Authentication" on page 42.
- Multicast Security. See "Multicast Security" on page 43.
- Single Sign-On. See "Using Single Sign-On among Web Applications" on page 44.
- Secure Sockets Layer (SSL). See "Using Secure Sockets Layer (SSL) for Web Applications " on page 45.
- Restrictive Policy Files. See "Configuring and Deploying Restrictive Policy Files " on page 46.

Using the SAS Anonymous Web User with SAS Authentication

The SAS Anonymous Web User (webanon) is an optional account that can be used to grant Web clients anonymous access to certain SAS Web Infrastructure Platform applications (SAS BI Web Services and SAS Stored Process Web Application). This anonymous account, which is configured with the SAS Deployment Wizard, is applicable only when SAS authentication is being used. If Web authentication is used, the Web application server processes authentication requests, and this anonymous account has no effect.

If the webanon account is configured, it is used when a Web service is configured for SAS authentication, and credentials are not supplied. If the webanon account is not configured, there are no credentials for authentication, and the request fails.

In a default deployment, this anonymous account is configured as an internal user account. To determine whether to enable the webanon user account, administrators must decide whether they want to require clients to provide credentials for all requests. When clients provide credentials to an incoming request, these credentials are always used for authentication whether the account has been enabled or not.

The webanon user is defined in the following locations:

- in metadata. In default deployments, the SAS Anonymous Web Service User is an internal user account that is known only to SAS and that is authenticated internally in metadata. When internal authentication is used, it is not necessary for this user to have a local or network account.
- in the operating system of the metadata server machine, only if you selected the External authentication option for this user during a custom installation.

Multicast Security

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). During installation, the SAS Deployment Wizard supplies you with a default multicast address and port number that it generates based on the machine's (metadata server) IP address. 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 IP address and multicast UDP port number for the multicast host must match the values in the Web application server's start-up script (for example, **`SASServer1.bat`**) and the **`environment.properties`** file located in the *SAS-config-dir*`\Lev1\Web\Applications\RemoteServices` directory.

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 in the SAS Deployment Wizard. The defaults are most appropriate for deployments in the firewall, isolated data center environment. After installation, if you choose to modify the scoping or encryption options, you can do so by specifying the options for the **`-Dmulticast.security`** parameter for your Web application server.

For more information, see "Administering Multicast Options" on page 238.

Using Single Sign-On among Web Applications

Single Sign-On (SSO) is an authentication model that enables users to access a variety of computing resources without being repeatedly prompted for their user IDs and passwords. SSO can enable a user to access SAS servers that run on different platforms without interactively providing the user's ID and password for each platform. SSO can also enable someone who is using one application to launch other applications based on the authentication that was performed when the user initially logged in.

SAS provides these SSO features:

- To bypass the logon prompt when launching a desktop application (such as SAS Information Map Studio, SAS Enterprise Guide, SAS Data Integration Studio, SAS OLAP Cube Studio, or SAS Management Console), use Integrated Windows authentication. The client and the metadata server must be in the same Windows domain or in domains that trust each other.

- To bypass the logon prompt when launching a SAS Web application (such as SAS Web Report Studio or SAS Information Delivery Portal), use Web authentication.
- Seamless access to data servers and processing servers is provided by mechanisms including SAS token authentication, Integrated Windows authentication, credential reuse, and credential retrieval.

For more information about SSO, see the *SAS Intelligence Platform: Security Administration Guide*.

Using Secure Sockets Layer (SSL) for Web Applications

Secure Sockets Layer (SSL) is a protocol that provides network security and privacy. Developed by Netscape Communications, SSL uses encryption algorithms that include RC2, RC4, DES, TripleDES, IDEA, MD5, and others. In addition to providing encryption services, SSL uses trusted certificates to perform client and server authentication, and it uses message authentication codes to ensure data integrity. SSL is supported by both Firefox and Internet Explorer.

This documentation assumes that you have a basic understanding of SSL and that you know how to obtain and use trusted certificates. See your Web application server's documentation for SSL implementation details at the following Web sites:

- `http://www.jboss.org/docs`
- `http://www.oracle.com/technology/documentation/index.html`
- `http://www.ibm.com/support/documentation/us/en/`

Also, see `http://support.sas.com/resources/thirdpartysupport/v93`.

Note: Transport Layer Security (TLS) is the successor to SSL V3.0. The Internet Engineering Task Force (IETF) adopted SSL V3.0 as the de facto standard and renamed it TLS. Throughout this document, any reference to SSL also applies to TLS.

Configuring and Deploying Restrictive Policy Files

About Restrictive Policy Files

An express or typical installation completed with the SAS Deployment Wizard creates a SAS environment that does not use restrictive policy files to limit the access given to SAS Web applications. By default, the **`sas.all.permissions.policy`** file is used to allow access to the SAS Web applications. As a result, SAS Web applications can access the necessary content.

Java 2 Security provides a policy-based, fine-grain access control mechanism that increases overall system integrity by checking for permissions before allowing access to certain protected system resources. By default, Java 2 Security is turned off. If your site requires Web applications to use Java 2 Security, the custom installation option in the SAS Deployment Wizard enables you to configure your SAS environment with restrictive policy files.

A custom installation of SAS software gives you the opportunity to select the use of restrictive policy files for JBoss or WebSphere Application Server. Although WebLogic Server provides restrictive policy files, implementation of these policy files is problematic, and they cannot be used in the SAS environment. Therefore, SAS does not support restrictive policy files for WebLogic Server.

Your **`Instructions.html`** file provides basic guidelines for creating policy files from existing sample files, saving those files, and rebuilding the applications. If you chose not to enforce restrictive policy files at the time of initial installation, choose from one of the following methods for configuring restrictive policy files:

- Use the SAS Deployment Manager to remove the existing configuration of your SAS environment. Then, reconfigure the environment by choosing the custom installation option in SAS Deployment Wizard. The custom installation option enables you to configure restrictive policy files. This method, which is highly recommended, offers the most dependable and thorough approach to ensure that your SAS environment is set up correctly to use the Java 2 Security and restrictive policy files.

- Manually configure and enforce the use of restrictive policy files. Follow this method if your site has significantly large amounts of custom content, and the previously described method is not feasible at your site.

CAUTION! SAS strongly discourages the use of restrictive policy files on SAS middle-tier applications because they provide no end-user security, they are difficult to maintain, and they can be very detrimental to application performance.

The SAS Deployment Wizard implements the following restrictive policies by using different methods for JBoss and WebSphere Application Server:

- JBoss: When **policy** files are edited and the SAS Web applications are rebuilt by using the SAS Deployment Manager, the edits made to the **policy** files are united into a single policy file (**sas.restrictive.permissions.policy**) that is applied to JBoss.
- WebSphere Application Server: Policy files for WebSphere Application Server are applied to each EAR file. Each policy file's inputs are placed into the corresponding EAR file as a **was.policy** file.

Example Policy Files for JBoss and WebSphere Application Server

SAS applications provide policy files (**example.policy**) for JBoss and WebSphere Application Server in the ***SAS-config-dir*\Lev1\Web\Common \SASServer1*Application-name*\PolicyFileInputs\ears** directory. These **example.policy** files contain default restrictive policy settings. Do not edit policy files directly. Instead, copy the **example.policy** file, rename the copied file to **policy**, and edit the **policy** file. If the **policy** file exists, it is used to implement restrictive policies.

Note: The united **example.policy** file for JBoss is located in the ***SAS-config-dir* \Lev1\Web\Common\SASServer1\JBoss\PolicyFileInputs\ears** directory.

The following table shows the directory paths for the JBoss and WebSphere Application Server policy files with security restrictions for SAS applications.

Table 3.1 Policy Files with Security Restrictions

Application	Location of example.policy below \Lev1\Web\Common \SASServer1 Directory
SAS Information Delivery Portal	`SASPortal4.3\PolicyFileInputs\ears\sas.portal`
SAS Web Report Studio	`SASWebReportStudio4.3\PolicyFileInputs\ears \sas.webreportstudio`
SAS Content Server	`SASContentServer9.3\PolicyFileInputs\ears \sas.wip.scs`
SAS Stored Process	`SASStoredProcess9.3\PolicyFileInputs\ears \sas.storedprocess`
SAS WebInfrastructure Platform Applications	`SASWebInfrastructurePlatformApplications9.3\PolicyFileInputs\ears\sas.wip.apps`
SAS WebInfrastructure Platform Services	`SASWebInfrastructurePlatformServices9.3\PolicyFileInputs\ears\sas.wip.services`
SAS Workflow	`SASWorkflow9.3\PolicyFileInputs\ears \sas.workflow`
SAS BI Dashboard	`SASBIDashboard4.3\PolicyFileInputs\ears \sas.bidashboard`
SAS BI Portlets	`SASBIPortlets4.3\PolicyFileInputs\ears \sas.biportlets`
SAS Package Viewer	`SASPackageViewer4.3\PolicyFileInputs\ears \sas.packageviewer`
SAS Help Viewer for the Web	`SASWebDoc9.3\PolicyFileInputs\ears \sas.webdocmd`

Create Restrictive Policies for JBoss

To create a restrictive policy file for JBoss, follow these steps for each applicable SAS application's **`policy`** file:

1 Copy the **`example.policy`** file in the same directory and name the copied file **`policy`**.

2 Edit the **`policy`** file that you created from the original **`example.policy`** file. Policy files must use UTF-8 character encoding.

3 A restrictive policy file that is unique to JBoss is located in ***`SAS-config-dir`*** **`\Lev1\Web\Common\SASServer1\JBoss\PolicyFileInputs\ears\jboss.policy`**. If you need to modify this file, copy it to **`policy`**, and then edit it.

4 Run the SAS Deployment Manager to rebuild SAS Web applications. Select JBoss and any applications for which you have edited the restrictive policy file. Rebuilding for JBoss re-creates the **`Java 2 security policy`** file, and the **`sas.restrictive.permissions.policy`**.

5 Redeploy each SAS Web application that was modified previously.

6 If you performed an auto-configuration of JBoss, restart the JBoss application server. If you want to follow a manual process, copy the **`sas.restrictive.permissions.policy`** file located in the ***`SAS-config-dir`*** **`\Lev1\Web\Common\jboss`** directory to the ***`JBOSS_HOME`*****`\server\SASServer1\conf`** directory. Then restart JBoss.

Create Restrictive Policies for WebSphere

To convert an environment that does not use restrictive policies to an environment where restrictive policies are applied, modify the **`was.policy`** file for each SAS application that has a EAR file associated with it.

Although the following task applies to the policy file for SAS Information Delivery Portal, you can follow the same steps by substituting the appropriate directories for the policy file that applies to each SAS application.

To convert from all permissions to restrictive permissions for SAS applications, follow these steps:

1 The `webappsrv.policy.use_restrictive` property that is stored in metadata must be updated and set to true. You can do this with the Metadata Browser window that is started with the METABROWSE command from a Base SAS session. Contact SAS Technical Support for more information about using the Metadata Browser window.

2 In the Integrated Solutions Console, navigate to **Security** ▶ **Secure administration, applications, and infrastructure**. Enable Java 2 Security by selecting the check box **Use Java 2 Security to restrict application access to local resources**. Save your changes.

3 Copy the ***SAS-config-dir***`\Lev1\Web\Common\SASServer1\SASPortal4.3\PolicyFileInputs\ears\sas.portal\example.policy` file to ***SAS-config-dir***`\Lev1\Web\Common\SASServer1\SASPortal4.3\CustomContent\ears\sas.portal\META-INF\was.policy`.

> **TIP** You must create the `META-INF` directory that is specified in the destination path. Also, the file is renamed from `example.policy` to `was.policy`.

4 Edit the `was.policy` file that you copied from the original `example.policy` file. Policy files must use UTF-8 character encoding. Remove comments from the `was.policy` file.

5 Rename the ***SAS-home-dir***`\SASInformationDeliveryPortal\4.31\Configurable\ears\sas.portal\META-INF\was.policy.websphere.orig` to `was.policy.websphere.bak`. You must perform this step so that the Web application is built with the `was.policy` file from the `CustomContent` directory path.

6 Run the SAS Deployment Manager to rebuild the SAS Web applications (select the applications for which the policy files were modified). The edited **`was.policy`** files are inserted into the appropriate EAR files. When you rebuild the Web applications, SAS Deployment Manager rebuilds a complete EAR file that includes any custom content, including the **`was.policy`** file.

7 Redeploy each SAS Web application that was modified previously.

8 Restart the Web application server.

Restore Your SAS Environment to Use Default Policies

If you customized your SAS environment by implementing the use of restrictive policy files, and you determined that the policy restrictions are unnecessary or that the performance impact is debilitating, you can restore your SAS environment to use default policies. To turn off restrictive policies and the use of Java 2 Security in your SAS environment, follow these steps:

1 Use the SAS Deployment Manager to remove the current configuration of your SAS environment.

2 Use the SAS Deployment Wizard to configure your SAS environment by not selecting the option to use restrictive policy files.

It is highly recommended that you use the SAS Deployment Manager and the SAS Deployment Wizard to complete the process of disabling restrictive policy files. However, if your site contains large amounts of custom content, or there are other reasons that require you to manually disable restrictive policy handling, see the following topics:

- “Disable Restrictive Policy Handling for JBoss” on page 52.
- “Disable Restrictive Policy Handling for WebSphere Application Server” on page 52.

Disable Restrictive Policy Handling for JBoss

To manually disable the use of SAS restrictive policy files for JBoss, follow these steps:

1. On Windows, access the **`SASServer1.bat`** file located in the ***`JBOSS_HOME`*****`\bin`** directory. On UNIX, the file is named **`SASServer1.sh`**.

2. In the JAVA_OPTS variable that is located in the start_as_script section, remove the following parameters:

   ```
   –Djava.security.manager -Djava.security.policy=
   JBOSS_HOME\server\SASServer1\sas.restrictive.permissions.policy
   ```

3. Restart the JBoss application server.

If JBoss is running as a Windows service, follow these steps to remove restrictive policy files:

1. Edit the ***`JBOSS_HOME`*****`\server\SASServer1\wrapper.conf`** file.

2. Remove the following parameters in the **`wrapper.conf`** file:

   ```
   wrapper.java.additional.nn=-Djava.security.manager
   wrapper.java.additional.nn=Djava.security.policy=
   JBOSS_HOME\server\SASServer1\sas.restrictive.permissions.policy
   ```

3. Restart the JBoss application server.

Disable Restrictive Policy Handling for WebSphere Application Server

To manually disable SAS restrictive policy handling for WebSphere Application Server, follow these steps:

1. Using the Integrated Solutions Console, navigate to **Security** ▶ **Secure administration, applications, and infrastructure**.

2 To disable Java 2 security deselect the check box for **Use Java 2 security to restrict application access to local resources**.

3 Restart the WebSphere application server.

Customize Permissions for Socket Access

For each application (Web or stand-alone) that needs to communicate with a SAS server, the Java policy files for the calling application include a permission to communicate with the SAS server. By default, the **`example.policy`** files for each SAS Web application contain wildcard permission for socket access:

```
permission.java.net.SocketPermission "*", "accept,connect,listen,resolve”;
```

This wildcard permission enables the Java code in the applications to connect to any host or port that is accessible to your site's network topology. If you want to provide strong protection with custom access, you can create specific socket permissions for the hosts and ports that are accessed by an individual SAS Web application.

Access Permissions for Custom Portlets and Web Applications

About Access Permissions for Custom Portlets and Web Applications

If you implement a remote portlet or foundation service-enabled Web application, you must add additional permissions to each Web application component's codebase and define a codebase and permissions for the remote portlet or foundation service-enabled Web application.

The following sections show the permission statements that you must specify in each application or portlet's policy file in order to enable communication with its required servers and services.

CodeBase: <Remote Portlet or Web Application>

The localhost is the machine where the Web application server resides along with the metadata server and SAS Remote Services. When using a localhost, specify the permissions for the remote portlet or Web application's CodeBase:

- Access to the SAS Metadata Server:

  When running on localhost, create an entry that contains the fully qualified host name.

  ```
  // permission java.net.SocketPermission
  // "localhost:8561", "listen, connect, accept, resolve";

  permission java.net.SocketPermission
   <SAS Metadata Server's machine>:8561,
   "listen, connect, accept, resolve";
  ```

- Access to the Java RMI server and remote SAS Foundation Services:

  When running on localhost, create an entry that contains the fully qualified host name.

  ```
  // permission java.net.SocketPermission
  // "localhost:1024-", "listen, connect, accept, resolve";

  permission java.net.SocketPermission
   <SAS Services application's machine name>:1024-,
   "listen, connect, accept, resolve";
  ```

- Access to the remote portlet or Web application's local SAS Foundation Services:

  Always create an entry for both the localhost and fully qualified host name.

  ```
  permission java.net.SocketPermission
   "localhost:1024-", "listen, connect, accept, resolve";
  permission java.net.SocketPermission
   <remote portlet or Web application's machine name>:1024-,
   "listen, connect, accept, resolve";
  ```

- Access for foundation service-enabled applications that call this application to pass objects (via RMI to this application):

  Create one entry per machine.

  ```
  permission java.net.SocketPermission
   <portal Web application's machine name>:1024-,
  ```

```
 "listen, connect, accept, resolve";
```

- Access to a SAS Stored Process Server, SAS Workspace Server, or SAS OLAP Server:

  Create one entry per machine.

  ```
  permission java.net.SocketPermission
   <SAS Workspace Server's machine name>:1024-,
           "connect, resolve";
  permission java.net.SocketPermission
   <SAS Stored Process Server's machine name>:1024-,
           "connect, resolve";
  permission java.net.SocketPermission
   <SAS OLAP Server's machine name>:1024-,
           "connect, resolve";
  ```

- Access to the host and port where the SAS Web Application Themes is running:

  ```
  // ---------- Socket Access to Themes ------------
   permission java.net.SocketPermission
   Theme_host:Theme_Port:,
   "connect, resolve";
  ```

CodeBase: Portal

Access for foundation service-enabled applications that are called by this application to pass objects (via RMI) (for example, remote portlets, Web applications, and applications):

Create one entry per machine.

```
permission java.net.SocketPermission
 <remote portlet/Web application's machine name>:1024-,
 "listen, connect, accept, resolve";
```

CodeBase: SASServices

The **`remoteservices.policy`** file is located in the ***`SAS-config-dir`*****`\Lev1\Web\Applications\RemoteServices`** directory. The following applies to connections with applications that use SAS Foundation Service session sharing:

```
permission java.net.SocketPermission
 <remote portlet/Web application's machine name>:1024-,
 "listen, connect, accept, resolve";
```

4

Interacting with the Server Tier

Configuration Shared between the Middle Tier and the Server Tier

The Web applications and services that form the SAS middle tier require specific configured connections to back-end servers. You might want to modify the connections and settings in the following ways:

- Change the connection to an SMTP mail server.
- Modify the data source that provides a connection to a relational database.

- Define pooling options for connections to SAS Workspace Servers.
- Integrate Application Response Measurement (ARM) capabilities between the SAS middle tier and SAS servers.

SMTP Mail Server

The Web Infrastructure Platform includes a SAS Mail Service that is used by SAS Web applications and services to send e-mail messages such as alert notifications and administrative status updates. The SAS Mail Service relies on a single Java Mail Session that is defined in the Web application server on which the service is deployed. This Java Mail Session provides the single point of configuration to an external SMTP mail server that your site designates to use for application e-mail. Because the SAS Mail Service relies on this single configuration location, if the SMTP mail server changes, you can modify the appropriate settings in a single place.

The Java Mail Session depends on configuration information that defines the mail transport capabilities. The SAS Mail Service requires that the following minimum set of mail properties be specified:

mail.transport.protocol
: This property must be set to smtp.

mail.smtp.host
: This property must be set to the host name of the SMTP mail server.

mail.smtp.port
: This property must be set to the corresponding port (typically 25 for SMTP servers).

mail.debug
: This property is set to false. You can set the value to true for assistance with debugging mail transactions.

In a standard installation of SAS middle-tier components, the configuration of the Java Mail Session is typically automated using prompted values that are provided by the installer. To modify the settings for the Java Mail Session (for example, if the host name of the SMTP mail server changes), see the appropriate documentation for your Web application server.

If the mail server information, such as host name or port number, is changed, then it must be changed in SAS metadata as well. To set the new values, follow these steps:

1. Log on to SAS Management Console and select **Application Management** ▶ **Configuration Manager**.

2. Right-click **SAS Application Infrastructure** and select **Properties**.

3. Click **Advanced**, and then set the new values for **Email.Host** or **Email.Port**.

JDBC Data Sources

About the Data Sources Used by the Middle Tier

The SAS Web Infrastructure Platform, and some solutions, provide a set of features that rely on a relational database to store service data. These relational tables differ from the data that is analyzed, modeled, or otherwise processed by SAS applications, which typically is derived from a site's enterprise or legacy sources. Instead, the relational tables in the SAS Web Infrastructure Platform database are intrinsic to or used primarily for the operations of a particular application, product, or service.

SAS Web applications and services access data from the SAS Web Infrastructure Platform database through JDBC. SAS Web Infrastructure Platform provides support for the following third-party vendor databases:

- Oracle Database
- IBM DB2
- Microsoft SQL Server
- MySQL

- PostgreSQL

Your site can choose to use the database that you are familiar with. However, some SAS solutions have requirements for specific databases. Consider these requirements when you select a database to use as the data source for the SAS Web Infrastructure Platform. As a default option, the SAS Framework Data Server can be configured as the data source for SAS Web Infrastructure Platform.

Connection Information for the JDBC Data Source

The database used by the SAS Web Infrastructure Platform must be configured in the Web application server as a JDBC data source. The JDBC data source is configured with the JDBC driver and connection information for the selected database. These settings are provided to the SAS Deployment Wizard during installation and configuration. You need to know the JDBC connection parameters if you make changes later, such as changing the connection to access a database on another machine. JDBC connection settings typically require a user ID and password for access to the data source.

The default database for SAS Web Infrastructure Platform is the SAS Framework Data Server. The JDBC connection parameters for the SAS Framework Data Server are provided in the following table:

Table 4.1 *JDBC Connection Parameters for SAS Framework Data Server*

Connection Parameter	Setting
JNDI name:	sas/jdbc/SharedServices
JDBC URL:	`jdbc:sastkts://`*serverName:port*`?stmtpooling=0&constring=(DSN=SharedServices;encoding=UNICODE_FSS)` In the URL, substitute the server name and port number of the SAS Framework Data Server at your site. The default port is 22031.
JDBC driver class:	com.sas.tkts.TKTSDriver

These settings are configured during initial deployment. However, you need to know the connection information if you make changes later, such as moving the SAS Framework Data Server to another host system.

Note: You must specify the user name and password values as required to access the data source.

The SAS Drivers for JDBC are used to connect to the SAS Framework Data Server. The JAR files in the following list must be in the same directory as the JDBC driver to connect with the SAS Framework Data Server:

- sas.core.jar
- sas.core.nls.jar
- sas.icons.jar
- sas.icons.nls.jar
- sas.intrnet.javatools.jar
- sas.intrnet.javatools.nls.jar
- sas.nls.collator.jar
- sas.oda.tkts.jar
- sas.oda.tkts.nls.jar
- sas.security.sspi.jar
- sas.svc.connection.jar
- sas.svc.connection.nls.jar

To modify the settings for a JDBC data source, see the documentation for your Web application server.

The Shared Services Database on SAS Framework Data Server

The database file is located in the following directories:

On Windows:

```
SAS-config-dir\Lev1\FrameworkServer\Content\SHAREDSERVICES.FDB
```

On UNIX and z/OS:

```
SAS-config-dir/Lev1/FrameworkServer/Content/SHAREDSERVICES.FDB
```

CAUTION! Do not change the name or contents of the DSN. Doing so prevents SAS Web Infrastructure Platform from functioning.

Using Other Relational Databases with the SAS Middle Tier

SAS Web Infrastructure Platform can be configured to use a third-party vendor relational database for storage. In addition, some SAS solutions and applications might require a database other than SAS Framework Data Server. The other relational databases that can be used vary depending on the set of SAS applications that your site has installed. Contact your on-site SAS support personnel for more information.

Client-Side Pooling and Server-Side Pooling Options

A collection of reusable workspace server and stored process server processes is referred to as a pool. By reusing server processes, pooling avoids the cost that is associated with creating a new process for each connection. If your client application uses frequent, short-duration connections to SAS, pooling might greatly improve your server performance.

SAS supports the following types of pooling:

server-side pooling

> is the process by which the SAS Object Spawner maintains a collection of workspace servers that are available for clients. The usage of servers in this pool is governed by the authorization rules that are set on the servers in the SAS metadata.

client-side pooling

is the process by which the client application maintains a collection of reusable workspace server processes.

For a comparison of client-side pooling and server-side pooling, see “Choices in Workspace Server Pooling” in the “Server Configuration, Data Retrieval, and Risk” chapter in the *SAS Intelligence Platform: Security Administration Guide*.

For more detailed information about pooling, see “Understanding Server Pooling” in the *SAS Intelligence Platform: Application Server Administration Guide*.

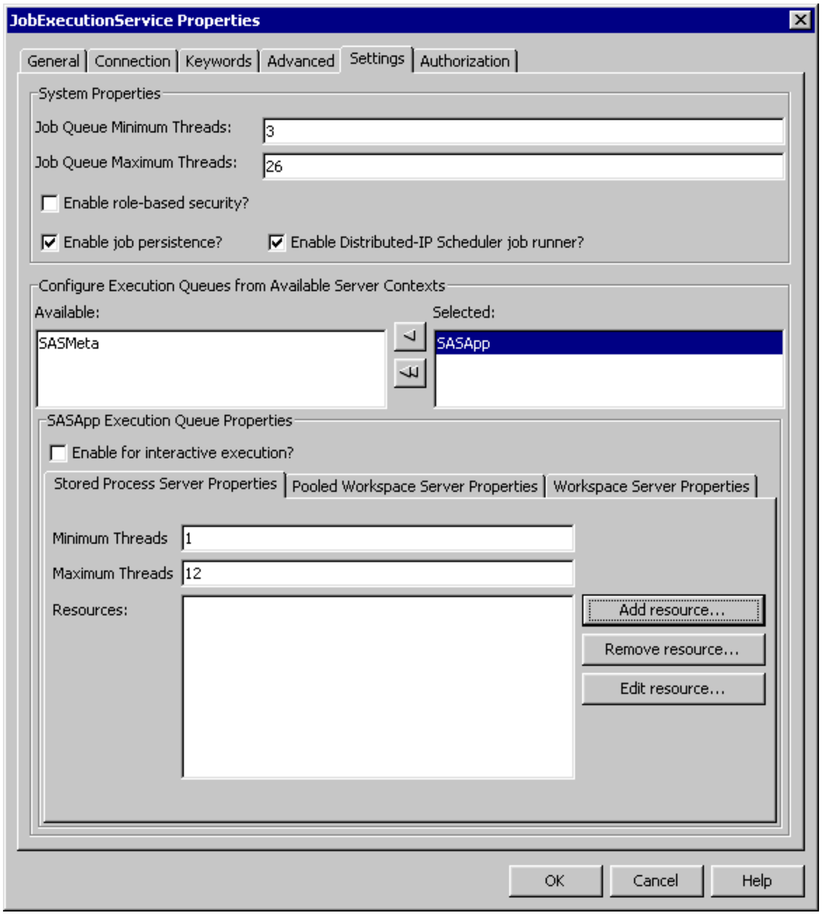
For instructions on configuring client-side pooling properties, see “Configuring Client-Side Pooling” in the *SAS Intelligence Platform: Application Server Administration Guide*.

Job Execution Services

The job execution service provides a common, standardized way for applications to create, submit, store, retrieve, and queue jobs for SAS servers. The job execution service can be configured with the Configuration Manager plug-in to SAS Management

Console. The settings define the job thread pool and the execution thread pools for all logical servers that the job execution service uses for delegating work.

Figure 4.1 Job Execution Services Settings



JobExecutionService Properties

System Properties

Job Queue Minimum Threads: 3

Job Queue Maximum Threads: 26

□ Enable role-based security?

☑ Enable job persistence? ☑ Enable Distributed-IP Scheduler job runner?

Configure Execution Queues from Available Server Contexts

Available: SASMeta

Selected: SASApp

SASApp Execution Queue Properties

□ Enable for interactive execution?

Minimum Threads 1

Maximum Threads 12

Resources:

Table 4.2 Job Execution Service Settings Descriptions

Setting	Default Value	Description
Job Queue Minimum Threads	3	Initial number of job queue threads to create for incoming job requests.
Job Queue Maximum Threads	26	Maximum number of job queue threads to create if the demand requires additional resources.

Setting	Default Value	Description
Enable role-based security	Disabled	If enabled, then the job execution service checks the identity and the job characteristics to make sure the identity making the request meets the assigned permissions. For more information, see Table 4.3 on page 67.
Enable job persistence	Enabled	Jobs are kept in memory only if persistence is disabled. If persistence is disabled and the SAS Web Infrastructure Platform Services Web application or the Web application server is stopped, then there are no records written to the SAS Web Infrastructure Platform database about any jobs that were submitted. When persistence is enabled, the job execution services can restart any jobs that were submitted, queued, or running. For jobs that are complete, clients can fetch the results after a restart, when persistence is enabled.
Enable Distributed-IP Scheduler job runner	Enabled	If enabled, then the distributed in-process scheduler is used for running scheduled jobs. Disable this setting if Platform Suite for SAS is available and the preferred scheduling method.
Available Server Contexts	SASApp	Use the controls to select the server context to configure.
Enable for interactive execution	Disabled	If enabled, then the servers in the associated server context perform interactive workspace tasks and interactive stored process tasks only. If disabled, then the servers can perform batch and interactive job execution.
Server Minimum Threads	1	Initial number of task threads to create for incoming job requests.
Server Maximum Threads	varies	Maximum number of task threads to create if the demand requires additional resources.

Setting	Default Value	Description
Server Resources		You can associate resources with servers and then a job can specify that it requires a resource. For example, you can associate a printer name with SASApp. When a client submits a job, and specifies that it requires the printer resource, the job execution service makes sure that the job runs on that server even when other servers are available.

The default settings are designed to provide good performance in a variety of operating environments. Before modifying the settings, consider enabling the auditing features of the job execution services to review the performance with the default settings. For information about enabling auditing, see "Configuring Auditing for SAS Web Applications" on page 86.

To modify any of these settings, follow these steps:

1 Log on to SAS Management Console as an administrator.

2 On the **Plug-ins** tab, navigate to **Application Management** ▶ **Configuration Manager** ▶ **SAS Application Infrastructure** ▶ **Web Infra Platform Services 9.3**.

3 Right-click **JobExecutionService** and select **Properties**.

4 Click the **Settings** tab.

5 Modify the settings and then click **OK**.

Settings are not applied and made active automatically. You need to restart the SAS Web Infrastructure Platform Services or the Web application server.

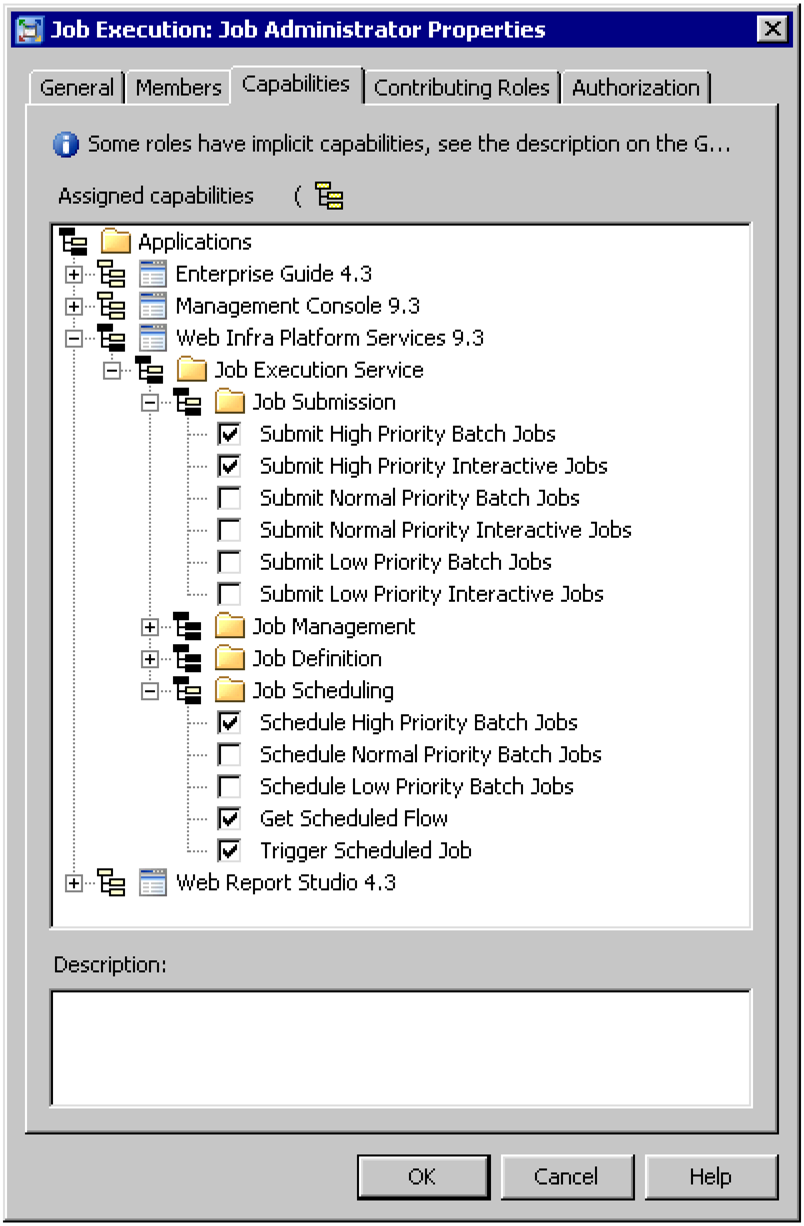
The default configuration for the job execution services does not check role-based permissions. If role-based security is enabled, then the job execution service checks that the identity submitting the request has sufficient permission.

Table 4.3 *Job Execution Service Roles*

Role	Capabilities
Job Execution: Job Administrator	Can submit jobs of high, normal, and low priority and perform all job-related operations.
Job Execution: Job Designer	Can add, update, or remove jobs and tasks from metadata.
Job Execution: Job Scheduler	Can schedule jobs.
Job Execution: Job Submitter	Can submit normal priority jobs for execution.

The following figure shows the default capabilities associated with the job administrator role.

Figure 4.2 *Job Administrator Capabilities*



Some roles have implicit capabilities, see the description on the G...

Assigned capabilities

- Applications
  - Enterprise Guide 4.3
  - Management Console 9.3
  - Web Infra Platform Services 9.3
    - Job Execution Service
      - Job Submission
        - ☑ Submit High Priority Batch Jobs
        - ☑ Submit High Priority Interactive Jobs
        - □ Submit Normal Priority Batch Jobs
        - □ Submit Normal Priority Interactive Jobs
        - □ Submit Low Priority Batch Jobs
        - □ Submit Low Priority Interactive Jobs
      - Job Management
      - Job Definition
      - Job Scheduling
        - ☑ Schedule High Priority Batch Jobs
        - □ Schedule Normal Priority Batch Jobs
        - □ Schedule Low Priority Batch Jobs
        - ☑ Get Scheduled Flow
        - ☑ Trigger Scheduled Job
  - Web Report Studio 4.3

Description:

5

Administering the SAS Web Infrastructure Platform

SAS Web Infrastructure Platform

About the SAS Web Infrastructure Platform

The SAS Web Infrastructure Platform is a collection of services and applications that provide common infrastructure and integration features to be used by SAS Web applications. These services and applications provide the following benefits:

- consistency in installation, configuration, and administration tasks for Web applications
- greater consistency in users' interactions with Web applications
- integration among Web applications as a result of the ability to share common resources

For a description of the SAS Web Infrastructure Platform services and applications, see “SAS Web Infrastructure Platform” on page 5.

SAS Preferences Manager

The SAS Preferences Manager is a Web application that provides a central facility for users to manage their preferences and settings.

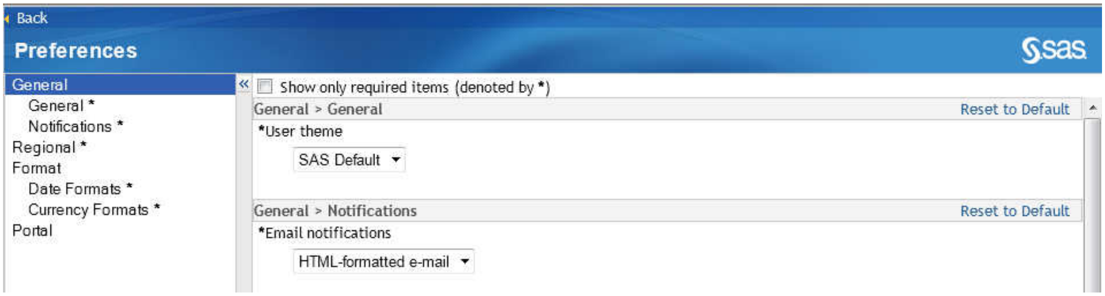
You can invoke the application by using the following URL address:

`http://`*server*`:`*port*`/SASPreferences`

Users of SAS Information Delivery Portal can invoke the SAS Preferences Manager from within the portal. For instructions, see the product Help.

The following figure shows a generic preferences application. The actual preferences that are available vary depending on the software that is installed. The SAS Preferences Manager at your site might have additional settings.

Display 5.1 *SAS Preferences Manager Console*



□ Show only required items (denoted by *)

General > General

*User theme

SAS Default ▾

General > Notifications

*Email notifications

HTML-formatted e-mail ▾

Here are the generic settings:

General
: Specify a theme for the applications. A theme includes settings for colors, fonts, and graphics.

  Users can also specify the format for notifications that are generated by SAS applications and solutions.

Language
: Select the locale (language and country) that you prefer.

Format
: Select the preferred format for dates, time, and currency.

Portal
: Specify the position of the portal navigation bar in the SAS Information Delivery Portal. You can also specify the sort order for packages that are published in the portal. You can sort packages in descending order (newest packages are at the top) or in ascending order (oldest packages are at the top).

SAS Comment Manager

The SAS Comment Manager can be used by SAS Web applications to capture user comments. For example, in SAS Web Report Studio, the **File** ▶ **Comments** menu item enables users to add comments to reports and graphs.

By default, all users who can log on to an application that uses the SAS Comment Manager can view and create comments. As an administrator, you might also want to edit and delete comments. Editing and deleting comments are considered administrative functions.

To edit and delete comments, you must belong to the predefined role, Comments:Administrator. This role includes the capabilities of editing or deleting comments. Users that have a need to edit or delete comments should be assigned to this role.

Note: Due to possible conflicts that can occur when multiple users delete comments in the same comment thread, the best practice is to limit the number of users to just a few.

To edit or delete a comment, follow these steps:

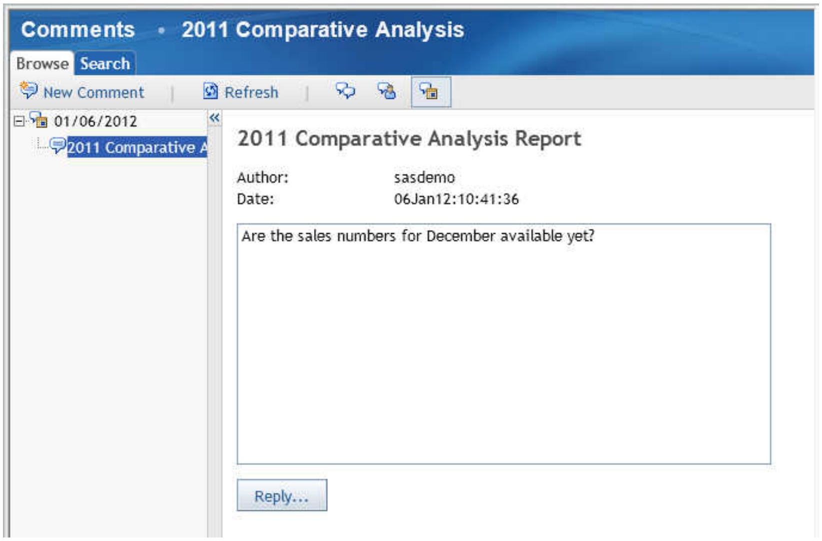
1. Select the comment in the left pane of SAS Comment Manager.

2. To edit the comment, in the right pane, click **Edit**. An Edit Comment page opens in which you can make changes. When you are finished, click **Save**.

3. To delete the comment, in the right pane, click **Delete**. You are prompted to confirm the deletion.

The following figure shows an example of SAS Comment Manager with a comment displayed.

Display 5.2 SAS Comment Manager



2011 Comparative Analysis Report

Author: sasdemo
Date: 06Jan12:10:41:36

Are the sales numbers for December available yet?

Using Configuration Manager

Overview of Configuration Manager

Configuration Manager is a plug-in available in SAS Management Console. Using the Configuration Manager, you can perform various administrative tasks such configuring properties and values and specifying settings for the SAS Web applications.

Configuration Manager offers a consistent interface to set properties for all SAS Web applications. Each SAS Web application has its own properties window with tabs. For example, the following display shows the **Settings** tab of the Web Report Studio 4.3 Properties dialog box.

Here is a brief description of the five tabs available in the properties dialog box associated with a SAS application:

Note: For more information about using these tabs, see the online Help for the Configuration Manager plug-in in SAS Management Console.

- The **General** tab provides basic information about the application.
- The **Connection** tab enables you to modify the parameters for connections to SAS Web applications. For more information, see "Specifying Connection Parameters for HTTP and HTTPS Sessions" on page 84.
- The **Settings** tab offers default values for settings that can be modified. For modifying values in the **Settings** tab, and to understand how the lock and unlock icons function, see "Setting Global Properties for SAS Applications Using SAS Application Infrastructure Properties" on page 77.
- The **Advanced** tab includes a limited number of default property names and values. You can modify existing properties and their values, or add custom properties and values for SAS Web applications.
- The **Authorization** tab enables you to specify permissions for users and groups and apply Access Control Templates.

Although certain XML configuration files (for example, `LocalProperties.xml` file for SAS Web Report Studio) are available and supported for SAS Web applications, it is recommended that you use the Configuration Manager to configure and set properties.

Summary of Steps for Using Configuration Manager

Here are the main steps for using Configuration Manager:

1 To access Configuration Manager, in SAS Management Console, navigate to **Plug-ins ▶ Application Management ▶ Configuration Manager ▶ SAS Application Infrastructure**.

2 To access the properties for an application, right-click the application's node and select **Properties**.

3 Add or modify properties as needed. You might need to unlock particular properties before you can change them. See "Setting Global Properties for SAS Applications Using SAS Application Infrastructure Properties" on page 77.

4 Changes to properties do not take effect immediately on the run-time system. To apply these changes, you must perform one of the following tasks:

- Stop and then restart the Web applications whose properties you changed.
- Use the application's JMX management bean to reload the configuration (if the application supports JMX beans). For more information about JMX, see "Using JMX Tools to Manage SAS Resources " on page 115.
- Alternatively, stop and then restart SAS Services Application and the Web application server.

Example: Configure a Property for SAS Web Report Studio

Suppose that you want to add the property, `wrs.ReportViewPrefs.LeftPanelOpenState` for SAS Web Report Studio 4.3, and specify the value for this property. To configure this property and its value, follow these steps:

1 Log on to SAS Management Console.

2 In SAS Management Console, navigate to **Plug-ins** ▸ **Application Management** ▸ **Configuration Manager** ▸ **Application Management** ▸ **Web Report Studio 4.3**. Right-click and select **Properties** to display the Web Report Studio 4.3 Properties dialog box.

3 Click the **Advanced** tab.

4 Click **Add** to display the Define New Property dialog box.

5 Enter the property name as shown and specify the property value:

Property Name: `wrs.ReportViewPrefs.LeftPanelOpenState`

Property Value: `user`

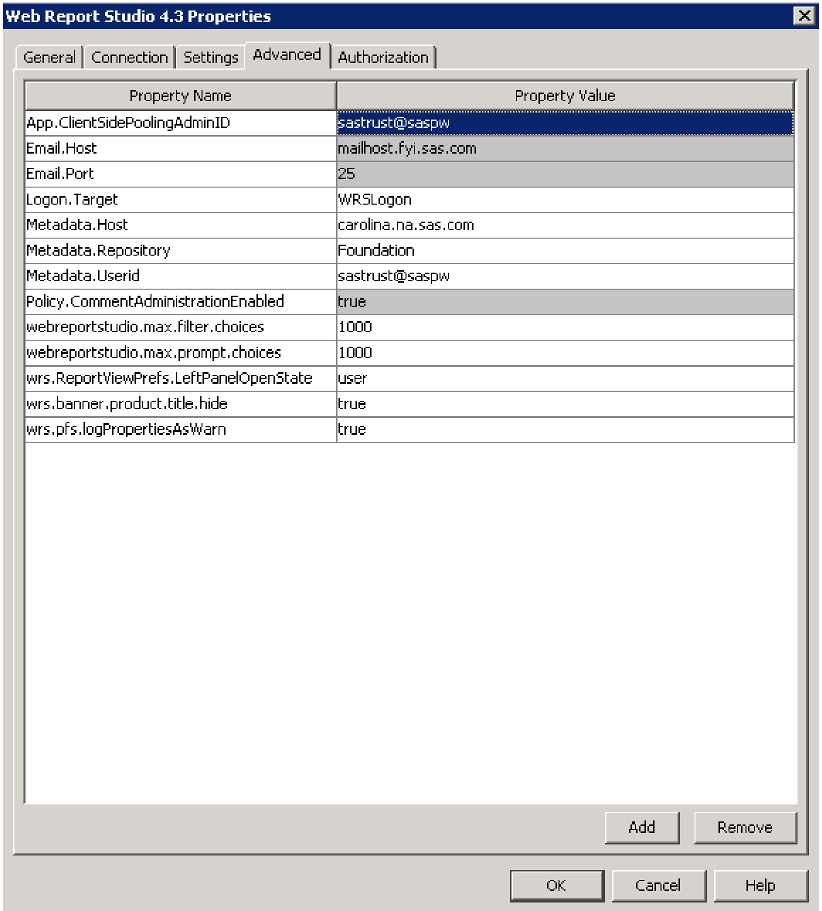
6 Click **OK** to exit the Define New Property dialog box.

7 Click **OK** to exit the Web Report Studio 4.3 Properties dialog box.

Changes to properties do not take effect immediately on the run-time system. For details, see "Summary of Steps for Using Configuration Manager" on page 74.

The following display shows the property name, `wrs.ReportViewPrefs.LeftPanelOpenState`, and its property value specified on the **Advanced** tab.

Display 5.3 Advanced Tab for SAS Web Report Studio 4.3 Properties



Property Name	Property Value
App.ClientSidePoolingAdminID	sastrust@saspw
Email.Host	mailhost.fyi.sas.com
Email.Port	25
Logon.Target	WRSLogon
Metadata.Host	carolina.na.sas.com
Metadata.Repository	Foundation
Metadata.Userid	sastrust@saspw
Policy.CommentAdministrationEnabled	true
webreportstudio.max.filter.choices	1000
webreportstudio.max.prompt.choices	1000
wrs.ReportViewPrefs.LeftPanelOpenState	user
wrs.banner.product.title.hide	true
wrs.pfs.logPropertiesAsWarn	true

The dimmed fields indicate that the values are inherited from the SAS Application Infrastructure, and these values are shared with other Web applications. The values in the dimmed fields can be changed only in the SAS Application Infrastructure properties.

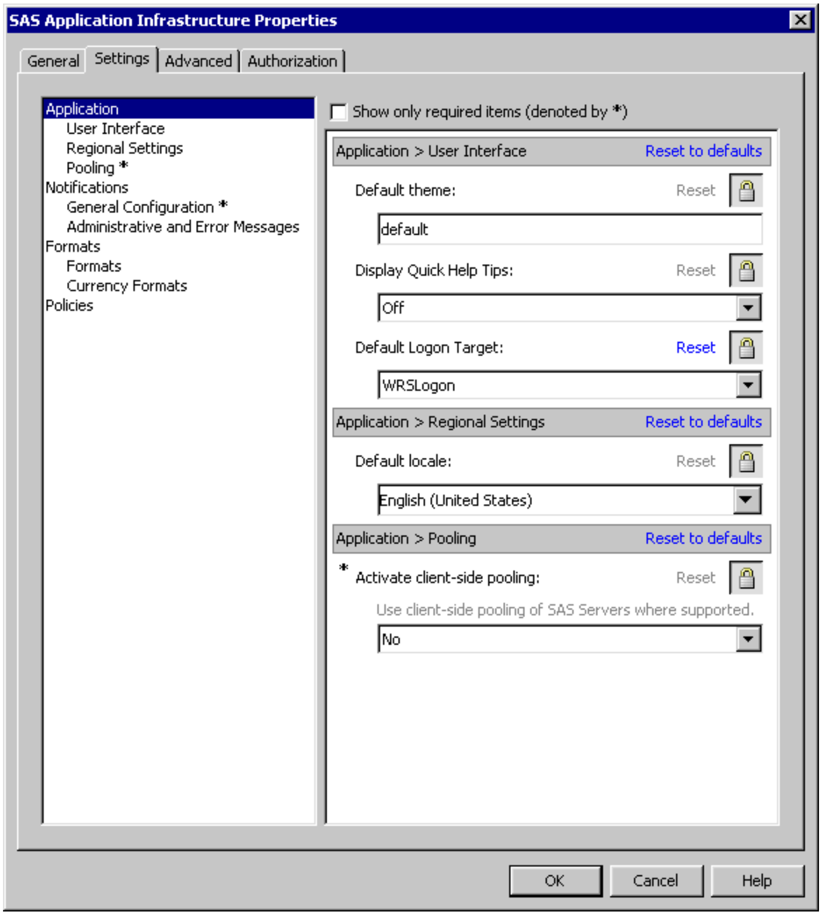
Setting Global Properties for SAS Applications Using SAS Application Infrastructure Properties

Purpose of the SAS Application Infrastructure Properties

The Configuration Manager plug-in within SAS Management Console enables you to configure properties that apply to all SAS applications that inherit their settings from SAS Application Infrastructure. Most SAS Application Infrastructure settings are locked, and the lock prevents individual SAS applications from overriding the settings. When you unlock a SAS Application Infrastructure setting, the setting can be overridden by individual applications. When you lock a SAS Application Infrastructure setting again, all applications inherit that setting from the SAS Application Infrastructure.

The following display shows the settings that can be set for SAS Application Infrastructure.

Display 5.4 Settings Tab for SAS Application Infrastructure Properties



SAS Application Infrastructure Properties

Application
- User Interface
- Regional Settings
- Pooling *

Notifications
- General Configuration *
- Administrative and Error Messages

Formats
- Formats
- Currency Formats

Policies

□ Show only required items (denoted by *)

Application > User Interface — Reset to defaults

Default theme: Reset 🔒
default

Display Quick Help Tips: Reset 🔒
Off

Default Logon Target: Reset 🔒
WRSLogon

Application > Regional Settings — Reset to defaults

Default locale: Reset 🔒
English (United States)

Application > Pooling — Reset to defaults

* Activate client-side pooling: Reset 🔒
Use client-side pooling of SAS Servers where supported.
No

The locked icon 🔒 indicates that a field is locked. When a field has a locked icon, the value or setting for that particular field cannot be overridden on the **Settings** tab for other SAS applications that inherit the setting. By default, all fields on the **Settings** tab of the SAS Application Infrastructure Properties dialog box are locked.

Changing a SAS Application Infrastructure Property

1 Log on to SAS Management Console as an administrator.

2 On the **Plug-ins** tab, navigate to **Application Management** ▶ **Configuration Manager** ▶ **SAS Application Infrastructure**.

3 Right-click **SAS Application Infrastructure** and select **Properties**.

4 Click the **Settings** tab.

5 Select the property to change from the left panel. Use the menus or text fields to set the property.

6 Click **OK**.

Settings are not applied and activated automatically. You must restart the SAS Web Infrastructure Platform Services and the applications that use the changed property. If unsure, restart the Web application server.

SAS Application Infrastructure Property Descriptions

The following table identifies the settings that are available for the SAS Application Infrastructure.

Table 5.1 *SAS Application Infrastructure Settings*

Setting	Default Value	Description
Application > User Interface		

Setting	Default Value	Description
Default theme	SAS Default	This setting controls the default theme that is used by the SAS Web applications. For information about creating an alternative theme, see "Administering SAS Web Application Themes" on page 204.
Display Quick Help Tips	Off	
Default Logon Target	none	Use the menu to select the application to which default URL requests are directed upon successful authentication. In this way, a site can be configured to direct users to SAS Web Report Studio, SAS Information Delivery Portal, or some solution, as a default target depending on requirements. The typical choices are identified in the following list: ■ AdminHome — SAS Web Administration Console ■ WRSLogon — SAS Web Report Studio ■ PortalLogon — SAS Information Delivery Portal ■ DisplayDashboard — SAS BI Dashboard ■ MobileAdmin — SAS BI Dashboard Mobile Device Administration
Application > Regional Settings		
Default locale	varies	Use the menu to select the default locale.
Application > Pooling		
Activate client-side pooling	No	For information about the advantages and disadvantages, see "Choices in Workspace Server Pooling" in Chapter 12 of *SAS Intelligence Platform: Security Administration Guide*. For information about configuring client-side pooling, see Chapter 9, "Configuring Client-side Pooling," in *SAS Intelligence Platform: Application Server Administration Guide*.

Setting	Default Value	Description
Notifications > General Configuration		
Alert notifications type	Portal	Use the menu to select the default notification types. For information about using the SMS setting, see “Using the SMS Alert Notification Type” on page 82.
Character set for e-mail messages	UTF-8	
Allow multi-part e-mail messages	Yes	
Alert prefix type	Default	
Alert prefix		
E-mail digest frequency		
Notifications > Administrative and Error Messages		
Sender of messages	noreply@*smtpserver*	Used as the sender e-mail address for administrative messages.
Recipient of administrative messages	varies	Administrative and error messages are sent to all e-mail addresses in the list.
Formats > Formats		
Short date format	varies	Use the menu to set the default format for date, time, and datetime values.
Time format		
Long date format		
Time/Date format		
Formats > Currency Formats		

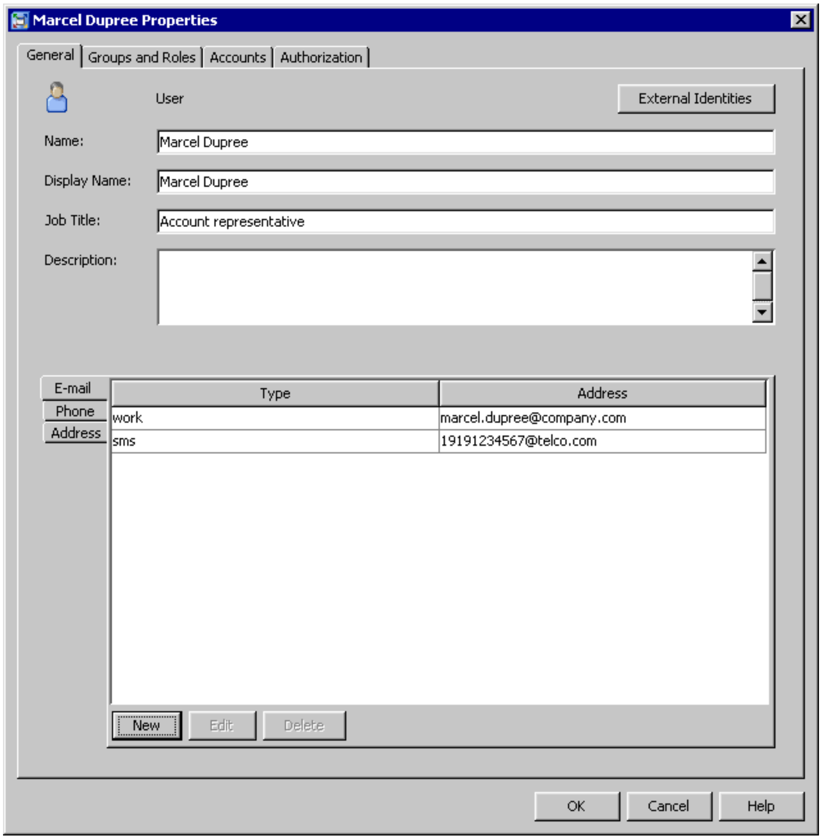
Setting	Default Value	Description
Currency display format	varies	Use the menu to set the default format for currency values.
Currency number format		
Policies		For information about policies, see "Configuring Middle Tier Security Policies" on page 157.

Using the SMS Alert Notification Type

The alert notification service can send alerts though Short Message Service (SMS) text messages, in addition to sending alert notifications through e-mail and displaying them in a portal. In order to use the SMS setting, the users that are to receive the messages must have an e-mail address that is specifically for the SMS messages. The following display shows an example of the User Manager plug-in to SAS Management Console.

In the display, a user has an e-mail address with the type set to **`sms`** and the address is provided in an SMS format.

Display 5.5 SMS E-mail Address



Name: Marcel Dupree

Display Name: Marcel Dupree

Job Title: Account representative

Description:

Type	Address
work	marcel.dupree@company.com
sms	19191234567@telco.com

Make sure that you know the SMS E-mail gateway for the provider. Some SMS E-mail gateways for providers in the North American market are as follows:

- Verizon: **`phonenumber`**@vtext.com
- AT&T: **`phonenumber`**@txt.att.net
- Sprint: **`phonenumber`**@messaging.sprintpcs.com
- T-Mobile: **`phonenumber`**@tmomail.net

In addition to making sure that recipients of the SMS messages have a SMS-style e-mail address, you might need to set two properties related to SMS.

Table 5.2 Advanced Properties for SMS Messages

Property Name	Default Value	Description
Notifications.SMSMessageLength	120 characters	Modify this value as needed to increase or decrease the size of SMS messages that SAS software sends to the mail server.
Policy.EnforceSMSMessageLength	false	If set to true, then messages are truncated to the length of the previous property.

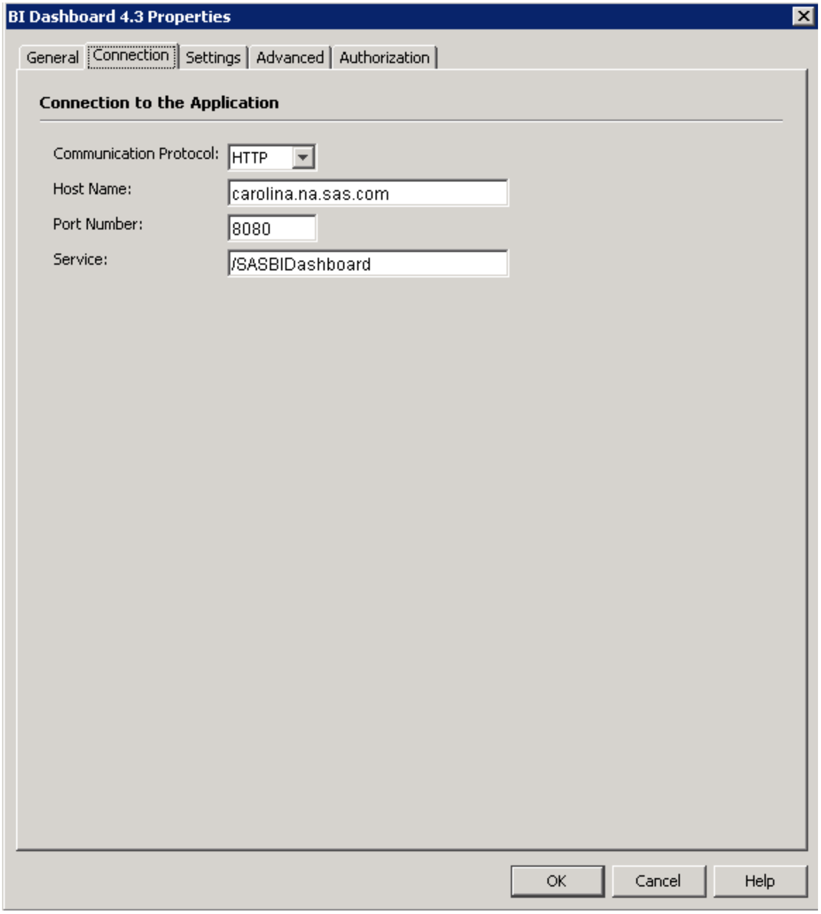
Specifying Connection Parameters for HTTP and HTTPS Sessions

Using the BI Dashboard Properties

The **Connection** tab in the properties dialog box for SAS applications enables you to modify the parameters for connecting to a SAS Web application. The selections that are displayed on the **Connection** tab determine the URL that is used to access the application's resources or services.

The following display shows the **Connection** tab for SAS BI Dashboard properties.

Display 5.6 *Connection Tab for BI Dashboard Properties*



Connection to the Application

Communication Protocol: HTTP

Host Name: carolina.na.sas.com

Port Number: 8080

Service: /SASBIDashboard

If your site changes its configuration after initial deployment, you might need to edit the connection information parameters. Here are some situations where the connection parameters are updated on the **Connection** tab:

- If a SAS Web application is moved to a different machine, you must modify the host name property for its connection.
- If you configure Secure Sockets Layer (SSL) for improved security, you must edit the Protocol property to modify the connection protocol to HTTPS for each affected application.
- If clustering or load balancing is configured, the connection parameters should be updated.

- If you deploy SAS Web Application Themes to a different Web application server, you should modify the theme metadata by specifying the name of the theme, and update other parameters such as host name and port number.

Changing the values for the **Host Name**, **Port**, or **Service** fields on the **Connection** tab enables the SAS Web Application Infrastructure to seamlessly redirect clients to the proper locations in a custom environment. For the host name, you can supply an IP address. If you enter an IP version 6 address, you must enclose the address in brackets.

For example: [FE80::202:B3FF:FE1E:8329]

Configuring Auditing for SAS Web Applications

Overview of Auditing

SAS Web applications and other SAS middle-tier services provide auditing features. Depending on the application and its configuration, these auditing features can record all actions performed both by the direct users of the system and by the system itself. Some applications might provide a more complete audit, detailing not only the actions that are performed but also the states of the objects that are affected by those actions.

Log on, log off, and unsuccessful log on attempts create audit records for all deployments. Additional actions that can be audited for SAS Web Infrastructure Platform are described in this section. If a SAS solution is installed, see the solution documentation for information about additional actions that can be audited.

Audit Record Storage

Audit records are stored in the SAS Web Infrastructure Platform database. These audit records are stored in two relational tables, SAS_AUDIT and SAS_AUDIT_ENTRY. Two additional tables, SAS_AUDIT_ARCHIVE and SAS_AUDIT_ENTRY_ARCHIVE, provide archival audit data.

Do not access the tables directly for audit reporting. The SAS Web Administration Console provides an interface for viewing log on, log off, unsuccessful log on attempts, and last user logon information.

Depending on the auditing configuration of the deployed SAS applications, audit records can contain different types of audit information. However, all audit records contain the following information:

- user ID that performed the audited action.
- action that occurred. This is stored as an action code.
- data and time that the audited action occurred.

Guidelines for Auditing the SAS Middle Tier

The auditing process in the SAS middle tier is designed to be efficient for both processing time and storage. However, you might want to limit the number of audited events to minimize any effect on performance and minimize the size of the audit trail. The SAS middle tier auditing features provide the tools to help you balance the need to gather sufficient security or historical records with the ability to store and process it.

Consider these guidelines to make efficient use of the SAS middle tier auditing features:

- Evaluate the purpose of auditing an action. Make sure that records for an audited action can be used to serve a business purpose.
- When auditing for security, audit generally and then audit specifically. Analyze the records from general audit options to provide the basis for targeting specific audited actions.
- When auditing for historical information, audit for actions that are important to your business only. Avoid cluttering valuable audit records with less relevant audited actions. Narrowing the focus to valuable actions also reduces the amount of audit trail administration.
- Align the audit requirements to the most strictly regulated application. If your SAS deployment includes a number of SAS applications, the applications might have varying requirements. Make sure that the audited actions match the most strictly regulated application.

When auditing is enabled and audit records are generated, the audit trail size increases according to two factors:

- the number actions that are enabled for auditing
- how frequently the audited actions are performed

If the SAS Web Infrastructure Platform database becomes completely full and audit records cannot be inserted, the audited actions cannot be successfully executed until the audit trail is purged. The system administrator must control the rate of increase and size of the audit trail. To control the size of the audit trail, consider the following strategies:

- Be selective about which actions are enabled for auditing. If the number of audited actions is reduced, then unnecessary and useless audit records are not generated and are not stored in the audit trail.
- Design archive rules to move important, but not critically important, information out of the audit trail. This process archives the audit records of interest and removes them from the main audit table. For information about archiving, see "Archive Process for Audit Records" on page 89.
- Purge the audit archive tables as needed.

Enable Auditing for Additional Services

All SAS products that include the SAS Web Infrastructure Platform provide audit records for logon, log off, and unsuccessful log on attempts. Other standard services can also be audited:

- mail service
- content service
- job execution service
- workspace service
- scheduling service
- impersonation service

To enable auditing for any of these services, follow these steps:

1 Edit the ***SAS-install-dir*****\SASWebInfrastructurePlatform\9.3\Static\wars\sas.wip.services\WEB-INF\spring-config\aop-config.xml** file.

2 Review the comments to locate the service that you want to audit. Each of the services is commented out in the initial deployment. The following example shows the job execution service:

```
<!-- Job Execution Service auditing
<bean class="com.sas.svcs.aop.auditing.jes.SuccessfulSubmitJobAuditAdvice">
     <property name="auditRecorder" ref="auditService" />
</bean>
```

3 Add closing comment markup and then remove the original closing comment markup (`-->`) from the bottom of the code block. Save your changes.

4 Rebuild the SAS Web Infrastructure Platform with the SAS Deployment Manager.

Note: Subsequent upgrade activities can overwrite this file. For example, if you later install a maintenance release that includes **aop-config.xml**, then you must repeat this procedure.

5 Redeploy the SAS Web Infrastructure Platform Services Web application (**sas.wip.services9.3.ear**).

Enabling auditing for other SAS applications requires editing different files, but the steps are similar to the previous procedure. For example, auditing for SAS Workflow is controlled with the ***SAS-install-dir*****\SASWebInfrastructurePlatform\9.3\Static\wars\sas.workflow\WEB-INF\spring-config\aop-config.xml** file.

Archive Process for Audit Records

Once the audit features are enabled, records are added to the SAS_AUDIT and SAS_AUDIT_ENTRY tables. The records can be archived to the SAS_AUDIT_ARCHIVE and SAS_AUDIT_ENTRY_ARCHIVE tables. An archive job is used to control which records to archive. The archive job reads the archive rules in the

SAS_AUDIT_ARCHIVE_RULE table. The archive job always starts when SAS Web Infrastructure Platform Services starts. In addition, the default archive job is scheduled to start every Monday at the start of day, but the archive job schedule can be configured.

The following table describes the columns in table SAS_AUDIT_ARCHIVE_RULE. Rows must be added to this table to identify the objects, actions, and age for the archive job to process.

Table 5.3 SAS_AUDIT_ARCHIVE_RULE Column Description

Column Name	Description
OBJECT_TYPE_ID	Object type. Each object type is assigned an ID in table SAS_TYPE_OBJECT.
ACTION_TYPE_ID	Type of change. Each action type is assigned an ID in table SAS_TYPE_ACTION.
FREQUENCY_NO	A numeric value in milliseconds. Records that meet the criteria for OBJECT_TYPE_ID and ACTION_TYPE_ID, and are also older than this value, are archived.

To control the archive job schedule, you can add a JVM option to the Web application server. The `-Dsas.audit.archive.cron` JVM option can be used to specify the schedule. The schedule is set with a syntax that is similar to cron:

```
-Dsas.audit.archive.cron="second minute hour day_of_month month day_of_week"
```

The following example schedules the archive job to run each day at midnight:

```
-Dsas.audit.archive.cron="0 0 0 * * *"
```

You can confirm the archive job runs and reads the archive rules by adding a logging context to com.sas.svcs.audit at the INFO level.

The following table identifies the common object types and actions that you might want to include in the SAS_AUDIT_ARCHIVE_RULE table:

Table 5.4 Common Audit Object Types and Actions

Audit Action	Object Type ID Value	Action Type ID Value
User log on	-1	8
Use log off	-1	9
Sent E-mail	-1	44
Add job	11	0
Submit job	10	3
Retrieve job	11	45
Cancel job	10	47
Release job	10	48
Update job	11	1
Remove job	11	37
Start scheduled job	86	3
Remove scheduled job	86	37

Purging Audit Records

After auditing has been enabled for some time and the audit archive process runs, you might want to delete records from the SAS_AUDIT_ARCHIVE and SAS_AUDIT_ENTRY_ARCHIVE tables. Purging records that are no longer needed recovers some archival space and facilitates better audit trail management. For information about deleting records from the SAS Web Infrastructure Platform database, see the documentation for the database.

Using the SAS Web Administration Console

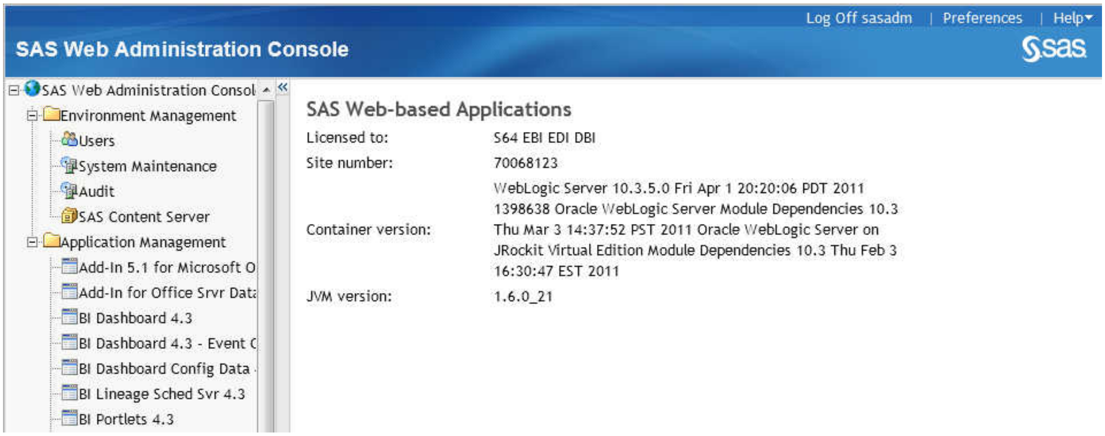
About the SAS Web Administration Console

The SAS Web Administration Console provides a central location for the following activities:

- monitoring users
- enabling an environment for system maintenance tasks
- monitoring audit reports
- managing folders and permissions for the SAS Content Server
- managing SAS Web applications

The following display shows an expanded view of a main page for the SAS Web Administration Console.

Display 5.7 Main Page in SAS Web Administration Console


Log Off sasadm | Preferences | Help
SAS Web Administration Console
sas
SAS Web Administration Consol
Environment Management
Users
System Maintenance
Audit
SAS Content Server
Application Management
Add-In 5.1 for Microsoft O
Add-In for Office Srvr Data
BI Dashboard 4.3
BI Dashboard 4.3 - Event C
BI Dashboard Config Data
BI Lineage Sched Svr 4.3
BI Portlets 4.3

SAS Web-based Applications

Licensed to: S64 EBI EDI DBI

Site number: 70068123

Container version: WebLogic Server 10.3.5.0 Fri Apr 1 20:20:06 PDT 2011 1398638 Oracle WebLogic Server Module Dependencies 10.3 Thu Mar 3 14:37:52 PST 2011 Oracle WebLogic Server on JRockit Virtual Edition Module Dependencies 10.3 Thu Feb 3 16:30:47 EST 2011

JVM version: 1.6.0_21

Here is a description of what you can accomplish with the SAS Web Administration Console:

- The Users page enables you to view and monitor authenticated users and system users that are currently logged on to a SAS Web application. See "Monitor Users " on page 94.
- The System Maintenance page provides the Restart Maintenance Wizard and the Quiesce System feature. When you want to perform system maintenance, the Restart Maintenance Wizard enables you to send e-mail to users to log off from their sessions within a specified deadline, to log off users after the deadline, and to prohibit new users from logging on to their applications. The Quiesce System feature is useful when you want to allow existing users to stay logged on to their user sessions, but you want to quiesce the system by preventing new users from logging on to SAS Web applications. See "Managing User Login Sessions with System Maintenance Tools" on page 96.
- The Audit page enables you to review user log on and logoff activity and failed log on attempt counts. You can also search by user ID for a user's last logon time.
- The SAS Content Server page enables you to manage folders and permissions for content in the SAS Content Server. You manage content by using either the SAS Content Server Administration Console (within the SAS Web Administration Console) or by using a stand-alone SAS Content Server Administration Console. You must be an unrestricted user in order to access the SAS Content Server Administration Console.

  To access the SAS Content Server feature in the SAS Web Administration Console, select **Environment Management** ▶ **SAS Content Server** in the navigation pane.

  For instructions on administering the SAS Content Server, see "Using the SAS Content Server Administration Console " on page 172.
- The Application Management page enables you to view the current configuration for Web applications that have been deployed at your site. For more information, see "Viewing Information about Web Applications" on page 100.

Note: The SAS Web Administration Console can be extended by other SAS applications. Depending on the software that is installed at your site, your SAS Web Administration Console might be different from the one shown here. For more information about the console at your site, see the administration guides for your applications.

Access the SAS Web Administration Console

To access the SAS Web Administration Console, enter the following URL in your Web browser and substitute the server name and port number of your Web application server:

`http(s)://`*server:port*`/SASAdmin`

To use this application, you must log on as someone who is a member of the SAS Administrators group (for example, sasadm@saspw).

Note: The SAS Content Server Administration Console has its own logon requirements. For more information, see "Using the SAS Content Server Administration Console " on page 172.

Monitor Users

About the Users That Appear in the SAS Web Administration Console

The Users page in the SAS Web Administration Console lists the following types of users:

Authenticated users
: are users who are currently authenticated on the system.

System users
: are system-level users who are required to perform particular tasks, such as running a stored process or accessing metadata. The information provided on the Users page is for informational purposes only. You cannot manage these users from the SAS Web Administration Console.

Send E-Mail to One or More Users

You can send e-mail to any of the users who are currently logged on to a SAS Web application. This feature is useful if you want to notify users of an impending system operation or a system outage.

To send e-mail to a user, follow these steps:

1 Select **Environment Management** ▶ **Users** in the navigation pane.

2 In the Users pane, select the check box next to an authenticated user's name.

You can select multiple check boxes in order to send e-mail to several users. To select all of the check boxes, select the check box in the heading of the last column.

3 Click the action menu ▤ in the heading of the last column and select **Send E-mail**.

4 If necessary, enter the e-mail address of the recipient. If you enter more than one address, separate the addresses with a semicolon.

The addresses are already listed for users who have an e-mail address defined in SAS metadata.

5 Enter the subject and text of the message.

6 If you have more than one recipient, specify whether you want to send a single message to all recipients or to send a separate message to each recipient.

7 Click **Send**.

Force Users to Log Off

In some cases, users might not be actively working with a SAS Web application, and yet their sessions remain active in the system. You can force the termination of these user sessions by using the SAS Web Administration Console.

To force users to log off, follow these steps:

1 Select **Environment Management** ▶ **Users** in the navigation pane.

2 In the Users pane, select the check box next to an authenticated user's name.

You can select multiple check boxes in order to force off several users. To select all of the check boxes, select the check box in the heading of the last column.

3 Click the action menu ▤ in the heading of the last column and select **Force Log Off**.

A confirmation page displays the user ID, e-mail address, and last logon time for the selected user. Review this information to ensure that you want to continue with the logoff operation.

4 Click **OK** to force the logoff.

Managing User Login Sessions with System Maintenance Tools

Overview

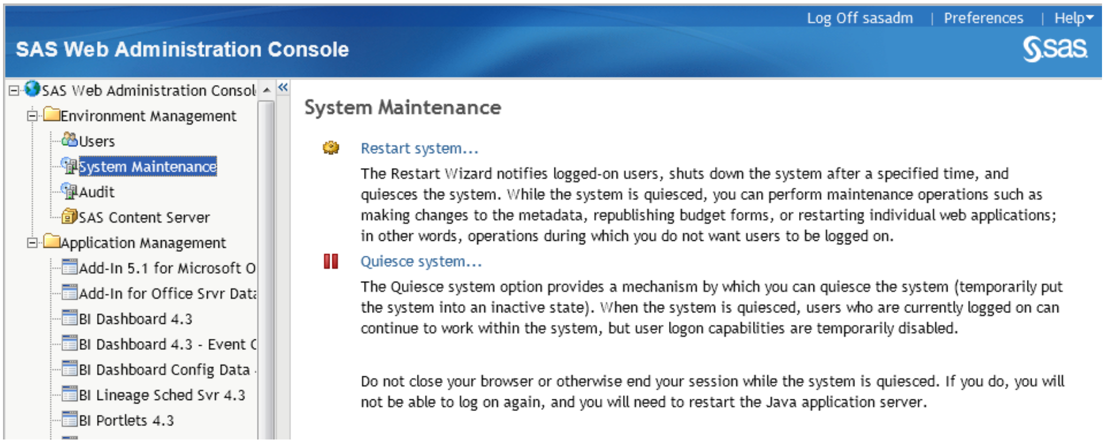
Tasks such as making changes to the metadata, restarting a metadata server, restarting the object spawner, or restarting a Web application can be performed safely only when users are not logged on to applications or when new users are prohibited from logging on to the applications. The Maintenance Restart Wizard enables you to perform a sequence of tasks to prepare the system for maintenance.

The SAS Web Administration Console cannot stop, pause, or start servers. For instructions about system maintenance tasks such as stopping, pausing, or starting servers, see the *SAS Intelligence Platform: System Administration Guide*.

Note: Do not close the Web browser during a quiesced state or when you are completing the steps in the Restart Maintenance Wizard. If the Web browser is closed during these sessions, restart your Web application server.

The following display shows the System Maintenance page in the SAS Web Administration Console.

***Display 5.8** System Maintenance Page*



The Restart Wizard notifies logged-on users, shuts down the system after a specified time, and quiesces the system. While the system is quiesced, you can perform maintenance operations such as making changes to the metadata, republishing budget forms, or restarting individual web applications; in other words, operations during which you do not want users to be logged on.

The Quiesce system option provides a mechanism by which you can quiesce the system (temporarily put the system into an inactive state). When the system is quiesced, users who are currently logged on can continue to work within the system, but user logon capabilities are temporarily disabled.

Do not close your browser or otherwise end your session while the system is quiesced. If you do, you will not be able to log on again, and you will need to restart the Java application server.

Maintenance Restart Wizard

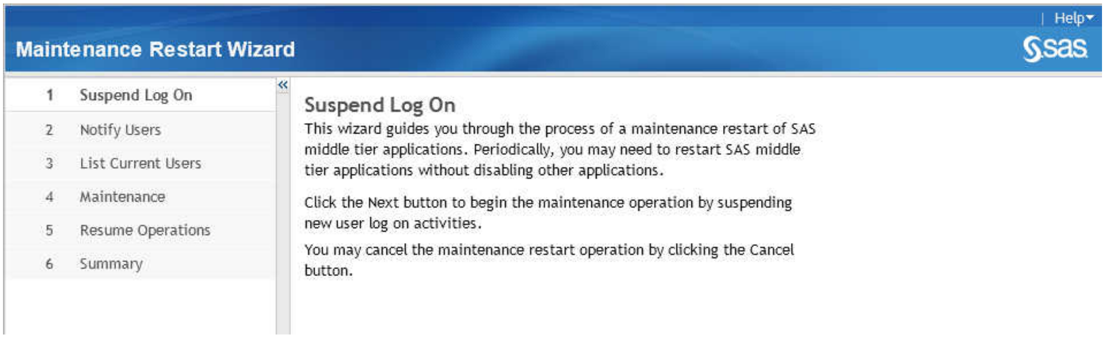
Use the Maintenance Restart Wizard to prepare a system for maintenance and resume system operations as described in the following list:

- Notify authenticated users who are logged on to applications that system maintenance is planned, and specify a deadline by which they need to log off from their applications.
- Enable the shutdown of the system after a specified deadline.
- Enable the system to prohibit new users from logging on to their applications.
- If the notification deadline has passed, and users and have not terminated their sessions, the system forces authenticated users to exit and terminate their sessions. All users are logged off.
- Quiesce the system by temporarily putting the system into an inactive state. When the system is quiesced, users' logon capabilities are disabled.
- Begin maintenance operations such as restarting the metadata server, the object spawner, or a Web application.
- Resume system operation by removing the quiesced state from the system, and enabling users to log on to the system and their applications.

To use the Maintenance Restart Wizard, log on to the SAS Web Administration Console. Navigate to **Environment Management** ▶ **System Maintenance**. Click **Restart System** and follow the Wizard's instructions.

The following display shows the main page for the Maintenance Restart Wizard.

Display 5.9 *Maintenance Restart Wizard*



Suspend Log On

This wizard guides you through the process of a maintenance restart of SAS middle tier applications. Periodically, you may need to restart SAS middle tier applications without disabling other applications.

Click the Next button to begin the maintenance operation by suspending new user log on activities.

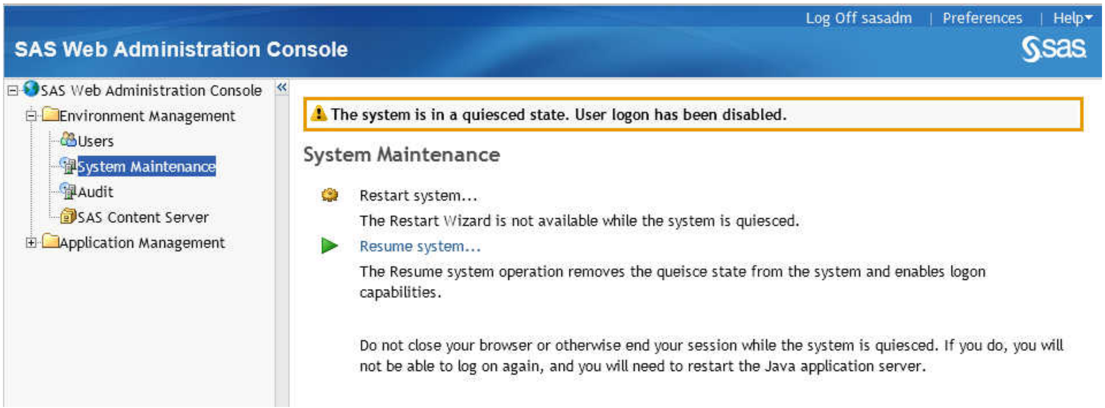
You may cancel the maintenance restart operation by clicking the Cancel button.

Quiesce the System

You can quiesce a system by allowing existing users to stay logged on to their applications, and prohibiting new users from logging on to their applications.

To quiesce the system, log on to the SAS Web Administration Console. Navigate to **Environment Management** ▶ **System Maintenance**. Click **Quiesce System**. When you are finished with your maintenance operations, click **Resume system** to remove the quiesced state and enable users to log on to their applications. The following display shows the message that is displayed when a system is quiesced.

Display 5.10 Message Displayed When System Is Quiesced


Log Off sasadm | Preferences | Help
SAS Web Administration Console
sas
SAS Web Administration Console
Environment Management
Users
System Maintenance
Audit
SAS Content Server
Application Management

The system is in a quiesced state. User logon has been disabled.

System Maintenance

Restart system...

The Restart Wizard is not available while the system is quiesced.

Resume system...

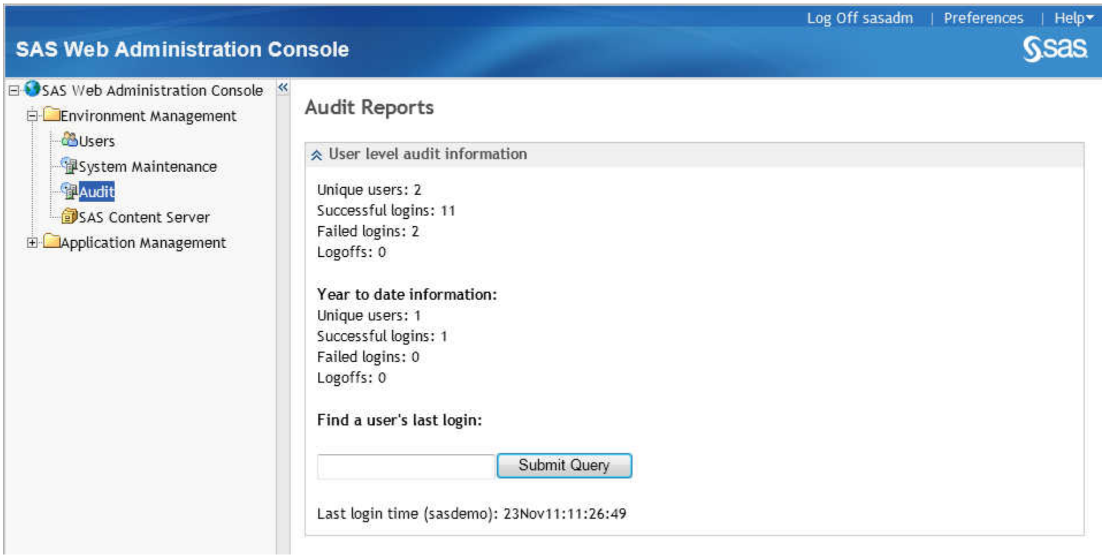
The Resume system operation removes the queisce state from the system and enables logon capabilities.

Do not close your browser or otherwise end your session while the system is quiesced. If you do, you will not be able to log on again, and you will need to restart the Java application server.

Audit Reports

The Audit page provides information about user log on and logoff activity. A failed logon count is also provided.

Display 5.11 Audit Reports Page



Audit Reports

User level audit information

Unique users: 2
Successful logins: 11
Failed logins: 2
Logoffs: 0

Year to date information:
Unique users: 1
Successful logins: 1
Failed logins: 0
Logoffs: 0

Find a user's last login:

Last login time (sasdemo): 23Nov11:11:26:49

To search for a user’s last logon time, follow these steps:

1 Select **Environment Management** ▶ **Audit** in the navigation pane.

2 In the Audit Reports pane, enter an authenticated user's ID in the text field and click **Submit Query**.

Viewing Information about Web Applications

The SAS Web Administration Console provides information about the SAS Web applications that are installed and configured at your site. This application is used for viewing application information from any machine with a Web browser without the need to have SAS Management Console installed on the machine.

To display the applications, expand the **Application Management** node in the navigation pane.

The tree view on the left side of the page displays a hierarchical list of configured applications. The list varies depending on the software that is installed.

When you click the name of an application, the right side of the page displays the following types of information:

Application settings

displays settings that are currently configured for the application. For example, SAS Information Delivery Portal settings include the locale that is in use, the location where portlets are deployed, the e-mail host, and default settings for various user preferences.

You cannot change any of the application settings here. To change settings, use the **Application Management** ▶ **Configuration Manager** plug-in in SAS Management Console.

Directives

provides the internal direction to the application's URL. This information is used internally to route applications. You might use this information to troubleshoot applications under the guidance of SAS Technical Support.

Logging

displays a form that is used to configure logging for applications that are instrumented for dynamic logging control.

6

Using the SAS Web Infrastructure Platform Utilities

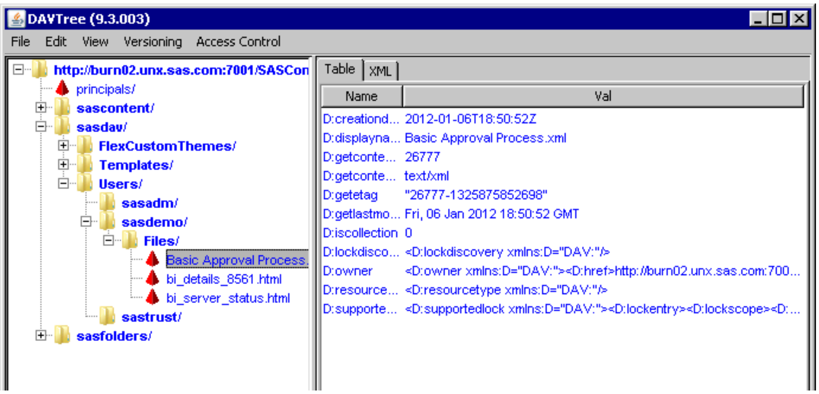
Using the DAVTree Utility to Manage WebDAV Content

About the DAVTree Utility

The DAVTree utility is a stand-alone Java application that provides a tree view of WebDAV resources. The utility enables you to manipulate content by copying files to a WebDAV repository or by creating text files such as forms and templates.

The utility presents information in a tree view. When you select a resource item in the tree on the left side of the window, the WebDAV properties for the resource are displayed on the right side.

Here is an example DAVTree interface:



Name	Val
D:creationd...	2012-01-06T18:50:52Z
D:displayna...	Basic Approval Process.xml
D:getconte...	26777
D:getconte...	text/xml
D:getetag	"26777-1325875852698"
D:getlastmo...	Fri, 06 Jan 2012 18:50:52 GMT
D:iscollection	0
D:lockdisco...	<D:lockdiscovery xmlns:D="DAV:"/>
D:owner	<D:owner xmlns:D="DAV:"><D:href>http://burn02.unx.sas.com:700...
D:resource...	<D:resourcetype xmlns:D="DAV:"/>
D:supporte...	<D:supportedlock xmlns:D="DAV:"><D:lockentry><D:lockscope><D:...

In the interface, you see only the content that you are authorized to see.

Start the Utility and Connect to a WebDAV Location

To use this utility, follow these steps:

1 Run the following command on Windows:

SAS-config-dir`\Lev`*n*`\Web\Utilities\DAVTree.bat`

On UNIX and z/OS:

SAS-config-dir/`Levn/Web/Utilities/DAVTree.sh`.

The DAVTree utility appears.

2 Select **File** ▶ **Open**.

The DAV Location dialog box appears.

3 In the URL field, enter the URL for a WebDAV location. For example, enter the following URL and substitute the server name and port number of your WebDAV server (SAS Content Server):

`http://`*server:port*`/SASContentServer/repository/default/`

4 If the WebDAV server was set up with a proxy, enter the proxy host and port.

5 Click **OK**. You are prompted for credentials.

6 Enter your administrator credentials in the logon dialog box.

You can later connect to a different WebDAV location by repeating steps 2 through 6 and providing the URL for the new location.

Add Resources to WebDAV

Copy Files to DAVTree

You can copy both text files and binary files to the repository. To copy a file, click and drag the file from the file system to a folder in the DAVTree interface. This action can be performed on Windows systems and on UNIX systems that provide a graphical interface.

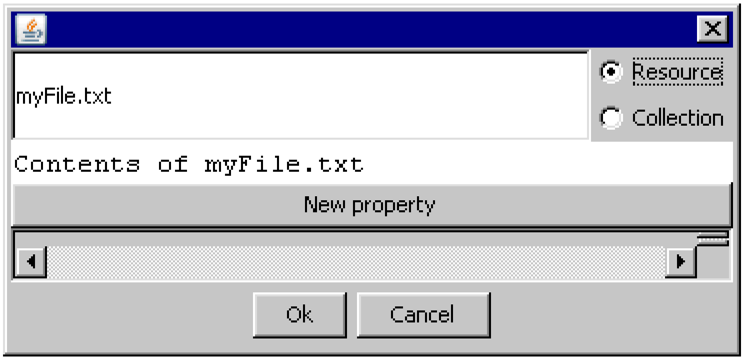
Note: To delete a resource, select the resource in the tree and then select **Edit** ▶ **Delete**. You are prompted to confirm the deletion.

Create a Text File

1 Position the cursor on the folder where you want to create the text file.

2 Select **Edit** ▶ **Add**.

You are prompted to confirm the action, and then an Add dialog box appears. Here is an example dialog box with data entered in the fields.



myFile.txt

● Resource
○ Collection

```
Contents of myFile.txt
```

3 Select **Resource**.

4 In the field to the left of the **Resource** radio button, enter the name of the text file. If a file already exists with the name that you provide, the file is overwritten.

The example shows a file with the name `myFile.txt`.

5 In the field below the **Resource** radio button, enter the text that you want the file to contain. Press ENTER to start a new line.

The example shows a file that contains the text string “Contents of myFile.txt.”

6 If you want to define a custom WebDAV property, click **New property**. Two text fields appear in the gray properties panel. In the left field, add the property name. In the right field, enter the property value.

7 Click **OK**.

Create a Folder

1 Position the cursor on the folder where you want to create the new folder.

2 Select **Edit** ▶ **Add**.

You are prompted to confirm the action, and then an Add dialog box appears.

3 Select **Collection**.

4 In the field to the left of the **Collection** radio button, enter the name that you want to give the folder.

5 Click **OK**.

Edit a Text File in WebDAV

To edit a text file, follow these steps:

1 Right-click the text file and select **Edit**. The Edit File dialog box appears and displays the contents of the file.

2 Make your changes to the text.

3 Click **Save**.

Copy or Move a File in WebDAV

To move a file from one location to another in WebDAV, in DAVTree click and drag the file to the desired location.

To copy rather than move a file, press and hold the CTRL key while dragging.

Advanced Features

The DAVTree utility can be used as a diagnostic tool. The utility provides features such as locking files, versioning files, and modifying WebDAV properties.

CAUTION! These are advanced WebDAV functions. These advanced WebDAV functions, which are not covered in this documentation, should be performed only by someone who has WebDAV expertise.

Using the Package Cleanup Utility to Remove Packages

Overview of the Package Cleanup Utility

The Package Cleanup utility provides a simple, command-line interface for deleting or listing packages that have been published in a publication channel or in a WebDAV repository.

The SAS Publishing Framework supports channels that you define in the SAS Metadata Repository. Once channels have been defined, users can publish packages to the channels. For example, portal users can subscribe to available channels, view the persisted packages, and publish content (files, links, stored processes, and information maps).

Channels can be defined with archive or WebDAV persistent stores. When a package is published to a channel that is defined with a persistent store, the package is first persisted to that location and then it is published to all subscribers of that channel. All persisted packages have an expiration date. However, expired packages are not deleted automatically; you must explicitly delete them. You can use the Package Cleanup utility for this purpose.

Here is the path to the utility:

On Windows:

SAS-config-dir`\Lev`*n*`\Web\Utilities\PackageCleanup.bat`

On UNIX and z/OS:

SAS-config-dir`/Lev`*n*`/Web/Utilities/PackageCleanup.sh`.

The Package Cleanup utility enables you to review basic information about a persisted package and delete both the metadata and the actual package. Deletions are based on the expiration date of the package. This utility supports the deletion of packages from either type of persistent store (archive or WebDAV). The utility also supports the deletion of packages that are not defined in any channel.

The Package Cleanup utility also supports a listing feature. The utility can be used to display information about packages that are published in a particular channel, packages that are not defined in any channel, and packages that exist on a WebDAV server.

Note: You must have the appropriate permissions on a channel in order to delete packages from the channel. See the “Authorization Model” chapter in the *SAS Intelligence Platform: Security Administration Guide*.

Deleting Packages

Delete Packages

To delete packages, follow these steps:

1. Run the command and specify the deletion date. You can also provide one of the following arguments:

   - a channel name in order to delete packages that are defined in a specific channel
   - a WebDAV URL in order to delete packages that are in the specified WebDAV location

   Note: If you do not provide the channel or WebDAV URL, then the utility deletes only orphaned packages that are not defined for any channel or WebDAV URL.

   After you run the command, the utility displays a list of packages that match your deletion criteria and prompts you to confirm deletion.

2. Respond to the prompt to confirm deletion of the packages or to exit without deleting any packages.

Minimal Syntax for Deleting Packages

Here is the minimal syntax for deleting packages that are defined in a channel:

```
PackageCleanup
       -d expiration-date
       -ch channel-name
       -metauser Metadata-Server-username
       -metapass Metadata-Server-password
       -domain  authentication-domain
```

The utility deletes all packages in the specified channel that expire before the date and time specified.

Here is the minimal syntax for deleting packages that are not defined in a channel:

```
PackageCleanup
       -d expiration-date
       -metauser Metadata-Server-username
       -metapass Metadata-Server-password
       -domain  authentication-domain
```

Here is the minimal syntax for deleting packages that are defined in a WebDAV server:

```
PackageCleanup
       -url WebDAV-URL
       -username WebDAV-Server-username
       -password WebDAV-Server-password
       -d expiration-date
       -metauser Metadata-Server-username
       -metapass Metadata-Server-password
       -domain  authentication-domain
```

Delete Specific Packages

To delete a specific package, specify `-package` *`package-name`* (or `-pkg` *`package-name`*) along with the date. The PACKAGE option enables you to specify the name of the package to delete.

Change Prompt Behavior

When you run the utility command, the utility displays a list of packages that match your deletion criteria and prompts you to confirm deletion of all the packages that are listed.

You can override this default behavior in order to be prompted for each package individually.

To override the default, specify `-prompteach`. You are then prompted to delete each package that meets the deletion criteria. After each package is processed, the utility displays a final list of all packages that were selected. You can then choose to delete all of those packages or exit without deleting any packages.

You can also turn off prompting altogether by specifying `-noprompt`. When you run the utility in batch mode, you must use the `-noprompt` option (unless shell programming is provided to respond to the prompts). It is best to run with prompts when you are learning how to use the application. With prompts, you can review proper date formatting and correct package deletion candidates with the option to exit without deleting any packages.

List Packages

To obtain a list of packages, run the command and specify the `-list` option. You can also provide one of the following arguments:

- a channel name in order to list packages that are defined in a specific channel
- a WebDAV URL in order to list packages that are in the specified WebDAV location

Note: If you do not provide the channel or WebDAV URL, then the utility displays only orphaned packages that are not defined for any channel or WebDAV URL.

The LIST option lists the following information for each package:

- package name
- date and time that the package was created
- date and time that the package expires

Here is the minimal syntax for listing packages that are defined in a channel:

```
PackageCleanup
       -list
       -ch channel-name
       -metauser Metadata-Server-username
       -metapass Metadata-Server-password
        -domain  authentication-domain
```

Here is the minimal syntax for listing packages that are not defined in a channel:

```
PackageCleanup
       -list
       -metauser Metadata-Server-username
       -metapass Metadata-Server-password
       -domain  authentication-domain
```

Here is the minimal syntax for listing packages that are defined in a WebDAV server:

```
PackageCleanup
       -list
       -url WebDAV-URL
       -username WebDAV-Server-username
       -password WebDAV-Server-password
       -metauser Metadata-Server-username
       -metapass Metadata-Server-password
       -domain  authentication-domain
```

Arguments

The utility supports the following arguments:

-channel | **-ch***channel-name*
Specify the channel that contains the packages that you want to list or delete.

-deletionDate | **-d***"expiration-date"*
Specify the expiration date and time for the packages to be deleted. You can also use this argument when you list packages. The utility deletes or lists packages that have an expiration date before the date and time that you specify. The date and time should be enclosed in quotation marks. Format: “yyyy.MM.dd at hh:mm”

-list
The utility displays a list of packages (no deletion occurs).

-metauser *Metadata-Server-username*
Specify the user name to use when connecting to the SAS Metadata Server.

-metapass *Metadata-Server-password*
Specify the password to use when connecting to the SAS Metadata Server.

-domain *authentication-domain*
Specify the authentication domain for the SAS Metadata Server.

-package | **-pkg** *package-name*
Specify the name of a package to delete.

-url *WebDAV-URL*
Specify the WebDAV URL to use to locate packages to delete.

`-username` *WebDAV-username*
Specify the user name to use to connect to a WebDAV server.

`-password` *WebDAV-password*
Specify the password to use to connect to a WebDAV server.

`-logfile` | **`-log`** *file-name*
Specify the name of a log file to create. If the log file already exists, then the log lines are appended to the current file.

`-noprompt`
The utility does not prompt for confirmation of deletions.

`-deletenodate`
The utility lists or deletes packages that have no expiration date defined.

`-prompteach`
The utility prompts you to confirm each package individually for deletion.

`-debug`
The utility produces debugging information for all the SAS Foundation Services.

`-help`
The utility displays this help information. (You must also provide the -metauser, -metapass, and -domain arguments in order to get the help information.)

Utility Logging and Debugging

By default, application activity is sent to the Java standard out console. If you want to log to a file, use the LOGFILE option. For example, you might specify `-logfile c:\mylog.file`. If the log file already exists, then the log lines are appended to the current file.

Use the DEBUG option to enable debugging-level information. This option provides debugging information for all of the Foundation Services as well as the utility. This option should be used only when you experience problems with the utility and want to determine the cause.

Examples

This example deletes all packages published to the Sales channel that have an expiration date before October 7, 2009, at 12:59 p.m.

```
     PackageCleanup -ch Sales -d  "2009.10.07 at 12:59 PM" -metauser userX
        -metapass passX -domain DefaultAuth
```

This example uses the PROMPTEACH option, which enables you to confirm deletion of each package individually.

```
   PackageCleanup -ch Sales -d "2009.10.07 at 12:59 PM" -metauser userX
        -metapass passX -domain DefaultAuth -prompteach
```

This example deletes a specific package that is defined in the Sales channel. The PKG option is specified to identify the exact package to delete. In this example, the package is named s109513698.spk and has an expiration date of October 7, 2009, at 12:59 p.m.

```
   PackageCleanup -ch Sales -d "2009.10.07 at 12:59 PM" -pkg s109513698.spk
      -metauser userX -metapass passX -domain DefaultAuth
```

This example deletes all packages that are not defined in any channel. Only packages that are not defined in a channel and have an expiration date before October 7, 2009, at 10:00 a.m. are deleted.

```
   PackageCleanup -d "2009.10.07 at 10:00 AM" -metauser userX -metapass passX
        -domain DefaultAuth
```

This example deletes packages that have been published to a WebDAV server. The utility connects to the server using the specified URL and deletes all packages published to that location that have an expiration before October 7, 2009, at 05:00 a.m.

```
   PackageCleanup -d "2009.10.07 at 05:00 AM" -url http://myhost.com/Sales/Packages
        -username davUserX -password davPasswordX -metauser userX -metapass passX
        -domain DefaultAuth
```

This example deletes a specific package from a WebDAV server. The PKG option is used to provide the name of the package to delete. The utility connects to the server using the specified URL and deletes the package named s3964865240.

```
   PackageCleanup -d "2009.10.07 at 12:59 PM"  -metauser userX -metapass passX
        -domain DefaultAuth -url http://myhost.com/Sales/Packages -username davUserX
        -password davPasswordX -pkg s3964865240
```

This example lists packages (does not delete) by using the LIST option. Note that the -d argument is not required when listing packages. This example lists all packages that are published in the Sales channel.

```
PackageCleanup -list -ch Sales -metauser userX -metapass passX
   -domain DefaultAuth
```

This example uses the LIST option to list all packages with an expiration date before October 7, 2009, at 12:00 p.m.

```
PackageCleanup -ch Sales -d "2009.10.07 at 12:00 PM" -metauser userX
     -metapass passX  -domain DefaultAuth -prompteach -list
```

Using JMX Tools to Manage SAS Resources

About JMX and MBeans

SAS servers implement common administrative interfaces. These interfaces enable you to perform basic administrative functions such as stopping, pausing, and resuming servers. You can also use the interfaces to monitor the health of the servers via real-time and historical metrics. Java Management Extensions (JMX) is a Java technology that supplies tools for managing and monitoring applications, system objects, devices (such as printers), and service-oriented networks. JMX managed beans, known as MBeans, have been implemented to provide a standard way of managing SAS resources.

Accessing the SAS MBeans

About Accessing the SAS MBeans

You can use any of the standard JMX monitoring tools to access the MBeans that manage SAS resources. To use these tools, you must do the following:

1 Enable access to the MBeans from the Web application server. See “Configure the Web Application Server to Enable JMX Client Access” on page 116.

2 Use an application to connect and access the SAS MBeans. Follow the specific instructions for your JMX tool. For information about using the JConsole tool, see "Manage SAS Resources Using JConsole" on page 116.

Configure the Web Application Server to Enable JMX Client Access

You configure the Web application server to enable access to the MBeans by setting specific Java system options.

Specify the following Java Virtual Machine (JVM) argument to access the MBeans locally:

```
com.sun.management.jmxremote
```

Specify the following JVM argument to access the MBeans from a remote system. Replace *portNum* with the port number to use for JMX RMI connections:

```
com.sun.management.jmxremote.port=portNum
```

Remote monitoring and management requires security to ensure that unauthorized persons cannot control or monitor your application. It is recommended that you set the following JVM arguments when MBeans are accessed remotely:

```
com.sun.management.jmxremote.authenticate=true | false
com.sun.management.jmxremote.ssl=true  | false
```

For information about these arguments, see the Java documentation.

Manage SAS Resources Using JConsole

JConsole is a JMX tool that is included with the standard Java Development Kit (JDK). The information provided through JMX technology enables JConsole to provide information about application performance and functions. You can use JConsole to interact with the JMX MBeans that are available to manage SAS resources. The console's simple user interface displays all MBeans in a tree navigator on the left side of the window. When you select a specific MBean, its attributes, operations, notifications, and other information are displayed on the right side of the window.

To access information about SAS resources using JConsole, follow these steps:

1 Start JConsole by running the following command:

```
JDK-HOME\bin\jconsole
```

2 Connect to the MBean server as follows:

- If you are accessing the MBeans locally, the **Local** tab should display every JVM that is running on the local system that was started with the same user ID as JConsole. Select the appropriate JVM and click **Connect**.
- If you are accessing the MBeans remotely, follow these steps:

   1 Select the **Remote** tab.

   2 Enter the host on which the JVM is running, along with the port where the RMI connector was registered.

   3 You might need to specify credentials if authentication to the MBean server is required.

   4 Click **Connect** to connect to the MBean server.

3 Select the **MBeans** tab. This tab displays a tree view of all the registered MBeans.

4 Expand the **com.sas.services** domain to see all MBeans registered in this domain.

5 Select the **ServerFactory** MBean.

6 In the right pane, select the **Operations** tab. You can now see the operations (listing, stopping, pausing, and so on) so that you can list the defined SAS servers and manage your running SAS servers. When you invoke one of the manage-server operations, a new MBean is registered that is connected to the specified, running SAS server. The newly registered MBean can then be used to manage and monitor that particular SAS server.

Understanding How to Use the SAS MBeans

About the SAS MBeans

There are three primary MBeans provided by the SAS Web Infrastructure Platform for managing and monitoring SAS resources:

- ServerFactory MBean
- Spawner MBean
- Server MBean

The following sections describe these MBeans.

ServerFactory MBean

The ServerFactory MBean is the starting point for managing SAS servers. This MBean is registered during deployment of the SAS Web Infrastructure Platform and is named as follows:

```
com.sas.services:type=ServerFactory
```

During initialization, the ServerFactory MBean connects to the SAS Metadata Server. This enables the MBean to list all SAS servers defined in the metadata. The MBean can then be used to register additional MBeans that enable the running servers to be managed and monitored directly. The ServerFactory MBean does not have any attributes, but supports three operations:

listDefinedServers()

provides a list of SAS IOM servers that are defined in the Metadata Server. Information that is returned for each defined server includes the server name, host, port, and server type. To begin actively managing a server, specify the name of the server on the manageServerByName operation.

manageServerByName(String ServerName, String Host)

registers a Server MBean that enables you to actively manage the specified IOM server. The newly registered MBean connects to the running IOM server and can then be used to manage and monitor that server. The host name can be left blank if the IOM server is defined to run on only one host. If defined to run on multiple hosts, the proper host name should be provided.

The manageServerByName() operation does not work on a server that is spawned by the SAS Object Spawner.

manageServer(String Host, Integer Port, String Username, String Password)

registers a Server MBean that enables you to actively manage the specified IOM server. The IOM server that is managed is identified by the host and port provided on the manageServer operation. The newly registered MBean can be used to manage and monitor that specific IOM server. This operation is useful when the IOM server is not defined in the Metadata Server.

Spawner MBean

The Spawner MBean is created whenever an IOM Spawner is identified in one of the ServerFactory MBean's manageServer operations. The name of the registered MBean uses the form:

```
com.sas.services:type=Server,serverType=Spawner,
     name="Server Name",
     host=Host Name,port=Port
```

The Spawner MBean enables you to manage and monitor the running Object Spawner. You can perform SAS Spawner operations such as stop, pause, and resume.

Here are some commonly used Spawner MBean attributes:

- the number of times the counters have been reset
- the amount of time the server has been idle
- the number of currently connected clients
- the server start time
- the number of currently abandoned servers
- the number of currently launched servers
- the total number of servers that have been launched
- the number of currently failed servers
- the process identifier of the server process
- the amount of time spent in server method calls
- the number of method calls that the server has processed

Server MBean

The Server MBean is created whenever a SAS server is identified in one of the ServerFactory MBean's manageServer operations or when a server is managed via the Spawner MBean's manageLaunchedServer(s) operation.

A server MBean can represent a SAS Workspace Server, a SAS Stored Process Server, a SAS Framework Data Server, a SAS Metadata Server, or a SAS OLAP Server. The name of the registered SAS Server MBean uses one of these three forms:

```
com.sas.services:type=Server, serverType=Workspace, logicalServer=
     "LogicalServerName", name="Server Name",
     instanceid="Unique instance ID"
```

```
com.sas.services:type=Server, serverType=StoredProcess, logicalServer=
     "LogicalServerName", name="Server Name",
     instanceid="Unique instance ID"
```

```
com.sas.services:type=Server, serverType=Table, logicalServer=
     "LogicalServerName", name="Server Name",
     host=Host Name,
     port=Port Number
```

The Server MBean enables you to manage and monitor the running SAS server. You can perform server operations such as stop, pause, and resume.

Here are some commonly used Server MBean attributes:

- the number of times the counters have been reset
- the amount of time the server has been idle
- the number of currently connected clients
- the server start time
- the last time the counters were reset
- the execution state of the server
- the amount of time spent in server method calls
- the number of method calls that the server has processed
- the number of clients that the server has serviced
- the process identifier of the server process

- the identity under which the server process is executing

7

Administering SAS Web Applications

Using the SAS Deployment Manager

The SAS Deployment Manager enables a SAS administrator to perform several tasks. The following list identifies the tasks that are typical for the middle tier:

- Rebuild Web applications. You can rebuild Web applications that have previously been configured but whose configuration has changed. This option rebuilds the Web application based on the current configuration. See "Rebuilding the SAS Web Applications" on page 125.
- Remove the existing configuration. You can remove the product configuration for one or more products in the deployment. This option enables you to remove the product configuration for an application that you are no longer using or that you are moving to another machine. You can then use the SAS Deployment Wizard to reinstall or reconfigure the application. For details, see "Removing a SAS Configuration" in the *SAS Intelligence Platform: Installation and Configuration Guide*.

  Note the following about removing a configuration:

  - Installed products are not removed.
  - If you remove the configuration for the SAS Information Delivery Portal, do not select the **Remove all User Content** option unless you have made a backup copy of the content repository. If you choose this option, you must re-create the content later from your backup. When you choose to remove portal content, all pages, portlets, and other items created by the users are removed.
  - If you remove the configuration for the Web Infrastructure Platform, the contents of the SAS Content Server repository (located in the ***`SAS-config-dir`*** **`\Lev1\AppData\SASContentServer\Repository`** directory) are not deleted. If you do not need the contents of this directory, you should manually delete the contents before rebuilding the Web Infrastructure Platform with the SAS Deployment Manager.

Access the SAS Deployment Manager by running the ***`SAS-install-dir`*** **`\SASDeploymentManager\9.3\sasdm.exe`** command. On UNIX and z/OS operating environments, the command is **`sasdm.sh`**.

Rebuilding the SAS Web Applications

When to Rebuild the SAS Web Applications

The Rebuild Web Applications feature of the SAS Deployment Manager provides an automated way to rebuild the Web applications that are deployed in your environment. You should rebuild the Web applications in the following situations:

- You might need to rebuild applications that you have reconfigured. For example, if you change the HTTP time-out interval for an application, then you should rebuild the application.

  Note: This administration guide informs you when an application must be rebuilt after reconfiguration.

- Rebuild an application after you change the Java security configuration for the application.

- If a custom theme is created for your organization, then rebuild the SAS Web Application Themes.

- If custom content is created, then add files to the WAR directory and rebuild the application to which the custom content applies. For example, to create custom forms for SAS Stored Process, place the file for the EAR or the WAR in the ***`SAS-config-dir`*** **`\Lev1\Web\Common\SASServer1\SASStoredProcess9.3\CustomContent\ears\sas.storedprocess\input`** directory. Then, use the SAS Deployment Manager to rebuild the SAS Stored Process application.

- If custom portal content is created, such as a custom portlet, then rebuild the SAS Information Delivery Portal. For more information, see “Rebuild Web Applications” on page 126.

- Rebuild SAS Help Viewer for Midtier Applications after your initial deployment if you install or upgrade a SAS Web application that offers online Help. (SAS Help Viewer for Midtier Applications combines SAS Help Viewer for the Web software with various help content into its EAR file.)

  The following Web applications use SAS Help Viewer for Midtier Applications:

  - SAS Information Delivery Portal Help
  - SAS Web Report Studio Help
  - SAS Web Report Viewer Help
  - SAS BI Dashboard Help
  - SAS Comment Manager Help

- After installing a maintenance release or hot fixes, rebuild the EAR files for all Web applications that were updated at your site. Follow the instructions in the maintenance documentation or the hot fix instructions. Because the EAR files are rebuilt, you might lose any customizations that you added to the EAR files after initial deployment.

Rebuild Web Applications

The **Rebuild Web Applications** option in the SAS Deployment Manager enables you to rebuild one or more Web applications. The rebuild process updates two directories for each rebuilt Web application:

- ***SAS-config-dir*\Lev1\Web\Staging**. An EAR file for each rebuilt Web application is placed in this directory.

  The approximate size of the collection of EAR files for EBI is 2 GB.

- ***SAS-config-dir*\Lev1\Web\Staging\exploded**. An exploded version of each rebuilt Web application is placed in this directory.

  The approximate size of the entire **exploded** directory is 2 GB. The size is similar to the size of all the EAR files in the **Staging** directory.

Note: You can delete any unwanted directories in the `exploded` directory to save disk space.

To rebuild one or more Web applications, follow these steps:

1 The Web application server can be running or stopped.

- For WebLogic Server, the administration server and `nodemanager` can be running or stopped.
- For WebSphere Application Server, the `dmgr` and `nodeagent` can be running or stopped.

2 Make sure that the SAS Metadata Server is running.

3 Start the SAS Deployment Manager.

4 Select **Rebuild Web Applications** and click **Next**.

5 Specify the configuration directory and the level (for example, Lev1) on the Select Configuration Directory/Level page. Click **Next**.

6 Enter the user ID and password for an unrestricted administrative user (for example, sasadm@saspw) on the Specify Connection Information page. Click **Next**.

7 Select the check boxes for the Web applications that you want to rebuild and click **Next**.

8 Review the Summary page and click **Start**. The SAS Deployment Manager builds the EAR files for the selected applications. For the names and location of the EAR files, see “Names of the Web Applications and EAR Files” on page 128.

9 If you are rebuilding theme content, you might need to stop and restart the Web application server as follows:

- If SAS Web Application Themes is deployed as an EAR in a Web application server, then the first time a custom theme is deployed, the Web application server must be stopped and restarted. Any subsequent modifications to the custom theme do not require a restart of the Web application server unless the theme descriptors have been changed.

- If SAS Web Application Themes is exploded and deployed in an HTTP server (such as Apache HTTP Server), then the Web application server does not need to be restarted based on any theme changes.

After rebuilding the Web applications, the next action is typically to redeploy them. See “Redeploying the SAS Web Applications” on page 129.

Names of the Web Applications and EAR Files

The files for the SAS Web applications are stored in the following directories:

- ***SAS-config-dir*\Lev1\Web\Staging**
- ***SAS-config-dir*\Lev1\Web\Staging\exploded**

When the SAS Deployment Manager is used to rebuild a Web application, the files for the Web application in the previous directories are overwritten. The following table identifies the product configuration name that is used in the SAS Deployment Manager for the Web applications that are part of the SAS Enterprise Business Intelligence Server. Use this table to understand which Web applications and EAR files are updated when a product configuration is selected in the SAS Deployment Manager.

Table 7.1 Product Configuration, Web Application, and EAR Filenames

Product Configuration	Application	EAR File
BI Dashboard 4.3	SAS BI Dashboard	**sas.bidashboard4.3.ear**
BI Portlets 4.3	SAS BI Portlets	**sas.biportlets4.3.ear**
Flex Application Themes	SAS Flex Application Themes	**sas.flexthemes3.4.ear**
	SAS Theme Designer for Flex	**sas.themedesigner3.4.ear**
Help Viewer for Midtier App 9.3	SAS Help Viewer for Midtier Applications	**sas.webdocmd9.3.ear**

Product Configuration	Application	EAR File
Information Delivery Portal 4.3	SAS Information Delivery Portal	**`sas.portal4.3.ear`**
	SAS Package Viewer	**`sas.packageviewer4.3.ear`**
SAS Themes	SAS Web Application Themes	**`sas.themes.ear`**
Web Infrastructure Platform 9.3	SAS Content Server	**`sas.wip.scs9.3.ear`**
	SAS Stored Process	**`sas.storedprocess9.3.ear`**
	SAS Web Administration Console	**`sas.wip.admin9.3.ear`**
	SAS Web Infrastructure Platform Applications	**`sas.wip.apps9.3.ear`**
	SAS Web Infrastructure Platform Resources	**`sas.wip.resources9.3.ear`**
	SAS Web Infrastructure Platform Services	**`sas.wip.services9.3.ear`**
	SAS Workflow	**`sas.workflow9.3.ear`**
Web Report Studio 4.3	SAS Web Report Studio	**`sas.webreportstudio4.3.ear`**

Redeploying the SAS Web Applications

Redeploying Web Applications

When the SAS Deployment Manager rebuilds SAS Web applications, the rebuilt EAR files are placed in the ***`SAS-config-dir`*****`\Lev1\Web\Staging`** directory. All EAR files are placed in a single directory even if your deployment includes multiple Web application servers (for example, SASServer1 and SASServer2).

If you have Web application servers that were installed and configured by the SAS Deployment Wizard in your environment, make a note of the server names and the Web applications that are installed on each server. For example, if you have six applications located on SASServer1 and three Web applications located on SASServer2, make a list of the applications that are installed on each of these servers. Alternatively, you can refer to your **Instructions.html** file, which specifies the following:

- the list of Web applications to be deployed
- the location of the applications
- the Web application server where each application should be deployed

When you redeploy the SAS Web applications, you can refer to your list or the **Instructions.html** file, to ensure that you redeploy each Web application to the correct server.

JBoss Application Server

JBoss is configured to run the SAS Web applications from exploded EAR files. To redeploy a SAS Web application to JBoss, follow these steps:

1. Shut down JBoss.
2. Create a directory where you can store unused EAR files. Do not create this directory below the deployment directory or below the ***JBOSS_HOME*** **\server\SASServer1\deploy_sas**. Instead, choose a different location to store these unused EAR files.
3. Move the unused application EAR files from the **deploy_sas** directory to the directory that you created for unused EAR files.
4. If applicable, repeat the previous step for each JBoss application server.

5 Copy the rebuilt EAR files for the applications that are deployed on this server from the ***SAS-config-dir*\Lev1\Web\Staging\exploded** directory to the ***JBOSS_HOME*\server\SASServer1\deploy_sas** directory.

For Windows deployments, you can use the **xcopy /e /i** command for each Web application to copy an exploded EAR file to the deploy_sas directory. The following example shows how to copy SAS BI Dashboard:

```
xcopy /e /i SAS-config-dir\Lev1\Web\Staging\exploded\sas.bidashboard4.3.ear
sas.bidashboard4.3.ear
```

For UNIX deployments, you can use the **cp -r** command for each Web application to copy an exploded EAR file to the deploy_sas directory. The following example shows how to copy SAS BI Dashboard:

```
cp -r SAS-config-dir/Lev1/Web/Staging/exploded/sas.bidashboard4.3.ear .
```

6 Repeat the previous step for any additional JBoss application servers (for example, SASServer2).

7 Start JBoss.

For complete deployment instructions, see the JBoss documentation at **http://www.jboss.org/docs**.

Oracle WebLogic Server

Redeploying SAS Applications Using the WebLogic Administration Console

There are a number of ways to redeploy applications in WebLogic Server. The following steps describe how to redeploy Web applications with the WebLogic Server Administration Console:

1 Stop and delete all SAS applications. See “Stop and Delete All SAS Applications” on page 132.

2 Shut down the SAS managed servers. See “Stop the Managed Servers” on page 133.

3 Reinstall the SAS applications. See "Reinstall the SAS Applications" on page 133.

4 Restart the managed servers. See "Start the Managed Servers" on page 134.

5 Start the SAS applications. See "Start the SAS Applications" on page 135.

For complete deployment instructions about WebLogic, see the WebLogic documentation at `http://www.oracle.com/technology/documentation/index.html`.

Stop and Delete All SAS Applications

To stop and delete all SAS applications, follow these steps:

1 In the WebLogic Administration Console, select **Deployments** in the **Domain Structure** panel.

2 In the **Deployments** panel, select all applications by selecting the check box next to **Name**.

3 On the **Stop** menu, select **Force Stop Now**.

4 In the **Summary of Deployments** tab, select **Yes**.

5 Wait until all applications are displayed in Prepared state. Refresh the view as needed until all applications reach the Prepared state.

6 When the managed servers are running, delete all applications by selecting **Lock and Edit** in the **Change Center** panel.

7 In the **Deployments** panel, select all applications by selecting the check box next to **Name**.

8 Click **Delete**.

9 In the **Delete Application Assistant** panel, select **Yes**.

10 When the message "Selected deployments were deleted," is displayed, select **Activate Changes** in the **Delete Application Assistant** panel.

Stop the Managed Servers

It is recommended that you stop the managed servers. Leave the WebLogic administration server running.

To shut down the managed servers, use the WebLogic Server Administration Console and follow these steps:

1. In the **Domain Structure** panel, select **Environment** ▶ **Servers in the Domain Structure**.

2. Leave the administration server running; do not stop it. Then, for each other server, complete the following steps:

   a. In the Summary of Servers table, select the server (for example, SASServer1).

   b. Select the **Control** tab.

   c. From the menu for **Shutdown**, select **Force Shutdown Now**.

   d. Click **Yes** to the prompt **Forcibly Shutdown Servers**.

   e. Verify that the server has been shut down.

Reinstall the SAS Applications

All Web applications should be deployed from the EAR files in the ***`SAS-config-dir`***`\Lev1\Web\Staging` directory.

To redeploy the Web applications, use the WebLogic Server Administration Console and follow these steps:

1. Locate the `Instructions.html` file in the ***`SAS-config-dir`***`\Lev1\Documents` directory, and make a note of the list of SAS applications and their associated servers. This information is available in the Web Application Server section. You need this information when you redeploy and install the EAR files.

2. In the **Domain Structure** panel, select **Deployments**.

3. Click **Lock and Edit** in the Change Center panel.

4 In the **Summary of Deployments** panel, click **Install**.

5 In the **Install Application Assistant** panel, browse and navigate to the ***SAS-config-dir*\Lev1\Web\Staging** directory.

6 In the **Install Application Assistant** panel, under Locate deployment to install and prepare for deployment, select an EAR file and click **Next**.

7 In the options available for Choose targeting style, retain the default (**Install this deployment as an application**), and click **Next**.

8 See the `Instructions.html` file to identify the server associated with the EAR file that you are deploying. Typically, for most SAS applications, the target server is SASServer1.

9 In the **Install Application Assistant** panel, under **Select deployment targets**, select the target server and click **Next**. Typically, SAS applications are deployed to SASServer1.

10 Under **Optional Settings, General**, enter a name for the EAR file or the directory for this deployment.

11 If the administration server and the managed server are on the same machine, under **Source accessibility**, select **I will make the deployment accessible from the following location** and click **Next**. Note that this is not a staged mode.

12 Under **Review your choices and click Finish**, select **No, I will review the configuration later**, and click **Finish**.

13 In the **Change Center** panel, select **Activate Changes**. The application should be displayed in a New state.

14 Repeat these steps to redeploy the other SAS Web applications.

Start the Managed Servers

To start the managed servers, use the WebLogic Server Administration Console and follow these steps:

1 In the **Domain Structure** panel, select **Environment** ▶ **Servers**.

2 In the **Change Center** panel, select **Activate Changes**.

3 On the Settings page, select the **Control** tab.

4 In the Servers table under **Summary of Servers**, click on the server name (for example, SASServer1).

5 In the Server Status table, click **Start**.

6 In the **Server Life Cycle Assistant** panel, click **Yes**.

7 In the Server Status table, verify that the task has been completed.

8 If applicable, repeat these steps for other managed servers.

Start the SAS Applications

To start the SAS Web applications use the WebLogic Server Administration Console and follow these steps:

1 In the **Domain Structure** panel, select **Deployments**. All SAS Web applications should be displayed in a Prepared state.

2 In the **Deployments** panel, select all applications by selecting the check box next to **Name**.

3 From the **Start** menu, select **Servicing All Requests**.

4 In the Start Application Assistant, select `Yes`.

IBM WebSphere Application Server

There are two methods to redeploy a SAS Web application to WebSphere Application Server. In the first method, you can update an installed application and select **Replace the entire application**. With this method, you can maintain all of the application settings, such as the class loader policy and mode for the EAR and WAR modules. For information about this operation, see the IBM WebSphere Application Server documentation at `http://www.ibm.com/support/documentation/us/en`.

In the second method, you undeploy and redeploy each application individually until all of the rebuilt Web applications have been redeployed.

Although you can redeploy the EAR files in any order of your choice, it is recommended that you follow the sequence of EAR files specified for WebSphere Application Server. See "Deploying and Starting Web Applications in the Correct Order" on page 16.

To redeploy a SAS Web application to WebSphere by undeploying and redeploying each application individually, follow these steps:

1 Uninstall and reinstall the Web application.

   a Shut down the WebSphere application server, but leave the **`dmgr`** and **`nodeagent`** running.

   b Follow the IBM WebSphere Application Server instructions for uninstalling and reinstalling a Web application. When you reinstall the application, specify the following two settings on the **Select installation options** page:

   Deploy enterprise beans
   Do not select this check box. SAS Web applications do not use Enterprise Java Beans.

   Deploy Web services
   Select this check box. This ensures that the Web services deploy tool is run.

2 Set the class loader order.

   a In the Integrated Solutions Console, select **Applications** ▶ **Application Types** ▶ **WebSphere enterprise applications**. Then select the SAS Web application that you are redeploying.

   b Click **Class loading and update detection**.

   c For the **Class loader order**, select the **Classes loaded with local class loader first (parent last)** radio button.

d Leave the **WAR class loader policy** set to **Class loader for each WAR file in application**.

e Click **OK**.

f Click **Manage Modules**.

g For each module (WAR file) listed under **Manage Modules**, click the WAR file link. Then select **Classes loaded with local class loader first (parent last)** from the **Class loader order** list box.

h After you have performed the previous step for each WAR file, click **OK**.

i Select **Startup behavior** and specify a value for **Startup order**.

j Save your changes.

3 Perform a Full Resynchronization.

Perform a full resynchronization of the `dmgr` server and `nodeagent` servers. This action ensures the WebSphere Master Repository and the Node Repository are updated and synchronized.

a In the Integrated Solutions Console, select **Administration** ▶ **Nodes**.

b Select the check box for the application server node.

c Click **Full Resynchronize**.

When you have completed these instructions, restart the application. (For the proper start-up sequence of the SAS Web applications, see "Deploying and Starting Web Applications in the Correct Order" on page 16.)

Reconfiguring the Web Application Server

Reconfigure your Web application server when any of the following conditions apply:

- A new SAS Web application is added to your deployment.
- A Web application is unconfigured and reconfigured.
- A software bundle is added to an existing configuration.

It is important to reconfigure your Web application server in the same manner that it was initially configured. If you manually configured the Web application server when you initially deployed, then configure it manually again. If the SAS Deployment Wizard automatically configured your Web application server, then choose the automatic configuration option again.

If the environment was initially configured with the **Web Application Server: Multiple Managed Servers** option in the SAS Deployment Wizard, then reconfigure the Web application server by using the Custom path in the SAS Deployment Wizard and selecting the **Web Application Server: Multiple Managed Servers** again. Reconfiguring a Web application server can cause the loss of some customizations, and they need to be reapplied.

For more information, see “Managing Your SAS Deployment” in the *SAS Intelligence Platform: Installation and Configuration Guide*.

Working with Exploded EAR Files in a Development Environment

It can be useful to run a SAS Web application from an exploded EAR file rather than an EAR file when you want to debug or develop new JavaServer Pages (JSP). SAS provides the Web applications as exploded EAR files in ***SAS-config-dir*\Lev1\Web\Staging\exploded**. Deployment of modified EAR files from an exploded directory varies with the Web application server as follows:

JBoss Application Server

JBoss has direct support for deployment of exploded EAR files. To deploy an exploded EAR file, move the exploded directory to the **deploy_sas** directory. Because the exploded directory name must be the same as the original EAR file, the original EAR file must be removed from the deployment directory.

Oracle WebLogic Server

WebLogic Server has direct support for deployment of exploded EAR files. To deploy an exploded EAR file using the WebLogic Server Administrative Console, select the full path to the exploded EAR.

IBM WebSphere Application Server

WebSphere Application Server explodes deployed EAR files on its own. Deployed files must be either EAR files or WAR files.

Starting with WebSphere Application Server 6.1, you can update an existing deployed application with individual files or modules. By selecting the full path to the JSP or WAR directory, individual components of a modified, exploded EAR file can be used in a deployed application. You can use the Integrated Solutions Console to update a deployed application.

Administering Logging for SAS Web Applications

Logging for SAS Web Applications

The SAS Web applications use log4j to perform logging. As each Web application begins running, the log4j configuration file for the Web application is read from ***SAS-config-dir*\Lev1\Web\Common\LogConfig**. After the log4j configuration file is read, the Web applications that permit dynamic logging changes check for modifications that were set with the SAS Web Administration Console.

The following table identifies if customizations can be performed by editing the log4j configuration file, using the SAS Web Administration Console, or both:

Task	Log4j Configuration File	SAS Web Administration Console
Change the logging levels.	Yes	Yes
Add a logging category.	Yes	Yes

Task	Log4j Configuration File	SAS Web Administration Console
Changes persist after Web application server restarts.	Yes	No
Add or change an appender to log to console, file, socket, or ARM.	Yes	No
Change a log filename or location.	Yes	No
Change the layout pattern for the log message.	Yes	No
Track user logons. You can monitor usage patterns by logging activity for SAS Web application logons.	Yes	No

For information about the log4j configuration file, see `http://logging.apache.org/log4j/index.html` and `http://logging.apache.org/log4j/1.2/manual.html`.

Logging categories use the fully qualified class name of the class where the logging message originates. Categories for the following classes are common to all SAS Web applications:

- com.sas
- com.sas.services
- com.sas.services.deployment
- com.sas.services.discovery
- com.sas.services.util

TIP To troubleshoot SAS Logon Manager authentication, set the `com.sas.svcs.authentication` context to DEBUG level for SAS WIP Services. Set the `com.sas.services.user` context to DEBUG level for SAS Remote Services. You must restart SAS Remote Services and the Web application server.

Change the Location of the Log Files

To modify the location of a log file, follow these steps:

1 Change directory to **_SAS-config-dir_\Lev1\Web\Common\LogConfig** and edit the log4j file for the application to modify.

2 Locate the file appender and modify the value of the file parameter:

```
<appender
        class="org.apache.log4j.FileAppender"
        name="SAS_FILE">
    <param
        name="append"
        value="true"/>
    <param
        name="file"
        value="C:/SAS/Config/Lev1/Web/Logs/SASLogon9.3.log"/>
    <layout
        class="com.sas.svcs.logging.CustomPatternLayout">
            <param
                name="ConversionPattern"
                value="%d [%t] %-5p [%u] %c - %m%n"/>
    </layout>
</appender>
```

> **TIP** The CustomPatternLayout that is provided by SAS accepts the log4j conversion characters and two conversion characters that are added by SAS. The %u conversion character is used to report the client identity that is in the security context. The %s conversion character is used to report the session identifier that is in the security context. The log4j conversion characters are described at **http://logging.apache.org/log4j/1.2/apidocs/org/apache/log4j/PatternLayout.html**.

3 Restart the Web application so that it uses the new configuration.

Change the Logging Levels

Logging Level Descriptions

The log4j file has five levels of detail: DEBUG, INFO, WARN, ERROR, and FATAL. Enabling a level also enables the less detailed levels above the selected level. The default level is set to WARN, which means that WARN, ERROR, and FATAL messages are recorded. In large-scale deployments, the size of the log file can grow rapidly when INFO messages are enabled. However, you might want to enable the INFO messages during the development and testing phases.

CAUTION! Excessive logging can degrade performance. Therefore, you should not use the DEBUG level unless you are directed to do so by SAS Technical Support.

If you need to debug a problem, it is recommended that you dynamically change the log output temporarily.

Here is a brief description of each level:

DEBUG
: displays the informational events that are most useful for debugging an application.

INFO
: displays informational messages that highlight the progress of the application.

WARN
: displays potentially harmful situations.

ERROR
: displays error events that might allow the application to continue to run.

FATAL
: displays very severe error events that might cause the application to end abnormally.

Using log4j Files

To modify the logging level by editing a log4j configuration file, follow these steps:

1 Change directory to *SAS-config-dir*\Lev1\Web\Common\LogConfig and edit the log4j file for the application to modify.

2 Locate the category for the class that you want to modify and modify the value of the priority parameter:

```
<category
        additivity="false"
        name="com.sas.workflow">
    <priority
            value="WARN"/>
    <appender-ref
            ref="SAS_CONSOLE"/>
    <appender-ref
            ref="SAS_FILE"/>
</category>
```

3 Restart the Web application so that it uses the new configuration.

Using SAS Web Administration Console

Note: Changing the logging level with the SAS Web Administration Console is supported by some of the SAS Web applications.

1 Log on to SAS Web Administration Console.

2 Expand **Application Management** and then select the Web application.

3 Expand the **Logging** section.

4 Select the radio button for the class and logging level that you want to change.

5 Click **Submit Changes**. The change takes effect immediately. You do not need to restart the Web application.

Understanding How the Web Applications Provide a Logging Context

The SAS Web Infrastructure Platform implements a framework that provides separate logging contexts for the individual SAS Web applications. It is useful to understand how SAS implements individual logging contexts in case you need to modify any of the related configuration files. In addition, you might want to create a logging context for Web applications that are developed at your site.

The SAS Web applications implement this capability as follows:

- The **web.xml** file for the Web application contains the following listener element:

  ```
  <listener>
    <listener-class>com.sas.svcs.logging.LoggingContextListener
    </listener-class>
  </listener>
  ```

  The listener element must directly follow the filter and filter-mapping elements and directly precede the servlet element. This listener is added as the first listener within the <web-app> element if there are multiple listeners.

  The **web.xml** file also contains this tag:

  ```
  <context-param>
    <param-name>log4j-config-name-prefix</param-name>
    <param-value>YourWebAppName</param-value>
  </context-param>
  ```

  In the tag, *YourWebAppName* should be a name that contain no spaces or special characters (for example, SASWebReportStudio). This name is prefixed to -log4j.xml to form the filename of the application-specific log4j configuration file.

- Web application servers use a JVM option, -Dcom.sas.log.config.url, that identifies the directory where the log4j configuration files are located. The framework within the SAS Web Infrastructure Platform uses this property to locate the log4j file for a particular Web application. The framework then loads the configuration into a private logging context for the Web application. Any loggers that the Web application obtains from a locally deployed Logging Service also share this same private logging context. Check your Web application server start-up script or configuration file to determine the appropriate directory location.

Here is an example directory for a default deployment:

***SAS-config-dir*\Levn\Web\Common\LogConfig**

The name of the log4j file has this form:

***YourWebAppName*-log4j.xml**

where *YourWebAppName* is the string that was provided in the <context-param> element of the **web.xml** file.

- A copy of the **sas.svcs.commons.jar**, which contains the com.sas.svcs.logging.LoggingContextListener class, must be in the Web application's CLASSPATH. This is accomplished by placing the JAR file within the **WEB_INF/lib** directory for the Web application.

8

Administering SAS Logon Manager

About SAS Logon Manager

The SAS Logon Manager is a Web application that handles all authentication requests for SAS Web applications. As a result, users see the same logon page when they access the SAS Web applications.

The purpose of the SAS Logon Manager is to authenticate and direct a successful logon to the appropriate Web application. The application also serves as the central point for handling changes to authentication mechanisms, such as the addition of Windows SSPI or third party single sign-on products.

Configuring Web Authentication

Overview of Web Authentication

By default, SAS Web applications use the form-based authentication that is provided by the SAS Logon Manager Web application. When credentials are provided to the SAS Logon Manager Web application, the credentials are sent to the SAS Metadata server for authentication. The metadata server then authenticates the credentials against its authentication provider. The default provider is the host operating system.

As an alternative, you can configure the SAS Web applications to authenticate on the middle tier. When users log on to a SAS Web application, the Web application server handles the initial authentication. In this configuration, the Web application server's JAAS login module authentication provider verifies the user's identity. Then, the SAS Logon Manager Web application makes a trusted user connection to the metadata server to check that the authenticated user has a SAS identity in metadata.

Performing Web authentication facilitates single sign-on. Most likely, your organization has several applications behind a common set of reverse proxy and HTTP servers. By having a common server handle authentication, users do not need to re-authenticate for access to each application.

Configuration Instructions

Instructions for configuring the SAS Web applications and the Web application server for Web authentication are provided at the following URLs:

- `http://support.sas.com/resources/thirdpartysupport/v93/appservers/jbossdoc.html`
- `http://support.sas.com/resources/thirdpartysupport/v93/appservers/webspheredoc.html`
- `http://support.sas.com/resources/thirdpartysupport/v93/appservers/weblogicdoc.html`

Configuring Custom Log On, Log Off, and Time Out Messages

Step 1: Customize the Message

You can configure a customized message that is displayed when users of SAS Web applications log on, log off, or the session reaches the time out interval. To enable the display of a custom message, follow these steps:

1. Edit one or both of the ***`SAS-install-dir`***`\SASWebInfrastructurePlatform\9.3\Static\wars\sas.svcs.logon\logoff_custom.jsp` and `logon_custom.jsp` files.

   The time out message is customized in the `logoff_custom.jsp` file. Each file is included as part of an HTML page. Therefore, each should contain valid HTML code.

2. Save your changes.

Step 2: Configure SAS Application Infrastructure

1 Log on to SAS Management Console.

2 On the **Plug-ins** tab, select **Application Management** ▶ **Configuration Manager**, right-click **SAS Application Infrastructure**, and select **Properties**.

3 Click the **Settings** tab.

4 Select **Policies** in the left pane.

5 Set any or all of these properties to `Yes`:

- Display custom logon message
- Display custom logoff message
- Display custom timeout message

Click **OK**.

6 Exit from SAS Management Console.

Step 3: Rebuild and Redeploy SAS Web Infrastructure Platform

1 Rebuild the SAS Web Infrastructure Platform with the SAS Deployment Manager.

2 Redeploy the SAS Web Infrastructure Platform Applications Web application (`sas.wip.apps9.3.ear`). Also redeploy the services (`sas.wip.services9.3.ear`), SAS Content Server (`sas.wip.scs9.3.ear`), and stored process Web application (`sas.storedprocess9.3.ear`).

3 Verify that the custom logoff message is displayed when you log on and log off from the Web application.

Configuring the HTTP Session Time-out Interval

A session time-out interval logs off users' inactive sessions after a specific period of time that is defined in the Web application server configuration. The default value for a session time-out interval is 30 minutes. You can customize the session time-out interval for your environment by modifying one or more of the **web.xml** files, and specifying a different time-out interval.

To specify a session time-out interval, follow these steps:

1. Use the table that follows this procedure to identify the files to modify.

2. Modify the following code in the appropriate files:

   ```
   <session-config>
     <session-timeout>time-out-interval</session-timeout>
   </session-config>
   ```

   Replace *time-out-interval* with the time-out interval in minutes. As a recommendation, the number should be no smaller than 5.

   When you are finished, save and close the file.

3. Use the SAS Deployment Manager to rebuild the EAR files that contain the SAS Web applications.

4. Redeploy the Web applications whose files you modified.

The following table lists the file or files that should be modified to specify a different time-out interval for each Web application.

Table 8.1 *Files to Modify for the Time-out Interval*

Web Application	File Location
SAS Help Viewer for Midtier Applications	*SAS-install-dir*\Documentation\9.3\Static\wars\sas.webdoc\WEB-INF\web.xml *SAS-install-dir*\Documentation\9.3\Static\wars\sas.webdoc\WEB-INF\web.spring-enabled.xml
SAS BI Dashboard	*SAS-install-dir*\SASBIDashboard\4.31\Configurable\wars\sas.bidashboard\WEB-INF\web.xml.orig
Event generation framework in SAS BI Dashboard	*SAS-install-dir*\SASBIDashboard\4.31\Configurable\wars\sas.eventsgenerationframework\WEB-INF\web.xml.orig
SAS BI Portlets	*SAS-install-dir*SASBIPortlets\4.3\Configurable\wars\sas.biportlets\WEB-INF\web.xml-thirdparty.orig *SAS-install-dir*SASBIPortlets\4.31\Configurable\wars\sas.biportlets\WEB-INF\web.xml-idp.orig
JSR 168 for SAS BI Portlets	*SAS-install-dir*SASBIPortlets\4.31\Configurable\wars\sas.jsr168remoteportlet\WEB-INF\web.xml.orig
Flex Themes for SAS*	*SAS-install-dir*\SASFlexApplicationThemes\3.4\Configurable\FlexThemes\wars\sas.flexthemes\WEB-INF\web.xml.orig
SAS Theme Designer for Flex	*SAS-install-dir*\SASFlexApplicationThemes\3.4\Configurable\ThemeDesigner\wars\sas.themedesigner\WEB-INF\web.xml.orig

Web Application	File Location
SAS Package Viewer	`SAS-install-dir\SASInformationDeliveryPortal\4.31\Configurable\wars\sas.packageviewer\WEB-INF\web.xml.orig`
SAS Information Delivery Portal	`SAS-install-dir\SASInformationDeliveryPortal\4.31\Configurable\wars\sas.portal\WEB-INF\web.xml.orig`
SAS BI Web Services*	`SAS-install-dir\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.biws\WEB-INF\web.xml.orig`
SAS Preferences*	`SAS-install-dir\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.preferences\WEB-INF\web.xml.orig`
SAS Shared Applications*	`SAS-install-dir\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.shared.apps\WEB-INF\web.xml.orig`
SAS Stored Process*	`SAS-install-dir\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.storedprocess\WEB-INF\web.xml.orig`
SAS Logon Manager*	`SAS-install-dir\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.svcs.logon\WEB-INF\web.xml.orig`
SAS Content Server*	`SAS-install-dir\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.svcs.scs\WEB-INF\web.xml.orig`
SAS Web Infrastructure Platform Client Access *	`SAS-install-dir\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.wip.access\WEB-INF\web.xml.orig`
SAS Web Administration Console *	`SAS-install-dir\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.wip.admin\WEB-INF\web.xml.orig`

Web Application	File Location
SAS Web Infrastructure Platform Services *	`*SAS-install-dir*\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.wip.services\WEB-INF\web.xml.orig`
SAS SOAP Services *	`*SAS-install-dir*\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.wip.soapservices\WEB-INF\web.xml.orig`
SAS Workflow Web Service *	`*SAS-install-dir*\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.workflow.webservice\WEB-INF\web.xml.orig`
SAS Workflow *	`*SAS-install-dir*\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.workflow\WEB-INF\web.xml.orig`
SAS Shared Web Assets*	`*SAS-install-dir*\SASWebInfrastructurePlatform\9.3\Static\wars\sasweb\WEB-INF\web.xml`

SAS Web Report Studio	`*SAS-install-dir*\SASWebReportStudio\4.31\Configurable\wars\sas.webreportstudio\WEB-INF\web.jboss.xml.orig`
	`*SAS-install-dir*\SASWebReportStudio\4.31\Configurable\wars\sas.webreportstudio\WEB-INF\web.weblogic.xml.orig`
	`*SAS-install-dir*\SASWebReportStudio\4.31\Configurable\wars\sas.webreportstudio\WEB-INF\web.websphere.xml.orig`

* The session-config element described in Step 2 must be added to the web.xml.orig file for this application.

Configuring the Display of a Warning Message for Inactive User Sessions

Understanding Inactive Users and Time-out Warnings

Inactive users are logged off their Web applications when their sessions are inactive for 30 minutes or for the amount of time specified by the administrator in the **`web.xml`** files. Before logging out inactive sessions, you can alert users about the impending logoff by displaying a warning message. When the warning message is displayed, users can click the **`Continue`** button to activate and extend their sessions. The following applications support the display of a warning message:

- SAS Web Report Studio
- SAS Information Delivery Portal
- SAS BI Dashboard
- SAS Package Viewer
- SAS Shared applications
- SAS Preferences
- SAS Web Administration Console
- SAS Stored Process

If you want to specify a different session time-out interval for each SAS application, complete this task for each SAS application by defining the **`App.SessionTimeoutWarningInterval`** property and a custom value in minutes.

Step 1: Configure the SAS Application Infrastructure

To configure the SAS application infrastructure:

1 Log on to SAS Management Console.

2 On the **Plug-ins** tab, select **Application Management** ▶ **Configuration Manager**, right-click **SAS Application Infrastructure**, and select **Properties**.

3 In the SAS Application Infrastructure Properties dialog box, click the **Advanced** tab.

Step 2: Set the Interval for the Inactive Session Warning

This set of steps is optional. If you do not specify a value for the App.SessionTimeoutWarningInterval, a default value of 5 minutes applies to the Policy.DisplaySessionTimeoutWarning property. The value specified for the App.SessionTimeoutWarningInterval must be smaller than the value or values specified for session time-out intervals in the web.xml files.

To set the interval for the inactive session warning:

1 Click **Add** to define a new property.

2 Enter `App.SessionTimeoutWarningInterval` in the **Property Name** field.

3 Enter the number of minutes for the inactive session warning in the **Property Value** field and click **OK**.

Step 3: Enable the Inactive Session Warning

To enable the inactive session warning:

1 Click **Add** to define another new property.

2 Enter `Policy.DisplaySessionTimeoutWarning` in the **Property Name** field.

3 Set the value to `true` and click **OK**.

To enable these properties to take effect, restart the Web application server.

Configuring Middle Tier Security Policies

The policies identified in the following table are configured with SAS Management Console. For more information, see "Setting Global Properties for SAS Applications Using SAS Application Infrastructure Properties" on page 77.

Table 8.2 *Middle Tier Security Policies*

Policy Name	Default Value	Description
Check for metadata updates	Check on navigation	This is a deprecated property. Do not change the value unless you are directed to by SAS technical support.
Profile refresh interval	600000	This is a deprecated property. Do not change the value unless you are directed to by SAS technical support.
Allow client password storage	Yes	Indicates whether the site permits remote SAS clients to store user password credentials locally on the client. Many sites prohibit end-user clients from caching or persisting passwords for use in distributed applications.
Allow user log on from web logoff page	Yes	Determines whether to display a **Log On** button on the logoff successful page. Some sites, especially those that deploy walk-up kiosks, might want to ensure that their application users close the browser for added security.

Policy Name	Default Value	Description
Allow user logon from web timeout page	Yes	Determines whether to display a **Log On** button on the session timed out page. Some sites, especially those that deploy walk-up kiosks, might want to ensure that their application users close the browser for added security.
Display custom logon message	No	Determines whether to display a custom message or custom page on the standard logon page.
Display custom logoff message	No	Determines whether to display a custom message or custom page on the standard logoff successful page.
Display custom timeout message	No	Determines whether to display a custom message or custom page on the standard session timed out page.
Display logoff security message	Yes	Determines whether to display a security message on the logoff successful page. Some sites, especially those that deploy walk-up kiosks, might want to ensure that their application users close the browser for added security.
Display timeout security message	Yes	Determines whether to display a security message on the session timed out page. Some sites, especially those that deploy walk-up kiosks, might want to ensure that their application users close the browser for added security. For more information about time out values, see “Configuring the HTTP Session Time-out Interval” on page 151.

Policy Name	Default Value	Description
Display failed logon hints	No	Determines whether to display detailed messages on the failed logon page (for example, to indicate that the password was invalid). If this policy is set to `No`, the system-generated exceptions and errors are still displayed, such as if the system is quiesced or if the SAS Metadata Server is paused. If the value is `No`, the only message that is displayed for any user input failure is the invalid credentials message.
Enable autocomplete feature on logon page	No	Determines whether to use the autocomplete feature that is provided by the Web browser on the logon page.
Allow clients to keep service sessions alive	Yes	Determines whether desktop client applications keep middle tier resources alive. If set to `No`, then middle tier resources time out in a similar manner to Web applications. If set to `Yes`, then desktop client applications ping the server to keep the resources available.

Disabling Concurrent Logon Sessions

The default behavior for the SAS Logon Manager and the other SAS Web applications is to permit multiple logon sessions. However, it is possible to configure an advanced middle-tier security policy to prevent multiple logon sessions. When this policy is active, users can log on to one SAS Web application at a time. When users use the **Log Off** link that is provided in the application banner, the logon session is destroyed, and users can log on to a SAS Web application again.

To disable concurrent logon sessions, follow these steps:

1 Log on to SAS Management Console.

2 On the **Plug-ins** tab, select **Application Management** ▶ **Configuration Manager**, right-click **SAS Application Infrastructure**, and select **Properties**.

3 In the SAS Application Infrastructure Properties dialog box, click the **Advanced** tab.

4 Click **Add** to define a new property.

5 Enter `Policy.DisableConcurrentUserLogins` in the **Property Name**. Enter `true` in the **Property Value** field.

6 Click **OK**.

Settings are not applied and made active automatically. You must restart the SAS Web Infrastructure Platform Services or the Web application server.

When this setting is enabled, each logon session is recorded and cached. When an additional request to log on is made, the existing session is found and the logon request is rejected. Sessions are removed from this cache in one of the following ways:

- The user logs off the SAS Web application using the **Log Off** link in the application banner.
- The user session times out.
- The user session is terminated by an administrator that uses the SAS Web Administration Console to **Force Log Off** the user.

If a user closes a Web browser, the session persists (and prevents subsequent log on attempts) until the session times out or an administrator forces a logoff with the SAS Web Administration Console.

Configuring Application Response Measurement (ARM) Capabilities

ARM processing for SAS Logon Manager is disabled by default in a standard deployment. To modify configuration information to enable ARM processing, follow these steps:

1 Edit the ***SAS-config-dir*\Lev1\Web\Common\LogConfig\SASLogon-log4j.xml** file and add the following lines:

```
<appender name="ArmAppender" class="com.sas.arm.log4jappender.ArmAppender">
   <param name="AppName"  value="IOM.APP"/>
   <param name="GroupName" value="SAS"/>
</appender>
<logger name="com.sas.arm.log4j.logger">
   <level value="debug"/>
   <appender-ref ref="ArmAppender"/>
</logger>
```

Note: All appenders in the file must precede all loggers and categories. Otherwise, the configuration fails.

2 Edit the ***SAS-install-dir*\SASWebInfrastructurePlatform\9.3\Static\wars\sas.svcs.logon\WEB-INF\spring-config\aop-config.xml** file. Remove the XML comments around the definition and reference of the arm-processor bean.

```
<!--  may also specify include-arm-processor="true" -->
<sas-aop:client-context-propagation
    include-target-processor="true"
    include-arm-processor="true" />
```

3 Edit the **SASWebInfrastructurePlatform\9.3\Static\wars\sas.wip.services\WEB-INF\spring-config\services-remote-config.xml** file. Remove the XML comments around the definition and reference of the arm-processor bean.

```
<!-- may also specify include-arm-processor="true" -->
<sas-aop:server-context-propagation
    include-target-processor="true"
    include-arm-processor="true" />
```

4 Rebuild and redeploy the SAS Web Infrastructure Platform Web application.

Upon successful start of the application server, the ARM monitoring of logon and logoff activities is enabled.

9

Administering the SAS Content Server

About the SAS Content Server

The SAS Content Server is a content repository that stores digital content (such as documents, reports, and images) created and used by SAS client applications. Examples of such content include reports and documents created by users of SAS Web Report Studio and the SAS Information Delivery Portal.

The Web-based Distributed Authoring and Versioning (WebDAV) protocol is currently the main method used to access the SAS Content Server. In addition to the basic features of HTTP, the WebDAV protocol is an extension to HTTP and provides Write access, version control, search, and other features.

The SAS Content Server starts automatically when the Web application server is started and depends on the SAS Services Application. The SAS Services Application deploys a set of services called Remote Services that are used by SAS Information Delivery Portal, the SAS Stored Process Web application, and other Web applications. The SAS Services Application must be started before you start your Web application server.

Three JVM options are related to the SAS Content Server deployment. In the event that the deployment of SAS Content Server changes, the JVM options can be used to set the new values.

Table 9.1 SAS Content Server JVM Options

JVM Option	Description
`-Dsas.scs.scheme`	Use `http` or `https`.
`-Dsas.scs.host`	Use the host name of the Web application server.
`-Dsas.scs.port`	Use the port number of the Web application server instance.

For deployments that use WebSphere Application Server with approximately 900 concurrent users, you can avoid performance issues and transaction time out errors by modifying the JDBC data source definition. Use the administration console to modify the SharedServices data source with a connection pool custom property. Add a custom connection pool property with a name of **`defaultConnectionTypeOverride`** and a value of **`unshared`**.

Moving Content or Backing Up the SAS Content Server

The SAS Content Server should be backed up whenever the metadata server is backed up. For instructions about how to back up the SAS Content Server, see “Best Practices for Backing Up Your SAS System” in the *SAS Intelligence Platform: System Administration Guide*.

Use the WebDAVDump and WebDAVRestore utilities to:

- Back up specific locations such as a subset of the WebDAV content.
- Create a backup for input to a system other than the SAS Content Server.
- Move content from one SAS Content Server to another one.
- Share content that is available in the SAS Content Server.

For instructions about using the WebDAVDump and the WebDAVRestore utilities, see SAS Note 38667.

Deploying Content Manually to the SAS Content Server

Overview

SAS Web applications such as the SAS Information Delivery Portal and SAS Web Report Studio require the availability of content for its users. The SAS Content Server provides a WebDAV content repository that stores digital content (such as documents, reports, and images) that is created and used by SAS client applications.

To enable the availability of the content in the SAS Content Server, you can load content, update existing content, and adjust Web applications that store SBIP URLs. These tasks can be automated or they can be performed manually.

The following table shows the choices available in the SAS Deployment Wizard, and the results or manual tasks that follow these choices.

Table 9.2 Selecting Automatic Options or Manual Performance of Tasks

Options Selected in SAS Deployment Wizard	Results and Instructions for Manual Tasks

`Web Application Server: Automatic Configuration`
`Web Application Server: Automatic Deployment`
	The Web application server is configured automatically. SAS Web applications are deployed automatically, and content is loaded to the SAS Content Server. If applicable, Web applications that store SBIP URLs are adjusted automatically.

`Web Application Server: Automatic Configuration` Manually deploy Web applications, load the content to the SAS Content Server, and adjust any Web applications that store SBIP URLs.	The Web application server is configured automatically. Instructions are provided on how to manually deploy SAS Web applications, load content to the SAS Content Server, and adjust any Web applications that store SBIP URLs.
Manually configure the Web application server, deploy the Web applications, load the content to the SAS Content Server, and adjust any Web applications that store SBIP URLs.	Instructions are provided on how to perform all tasks manually.

The following table shows when you can load or update content (and adjust URLs) either automatically or manually.

Table 9.3 *Criteria for Deploying Content to the SAS Content Server*

Configuration of Web Application Server	Deployment of Web Applications	Load Content	Update Content	Adjust URLs
Automatic	Automatic	Automatic	Automatic	Automatic
Automatic	Manual	Manual	Manual	Manual
Manual	Manual	Manual	Manual	Manual

The following table shows the files associated with loading content to the SAS Content Server or updating content. The filename for the batch or script file includes the order number.

Security Considerations for SAS Content Server Scripts

The scripts that are described in this section for loading content, updating content, and adjusting URLs use the SAS Administrator and SAS Trusted User credentials. For deployments that performed a manual deployment of the SAS Web applications, these scripts include the user IDs and an encoded form of the password. For deployments that performed an automatic deployment of the SAS Web applications, the scripts include the user IDs, but do not include the passwords in any form.

Passwords in these files, whether added by the SAS Deployment Wizard, or by a SAS administrator, are not updated with the Update passwords feature of the SAS

Deployment Manager. Running the scripts with an expired password, or no password, provides a log result like the following example:

Output 9.1 *Log File Example for Invalid Credentials*

```
config.init:
     [echo] ant.version=Apache Ant version 1.7.0 compiled on December 13 2006
     [echo] ant.file=/opt/SASHome/SASWebInfrastructurePlatform/9.3/Config/webinfpltfm_config.xml
     [echo] file.encoding=ISO646-US
     [echo] about to read property file because config.init.set=${config.init.set}
[GetObjectProperties] Error connecting to the metadata server: Access denied.
[GetObjectProperties]    Host: hostname.example.com
[GetObjectProperties]    Port: 8561
[GetObjectProperties]    User: sasadm@saspw
[GetObjectProperties]    m_mdFactory: com.sas.metadata.remote.MdFactoryImpl@74db2c
[GetObjectProperties] Error finding foundation repository: Encountered metadata exception.

BUILD FAILED
/opt/SASHome/SASDeploymentManager/9.3/products/
cfgwizard__93345__prt__xx__sp0__1/Utilities/configuration_targets.xml:95: null
```

If you need to update or add a password, use the PWENCODE procedure. The following code example shows how to generate the encoded form of the password *changeit*. Copy and paste the result into the scripts.

Example Code 9.1 *PWENCODE Procedure Example*

```
proc pwencode in="changeit" method=sas002; run;
```

The SAS log shows the value to copy and paste into the script:

```
{SAS002}4DE4CF4F130AC6BE4A6934E0596C8222
```

After you run the scripts, remove the encoded form of the passwords from the scripts as an additional security measure.

Load Content Manually to the SAS Content Server

If you deploy SAS Web applications manually, you need to load content manually to the SAS Content Server. For information about how to load content manually for SAS Web applications, see your **`Instructions.html`** file.

Use the following batch file or shell script to load content manually:

- On Windows:

***SAS-config-dir*\Lev1\Web\Utilities\manualLoadContent-*OrderNumber*.bat**

- On UNIX and z/OS:

  ***SAS-config-dir*/Lev1/Web/Utilities/manualLoadContent.sh-*OrderNumber*.sh**

If Web applications were deployed manually, this script contains the credentials for the SAS Administrator, as well as the SAS Trusted User. The password is always encrypted in the file. After loading content successfully, remove credentials for the SAS Administrator and the SAS Trusted User.

If Web applications were deployed automatically, the script does not contain the required credentials. You must manually enter the required credentials in this script file.

Update Content Manually for the SAS Content Server

If you deploy updated SAS Web applications manually, you must manually update the DAV content in the SAS Content Server. For more information, see your **UpdateInstructions.html** file, which is located in the ***SAS-config-dir* /Lev1/Documents** directory.

You must update content manually before portal content is promoted to SAS Information Delivery Portal 4.3. In this case, data explorations must be converted to reports, and directive URLs should be adjusted manually. For more information, see “Promote the Entire Portal Application Tree” in Chapter 12 of *SAS Intelligence Platform: Web Application Administration Guide*.

Use the following batch file or shell script to update the DAV content manually:

- On Windows:

  ***SAS-config-dir*\Lev1\Web\Utilities\manualUpdateContent-*OrderNumber*.bat**

- On UNIX and z/OS:

  ***SAS-config-dir*/Lev1/Web/Utilities/manualUpdateContent-*OrderNumber*.sh**

If Web applications were deployed manually, this script contains the credentials for the SAS Administrator, as well as the SAS Trusted User. The password is always encrypted in the file. After loading content successfully, remove credentials for the SAS Administrator and the SAS Trusted User.

If Web applications were deployed automatically, the script does not contain the required credentials. You must manually enter the required credentials in this script file.

Adjust Directive URLs Manually

Directive URLs are updated either during the migration of a product from one version to another version, or when a product's content is modified and updates are required. When the script is run to adjust URLs, it updates references to metadata that has moved either during migration or an upgrade. These references are stored as SBIP URLs.

You must update content manually before portal content is promoted to SAS Information Delivery Portal 4.3. In this case, data explorations must be converted to reports and directive URLs should be adjusted manually. For more information, see “Promote the Entire Portal Application Tree” in Chapter 12 of *SAS Intelligence Platform: Web Application Administration Guide*.

Here are some examples of instances that require adjusting URLs manually:

- When a migration is performed, some reports might be moved to a user’s home folder. If there were references to the data in those reports (in the form of SBIP URLs), then those references are updated by the script.
- During a migration or an upgrade, data explorations are converted to reports. If there were references to the data explorations (in the form of SBIP URLs), then those references are updated by the script.

After updating content manually for the SAS Content Server, adjust directive URLs manually by running the appropriate script or batch file:

- On Windows:

  ```
  SAS-config-dir\Lev1\Web\Utilities\manualAdjustURLs-
  OrderNumber.bat
  ```

- On UNIX and z/OS:

  ***SAS-config-dir*/Lev1/Web/Utilities/manualAdjustURLs-*OrderNumber*.sh**

The instructions for running the script or batch file are provided in the **Instructions.html** migration or the **UpdateInstructions.html** file during an upgrade. The script contains the credentials for the SAS Administrator, as well as the SAS Trusted User. The password is always encrypted. When you have successfully loaded the content, remove the credentials for the SAS Administrator and the SAS Trusted User.

Log Files Generated by the Scripts

When any of the scripts in the previous sections are run, log files are produced for each SAS Web application that is affected. Log messages are written to a file called ***product-name_script-name_date-and-time*.log** For UNIX and z/OS machines, the log filename always includes the date and timestamp. For Windows machines, the log filename includes the date and timestamp for machines that use an English locale only.

These log files are located in the following directories:

On Windows:

***SAS-config-dir*\Lev1\Logs\Configure**

On UNIX and z/OS:

***SAS-config-dir*/Lev1/Logs/Configure**

Using the SAS Content Server Administration Console

About the SAS Content Server Administration Console

The SAS Content Server Administration Console enables you to manage files and WebDAV folders in the SAS Content Server. Using the console, you can perform the following management tasks:

- view folders
- control access to WebDAV folders and files by setting permissions
- create folders
- delete folders

Access the SAS Content Server Administration Console

To access the console, enter the following URL in your Web browser and substitute the server name and port number of your SAS Content Server:

```
http://server:port/SASContentServer/dircontents.jsp
```

Note: This console is also part of the SAS Web Administration Console. You can administer the SAS Content Server by using either interface. For more information about accessing the SAS Web Administration Console, see “Using the SAS Web Administration Console ” on page 92.

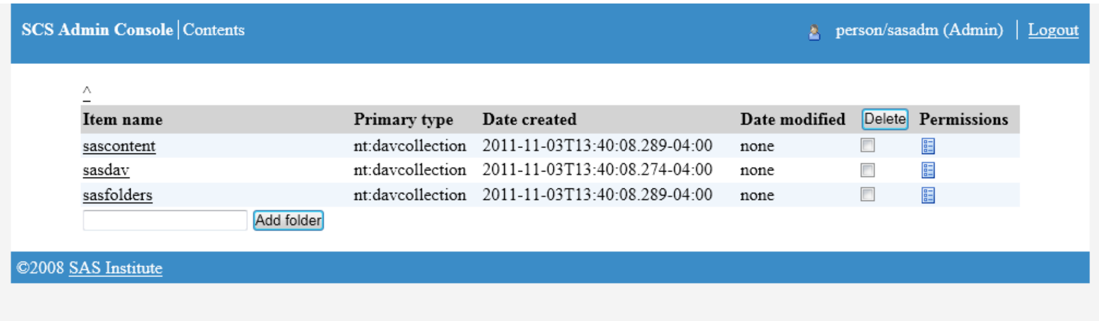
Log on to the console with an unrestricted user ID (for example, sasadm@saspw). The term "(Admin)" after your name at the top of the page indicates that you are logged on as an unrestricted user. This provides full administrator rights to use the console.

As a security precaution, make sure that you log off when you are finished using the console. If you go to another URL or close the tabbed page in your browser without logging off, your console logon remains in effect. This means that the console can be accessed again without re-entering a user name and password.

A Brief Tour of the Console Interface

The following display shows an example SAS Content Server Administration Console as it appears in a browser window:

Display 9.1 SAS Content Server Administration Console



Item name	Primary type	Date created	Date modified	Delete	Permissions
sascontent	nt:davcollection	2011-11-03T13:40:08.289-04:00	none	□	▤
sasdav	nt:davcollection	2011-11-03T13:40:08.274-04:00	none	□	▤
sasfolders	nt:davcollection	2011-11-03T13:40:08.289-04:00	none	□	▤

Objects in the console are either folders or files. By default, the initial view of the console displays the following folders:

`sascontent`

contains content that has been added to SAS Content Server by SAS applications. You see a folder only if the folder contains content.

`sasdav`

contains content that has been added to the SAS Content Server. By default, **`sasdav`** contains the following folders:

- **`sasdav/Users`** contains personal repository folders for users. A user's folder is created automatically when the user logs on to a SAS Web application. Users have full rights to their own folders.

- **`sasdav/Templates`** contains templates that are used for e-mail notification in SAS solutions.

`sasfolders`

contains content that has been defined in the SAS Folders tree in the SAS Metadata Server. You see a folder only if the folder contains content.

CAUTION! Administrators should not manage folders and content here. The content within this folder and subfolders is mapped to SAS Folders in the SAS Metadata Server. It is recommended that you use the SAS Management Console to add and manage folders.

Depending on the software that is installed at your site, your console might contain additional folders.

To navigate in the console, follow these steps:

1 Click an item in the list to display information about that item.

2 Use the breadcrumb trail above the list to return to a parent folder. For example, in the ^ / sasdav / Users breadcrumb trail, click `sasdav` to return to the sasdav folder.

The console displays the following information for each item listed:

Item name

displays the name of the folder or file.

Primary type

is an internal value that designates the type of object in the repository.

Date created

is the date when the object was created.

Date modified

is the date when the object was modified.

Delete

when the delete button is clicked, the selected objects are deleted.

Permissions

when the permissions icon ☰ is clicked, opens a page where permissions can be modified for the object.

Modify Permissions for WebDAV Folders and Files

The `sasfolders` directory should be accessed only by trusted or unrestricted users. These users are recognized as unrestricted administrators for the SAS Content Server, and do not require the Access Control List (ACL) to grant them access to this directory. If other types of users attempt to access this location, their permissions are verified before they are granted any access.

The `sasdav` directory can be accessed by regular users, and ACLs can be used to grant access to specific users and groups.

Principals can be granted permissions for folders and files. In the SAS Content Server, a principal is either a user or a group of users defined in the SAS Metadata Server. Principals can be given permissions that allow them to perform specific tasks such as reading an object, writing to an object, deleting an object, and so on.

You set permissions for an object by specifying which principals have which types of access. To modify permissions for an object, follow these steps:

1. Click the permission icon next to the item that you want to modify. A permissions page appears.

2. For each principal listed, modify the permissions by changing each permission to `Yes` or `No`.

   Note: You might see a principal named jcr:authenticated. This principal refers to any user who can log on to a SAS Web application. By default, authenticated users have Read and Inherit Read permissions only.

3. To add more principals to the page, do one of the following:

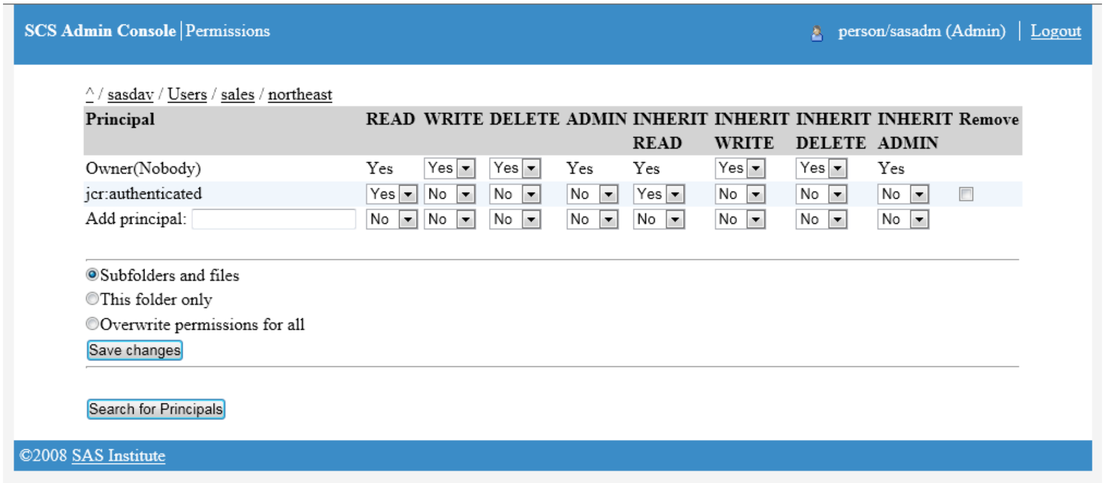
   - If you know the principal's name, enter it in the field and click **Save changes**.

   - Click **Search for Principals** to search for a name. When you find the principal that you want to add, select the check box next to the principal's name and then click **Return**.

After the principal's name appears on the permission page, you can set permissions for the principal.

The following display shows a portion of the console with permissions for a folder:

Display 9.2 Folder Permissions in the SAS Content Server


SCS Admin Console | Permissions
person/sasadm (Admin) | Logout
^ / sasdav / Users / sales / northeast
Save changes
Search for Principals
©2008 SAS Institute

Principal	READ	WRITE	DELETE	ADMIN	INHERIT READ	INHERIT WRITE	INHERIT DELETE	INHERIT ADMIN	Remove
Owner(Nobody)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
jcr:authenticated	Yes	No	No	No	Yes	No	No	No	☐
Add principal:	No	No	No	No	No	No	No	No	

● Subfolders and files
○ This folder only
○ Overwrite permissions for all

The following permissions are available for you to apply to objects:

Table 9.4 Permissions for Objects

Permissions	Purpose
Read	Allows the principal to read the object. For folders, this permission allows the principal to see the members of the folder.
Write	Allows the principal to write an object. For folders, this permission allows the principal to create new objects in a folder.
Delete	Allows the principal to delete the object.
Admin	Allows the principal to change the permissions on an object.
Inherit Read	Objects created in this folder inherit this setting for their Read permission (and Inherit Read permission for subfolders).

Permissions	Purpose
Inherit Write	Objects created in this folder inherit this setting for their Write permission (and Inherit Write permission for subfolders).
Inherit Delete	Objects created in this folder inherit this setting for their Delete permission (and Inherit Delete permission for subfolders).
Inherit Admin	Objects created in this folder inherit this setting for their Admin permission (and Inherit Admin permission for subfolders).

Note: Inherited permissions are assigned when objects are created. Each object has its own set of permissions. Inherited permissions are static; dynamic inheritance does not occur.

If you are applying permissions to folders, then the following options are available:

Table 9.5 *Results of Applying Permissions to Folders*

Permissions for Folders	Results
Subfolders and files	Changed permissions are applied to subfolders and files that exist below the current folder.
This folder only	Changed permissions are applied to subfolders and files that exist in the current folder.
Overwrite permissions for all	Changed permissions are applied to all folders and files.

Create a New Folder

To add a folder below the current folder, enter the name of the new folder in the field and click **Add Folder**.

Note: Although you can add a folder to the `sasfolders` location, the folder that you add is not added to the SAS Metadata Server. The best practice is to add folders to metadata using SAS Management Console.

Add Files to the SAS Content Server

You cannot use the SAS Content Server Administration Console to add files to folders. To add files, you can use one of the following methods:

- Use Microsoft Web folders to add content to the appropriate folder. You must use a browser on a Windows client machine in order to use this method.

  For example, the sasdemo user might open the following location as a Web folder:

  ```
  http://myServer:8080/SASContentServer/repository/default/
  sasdav/Users/sasdemo/
  ```

  Then, copy and paste content into the folder.

- Use the SAS DAVTree utility to drag and drop folders or files into console folders.

  To use this utility, run the following command:

  ```
  SAS-config-dir\Levn\Web\Utilities\DAVTree.bat
  ```

  On UNIX and z/OS, the utility command is `DAVTree.sh`.

  For more information about using DAVTree, see "Using the DAVTree Utility to Manage WebDAV Content " on page 104.

- Use the SAS Publishing Framework to publish files to the WebDAV repository.

  Portal users can publish portal content to the WebDAV repository by using the portal's publish and subscribe tools.

- Programmatically publish content to WebDAV.

Usage of these tools and techniques is beyond the scope of this documentation (with the exception of the DAVTree utility).

Delete Folders or Files

Delete a single or multiple folders when you are sure that the folders and their contents are not required.

CAUTION! Exercise caution when deleting items from the SAS Content Server.

When deleting folders, the following rules apply:

- Do not delete the `sasdav` or `sasfolders` directories.
- If you delete an item in the `sasfolders` tree, then applications that rely on the content mapping between the SAS Content Server and the SAS Metadata Server might not be able to access the content. To add and delete SAS metadata objects, use SAS Management Console.

  For information about the best practices to follow for managing SAS folders in SAS Management Console, see “Working With SAS Folders” in the *SAS Intelligence Platform: System Administration Guide*.
- When you delete a folder, all objects within that folder are also deleted.

To delete a folder or file, select the check box for the folder or file from the **Delete** column. Click the **Delete** button. The item is deleted. You are not prompted to confirm the deletion. To delete multiple items, select multiple check boxes from the **Delete** column.

Implementing Authorization for the SAS Content Server

Overview of SAS Content Server Authorization

SAS users and groups are defined in a SAS Metadata Repository. The SAS Web Administration Console enables you to specify which users or groups are authorized to access specific folders in the SAS Content Server repository, and what type of access permissions they have for the folders.

Use the SAS Web Administration Console to create folders and associate access controls with the folders.

Note: This topic does not describe authentication for the SAS Content Server. By default, SAS Content Server users are authenticated by using SAS token authentication.

Before you can associate access controls with a folder, you must complete these tasks:

1. Use the SAS Web Administration Console to create the folder on the SAS Content Server.

2. Ensure that the appropriate user and group definitions exist on the SAS Metadata Server for the SAS Content Server users and groups for whom you want to control access to the folder.

After you have created the WebDAV folders and have ensured that the appropriate user and group definitions are created on the SAS Metadata Server, use SAS Web Administration Console to associate access controls with the folders.

Example Scenario: SAS Content Server Authorization

Within your portal implementation, you might use the publish and subscribe capabilities to publish (write) and subscribe to (read) group folders on a WebDAV publication channel.

The following scenario shows the application's publish and subscribe setup for sales and executive teams that need different access to read (subscribe to) and write (publish) information that is stored in three different directories on the SAS Content Server. On the SAS Metadata Server, these teams are represented by two groups, Americas Sales and Sales Executives.

This publish and subscribe scenario has a requirement for three different content areas, or group folders, on the SAS Content Server:

- Catalog Sales: The **`/sasdav/Catalog Sales`** directory contains catalog sales information. The Americas Sales and Sales Executives groups can both read (subscribe to) and write (publish) information.
- Field Sales: The **`/sasdav/Field Sales`** directory contains direct sales information. The Americas Sales and Sales Executives groups can both read, but only the Sales Executives group can write information.
- Sales Execs: The **`/sasdav/Sales Execs`** directory contains executive-level sales information. Only the Sales Executives group can read and write information.

The following table summarizes this scenario's group-based folders on the SAS Content Server, and the permissions for each group:

Table 9.6 Summary of WebDAV Folders on the SAS Content Server

Folder	Americas Sales	Sales Executives
`/sasdav/Catalog Sales`	Read, Write	Read, Write
`/sasdav/Field Sales`	Read	Read, Write
`/sasdav/Sales Execs`	(none)	Read, Write

To create this sample configuration, follow these steps:

1 In SAS Management Console, define the users, groups, and login credentials that need to access the SAS Content Server. When you define login credentials, you must specify the same authentication domain name that you specified for the SAS Content server during installation.

For this example, the following users, groups, and logins are defined:

Table 9.7 Example Users, Groups, and Logins

Group Metadata Identities	User Metadata Identities	User ID	Authentication Domain
America Sales	salesusr1	salesusr1	DefaultAuth

Group Metadata Identities	User Metadata Identities	User ID	Authentication Domain
Sales Executives	execusr1	execusr1	DefaultAuth
SAS Trusted User	sastrust	sastrust	DefaultAuth

For example, the America Sales group contains a user named salesusr1 as a member, and salesusr1 has an associated login with a user ID of salesusr1 and an authentication domain of DefaultAuth. The America Sales group might include other members as well.

2 In the SAS Web Administration Console, create your new directory under the sasdav directory. For this example, navigate to the `sasdav` directory, and then create these three subdirectories: `Catalog Sales`, `Field Sales`, and `Sales Execs`.

3 In the SAS Web Administration Console, configure the access permissions for the folders that you created. For this example, set the access permissions for each subdirectory, using the following tables as guides:

Table 9.8 WebDAV Permissions for /sasdav/Catalog Sales

Group	Read	Write	Delete	Inherit Read	Inherit Write	Inherit Delete
Americas Sales	Yes	Yes	No	Yes	Yes	No
Sales Executives	Yes	Yes	No	Yes	Yes	No

Table 9.9 WebDAV Permissions for /sasdav/Field Sales

Group	Read	Write	Delete	Inherit Read	Inherit Write	Inherit Delete
Americas Sales	Yes	No	No	Yes	No	No

Group	Read	Write	Delete	Inherit Read	Inherit Write	Inherit Delete
Sales Executives	Yes	Yes	No	Yes	Yes	No

Table 9.10 WebDAV Permissions for /sasdav/Sales Execs

Group	Read	Write	Delete	Inherit Read	Inherit Write	Inherit Delete
Americas Sales	No	No	No	No	No	No
Sales Executives	Yes	Yes	No	Yes	Yes	No

Reconfiguring the SAS Content Server to Use a Database for Storage

Overview

The SAS Content Server supports using a database for storage. The default configuration for the SAS Content Server is to use the file system for storage, but SAS Deployment Wizard provides the **Use configured database for content storage** check box on the SAS Content Server: Repository Directory page. If that option is enabled, the wizard configures the SAS Content Server to use the same database that is used by the SAS Web Infrastructure Platform. The default configuration for the SAS Web Infrastructure Platform is to use the SAS Framework Data Server for database storage. However, the SAS Web Infrastructure Platform can be configured to use a third-party vendor database such as Oracle, MySQL, PostgreSQL, DB/2, or SQL Server.

When a third-party vendor database is used, make sure that the database is configured to accept large binary objects such as documents and images. For example, on MySQL, the max_allowed_packet variable must be set at least as large as the largest binary object in the SAS Content Server repository. If the SAS Deployment Wizard was not run with the **Use configured database for content storage** option, it is still possible to reconfigure SAS Content Server to use the same database that is used by the SAS Web Infrastructure Platform. The following sections describe how to reconfigure SAS Content Server.

JCRCopyRepository File

Obtaining the JCRCopyRepository File

To migrate the contents of the current SAS Content Server's repository to the database-based repository, obtain the **JCRCopyRepository.bat** or the **JCRCopyRepository.sh** file from SAS Technical Support. Place the script file in the ***SAS-config-dir*\Lev1\Web\Utilities** directory. This file should be customized for your environment. After the file is customized and saved, run the batch or script file to reconfigure the SAS Content Server and share the database used by SAS Web Infrastructure Platform Services.

Note: The **JCRCopyRepository** script file is not shipped with your software. To obtain a copy of the JCRCopyRepository script file, contact SAS Technical Support.

For information about running the **JCRCopyRepository** script file, see "Reconfigure SAS Content Server" on page 186.

JCRCopyRepository.bat File for Windows

Here is an example of the **JCRCopyRepository.bat** file in Windows:

```
@echo on
:Script for executing the JCRCopyRepository utility

setlocal

REM Define needed environment variables
call "%~dp0..\..\level_env.bat"

set LAUNCHERJAR=%SASVJR_HOME%\eclipse\plugins\sas.launcher.jar
set UTILITIESDIR=%LEVEL_ROOT%\Web\Utilities
set PICKLISTS=%SAS_HOME%\SASWebInfrastructurePlatform\9.3\Picklists\wars\
sas.svcs.scs\picklist
set DRIVER=path-to-jdbc-driver-JAR-file
set CLASSPATH=%UTILITIESDIR%;%LAUNCHERJAR%
```

```
"%JAVA_JRE_COMMAND%" ^
  -classpath "%CLASSPATH%" ^
  -Djava.system.class.loader=com.sas.app.AppClassLoader ^
  -Dsas.app.launch.config="%PICKLISTS%" ^
  -Dsas.app.repository.path="%SASVJR_REPOSITORYPATH%" ^
  -Dsas.app.class.path="%UTILITIESDIR%;%DRIVER%" ^
  -Djava.security.auth.login.config=%LEVEL_ROOT%\Web\Common\login.config^
  -Xmx256m ^
  -Dscs.jndi.jndiName=sas/jdbc/SharedServices ^
  -Dscs.jndi.jdbcUrl=jdbc-url ^
  -Dscs.jndi.driver=jdbc-driver-class^
  -Dscs.jndi.user=database-user ^
  -Dscs.jndi.pwd=password ^
  org.apache.jackrabbit.core.JCRCopyRepository %1 %2
endlocal
if [%2] EQU [exit] exit %ERRORLEVEL%
```

JCRCopyRepository.sh File for UNIX and z/OS

Here is an example of the **`JCRCopyRepository.sh`** file in UNIX:

```
#!/bin/sh
#
# JCRCopyRepository.sh
#
. `dirname $0`/../../level_env.sh
LAUNCHERJAR=$SASVJR_HOME/eclipse/plugins/sas.launcher.jar

UTILITIESDIR=$LEVEL_ROOT/Web/Utilities
PICKLISTS=$SAS_HOME/SASWebInfrastructurePlatform/9.3/Picklists
/wars/sas.svcs.scs/picklist
DRIVER=path-to-jdbc-driver-JAR-file
CLASSPATH=$UTILITIESDIR:$LAUNCHERJAR

"$JAVA_JRE_COMMAND" \
  -classpath "$CLASSPATH" \
  -Djava.system.class.loader=com.sas.app.AppClassLoader \
  -Dsas.app.launch.config="$PICKLISTS" \
  -Dsas.app.repository.path="$SASVJR_REPOSITORYPATH" \
  -Dsas.app.class.path="$UTILITIESDIR:$DRIVER" \
  -Djava.security.auth.login.config=../Common/login.config\
  -Xmx256m \
  -Dscs.jndi.jndiName=sas/jdbc/SharedServices \
  -Dscs.jndi.jdbcUrl=jdbc-url \
  -Dscs.jndi.driver=jdbc-driver-class \
  -Dscs.jndi.user=database-user \
  -Dscs.jndi.pwd=password \
 org.apache.jackrabbit.core.JCRCopyRepository $1  $2

exit 0
```

Reconfigure SAS Content Server

To reconfigure the SAS Content Server to use the same database that is used by SAS Web Infrastructure Platform, follow these steps.

1 Stop the Web application server. Typically, this is SASServer1 in the Web application server's configuration directory.

2 Rename the SAS Content Server repository from **Repository** to **RepositoryFS**.

On Windows:

```
move C:\SAS-config-dir\Lev1\AppData\SASContentServer\Repository
C:\SAS-config-dir\Lev1\AppData\SASContentServer\RepositoryFS
```

On UNIX and z/OS:

```
mv SAS-config-dir/Lev1/AppData/SASContentServer/Repository SAS-
config-dir/Lev1/AppData/SASContentServer/RepositoryFS
```

3 In the previous step, you moved the Repository directory. Now, re-create the directory:

On Windows:

```
mkdir C:\SAS-config-dir\Lev1\AppData\SASContentServer
\Repository
```

On UNIX and z/OS:

```
mkdir SAS-config-dir/Lev1/AppData/SASContentServer/Repository
```

Note: If you are performing this procedure to configure SAS Web application clustering, then create a directory named SASServer2 and use it as the repository directory for the rest of this procedure.

4 The contents of the repository.xml file should identify the database that is used for SAS Web Infrastructure Platform Services. Copy the

repository.*DatabaseName*.xml file from the ***SAS-install-dir*/SASWebInfrastructurePlatform/9.3/Static/wars/sas.svcs.scs/WEB-INF/templates** directory to the directory that you created in the previous step. Then, rename this file as **repository.xml**.

Example Code 9.2 *Copy Command Example for Windows*

```
copy C:\SAS_HOME\SASWebInfrastructurePlatform\9.3\Static\wars\sas.svcs.scs\
WEB-INF\templates\repository.tkts.xml C:\SAS-config-dir\Lev1\AppData\
SASContentServer\Repository\repository.xml
```

Example Code 9.3 *Copy Command Example for UNIX*

```
cp /$SAS_HOME/SASWebInfrastructurePlatform/9.3/Static/wars/sas.svcs.scs/
WEB-INF/templates/repository.tkts.xml SAS-config-dir/Lev1/AppData/
SASContentServer/Repository/repository.xml
```

TIP The SAS Framework Data Server uses the repository.tkts.xml file.

5 Edit the repository.xml file and perform the following changes:

a Change all instances of **@repository.jndi.url@** to **sas/jdbc/SharedServices**.

For deployments that use JBoss, change the value to include the java: namespace prefix, **java:sas/jdbc/SharedServices**.

b Comment out the extidTypes attribute in the AccessManager element:

```
<AccessManager class="org.apache.jackrabbit.core.CoreAccessManager">
<!--
  <@extid.comment.start@param name="extidTypes"
     value="@extid.types.list@"/@extid.comment.end@>
-->
```

6 Obtain the values for the database name, host, port, and user ID from the Web application server.

- JBoss

  Open the **SharedServices-ds.xml** file located in the ***JBOSS_HOME*/server/SASServer1/deploy/** directory. The user ID can be located in the ***JBOSS_HOME*/server/SASServer1/conf/login-config.xml** file, in the <application-policy name="webinfpltfm-encryptDBPassword"> section. You cannot use the password in the encrypted form that is used in the login-config.xml file. Use a SAS encoded version of the password.

> **TIP** Use the PWENCODE procedure to create an encoded password. For an example, see Example Code 9.1 on page 168.

- WebSphere Application Server

  In the WebSphere Admin Console, navigate to **Resources** ▶ **JDBC** ▶ **Data Sources** ▶ **Custom Properties**

- WebLogic Server

  In the WebLogic Admin Console, navigate to **SASDomain** ▶ **Services** ▶ **JDBC** ▶ **Data Sources** ▶ **SharedServices** ▶ **Configuration** and click on the `Connection Pool` tab.

7. Contact your database administrator or system administrator if you do not know the password for the user ID.

8. In the `JCRCopyRepository` script file that was placed in the ***SAS-config-dir*/Web/Utilities** directory, modify the value of the `DRIVER` parameter to indicate the path to the JDBC driver for the database:

   ```
   DRIVER=path-to-jdbc-driver-JAR-file
   ```

   The JAR file, or files, for the driver are located in ***SAS-config-dir*\Lev*n*\Web\Applications\SASWIPServices9.3\JDBCDrivers**.

   If there is more than one JAR file in the directory, then specify a concatenated list of the JAR files in the directory. Separate the paths with either semi-colons (Windows) or colons (UNIX).

9. Specify the values for user and password in the `JCRCopyRepository` script file. These values were retrieved earlier from your Web application server.

   ```
   -Dscs.jndi.user=database-user ^
   -Dscs.jndi.pwd=password ^
   ```

10. In the same `JCRCopyRepository` script file, enter the values for the following parameters:

```
-Dscs.jndi.jdbcUrl=jdbc-url ^
-Dscs.jndi.driver=jdbc-driver-class ^
```

The values specified for the JDBC URL and the driver are determined by the type of database used in your environment. The following table shows the examples of values for the different types of databases:

Table 9.11 *Parameters and Values for JDBC URL and Driver*

Database	Parameters	Values
SAS Framework Data Server	-Dscs.jndi.jdbcUrl	`jdbc:sastkts://`*host*`:22031?constring=(DSN=SharedServices;encoding=UNICODE_FSS)`
	-Dscs.jndi.driver	`com.sas.tkts.TKTSDriver`

Oracle	-Dscs.jndi.jdbcUrl	For Oracle:
		`jdbc:oracle:thin:@`*host*`:1521:orcl`
		For XE:
		`jdbc:oracle:thin:@`*host*`:1521:xe`

	-Dscs.jndi.driver	`oracle.jdbc.driver.OracleDriver`
PostgreSQL	-Dscs.jndi.jdbcUrl	`jdbc:postgresql://`*host*`:5432/SharedServices`
	-Dscs.jndi.driver	`org.postgresql.Driver`
DB2	-Dscs.jndi.jdbcUrl	`jdbc:db2//`*host*`:50000/database`
	-Dscs.jndi.driver	`com.ibm.db2.jcc.DB2Driver`
SQL Server	-Dscs.jndi.jdbcUrl	`jdbc:sqlserver://`*host*`:1433;DataBaseName=SharedServices;SelectMethod=cursor`
	-Dscs.jndi.driver	`com.microsoft.sqlserver.jdbc.SQLServerDriver`

Database	Parameters	Values
MySQL	-Dscs.jndi.jdbcUrl	`jdbc:mysql://`*host*`:3306/SharedServices`
	-Dscs.jndi.driver	`com.mysql.jdbc.Driver`

11 In the command window, navigate to the ***SAS-config-dir*/Lev1/Web/Utilities** directory.

12 Run the **JCRCopyRepository** script command by providing the complete directory path of the old and new repository directories.

On Windows:

```
JCRCopyRepository.bat C:\SAS-config-dir\Lev1\AppData
\SASContentServer\RepositoryFS C:\SAS-config-dir\Lev1\AppData
\SASContentServer\Repository
```

On UNIX:

```
./JCRCopyRepository.sh SAS-config-dir/Lev1/AppData/
SASContentServer/RepositoryFS SAS-config-dir/Lev1/AppData/
SASContentServer/Repository
```

13 To enable the changes to take effect, restart the Web application server. Typically, this is the SASServer1.

10

Administering the SAS BI Web Services

Overview of SAS BI Web Services for SAS 9.3

A Web service is an interface that enables communication between distributed applications. Web services enable cross-platform integration by enabling applications that are written in various programming languages to communicate by using a standard Web-based protocol, typically the Simple Object Access Protocol (SOAP) or

Representational State Transfer (REST). This functionality makes it possible for businesses to bridge the gaps between different applications and systems.

SAS BI Web Services in SAS 9.3

SAS BI Web Services in SAS 9.3 contains the following key changes:

1 Beginning with SAS 9.3, SAS BI Web Services is supported only in a Java application server deployment. Previously, in SAS 9.2, there were two implementations of SAS BI Web Services: one written in Java that requires a servlet container, and another written in C# that uses the .NET framework.

2 Artifacts are not required to be generated in SAS 9.3; only the metadata that is associated with the generated Web service is published.

3 All stored processes are presented as Web services without the need for any additional processing. If the metadata about a Web service is not required to be published to the SAS metadata server, the additional step to generate the metadata is no longer required. Beginning with SAS 9.3, for more information about stored processes, see *SAS 9.3 Stored Processes: Developer's Guide*.

4 In SAS 9.2, advanced configuration properties for the Web Service Maker were specified on the `Advanced` tab for WebServiceMaker Properties in SAS Management Console. In SAS 9.3, the values for these properties can be modified on the `Settings` tab for WebServiceMaker Properties.

5 Four new configuration properties are available in SAS 9.3.

Managing Generated Web Services

You can select a set of stored processes in SAS Management Console and use the Web Service Maker to deploy them as Web services. The Web Service Maker generates a new Web service that contains one operation for each stored process that you selected. For information about developing Web services, see the *SAS BI Web Services: Developer's Guide*. For information about using the Deploy as Web Service Wizard in SAS Management Console, see the product Help.

When you generate a Web service, the Web Service Maker publishes metadata about the new Web service to the SAS Metadata Server. The Web Service Maker stores information about the URL of the Web service, keywords that are associated with the Web service, and which stored processes are used by the Web service. You can view and update some of this information by using SAS Management Console and the Configuration Manager plug-in in. To import or export a generated Web service, use the SAS Management Console folder view.

To delete a Web service that was generated by the Web Service Maker, use SAS Management Console. Navigate to **Application Management** ▶ **Configuration Manager** ▶ **SAS Application Infrastructure** ▶ **BI Web Services for Java 9.3** ▶ **WebServiceMaker**. Expand the node, right-click the generated Web service, and select **Delete**. Deleting a generated Web service removes the metadata that is associated with the generated Web service. This action cannot be reversed.

Note: You must grant permissions on the `/System/Services` folder to users who want to create SAS BI Web Services. You can also delete a Web service directly from the `/System/Services` folder. Users need ReadMetadata and WriteMemberMetadata to create and delete Web services. By default, a default group named `BI Web Services Users` is created, which has these permissions. You can add users to this group to allow them to create and delete Web services, or use your own groups and permission settings.

Configuring SAS BI Web Services for Java

SAS BI Web Services for Java is initially configured during installation using the SAS Deployment Wizard. To modify this initial configuration, use the Configuration Manager plug-in for SAS Management Console.

To modify common configuration properties that apply to XMLA, WebServiceMaker, and generated Web services, go to SAS Management Console. Navigate to **Application Management ▸ Configuration Manager ▸ SAS Application Infrastructure ▸ BI Web Services for Java 9.3**. Right-click to select **Properties** and select the **Settings** tab.

In the **Application ▸ General Configuration** section, you can modify the following configuration properties:

Acceptable SYSCC List

When a Web service operation is invoked, it in turn calls the appropriate SAS Stored Process running on the server tier. SAS execution always returns the SYSCC macro variable upon completion. By default, if this completion code is not 0, a SOAP fault is generated and returned to the invoking client. Alternatively, a comma-separated list of acceptable SAS completion codes can be specified to alter this behavior. Also, a hyphen separating two values can be used to conveniently specify a range of acceptable completion codes. In this case, the acceptable list of completion codes are treated as warnings rather than errors and do not cause a SOAP fault.

Note that SYSCC can be set directly by SAS code developers. Likewise, some SAS procedures set this value, so see the appropriate SAS documentation to determine possible values that might be returned and whether these values are errors or warnings. For example, if a SAS procedure states that a SYSCC value less than 4 is a warning and you are willing to accept those values, set this property as follows: 0-4. Therefore, if the SAS stored process returns a value of 4 or less, it is considered successful as far as the Web service is concerned and the client receives an appropriate response rather than a fault.

Enable dynamic prompts validation

When invoking Web service operations for stored processes that have been configured with dynamic prompt data parameters, you can turn off validation to obtain better throughput if you are certain that these stored processes have been written in a robust manner to handle any possible data passed by clients. Dynamic prompt validation is enabled by default so that the middle-tier Web service validates client data against data providers to ensure that incoming data meets the specified criteria before calling the appropriate stored process on the server.

SAS Stored Process timeout

Set this property if you want to limit the amount of time that a stored process is allowed to run. If the stored process fails to execute in the specified time, it is canceled and a SOAP fault is returned to the invoking client. A value of zero indicates no time-out period.

Enable allowing anonymous execution

Specify whether you want to enable or disable anonymous execution.

To modify configuration properties that are specific to the Web Service Maker, navigate to the **WebServiceMaker** folder. Then, navigate to the **Settings** tab within the Properties dialog box.

Base namespace

This property is the base namespace that is concatenated with the service name to create a target namespace to uniquely identify generated Web services. For example, if the base namespace is set to `http://tempuri.org`, and a client creates a new service named `test` without specifying an overriding namespace for this new service, then the target namespace for this Web service becomes `http://tempuri.org/test`.

Attachment conformance

Specifies the attachment conformance that should be enabled for generated Web services. There are two options: Message Transmission Optimization Mechanism (MTOM) and SOAP Messages with Attachments (SWA). The default is MTOM.

Validate Request With Schema

Setting this property to True causes the incoming request to be validated against the service's schema. The default is false because this operation can be CPU intensive.

Validate Response With Schema

Setting this property to True causes the resulting output created by the service execution to be validated against the service's schema. The default is false because this operation can be CPU intensive.

Attachment Optimized Threshold

The default value is 2048 bytes. This attachment threshold is the number of bytes contained in the attachment that causes the data to be included as an out-of-band

XOP/Include MTOM attachment. An attachment containing fewer bytes is transferred inline as base64 encoding for optimization.

To modify configuration properties that are specific to a generated Web service, navigate to the folder for that service. Then navigate to the **Advanced** tab within the Properties dialog box. Specify the name of each configuration property and its value in the Define New Property dialog box.

The following advanced configuration properties are available:

AcceptSysccList
: See “Acceptable SYSCC List” on page 194. This property overrides its analogous common configuration property.

DynamicPromptsSupport
: See “Enable dynamic prompts validation” on page 194. This property overrides its analogous common configuration property.

MaxSTPExecTime
: See “SAS Stored Process timeout” on page 195. This property overrides its analogous common configuration property.

AnonymousExecution
: Enabled by default. This property requires the SAS Anonymous Web user or Webanon account to have been created previously.

BaseNameSpace
: This property is the base namespace that is concatenated with the service name to create a target namespace to uniquely identify generated Web services. For example, if the base namespace is set to `http://tempuri.org`, and a client creates a new service named `test` without specifying an overriding namespace for this new service, then the target namespace for this Web service becomes `http://tempuri.org/test`.

AttachmentConformance
: This property specifies the attachment conformance that should be enabled for generated Web services. There are two options: Message Transmission Optimization Mechanism (MTOM) and SOAP Messages with Attachments (SWA). The default is MTOM.

ValidateRequestWithSchema

Setting this property to true causes the incoming request to be validated against the service's schema. The default is false, because this operation can be CPU intensive.

ValidateResponseWithSchema

Setting this property to true causes the resulting output that is created by the service execution to be validated against the service's schema. The default is false because this operation can be CPU intensive.

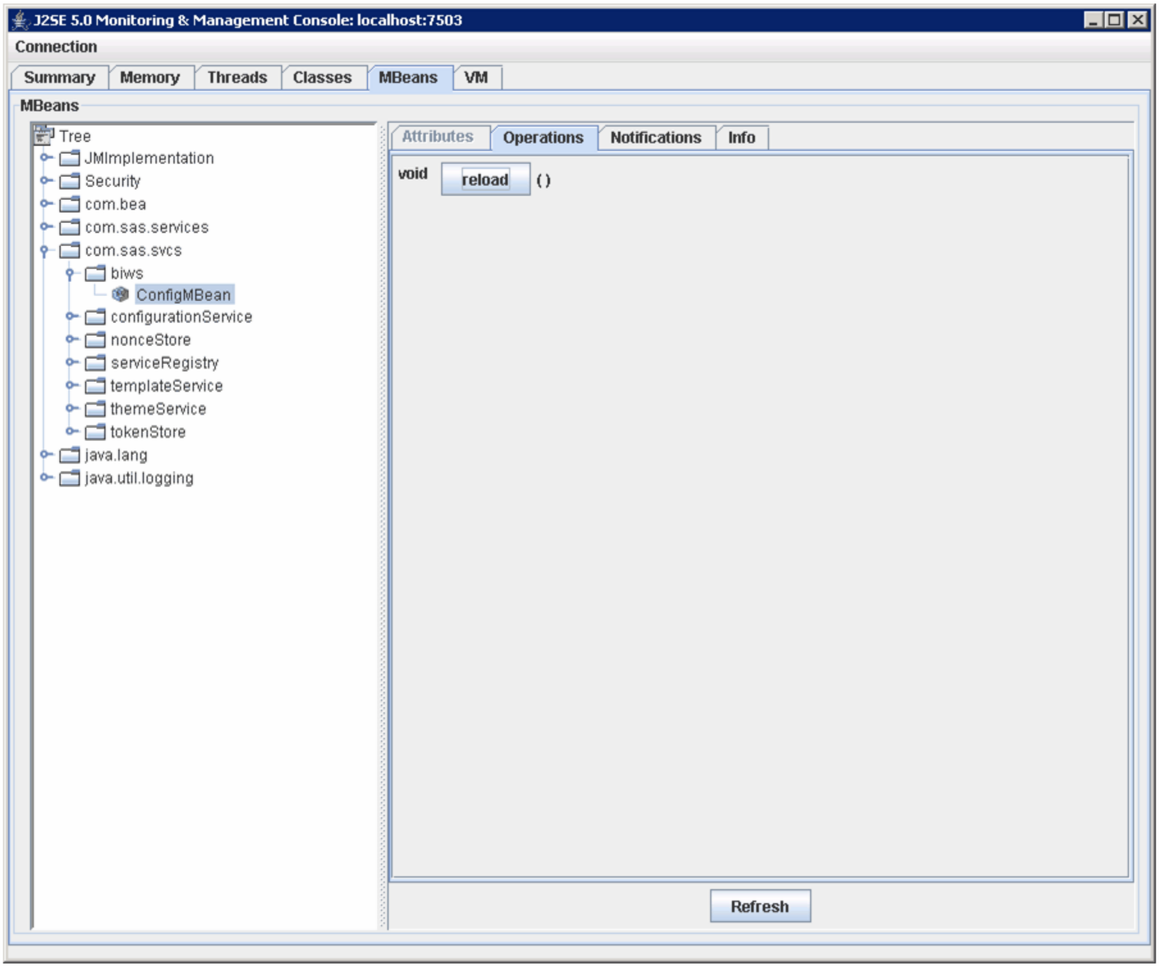
AttachmentOptimizedThreshold

The default is 2048 bytes. This attachment threshold is the number of bytes contained in the attachment that causes the data to be included as an out-of-band XOP/Include MTOM attachment. An attachment containing fewer bytes is used as base 64 encoding for optimization.

Changes to properties do not take effect immediately. To apply these changes, perform one of the following tasks:

- Either stop and restart the Web application server, or stop and restart the SAS BI Web Services for Java Web application (**`sas.wip.services9.3.ear`**).
- Use a Java Management Extensions (JMX) console to communicate with the `com.sas.svcs:service=biws,type=ConfigMBean` management bean.

The following image shows the use of the JMX console bundled with the JDK to reload the configuration metadata into a running SAS BI Web Services for Java application:



Overview of Security for Web Services

A default installation of SAS BI Web Services for Java is not highly secure. The default security mechanism is SAS authentication. All requests and responses are sent as clear text. If users want to authenticate as a specific user, then they can send a user name and password as clear text as part of the WS-Security headers. If you use a RESTful request that is supported in SAS 9.3, send the user name and password in a base64 encoded Authorization HTTP header. Authentication is performed by authenticating client credentials at the SAS Metadata Server. Whenever user names and passwords must be sent as clear text or base64 encoded, SSL should be enabled to provide transport layer security.

If you want to use SSL on the Web application server to secure the transmission of credentials with the Web services, and you also want to use the Deploy as Web Service Wizard in SAS Management Console, then you need to import the server certificate to SAS Management Console. To import the server certificate to SAS Management Console, follow these steps:

1 Create a Java keystore on the local machine and import the server certificate of the server that you want to communicate with. For more information about how to perform this step, see `http://docs.oracle.com/javase/1.5.0/docs/tooldocs/windows/keytool.html`.

2 Pass the keystore location and password into SAS Management Console using Java JVM arguments. The arguments that need to be set are:

```
javax.net.ssl.trustStore=
   "fully qualified path to keystore created with keytool from step 1"
javax.net.ssl.trustStorePassword=
   "trust store password"
```

To complete this step, add the following JavaArgs arguments to the sasmc.ini file, which is found at **`C:/Program Files/SAS/SASManagementConsole/9.3`**:

```
JavaArgs_14=-Djavax.net.ssl.trustStore =
   "fully qualified path to keystore created with keytool from step 1"
JavaArgs_15=-Djavax.net.ssl.trustStorePassword =
   "trust store password"
```

If you are using XMLA Web services or generated Web services, an anonymous user can be configured. The anonymous Web user is configured during SAS Deployment Wizard configuration. Anonymous users cannot use the Web Service Maker; credentials must always be provided to use the Web Service Maker. If you are using XMLA Web services, you can pass user credentials as XMLA properties in the payload.

SAS BI Web Services can also be secured by configuring the Web application server to perform Web authentication. This provides a way for SAS BI Web Services to identify the calling user with basic Web authentication that uses HTTP transport-level security.

Note: Web authentication can be used with both XMLA Web services and generated Web services. Web authentication cannot be used with the WebServiceMaker Web service when SAS Management clients are involved because these clients authenticate by using one-time passwords.

Securing SAS BI Web Services for Java

SAS Authentication

The default security configuration for SAS BI Web Services for Java is *SAS authentication*. In this mode the Web application server does not perform any authentication on behalf of the application. Instead, SAS BI Web Services for Java authenticates client credentials against the configured SAS Metadata Server. Client credentials are obtained by one of the following ways (in this order):

1. Use credentials that are passed in the UsernameToken WS-Security SOAP header. For RESTful invocation, use the credentials passed in the Authorization HTTP header.

2. Use credentials that are passed in the payload as properties (XMLA only).

3. Use anonymous credentials that are configured with the Webanon SAS metadata login account (XMLA and generated Web services).

Typically, the WebServiceMaker service is invoked via the Deploy As Web Service wizard in SAS Management Console. Therefore, this service must be able to process SAS one-time passwords. For this reason the WebServiceMaker service functions only in SAS authentication mode.

Web Authentication

As an alternative to SAS authentication, the application server can be configured to perform the authentication on behalf of the SAS BI Web Services for Java application.

This is known as *Web authentication*. Beginning with SAS 9.3, Web authentication can also be used with RESTful Web services.

Editing the web.xml File for Third-Party Authentication

If you configure third-party authentication with products such as CA SiteMinder, and use the JavaScript Objects Notation (JSON) and REST Web services, edit the **`web.xml`** file. This file is located in the *SAS-Installation-Directory* **`\SASWebInfrastructurePlatform\9.3\Configurable\wars\sas.wip.services9.3ear\sas.biws.war\WEB-INF`** directory. Remove or comment out the following configuration section in the **`web.xml`** file (within the SAS BI Web Services WAR file):

```
<filter>
     <filter-name>SecurityFilter</filter-name>
     <filter-class>org.springframework.web.filter.DelegatingFilterProxy
     </filter-class>
     <init-param>
          <param-name>targetBeanName</param-name>
          <param-value>basicAuthFilter</param-value>
     </init-param>
     <init-param>
          <param-name>targetFilterLifecycle</param-name>
          <param-value>true</param-value>
     </init-param>
</filter>
<filter-mapping>
          <filter-name>SecurityFilter</filter-name>
          <url-pattern>/rest/*</url-pattern>
</filter-mapping>
<filter-mapping>
          <filter-name>SecurityFilter</filter-name>
          <url-pattern>/json/*</url-pattern>
</filter-mapping>
```

Transport-level Security

HTTP transport-level security can be used instead of message-level security. The following security constraints should be applied to the web.xml deployment descriptor (sas.biws.war module with the sas.wip.services9.3.ear application) as follows:

```
<security-constraint>
```

```
   <web-resource-collection>
      <web-resource-name>All-resources</web-resource-name>
      <url-pattern>/services/XMLA/*</url-pattern>
      <url-pattern>/services/dynamicServicePath/*</url-pattern>
      <http-method>GET</http-method>
      <http-method>POST</http-method>
   </web-resource-collection>

   <auth-constraint>
      <role-name>SASWebUser</role-name>
   </auth-constraint>
</security-constraint>

<login-config>
   <auth-method>BASIC</auth-method>
</login-config>

<security-role>
   <role-name>SASWebUser</role-name>
</security-role>
```

11

Administering SAS Web Application Themes

Overview

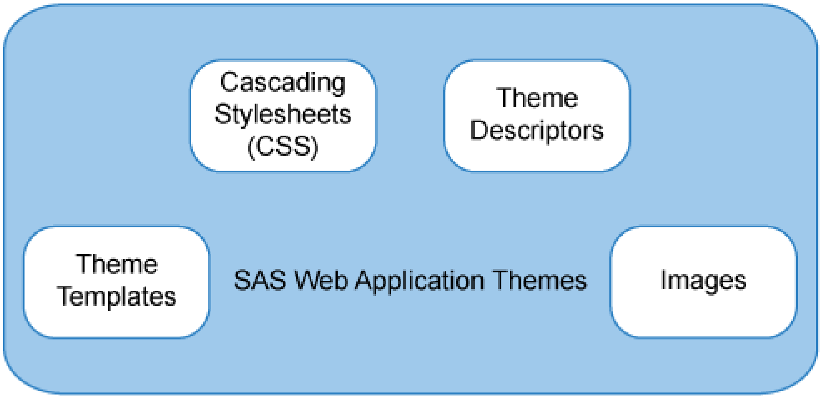
Introduction to SAS Web Application Themes

SAS Web Application Themes provide a way to define a consistent look and feel across SAS Web applications. You can use themes to apply uniform visual customizations and company branding to all SAS Web applications that support the theme infrastructure. A typical custom theme might include a banner with a standard corporate color scheme and company logo, a navigation bar with colors that coordinate with the banner, and new colors for borders and title bars.

Theme Components

A theme is a collection of resources that control the appearance of a SAS Web application. The following figure shows the components of a theme:

Figure 11.1 Components of a Theme



Here is an explanation of each theme component:

theme templates
: are HTML fragments that render specific portions of pages in SAS Web applications. The templates contain dynamic substitution variables of the form %*VARIABLE-NAME* that are replaced by application-specific values when the templates are used in SAS Web applications.

cascading style sheets
: determine the colors, fonts, backgrounds, alignment, and spacing for page elements in SAS Web applications. A cascading style sheet (CSS) is a standard mechanism for defining consistent and reusable presentation for Web-based content.

theme descriptors
: are XML files that describe the style sheets, templates, and images that make up a theme.

images
: include graphics for icons, a company logo, and banner and page backgrounds. You can incorporate your own customized graphics files as part of a new theme. Images can be in any format supported in the browser, including GIF, PNG, and JPEG.

Note: The application title that appears in the banner of the SAS Web application is not part of the theme. You also cannot use themes to change the application name that appears in the title bar of the browser window.

The SAS Default Theme

The initial theme that is installed with the theme infrastructure is named Default. This theme is typically used as the basis for creating new themes, so you should understand its structure before you attempt to create a custom theme. Specifications for the Default theme are provided in ***`SAS-config-dir`*****`\Lev1\Web\Utilities\SASThemeExtensions\specs\Default\index.html`**.

How Custom Themes Are Created and Deployed

The ***`SAS-config-dir`*****`\Lev1\Web\Utilities\SASThemeExtensions`** directory contains the scripts and resources needed to create a new theme:

- The **`NewTheme`** script creates a directory structure for your new theme, and populates it with configuration files that are modified to create a new theme definition. The new theme is based on the SAS default theme that is shipped with the software.
- The **`specs`** directory provides documentation for the general color palette and color and image guidelines that are specific to each user interface component. This document is useful when you are designing and defining your custom theme.

Developing a custom theme involves creating CSS files, image files, theme template files, and theme descriptor files. It is possible to create a new theme by authoring these files from scratch, but the task is laborious and requires a thorough understanding of Web page design. The theme infrastructure provides a templating mechanism to simplify the process.

Instead of editing CSS and theme descriptor files directly, template files (extension `.vtl`) are provided that contain key and value pairs that isolate the elements of the theme that you are likely to want to customize. In addition, context files (extension `.vctxt`) enable you to create a centralized set of definitions for key values that you can use in place of explicit values to simplify the process of maintaining the template files. When you use the SAS Deployment Manager to rebuild the SAS Web Application Themes, the context files are merged into the template files to create a complete set of shared and product-specific style sheets and theme descriptors. The build process also packages your new theme into the `sas.themes.ear` archive file that you deploy to make themes available in your production environment.

Once the theme archive is deployed, users can use the Preferences page in their SAS Web application to apply the new theme (or any of the other themes in the archive). You can also specify the custom theme as the default for all SAS Web applications. This means that the theme is applied automatically for users who do not make a selection on the Preferences page.

Note: Previously, SAS Web Report Studio 3.1 used product-specific branding. Product-specific branding is not available for SAS Web Report Studio 4.3. Use themes to create branding in SAS Web Report Studio 4.3. A few properties for branding that existed in SAS WebReport Studio 3.1 are supported in SAS Web Report Studio 4.3. For information about these properties and usage, see “Customizing Report Styles for SAS Web Report Studio” in Chapter 6 of *SAS Intelligence Platform: Web Application Administration Guide*.

Steps for Defining and Deploying a New Theme

Overview

SAS provides a default theme for your use. You also have the choice of designing and deploying a custom theme for your environment.

To develop and deploy a new theme, follow these steps:

1. “Step 1: Design the Theme” (See page 208.)

2. “Step 2: Create a Work Area for the Theme” (See page 209.)

3. “Step 3: Make Desired Changes to the Styles, Graphics, and Theme Templates” (See page 214.)

4. “Step 4: Rebuild SAS Web Application Themes” (See page 218.)

5. "Step 5: Deploy SAS Web Application Themes in Your Test Environment " (See page 218.)
6. "Step 6: Test the New Theme" (See page 219.)
7. "Step 7: Move the New Theme from Test to Production Environment" (See page 219.)
8. "Step 8: Assign the Default Theme" (See page 220.)

Note: You might choose to perform steps 3 through 6 iteratively, making limited changes to the theme during each iteration, so that you can more readily determine the effects of each set of changes to the theme. To deploy multiple themes in your environment, follow steps 1 to 6 to design and create your themes. Then follow step 7 to move each theme from test to production environment.

You can deploy multiple themes in your corporate environment. Before deploying the new theme in a production environment, you should first test it in a test environment to ensure that SAS Web applications function as expected with the new theme applied.

Step 1: Design the Theme

Overview

The first step in creating a custom theme is to plan the visual elements. Usually, the new theme is based on an existing design, your organization's intranet standards, another in-house written application, or a purchased application or solution. Some organizations have a standard color palette with color specifications.

Review the specifications for the Default theme at ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\specs\Default\index.html**, and identify the component keys and image keys for the visual elements that you want to change in the new theme. Establish a set of colors that are compatible with your organization, and choose the images (for example, logos, banner images) you want to use in the new theme.

Generally, you can make the largest impact by updating the background colors, border colors, and text attributes for Web application pages and SAS Information Delivery

Portal portlets. In addition, you might want to replace the SAS logo in the banner with our own organization's logo. If you select a different color palette, consider that you might need to adjust the colors in images to match the new palette.

The Color Palette page at ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\specs\Default\html\colorPalette.html** lists all 55 color keys of the default theme and specifies the default hexadecimal color value for each color key. It also provides links to documentation on each user interface element where the color is applied.

Options in Designing the Theme

When you create a new theme, there are three ways to define your theme:

- Use the Color Palette and replace the 55 default SAS colors with your organization's palette. The colors are applied automatically across the user interface.
- Specify the color to be used for each interface component. You must specify the color for each context key of the user interface component. This approach takes more time, but it provides maximum flexibility and control.
- Start with the Color Palette, and make individual changes to selected user interface components. This approach overrides how the color palette is applied in some cases.

If you choose to set colors for the context key of each user interface component, the Web pages at ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\specs\Default\index.html** provide tools and resources to assist you with this process.

Step 2: Create a Work Area for the Theme

To create a work area that contains a copy of the Default theme as a basis for your new theme, use one of the following scripts provided in the ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions** directory:

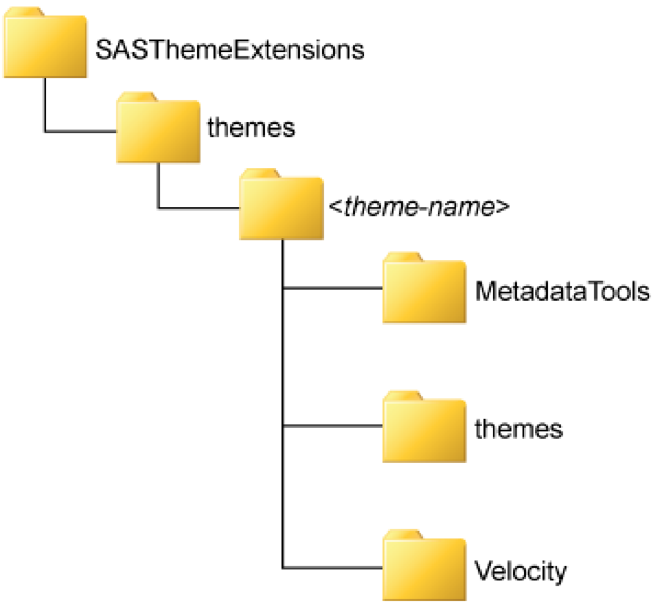
- for Windows: **NewTheme.bat *theme-name* true**
- for UNIX and z/OS: **NewTheme.sh *theme-name* true**

To use the Color Palette option, the `true` parameter is required in the command.

Note: The theme name must not contain spaces.

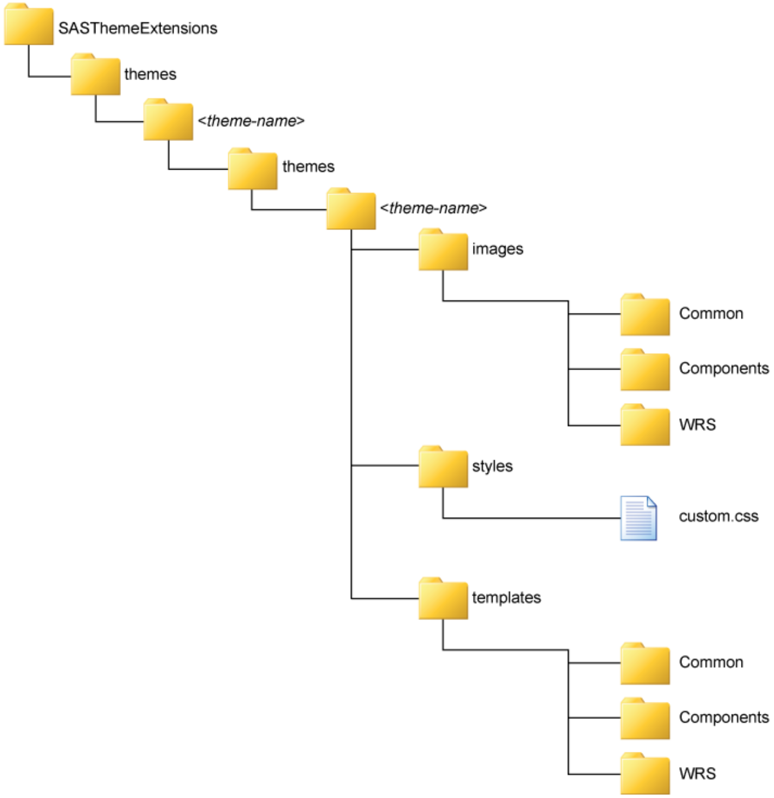
The following figure shows the *theme-name* directory, which is the root directory for theme resources. The `\`***`theme-name`***`\MetadataTools` directory contains SAS programs for managing the theme. The `Velocity` directory contains several subdirectories with files.

Figure 11.2 Subdirectories within SASThemeExtensions Directory



The following figure shows the subdirectory structure that is created under the *SAS-config-dir*`\Lev1\Web\Utilities\SASThemeExtensions\themes\`*theme-name*`\themes\`*theme-name* directory.

Figure 11.3 *Subdirectories for Images, Styles, and Templates*



Here is an explanation of the folders and their contents:

`\`***`theme-name`***`\themes\`***`theme-name`***`\images`**

contains the standard collection of images for SAS Web applications that use the theme infrastructure. The images are divided into the following subdirectories by category:

`Common`

contains images that are commonly used in SAS Web applications.

`Components`

contains images for the collection of components (widgets) that are shared by SAS Web applications.

WRS
contains images for SAS Web Report Studio.

\*theme-name*\\themes\theme-name\\styles
contains a cascading style sheet file named `custom.css` that can be used to define additional style elements for the theme. This file is empty when the work area is created.

\*theme-name*\\themes\theme-name\\templates
contains theme templates, which are HTML fragments that render specific portions of pages in SAS Web applications. The template files are divided into the following subdirectories by category:

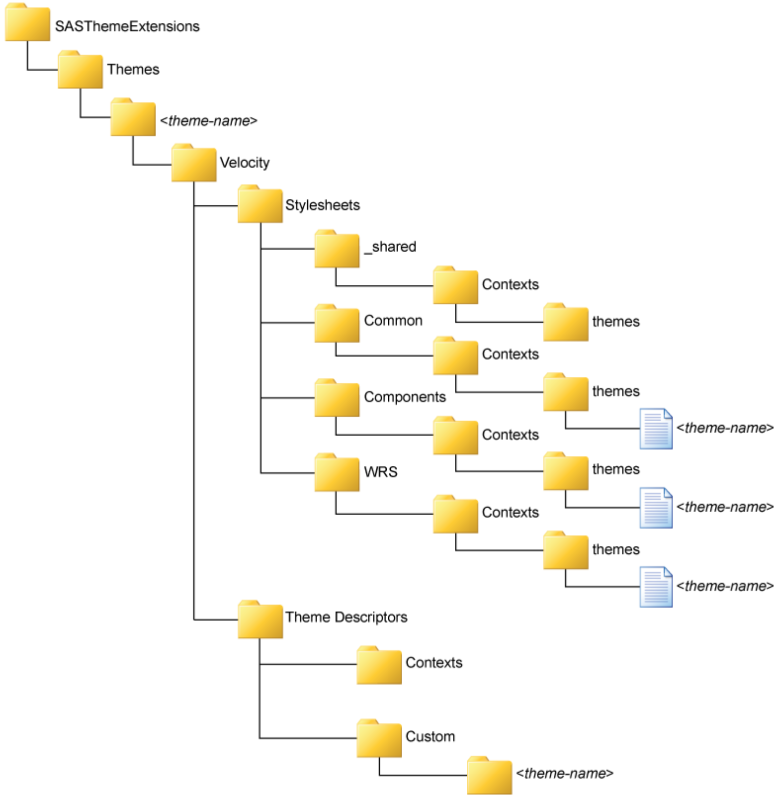
Common
contains theme templates for page elements that are commonly used in SAS Web applications.

Components
contains theme templates for the collection of components that are shared by SAS Web applications.

WRS
contains theme templates for elements in SAS Web Report Studio pages.

The following figure shows the subdirectories below the ***SAS-config-dir*****\\Lev1\\Web\\Utilities\\SASThemeExtensions\\themes\*****theme-name*****\\Velocity** directory.

Figure 11.4 Subdirectories within the Velocity Directory



Here is an explanation of the contents of the directories:

`\`*`theme-name`*`\Velocity\Stylesheets\_shared\contexts\themes`
contains a context file named *theme-name*`.vctxt` that defines context values for font families and standard colors that can be used in CSS templates.

`\`*`theme-name`*`\Velocity\Stylesheets\Common\contexts\themes\`*`theme-name`*
contains CSS template files that are used to build style sheets for page elements that are commonly used in SAS Web applications, including `portal.`*theme-name*`.vtl`, `sasStyle.`*theme-name*`.vtl`, and `sasScorecard.`*theme-name*`.vtl`.

\*theme-name*\\Velocity\\Stylesheets\\Components\\contexts\\themes\*theme-name*
contains a CSS template file named `components.`*theme-name*`.vtl` that is used to build style sheets for the collection of components that are shared by SAS Web applications.

\*theme-name*\\Velocity\\Stylesheets\\WRS\\contexts\\themes\*theme-name*
contains a CSS template file named `wrs.`*theme-name*`.vtl` that is used to build style sheets for SAS Web Report Studio.

\*theme-name*\\Velocity\\ThemeDescriptors\\contexts
contains a context file named *theme-name*`.themeDescriptor.vctxt` that defines context values that can be used in theme descriptor templates.

\*theme-name*\\Velocity\\ThemeDescriptors\\contexts\\custom\*theme-name*
contains theme descriptor template files for building the XML files that define the available collections of style sheets, theme templates, and images, including `ComponentsThemes.vtl`, `CustomThemes.vtl`, `SASThemes.vtl`, `SolutionsThemes.vtl`, and `WRSThemes.vtl`. The `SemanticThemes.vtl` file is added in the second maintenance release for SAS 9.3.

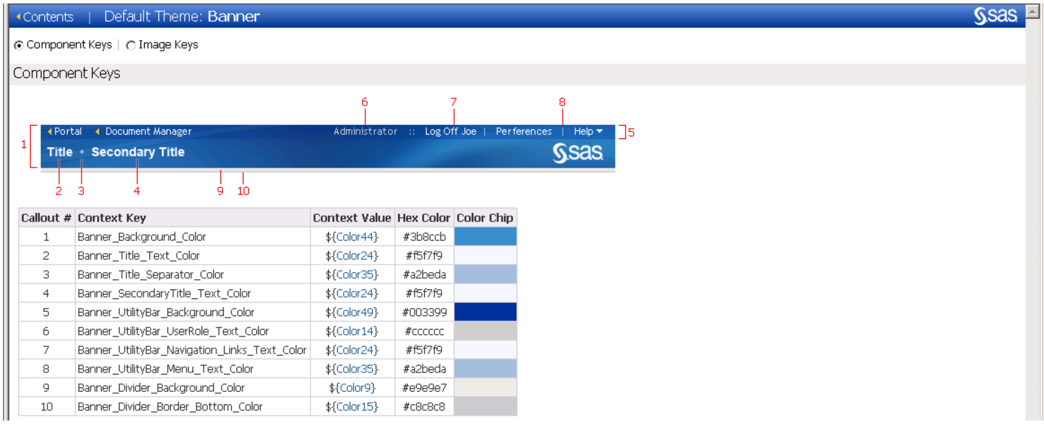
If you were to build the new theme at this point, it would be a fully functional duplicate of the Default theme.

Step 3: Make Desired Changes to the Styles, Graphics, and Theme Templates

Changing Colors

To make style changes to specific page features, you must first identify the component key associated with that feature and then locate the CSS template file that sets the value for that key.

For example, suppose your new theme design calls for changing the color for the title text in the banner at the top of SAS Web applications. The Banner specifications at the Themes Web site ***SAS-config-dir*\\Lev1\\Web\\Utilities\\SASThemeExtensions\\specs\\Default\\Components\\html\\Banner.html** show that the context key for the title text is **`Banner_Title_Text_Color`** and it displays its context value.


Contents | Default Theme: Banner
● Component Keys | ○ Image Keys
Component Keys
Portal
Document Manager
Administrator :: Log Off Joe | Perferences | Help
Title • Secondary Title
sas
1
2
3
4
5
6
7
8
9
10

Callout #	Context Key	Context Value	Hex Color	Color Chip
1	Banner_Background_Color	${Color44}	#3b8ccb	🟦
2	Banner_Title_Text_Color	${Color24}	#f5f7f9	⬜
3	Banner_Title_Separator_Color	${Color35}	#a2beda	🟦
4	Banner_SecondaryTitle_Text_Color	${Color24}	#f5f7f9	⬜
5	Banner_UtilityBar_Background_Color	${Color49}	#003399	🟦
6	Banner_UtilityBar_UserRole_Text_Color	${Color14}	#cccccc	⬜
7	Banner_UtilityBar_Navigation_Links_Text_Color	${Color24}	#f5f7f9	⬜
8	Banner_UtilityBar_Menu_Text_Color	${Color35}	#a2beda	🟦
9	Banner_Divider_Background_Color	${Color9}	#e9e9e7	⬜
10	Banner_Divider_Border_Bottom_Color	${Color15}	#c8c8c8	⬜

Each Themes Web page displays the context keys and context values.

You can specify a new color explicitly, as follows:

```
Banner_Title_Text_Color=#e69b00
```

Because **`components.`***theme-name***`.vtl`** is a CSS template file, another option is to use the generic color values that are defined in the ***`theme-name`*`.vctxt`** file in the **`\Velocity\Stylesheets\_shared\contexts\themes`** subdirectory of the work area for the new theme. For example, you might specify the following value instead of an explicit value:

```
Banner_Title_Text_Color=${Color53}
```

The corresponding color value is substituted in the resulting CSS when the new theme is built.

The general form for using a context value in a template file is `${`*context-value-name*`}`. Using context values instead of explicit values can make it easier to maintain the theme because you can change all component keys that use a given value by making one change to the context file.

Changing Graphics

Image files are located in three subdirectories located in the ***`SAS-config-dir`*** **`\Lev1\Web\Utilities\SASThemeExtensions\specs\Default`** folder. These subfolders are: **Common**, **Components**, and **WRS**. The properties of each image are defined in the Theme Descriptors files.

The process for customizing images is similar to that for customizing styles. For example, suppose your new theme design calls for changing the background image for the banner at the top of SAS Web applications. A review of the Banner specifications at ***SAS-config-dir*****\Lev1\Web\Utilities\SASThemeExtensions\specs\Default\index.html** shows that the image key for the banner background is **banner_background**. A search for that string in the work area for the new theme shows the following IMAGE element in the **ComponentsThemes.vtl** file in the **Velocity\ThemeDescriptors\custom\*****theme-name*** subdirectory of the work area:

```
<Image name="banner_background" ...  file="BannerBackground.gif"/>
```

You can change the image used for the banner background image in either of the following ways:

- by replacing the existing **BannerBackground.gif** file in the **themes\*****theme-name*****\images\Components** subdirectory of the work area with a revised image with the same name. Make sure that the new image has the following criteria:

  - □ The filename of the new graphic is identical to the filename of the graphic being replaced.
  - □ The new graphic is in the same format as the original image (for example, .jpg or .gif).
  - □ The dimensions of the new graphic and its pixels are same as the graphic being replaced.

  If you need to change the size, filename, or the image format of the graphic, modify the theme descriptor. For example, if you replace the **logo.gif** file with a new file called **myLogo.jpg** that has a width of 300 pixels and height of 70 pixels, modify the **ComponentsThemes.vtl** file as follows:

  ```
  <Image name="logo" description="My Logo" altTextKey="desktop.logo.text"
  appliesTo="ALL" width="300" height="70" file="myLogo.jpg"/>
  ```

- by changing the FILE= attribute in the IMAGE element in the **ComponentsThemes.vtl** context file to point to a different image file.

Note: You should not change the value of the NAME= attribute in the IMAGE element. SAS Web applications depend on the NAME= attributes remaining constant.

Another common image change is to replace the SAS logo in the standard banner with your organization's logo. You can change the graphic used for the banner logo either by replacing the existing `logo.gif` file in the `themes\`***`theme-name`***`\images\Components` subdirectory of the work area with a copy of your logo with that filename or by changing the target of the FILE= attribute for the IMAGE element in the `ComponentsThemes.vtl` context file for which the NAME= attribute has the value `logo`.

Note: In the second maintenance release for SAS 9.3, the SAS Logon Manager application uses graphics from the `themes\`***`theme-name`***`\images\semantic` directory. For more information, see "Special Considerations for SAS Logon Manager" on page 226.

When customizing images, you should ensure that the replacement graphics have approximately the same dimensions as the original graphics. Otherwise, the images might disrupt the appearance of the applications in which they are used.

Changing Theme Templates

You should make changes to theme templates only in situations where you want to change the layout of a page element (for example, to change the logo's placement in the banner or to adjust the padding between rows in a menu). If you decide to alter a theme template, proceed with caution. SAS Web applications rely on the template structure being consistent with the versions that are shipped with the software. Improper changes to theme templates might prevent SAS Web applications from functioning properly. In particular, do not change the dynamic substitution variables in theme templates because SAS Web applications expect the existing values.

Dynamic substitution variables should not be changed in theme templates because SAS Web applications expect the existing values. However, if you need to change a dynamic substitution variable, here is an example where %BANNER_TITLE is the dynamic substitution variable:

```
<td nowrap id=”bantitle”
class="banner_title">%BANNER_TITLE</td>
```

Note: When a new release of themes is installed at your site or an upgrade is performed, the existing theme template files are replaced by the new theme template files. If you have customized theme template files and want to retain them for future use, copy them to a different location before the installation or upgrade.

Additional Considerations

Another change that you might want to make when creating your new theme is to update the `theme_displayName=` element in the ***theme-name*.themeDescriptor.vctxt** file in the `Velocity\ThemeDescriptors\contexts` subdirectory of the work area. Provide a descriptive name for the new theme. The name is used in the selection list of available themes in the Preferences page in SAS Web applications.

Step 4: Rebuild SAS Web Application Themes

To rebuild the EAR file for SAS Web Application Themes and register your themes in metadata, follow the steps provided in "Rebuild Web Applications" on page 126.

The rebuilt SAS Web Application Themes archive file (`sas.themes.ear`) can be found in the ***SAS-config-dir*\Lev1\Web\Staging** directory. It should now contain a new Web archive (WAR) file for the new theme named **sas.theme.*theme-name*.war**.

Step 5: Deploy SAS Web Application Themes in Your Test Environment

To deploy the rebuilt SAS Web Application Themes to your Web application server in a test environment, see "Redeploying the SAS Web Applications" on page 129.

If you chose to configure your Web application server manually or deployed the SAS Web applications manually, see your `Instructions.html` generated by the SAS Deployment Wizard.

Step 6: Test the New Theme

After you have completed the deployment procedures, follow these steps to test the new theme:

1. Navigate to the portal in the production environment.
2. Log on and select **Options** ▶ **Preferences**. The new theme should appear as a selection on the Preferences page.
3. Select the new theme and observe the effect of the changes that you made in "Step 3: Make Desired Changes to the Styles, Graphics, and Theme Templates" on page 214. To view the new theme, log off from the portal. Then log on to the portal to view the new theme that was applied.
4. Repeat the procedures outlined in "Steps for Defining and Deploying a New Theme " on page 207 until you are satisfied with the display of the new theme.

If you test the new theme several times, log off from the portal and log on again to view the updated theme each time.

Step 7: Move the New Theme from Test to Production Environment

To move a theme from a test to a production environment, follow these steps:

- Copy the entire contents of the ***`SAS-config-dir`*****`\Lev1\Web\Utilities\SASThemeExtensions`** directory to the same directory path on the production machine.
- Run SAS Deployment Manager, and use the **Rebuild Web Applications** option to register the theme in the metadata. See "Step 4: Rebuild SAS Web Application Themes" on page 218.
- Rebuild SAS Web Application Themes and deploy to your Web application server. See "Step 5: Deploy SAS Web Application Themes in Your Test Environment " on page 218.

- Assign the new theme as the default theme. See "Step 8: Assign the Default Theme" on page 220.

Step 8: Assign the Default Theme

Overview

If you want your new or custom theme to be the default theme for all users who have not selected a theme for themselves in their application's Preferences, then you should set the new theme as the default.

There are two ways to modify the theme metadata:

- Use SAS Management Console. See "Assign the Default Theme from SAS Management Console" on page 220.
- Use the `UpdateDefaultTheme.sas` program. See "Assign the Default Theme with the UpdateDefaultTheme.sas Program" on page 221.

Assign the Default Theme from SAS Management Console

To assign a new theme as the default theme by using the SAS Management Console, follow these steps:

1. Deploy the new EAR file by using the appropriate procedures for your Web application server.
2. In SAS Management Console, on the **Plug-ins** tab, navigate to **Application Management** ▶ **Configuration Manager** ▶ **SAS Application Infrastructure** and right-click to display the SAS Application Infrastructure Properties dialog box.
3. Click the **Settings** tab.
4. In the **Default Theme** field, enter the name of your theme.
5. Click **OK** to exit the SAS Application Infrastructure Properties window.
6. To enable the new theme to go into effect, restart SAS Remote Services and the Web Infrastructure Platform in the Web application server.

Assign the Default Theme with the UpdateDefaultTheme.sas Program

To assign a theme as the default theme, use the `UpdateDefaultTheme.sas` program located in the *`SAS-config-dir`*`\Lev1\Web\Utilities\SASThemeExtensions\themes\`*`theme-name`*`\MetadataTools` directory. After the `UpdateDefaultTheme.sas` program has been run, the new theme will be in effect for users who have not selected a different theme on their Preferences page.

If SAS is not installed on the middle tier machine, copy the `UpdateDefaultTheme.sas` program to the metadata server, and submit the SAS program on that machine.

Deploying SAS Web Application Themes on a Different Web Application Server

Overview

Typically, SAS Web Application Themes are deployed along with other SAS Web applications on the same Web application server. If you want to deploy themes to a different Web application server, you should modify the theme metadata.

There are two ways to modify the theme metadata:

- Use SAS Management Console. See "Modify Theme Metadata from the SAS Management Console" on page 221.
- Use the `UpdateTheme.sas` program. See "Modify Theme Metadata with the UpdateTheme.sas Program" on page 222.

Modify Theme Metadata from the SAS Management Console

To deploy SAS Web Application themes to a different Web application server and modify the theme metadata, follow these steps:

1. Deploy the new EAR file by using the appropriate procedures for your Web application server.

2. In SAS Management Console, navigate to **Application Management** ▶ **Configuration Manager**, right-click on *Theme Name*, and select **Properties**.

3. On the **Connection** tab, complete the following:

   Select the communication protocol (either http or https).

   Enter the host name of the Web application server on which the theme is deployed.

   Enter the port number of the Web application server.

   Enter the name of the new theme in the **Service** field.

4. Click **OK** to save your changes.

5. To enable the new theme to go into effect, restart your Web application server.

Modify Theme Metadata with the UpdateTheme.sas Program

To deploy SAS Web Application themes to a different Web application server and modify the theme metadata, follow these steps:

1. Deploy the new EAR file by using the appropriate procedures for your Web application server.

2. Locate the `UpdateTheme.sas` program in the ***SAS-config-dir*****\Lev1\Web\Utilities\SASThemeExtensions\themes\*****theme-name*****\MetadataTools** directory.

3. Modify the following fields in the `UpdateTheme.sas`:

   %let themeName=*Theme Name*;

   Specify the name of the theme to update.

%let hostName=*Host Name*;
: Specify the host name of the Web application server on which the theme is deployed.

%let port=*Port*;
: Specify the port number of the Web application server.

%let URLPath=*base URL*;
: Specify the application context root of the new theme as deployed on the Web application server.

%let protocol=*http*;
: If you are using Secure Sockets Layer (SSL), specify *https* instead of *http* as the protocol for the URL.

4 Run the **`UpdateTheme.sas`** program.

5 To enable the new theme to go into effect, restart your Web application server.

Deleting a Custom Theme from the Metadata

To delete a custom-developed theme from the deployment for the SAS Information Delivery Portal, use the **`DeleteTheme.sas`** program located in the ***`SAS-config-dir`*** **`\Lev1\Web\Utilities\SASThemeExtensions\themes\`*****`theme-name`*** **`\MetadataTools`** directory.

If SAS software is not installed on the middle-tier machine, copy the **`DeleteTheme.sas`** program to the metadata server, and submit the program on that system machine.

Migrating Custom Themes

Overview

To apply a custom theme that you developed for an earlier release to SAS 9.3 Web applications, follow these steps:

1. Create a new theme structure. For information about creating a work area in which to construct the new version of your existing theme, see “Step 2: Create a Work Area for the Theme” on page 209.
2. Migrate the cascading style sheets used in your theme.
3. Migrate the images used in your theme.
4. Migrate the theme templates.
5. Migrate the descriptors used in your theme.

Migrating Cascading Style Sheets

Before attempting to move any CSS files from an existing theme to the **\themes\*theme-name*\styles** subdirectory of the work area for the new theme, you should first review the specifications for the Default theme at ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\specs\Default\index.html**. For any feature for which a component key has been defined, you should update the corresponding component key values in the CSS template (**.vtl**) files in the **\Velocity\Stylesheets\Common\contexts\themes\*theme-name***, **\Velocity\Stylesheets\Components\contexts\themes\*theme-name***, and **\Velocity\Stylesheets\WRS\contexts\themes\*theme-name*** subdirectories of the work area to achieve a compatible look and feel.

Custom style sheet files are required only if you need to provide theme support to features that are not covered by the CSS templates. For each style sheet file that you add, you must ensure that a corresponding STYLESHEET element is added to in the appropriate theme descriptor template (**`.vtl`**) file in the **`\Velocity\ThemeDescriptors\contexts\custom\`*****`theme-name`*** subdirectory of the work area for the new theme. The STYLESHEET element must specify the value **`all`** for its PRODUCT= attribute.

Migrating Images

Before attempting to move any image files from an existing theme to the **`\themes\`*****`theme-name`*****`\images`** subdirectory of the work area for the new theme, see the image specifications for the Default theme at ***`SAS-config-dir`*****`\Lev1\Web\Utilities\SASThemeExtensions\specs\Default\index.html`**. If the image from the existing theme replaces one of the images in the new theme, then you should ensure that the image from the existing theme is saved over the default image in the proper directory under the **`\themes\`*****`theme-name`*****`\images`** subdirectory. If the image from the existing theme does not replace an image in new theme, save it in the **`\themes\`*****`theme-name`*****`\images\Common`** subdirectory.

For each image file that you update or add, you must ensure that a corresponding IMAGE element is present in the appropriate theme descriptor template (**`.vtl`**) file in the **`\Velocity\ThemeDescriptors\contexts\custom\`*****`theme-name`*** subdirectory of the work area for the new theme.

Migrating Theme Templates

Before attempting to move any theme template files from an existing theme to the **`\themes\`*****`theme-name`*****`\templates`** subdirectory of the work area for the new theme, you should consider carefully whether they are compatible with the SAS Web applications. SAS Web applications rely on the theme template structure being consistent with the versions that are shipped with the software. Theme templates must have the expected set of dynamic substitution variables in order for the applications to function properly.

Migrating Theme Descriptors

The theme descriptor template (`.vtl`) files in the **`\Velocity\ThemeDescriptors\contexts\custom\`*`theme-name`*** subdirectory of the work area for the new theme should represent the structure of the migrated theme resources. Review the files to ensure the following:

- If you add cascading style sheet files to provide theme support for features that are not covered by CSS templates, ensure that you add corresponding new STYLESHEET elements to the STYLES section.

- For each image file that you update or add, ensure that you update or add a corresponding IMAGE element in the IMAGES sections.

- If you migrate existing theme template files, ensure that you update or add a corresponding TEMPLATE element in the TEMPLATES sections to reflect the change.

Special Considerations for SAS Logon Manager

Changes in the Second Maintenance Release for SAS 9.3

In the second maintenance release for SAS 9.3, the SAS Logon Manager Web application uses two different designs: "logon classic" and "logon corporate." The classic design is used with SAS Web applications that use mostly HTML and JSP. The corporate design is used with SAS Web applications that use mostly Adobe Flash technology.

The corporate design uses a different directory for images and a template file than the classic design. When you migrate your custom themes, review whether your custom images or template changes should also be added to the following images and themes.

Migrating the Logon Logo Image

To migrate a custom logo image for the logon page:

1. Change the context file to point to a new logo image.

a Edit ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\Velocity\ThemeDescriptors\custom\theme-name\SemanticThemes.vtl**

b Change the following line to specify to a different image path.

```
<Image name="logo_png" file="semantic/logo.png"
description="SAS: The Power to Know" altTextKey="image.sas.logo.txt" />
```

If you want to use your existing customer logo.gif, then change the entry to resemble the following example:

```
<Image name="logo_png" file="logo.gif"
description="your-description-here" altTextKey="image.sas.logo.txt" />
```

TIP You can change or remove the description attribute. It is used as a tooltip for the logo image.

2 Add styles to your theme's ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\themes\theme-name\styles\custom.css** file. Adjust some of the values in the following example, depending on the dimensions of your logo image and the desired appearance.

```
 .figure1 img {
    width: your-image-widthpx;
    height: your-image-heightpx;
}

.figure1 {
    width: 100%;
    min-width: your-image-widthpx;
    max-width: your-image-widthpx;
}

.logonabout {
    margin-bottom: 0em;
}

.banner .clearfix {
    display: none;
}

.logonhd {
    height: 5.0em;
}

.logonhd h1 {
    padding-top: 1em;
}
```

Logon Banner Background Image

To migrate your logon banner background image:

1 Create a new image and copy it to a new location.

   a Create a new PNG version of your custom image at ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\themes*theme-name*\images\Components\BannerBackground.gif** and name it BannerBackground.png. You can use an application like Microsoft Paint to do this.

   b The dimensions of BannerBackground.png are 781x145 pixels. The dimensions of BannerBackground.gif are 1063x479 pixels. You might need to resize your new image to match the size of BannerBackground.png. Again, you can use an application like Microsoft Paint to make the change.

   c Copy BannerBackground.png to ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\themes*theme-name*\images\semantic\**.

2 If you want your BannerBackground.png image to repeat, then add a style override to the ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\themes*theme-name*\styles\custom.css** file:

```
.banner {
    background: url("../images/semantic/BannerBackground.png")
    repeat-x scroll left top transparent;
}
```

TIP As an alternative to step 1, you can change the URL value to specify a different image, if you prefer.

Note: The corporate design shares the `.banner` style with the classic design. If you include the preceding `.banner` style in your custom.css file, then the

BannerBackground.png appears in the corporate design—which might be undesirable. You can either create a BannerBackground.png image that works well for both the classic and corporate designs, or you can eliminate BannerBackground.png by adding the following style to your custom.css file:

```
.banner {
    background: none;
}
```

Logon Banner Background Color

This setting applies to the classic design only. If you want to change the banner background color that is to the right of the banner background image, edit ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\Velocity\Stylesheets\Common\contexts\themes\theme-name\logon.*theme-name*.vtl**. Change the Logon_Classic_Banner_Background_Color value.

LogonArtTile.gif File

This file is not used in the new logon page for the classic or corporate designs. You do not need to migrate it.

LogonArtTop.gif File

To migrate your custom LogonArtTop.gif file:

1 Copy your custom LogonArtTop.gif from ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\images\Common\** to ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\images\semantic\**.

2 If you want this image to repeat down the page from top to bottom, edit the custom.css file and add a `repeat-y` attribute as shown in the following example:

```
.content {
    background: url("../images/semantic/LogonArtTop.gif")
    repeat-y scroll 0 5em transparent;
}
```

TIP As an alternative to step 1, you can change the URL value to specify a different image, if you prefer.

Note: Similar to the `.banner` style, the `.content` style is used by both the classic and corporate designs. One setting might not look attractive on both designs. If you want to eliminate the graphic from the designs, you can set it to none (`background: none;`).

Colors for the Classic Design

To customize the color for the About link that appears in the banner for the classic design:

1 Edit ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\Velocity\Stylesheets\Common\contexts\themes\theme-name\logon.*theme-name*.vtl**.

2 Change the Logon_Classic_About_Link_Color value to a color that works well with your custom theme's Banner_UtilityBar_Background_Color value in ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\Velocity\Stylesheets\Common\contexts\themes\theme-name\components.*theme-name*.vtl**.

3 Change the additional About colors as needed. These are Logon_Classic_About_Link_Focus_Color and Logon_Classic_About_Link_Hover_Background_Color.

4 Adjust other Logon_Classic* colors in the logon.*theme-name*.vtl, as needed.

Colors for the Corporate Design

To customize the colors for the corporate design:

1 Edit ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\Velocity\Stylesheets\Common\contexts\themes\theme-name\logon.*theme-name*.vtl**.

This file is used by the classic and corporate designs. The rest of the instructions apply to modifying the corporate-related design colors.

2. Change the page body color:

   a. Change Logon_Corporate_Body_Background_Color to one in your theme's color palette or set to white (`#FFFFFF`) to match the classic design.

   b. Set Logon_Corporate_Body_Background_Gradient_Start_Color and Logon_Corporate_Body_Background_Gradient_End_Color to the same color as Logon_Corporate_Body_Background_Color.

3. Change the page text color by setting Logon_Corporate_Page_Text_Color to one in your theme's color palette or set to black (`#000000`) to match the classic design.

4. Change the About link colors:

   a. Change the Logon_Corporate_About_Link_Color value to a color that works well with your custom theme's color palette.

   b. Change additional About colors as needed. These are Logon_Corporate_About_Link_Focus_Color and Logon_Corporate_About_Link_Hover_Background_Color.

5. Adjust other Logon_Corporate* colors in the logon.*theme-name*.vtl, as needed.

Additional Changes for the Corporate Design

If you are migrating the corporate design, edit the ***SAS-config-dir*\Lev1\Web\Utilities\SASThemeExtensions\theme-name\themes*theme-name*\styles\custom.css** file and add the following styles:

```
body {
    filter: none;
    -ms-filter: none;
}
#page {
    /*
     * The following is required to override background image. It does not
     * inherit the color key value.
     */
    background: insert-Logon_Corporate_Body_Background_Color-value;
}
.logonabout a:link {
    text-shadow: none;
}
.logonabout a:hover {
    background: none;
}
.logonhd h1 {
    text-shadow: none;
}
.message {
    background: none;
    filter: none;
}
.message h2 {
    text-shadow: none;
}
.message.info {
    text-shadow: none;
}
.message.error {
    text-shadow: none;
}
.message.warning {
    text-shadow: none;
}
.main {
    background: none;
    -moz-border-radius: 0px;
    -webkit-border-radius: 0px;
    -khtml-border-radius: 0px;
    border-radius: 0px;
}
```

Rebuild SAS Themes

After previous changes are made to migrate your custom theme, run SAS Deployment Manager to rebuild the SAS Themes application. When this is complete, redeploy SAS Themes to your application server and restart the application server.

12

Administering SAS Flex Application Themes

Overview of SAS Flex Application Themes

Introduction to SAS Flex Application Themes

Some SAS Web applications, such as SAS BI Dashboard and SAS BI Portlets, are displayed with the Flex interface that is provided by SAS Flex Application Themes. At start-up time, Flex applications load Flex themes automatically. A theme consists of ShockWave Flash (SWF) files that include cascading style sheets (CSS) files. The theme content is downloaded to the client and is cached by the user's Web browser. As a result, subsequent uses of the Web application result in quicker loading of theme content than it is at initial loading. The SAS Corporate theme is the default theme for all Flex applications.

Themes can be created with the SAS Theme Designer for Flex. For information about custom themes for Flex applications, see *SAS Theme Designer for Flex User's Guide*.

Benefits of SAS Flex Application Themes

SAS Flex Application Themes are required for Flex applications, and they are downloaded as SWF files to the client's Web browser. Flex theme content runs within the Adobe Flash player and offers the following benefits:

- SAS Flex Application Themes coexist with SAS Web Application Themes. For example, SAS Information Delivery Portal uses the default Web theme, but it displays SAS BI Portlets with SAS Flex Application Themes.
- Applications that use SAS Flex Application Themes offer more visual impact, interactivity, and responsiveness.
- Improved visual impact and perceived depth are achieved through the use of skins. Skins are graphics that are applied to common user interface components that change their appearance. For example, the Corporate theme provides skins with a color palette that reflects the SAS visual identity. Skins also include some stylized graphics in the user interface.

Location of SAS Flex Application Themes

SAS Flex Application Theme files are located in the following directories:

- ***SAS-config-dir*\Lev1\Web\Staging\exploded\sas.flexthemes3.4.ear**
- ***SAS-config-dir*\Lev1\Web\Staging\sas.flexthemes3.4.ear**

Deploying SAS Flex Application Themes on a Different Web Application Server

Typically, SAS Flex Application Themes are deployed along with other SAS Web applications on the same Web application server. If you want to deploy themes to a different Web application server, follow these steps:

1 Deploy the EAR file by using the appropriate procedures for your Web application server.

2 In SAS Management Console, navigate to **Application Management** ▶ **Configuration Manager** ▶ **SAS Application Infrastructure**, right-click **Flex Application Themes**, and select **Properties**.

3 On the **Connection** tab, complete the following:

- Select the communication protocol (either http or https).
- Enter the host name of the Web application server on which the theme is deployed.
- Enter the port number of the Web application server.
- Click **OK** to save your changes.
- To enable the new theme location to take effect, restart your Web application server.

13

Administering Multicast Options

Overview of Multicasting

Multicast communication is used to communicate among SAS middle-tier applications in a single SAS deployment (the set of applications connected to the same SAS Metadata Server). When installation is performed with the SAS Deployment Wizard, the wizard generates a default multicast address that is based on IP address of the SAS Metadata Server. The combination of multicast address and multicast UDP port number must be different for each SAS deployment and also different from any other multicast applications at your site.

The multicast communication includes all the information that is needed to bootstrap the SAS middle-tier applications. Because this information includes the SAS environment credentials (such as the sasadm account name and its password), time to live (TTL) and encryption options are provided to secure the multicast communication.

Multicast options are specified as JVM options. Multicast options provide the ability to tune and change the behavior of the multicast communication that occurs within the SAS deployment. The multicast address and UDP port number must match the values in the Web application server's start-up script (for example, `SASServer1.bat`) and the environment.properties file located in the ***`SAS-config-dir`*****`\Lev1\Web\Applications\RemoteServices`** directory.

Administering multicast options typically involves the following:

- setting options such as the multicast address
- configuring security with a multicast authentication token
- configuring the bind address that is used for multicast communication

How Much Multicast Network Traffic is Generated?

The amount of multicast network traffic that is generated by SAS applications is fairly small. The greatest amount of traffic is generated during application start up. When SAS Remote Services starts, the largest packet that it generates is 124 bytes. Once startup is complete, the typical rate is less than 64 Kb per hour.

When the Web application server starts, the largest packet is 256 bytes. Once startup is complete, the typical rate for an entire SAS Enterprise Business Intelligence Server deployment (including SAS Remote Services) is less than 128 Kb per hour.

Once the applications are generating multicast traffic, the amount of traffic is steady regardless of the load on the SAS Web applications.

Configuring Multicast Options

Applications That Use Multicast Communication

Multicast options should be changed in a synchronous manner among the following applications:

- SAS Remote Services
- any Web application server that is used for a SAS Web application
- SAS BI Report Services Report Output Generation tool (if applicable)

Multicast Options Configuration Files for SAS Remote Services

You can make changes to the multicast options for the JVM that is used by SAS Remote Services. Edit the appropriate files as needed.

On Windows, in directory ***SAS-config-dir*\Lev1\Web\Applications\RemoteServices**, change the following files:

- RemoteServices.bat.
- wrapper.conf.
- environment.properties

On UNIX and z/OS, edit the RemoteServices.sh and environment.properties files.

Multicast Options Configuration Files for Web Application Servers

You can make changes to multicast options for any Web application server that is used for a SAS Web application. Edit the appropriate files as needed:

JBoss on Windows:

- Edit the *JBOSS_HOME*`\bin\SASServer1.bat` file.
- Edit the *JBOSS_HOME* `\server\SASServer1\wrapper.conf` file.

For JBoss on UNIX and z/OS, edit the `SASServer1.sh` file.

For deployments that use Oracle WebLogic Server, the multicast options are set as server start arguments with the administration console, and they must also be added to the ***SAS-config-dir*\Lev1\Web\SASDomain\bin\setDomainEnv.cmd** file. For deployments that use IBM WebSphere Application Server, the multicast options are set in the application server process definition. For more information about setting JVM options, see your product documentation.

Multicast Options Configuration Files for SAS BI Report Services

If the SAS BI Report Services Report Output Generation tool is used, then set multicast options for the Report Output Generation tool as well. The multicast options are set in the ***SAS-install-dir***`\SASBIReportServices\4.31\outputgen.ini` file.

Key Multicast Properties

The following table shows some key multicast properties.

Table 13.1 *Multicast Properties*

Property	Default Value	Unit	Description
multicast.address	239.*X.Y.Z*	Not applicable	This value is provided by the SAS Deployment Wizard prompting mechanism and defaults to 239.*X.Y.Z*. Values for X, Y, and Z are the last three octets of the metadata server's IP address. In an IPv6 environment, the value defaults to ff14::/16.
multicast.port	8561	Not applicable	This value is provided by the SAS Deployment Wizard prompting mechanism and represents the port on which UDP communication occurs.

Property	Default Value	Unit	Description
multicast_udp_ip_ttl	1	Decimal. Specifies how far a multicast packet should be forwarded from a sending host. 0 is restricted to the same host. 1 is restricted to the same subnet. 32 is restricted to the same site. 64 is restricted to the same region. 128 is restricted to the same continent. 255 is unrestricted.	The IP multicast routing protocol uses the Time to Live (TTL) field of IP datagrams to decide how far a multicast packet should be forwarded from a sending host. The default TTL for multicast datagrams is 1, which results in multicast packets going only to other hosts in the local network. If all SAS applications participating in the multicast (this includes Remote Services, any Java applications in the middle tier, and BI Report Services) are on the same machine, the value should be 0. If your site has a SAS middle-tier application that resides on a different subnet but uses the same metadata server within the same SAS deployment, increase the value for this property.
multicast.security	Not applicable	Not applicable	By default (with no value), both encryption and authentication are enabled. Valid values are: ■ ENCRYPT: encrypt but do not require authentication ■ NONE: do not encrypt and do not require authentication
multicast.config.file	Not applicable	URL string (file://, http://, and so on)	By default, a JGroups configuration is provided. However, you can provide your own configuration by specifying the URL path to that configuration. This option enables you to specify a port range or change from IP multicast to the gossip router capabilities of JGroups.

Configuring a Multicast Authentication Token

Understanding the Multicast Authentication Token

By default, the multicast communication is protected with encryption because it conveys credentials. This default setting for encryption uses a fixed encryption key that is built into the software and is common to all SAS middle-tier software. This strategy prevents access to the multicast communication from unauthorized listeners. This setting might be sufficient for deployments where multicast communication is isolated from the user community with a firewall, a TTL option, or the deployment is in an isolated data center.

If your middle tier meets any of the following criteria, then you might want to set a multicast authentication token value:

- the middle-tier environment is not well isolated from end-user access
- the security procedures at your site require protection among administrative and operational staff in various roles
- you want more protection against eavesdroppers and unauthorized participants

For these deployments, set a multicast authentication token value that is known only to the appropriate personnel. A multicast authentication token is a password-like string that is needed to connect to the multicast group and create a site-specific encryption key. In a multi-tier configuration, the SAS Deployment Wizard displays a prompt for a multicast authentication token on each tier that has an application participating in multicast communication. The same authentication token value must be specified for each tier in the same SAS deployment (each tier associated with the same metadata server).

The multicast authentication token has an interaction with the multicast.security property. By default, clients that want to join a multicast group to receive messages are required to provide an authentication token for the join request. (This is true whether a custom token value is used or if the default token value that is built into the software is used.) If you determine this process is causing an impact on performance, or that it is unnecessary, you can disable the use of authentication tokens. If you set the multicast.security property to NONE, encryption and authentication are disabled. If you set the property to ENCRYPT, then encryption is enabled with no authentication of the join request.

Reconfiguring to Use a Multicast Authentication Token

Generate a Token and Set the Token for SAS Remote Services

1 Use SAS and the PWENCODE procedure to generate an encoded password to use as the multicast authentication token. For example, {SAS002}DA9A0A5C20629B7F34D2C88A165E5530.

2 Edit the ***SAS-config-dir*\Lev1\Web\Applications\RemoteServices\RemoteServices.bat** file to add a -DMULTICAST_AUTHENTICATION_TOKEN JVM option.

   For Windows, add the option in the runasScripts section:

```
:runasScripts
set MULTICAST_AUTHENTICATION_TOKEN=token
```

   For UNIX and z/OS, add the option to the **RemoteServices.sh** file after the SERVERUSER variable:

```
SERVERUSER=sas

MULTICAST_AUTHENTICATION_TOKEN="token"
export MULTICAST_AUTHENTICATION_TOKEN
```

3 For Windows, also add the JVM option to the **wrapper.conf** file. Add it to the end of the wrapper.java.additional.11 entry:

```
wrapper.java.additional.11=-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=16m -XX:MaxNewSize=16m -XX:PermSize=64m -XX:MaxPermSize=64m
-DMULTICAST_AUTHENTICATION_TOKEN=token
```

   Note: Do not use carriage returns or line feed characters when editing long lines.

4 Restart SAS Remote Services.

Setting the Token for JBoss Application Server

1 For deployments on Windows, edit the **`JBOSS_HOME\server\SASServer1\wrapper.conf`** Add a wrapper.java.additional.nn entry that is similar to the following:

```
wrapper.java.additional.36=-Dcom.sas.log.config.url=file:///C:/SAS/Config/...
wrapper.java.additional.37=-DMULTICAST_AUTHENTICATION_TOKEN=token
```

2 Edit the **`JBOSS_HOME\bin\SASServer1.bat`** file. Add the JVM option to the JAVA_OPTS variable:

```
set JAVA_OPTS=-DMULTICAST_AUTHENTICATION_TOKEN=token
-Xms256m -Xmx512 ...
```

3 Restart the Web application server.

Setting the Token for WebLogic Server

1 Edit the **`SAS-config-dir\Lev1\Web\SASDomain\bin\setDomainEnv.cmd`** file. Add the JVM option to the USER_MEM_ARGS variable for SASServer1:

```
if "%SERVER_NAME%" == "SASServer1" (
   set USER_MEM_ARGS=-DMULTICAST_AUTHENTICATION_TOKEN=token
 -Dsas.server.name=Server
```

2 Use the WebLogic Server administration console to access the **Server Start** tab for SASServer1.

3 Add `-DMULTICAST_AUTHENTICATION_TOKEN=`*`token`* to the **Arguments** field.

4 Restart the Web application server.

Setting the Token for WebSphere Application Server

1 Use the Integrated Solutions Console to access the **Java Virtual Machine** for the application server.

2 Add `-DMULTICAST_AUTHENTICATION_TOKEN=`*`token`* to the **Generic JVM arguments** field.

3 Restart the Web application server.

Setting the Token for the Report Output Generation Tool

1 Edit the ***SAS-install-dir*\SASBIReportServices\4.31\outputgen.ini** file.

2 Add a JavaArgs_*nn* entry that is similar to the following:

```
JavaArgs_13=-Dsas.app.launch.picklist=picklist;"help\primary.picklist"
JavaArgs_14=-DMULTICAST_AUTHENTICATION_TOKEN=token
Classpath=-cp "<VJRHOME>/eclipse/plugins/sas.launcher.jar"
```

Configuring the JGroups Bind Address

Understanding JGroups the Bind Address

SAS middle-tier applications use JGroups to perform multicast communication between applications and to perform caching of application properties. The JGroups software binds to the IP address of first non-loopback network interface that it can detect on the machine. Many machines have multiple network interfaces (multihomed), and each network interface has its own IP address. In some cases, the Web application server selects the value of **InetAddress.getLocalHost().getHostName()** as the bind address to use for multicast communication and SAS Remote Services selects a different IP address to bind to.

Multicast communication does not function correctly if the IP address selected by JGroups for SAS Remote Services does not match the IP address selected by the Web application server. One indication of a mismatch is an error message that appears in the Web application server log file. See the following example:

```
13:39:35,602 ERROR [ContextLoader] Context initialization failed
org.springframework.beans.factory.BeanDefinitionStoreException: Invalid bean
definition with name 'dashboardServices' defined in ServletContext resource
[/WEB-INF/spring-config/services-config.xml]: Could not resolve placeholder
'metadata.user'


ERROR [main] - ****************************************************************
ERROR [main] - Required entry, '/sas/properties/environment', not found in the
cache.
ERROR [main] - Possible causes include: the RemoteServices VM is not started or
ERROR [main] - there is a multicast address/port mismatch; using
ERROR [main] - address=239.168.68.1 and port=8561.
ERROR [main] - ****************************************************************
```

Set the bind address for SAS Remote Services, the Web application server, and the SAS BI Report Services Report Generation tool if the previous error message is seen.

Setting the Bind Address for SAS Remote Services

1 For deployments on Windows, edit the ***SAS-config-dir*\Lev1\Web\Applications\RemoteServices\wrapper.conf** file. Add a wrapper.java.additional.*nn* entry that is similar to the following:

```
wrapper.java.additional.12=-Dlog4j.configuration="..."
wrapper.java.additional.13=-Djgroups.bind_addr=ip-address
```

2 Edit the ***SAS-config-dir*\Lev1\Web\Applications\RemoteServices\RemoteService.bat** file. Add the JVM option in the start2 section:

```
:start2
   start "SAS Remote Services" "%JAVA_JRE_COMMAND%" ^
   -classpath "%CLASSPATH%" ^
   -Dsas.ext.config="C:\Program Files\SASHome\sas.java.ext.config" ^
   -Djgroups.bind_addr=ip-address
```

3 Restart SAS Remote Services.

Setting the Bind Address for JBoss Application Server

1 For deployments on Windows, edit the ***JBOSS_HOME*\server\SASServer1\wrapper.conf** file. Add a wrapper.java.additional.*nn* entry that is similar to the following:

```
wrapper.java.additional.33=-Dcom.sas.log.config.url=file:///C:/SAS/Config...
wrapper.java.additional.34=-Djgroups.bind_addr=ip-address
```

2 Edit the ***JBOSS_HOME*\bin\SASServer1.bat** file. Add the JVM option to the JAVA_OPTS variable:

```
set JAVA_OPTS=-Djgroups.bind_addr=ip-address -Xms256m -Xmx512 ...
```

3 Restart the Web application server.

Setting the Bind Address for Oracle WebLogic Server

1 Edit the ***SAS-config-dir*\Lev1\Web\SASDomain\bin\setDomainEnv.cmd** file. Add the JVM option to the USER_MEM_ARGS variable for SASServer1:

```
if "%SERVER_NAME%" == "SASServer1" (
   set USER_MEM_ARGS=-Djgroups.bind_addr=ip-address -Dsas.server.name=Server
```

2 Use the WebLogic Server administration console to access the **Server Start** tab for SASServer1.

3 Add `-Djgroups.bind_addr=`*`ip-address`* to the **Arguments** field.

4 Restart the Web application server.

Setting the Bind Address for IBM WebSphere Application Server

1 Use the Integrated Solutions Console to access the **Java Virtual Machine** for the application server.

2 Add `-Djgroups.bind_addr=`*`ip-address`* to the **Generic JVM arguments** field.

3 Restart the Web application server.

Setting the Bind Address for the Report Output Generation Tool

1 Edit the ***SAS-install-dir*\SASBIReportServices\4.31\outputgen.ini** file.

2 Add a JavaArgs_*nn* entry that is similar to the following:

```
JavaArgs_13=-Dsas.app.launch.picklist=picklist;"help\primary.picklist"
JavaArgs_14=-Djgroups.bind_addr=ip-address
Classpath=-cp "<VJRHOME>/eclipse/plugins/sas.launcher.jar"
```

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SAS Configuration Scripting Tools

Overview

The configuration scripting tools enable administrators to perform the following tasks:

- **Create the Web application server configuration rather than following the manual instructions.** If the automatic configuration option was disabled in the SAS Deployment Wizard, then the SAS Deployment Wizard provides an Instructions.html file that describes the configuration steps to perform the Web application server configuration. You can use the configuration scripting tools to perform these steps automatically instead of manually.
- **Create the Web application server configuration on another machine.** This is useful for sites that do not permit running the SAS Deployment Wizard on the middle-tier machine. The middle-tier environment is archived, copied to the target machine, and then the configuration scripting tools can be used to configure the SAS middle-tier environment. For information about preparing to install and performing the installation, see *SAS Intelligence Platform: Installation and Configuration Guide*.
- **Rebuild the Web application server configuration.** The results are identical to what is performed by the SAS Deployment Wizard and SAS Deployment Manager.

The SAS configuration scripting tools also enable an administrator to perform the following additional tasks:

- Use a command line to perform a configuration operation on a single resource. For example, creating a server instance can be performed with a single command.
- Run the configuration scripting tools in interactive mode to perform a series of commands that are entered by hand. This feature is available for WebLogic Server deployments only.
- Edit property files that are associated with specific resources and then update the resources with the configuration scripting tools.

- Use existing property files as templates for creating additional resources. For example, an administrator can copy the definitions for SASServer1 to a new file and then use it as a template to create a new server instance.

Special Considerations

- If you are rebuilding or reconfiguring a Web application server, then make sure that all the Web application servers are stopped. For deployments that use WebLogic Server, also stop the administrative server and the **`nodemanager`** server. For deployments that use WebSphere Application Server, stop all the applications in the cell. This includes the deployment manager and the **`nodeagent`** server.
- For reconfiguration tasks and adding servers, make sure that you avoid port number conflicts.
- The configuration scripting tools do have the ability to perform administration like starting and stopping servers. However, the tools are not intended to replace the administration utilities provided by the Web application server vendor or the start and stop scripts provided by SAS.
- If you encounter errors while configuring resources such as a JDBC data source, it is possible to use the administrative console for WebSphere Application Server or WebLogic Server to delete the resource, check the settings in your properties files, and try the configuration again.
- If you encounter errors while configuring a WebSphere Application Server cell or profile, or while configuring a WebLogic Server domain, consider removing the configuration. For WebSphere Application Server, this might involve removing profiles with the manageprofiles command.
- If you encounter errors while configuring JBoss, review the properties that are being used by the tool and rerun the tool. The tool can be run many times without deleting the configuration between runs, so long as JBoss is not running. If JBoss starts in between runs, there can be locks on files that prevent subsequent runs from succeeding.

Scripting Tool for WebLogic Server

Building the WebLogic Server Domain on Another Machine

Some sites separate the administration of SAS applications and the administration of Web application servers. For sites that do not permit running the SAS Deployment Wizard on the Web application server machine, the configuration scripting tool can be used to configure a WebLogic Server domain. The configuration scripting tool is archived from the machine where the SAS Deployment Wizard was run and provided to the Web application server administrator. The configuration scripting tool can configure WebLogic Server identically to what is created with an automated deployment with SAS Deployment Wizard. The configuration scripting tool is located in ***SAS-config-dir*** **\Lev1\Web\Scripts\WebLogic**. The name of the command is saswls.cmd. The wlst.commands.txt file in the same directory contains all the commands that are needed to configure the domain. The following example shows the syntax for using the configuration scripting tool to configure domain:

```
saswls.cmd wlst.commands.txt
```

Note: For UNIX deployments, the command is named saswls.sh.

If the **Cache Credentials** check box was not selected on the Web Application Server: Scripting Configuration page in the SAS Deployment Wizard, then you are prompted for credentials when you run the command.

When the configuration scripting tool is used to create the domain, after the script completes, the domain is configured with all the resources that are needed for the SAS Web applications. The configuration scripting tool deploys the applications and starts the servers.

1 On the Web application server machine, create the directory structure that was used on the machine where the SAS Deployment Wizard was run. The following commands are examples for a Windows environment:

```
mkdir c:\SAS\Config\Lev1\Web\Staging
mkdir c:\SAS\Config\Lev1\Web\Scripts
mkdir c:\SAS\Config\Lev1\Web\Common
mkdir c:\SAS\Config\Lev1\Web\Temp
mkdir c:\SAS\Config\Lev1\AppData
```

Note: These directory paths must be archived from the machine where the SAS Deployment Wizard was run. The archive must be transferred to the Web application server machine.

2 Extract the archive into the directories that were created in the previous step.

3 Open the **`Scripts\Weblogic\props\global.properties`** file in a text editor. Review the properties to make sure that values for the JDK path, WebLogic Server installation path, host names, and ports are accurate.

4 Begin the configuration by running saswlst.cmd wlsct.commands.txt.

If the **Cache Credentials** check box was not selected on the Web Application Server: Scripting Configuration page in the SAS Deployment Wizard then monitor the progress because the tool prompts you for credentials. The following code is an example:

```
16 Dec 2011 14:28:08,730 - CredentialsDialogPrep-processCredentials: Determine
if credentials need to be solicited for those resources that require
authentication...

*=*=*=*=*=*=*  BEGIN Prompting for credentials *=*=*=*=*=*=*

------------------------------------------------------------------------
Please enter credentials for: SAS Trusted User
Enter username: sastrust@saspw
Is "sastrust@saspw" correct? (y/n): y
Username "sastrust@saspw" accepted.
Enter password:
Re-enter password:
```

5 If this is the first time the scripting tool is run on the machine, then there is a prompt to confirm that you want to create a key file:

```
Creating the key file can reduce the security of your system if it is not
kept in a secured location after it is created. Do you want to create the key
file? y or n
```

After the configuration scripting tool runs and WebLogic Server is configured, some additional tasks must be performed manually on the machine where the SAS Deployment Wizard was run. (For a multiple-machine deployment, this is the machine where the middle-tier configuration was performed.) These tasks are recorded in the Instructions.html file that is generated by the SAS Deployment Wizard. Before you perform those tasks, confirm or correct the JDK_HOME environment variable that is identified in ***SAS-config-dir*\Lev1\level_env.bat** . For UNIX deployments, the file is named level_env.sh. Open the file in an editor and make sure that the value for JDK_HOME identifies the path to a JDK or JRE.

Rebuilding the WebLogic Server Configuration

You can rebuild the WebLogic Server configuration by running the configuration scripting tool. The tool can re-create the entire WebLogic Server configuration and restore it to the originally configured state. The tool reads the commands in the commands file and configures the resources according to the settings in the properties files.

Executing a Batch Script

You can supply a file that contains a series of commands for the configuration scripting tool to execute. This approach is the same strategy that is used for rebuilding the domain with the commands listed in the wlst.commands.txt file. However, you can supply a file with different commands to configure different resources. The following example shows the syntax for using the configuration scripting tool with a commands file that is named cmds.txt:

```
saswls.cmds cmds.txt
```

In the batch script file, the commands take the following form:

```
<operation> <resource_type> <resource_name>
```

The following example shows the commands for undeploying and redeploying the SAS Web Application Themes:

```
undeploy application sas.themes.ear
deploy application sas.themes.ear
```

Executing a single command from the command line uses the same three parts for the command syntax.

If you are creating a resource that requires credentials, such as a data source, remember to create property keys in the credentials.properties file.

Executing a Single Command

You can execute a single command on a single resource from a command line. The following example shows how to undeploy SAS Web Application Themes:

```
saswls.cmd undeploy application sas.themes.ear
```

Executing Commands Interactively

In addition to running the configuration scripting tool in batch mode or executing a single command, the configuration scripting tool can be run interactively. The following example shows how to check the status of the SASServer1 server instance:

```
saslws.cmd

Initializing WebLogic Scripting Tool (WLST) ...

Welcome to WebLogic Server Administration Scripting Shell

Type help() for help on available commands

29 Apr 2011 13:44:43,134 - Running in script mode, forcing autoConfigure and
autoDeploy.
Enter commands interactively:
Usage: operation type name
> check server SASServer1
...
RUNNING
Disconnected from weblogic server: AdminServer
***** This step took 1.9210000038146973 seconds to complete. *****
operation completed with return code '0'
```

The command syntax and operations can be found by entering **help** at the interactive command prompt. The following display shows the results of the help command:

```
saswls operation resource_type resource_name [additional_options]
```

```
additional options that can appear anywhere on the command line to launch
the script:

credentials=file_name
promptMode=TEXT|GRAPHIC

valid resource types (supported operations):

application          (compile deploy undeploy)
connectionfactory    (create delete)
dataSource           (create delete)
domain               (create customize listservers listjmsservers
                      createloginmodule)
foreignjndiprovider (create)
jdbcprovider         (create delete)
jmsServer            (create delete)
mailSession          (create delete)
nodemanager          (start stop)
policy               (set)
queue                (create delete)
server               (check create delete start stop)
topic                (create delete)
user                 (create)
```

Properties Reference

Global Properties

Property files are used by the configuration scripting tool to configure the middle-tier environment. These properties are found in ***SAS-config-dir*/Lev1/Web/Scripts/Weblogic/props**. Each of the properties are described in the following list:

SASDomainName
: is the name of the WebLogic Server domain that is used for the SAS Web applications. This property is not used by the configuration scripting tool. This property is used by SAS Deployment Wizard to generate documentation only.

SASWlstScriptHome
: identifies the fully qualified path to the configuration scripting tool directory.

adminHost
: is the host name of the administration server for this domain.

adminJvmOptions
: is the list of JVM options for the administration server.

adminPort
: is the port number that the administration server listens on.

adminSSLPort
: is the port number for SSL communication with the administration server. This value can be set in the properties file, but the configuration scripting tool do not support configuring servers with SSL.

adminServerName
: is the name of the administration server. This property is not currently used by the configuration scripting tool. The name is always `AdminServer`.

adminServiceName
: is the Windows service name for the administration server. This property is used to generate the scripts that install Windows services.

adminUrl
: is the URL that is used by the `wlst` command to connect to the administration server.

applicationStagingDir
: is the fully qualified path to the staging directory for the SAS Web applications. This property is not used by the configuration scripting tool. This property is used to generate documentation only.

autoConfigure
: is a Boolean value. If set to **`false`**, then manual configuration is requested and the SAS Deployment Wizard creates a sample domain and configures servers in off-line mode only. All configuration steps that are run outside of SAS Deployment Wizard and SAS Deployment Manager are automated regardless of this setting.

autoDeploy
: is a Boolean value. If set to **`false`**, then the SAS Deployment Wizard does not deploy the SAS Web applications. This property is not used by the configuration scripting tool. This property is used by SAS Deployment Wizard to generate documentation.

backupBinDir
: identifies the fully qualified path to a directory that is used to save previous versions of the scripts in the *`domain`*`/bin` directory.

bitwidthOption
: is used to set the `-d64` JVM option for machines that need this JVM option. This property is used in the commEnvSAS.sh script.

configureJMSSecurity
: is used by SAS Deployment Wizard to generate documentation only.

domainChanges
: is used to generate a report of configuration changes in the instructions that are generated by SAS Deployment Wizard or SAS Deployment Manager. It is not used by the configuration scripting tool.

domainDir
: identifies the fully qualified path to the domain to configure.

host
: is the host name for this machine.

isAdminHost
: is a Boolean value. If the administration server is installed on this machine, then set this value to **`true`**.

javaHome
: set this property to the same value as the `JAVA_HOME` environment variable. The property is inherited by the managed servers and tool that are launched by the configuration scripting tool.

javaVendor
: identifies the Java vendor. Values include **`Sun`**, **`Oracle`**, **`IBM`**, **`BEA`**, and **`HP`**. The values are case sensitive.

jdkBugWorkaround
: is set to a JVM option that is required by most recent JDKs. Do not modify this property.

loginModuleFile

identifies the path of the JAAS loginModuleFile that is set as a JVM option for WebLogic managed servers.

midtierMulticastIpJavaOptions

is a list of JVM options that configure multicast communications with the SAS Remote Services application. These values must match the values used by the SAS Remote Services application.

minimumUlimit

is the minimum acceptable unlimit setting for file descriptors on UNIX machines. The create domain operation fails if a lower setting is detected.

mwHomeDir

identifies the Oracle middleware home directory (`MW_HOME`). This is typically the parent directory of the WebLogic Server installation directory, but the WebLogic Server installers permit installing WebLogic Server in a different location.

nodeManagerPort

is the port number that the **`nodemanager`** server for this domain is listening on.

osLinuxVendor

is set to a valid Linux vendor name. Values are **`redhat`** or **`SuSE`**. The values are case sensitive. On other operating systems, the value is set to **`UNKNOWN`**. This value is used in the commEnvSAS.sh script.

osLinuxVersion

identifies the Linux operating system version number. On other operating systems, the value is set to **`UNKNOWN`**.

osType

identifies the operating system type. Values are **`win`** or **`unx`**. The values are case sensitive.

pythonCachedirOption

identifies the location of the Python cache. This value is passed to the `wlst` command line.

rcFileName
: identifies the fully qualified path to a file that is used by `wlst` commands to return values in properties and return code status.

returnCodeProperties
: identifies the fully qualified path to the return code properties file that maps return code keys to numeric values. Do not change this property.

startScript
: identifies the fully qualified path to the domain setup script. This file is named setDomainEnv.cmd or setDomainEnv.sh.

templateDirectoryName
: identifies the fully qualified path to the directory that contains the velocity templates. The templates are used to create scripts in the *domain*/bin directory.

webappsrvScriptingCacheCredentials
: is a Boolean value. If set to **true**, then credential values are cached in the credentials.properties file. If set to **false**, then values are purged from credentials.properties when the configuration scripting tool exits.

webauthIsComment
: is set to the string or character that is used as a comment. Several lines are included in commEnvSAS.cmd or commEnvSAS.sh for the support of Web authentication. These lines are commented out unless you have manually modified the SAS deployment to support Web authentication. If Web authentication is configured, then this property contains an empty value.

weblogicBarName
: is a string that is used to create the name of the Windows services in installNodeMgrSvc.cmd and uninstallNodeMgrSvc.cmd.

weblogicHome
: identifies the fully qualified path to the WebLogic Server installation. The `WL_HOME` environment variable is set to this value in generated scripts.

weblogicInstalled

is a Boolean value. Set to **`true`** to indicate that WebLogic Server is installed on the machine that is used for the SAS middle tier. This value is used to generate documentation and is not used by the configuration scripting tool.

weblogicNodeManagerServiceName

is the Windows service name for the **`nodemanager`** server.

weblogicProdName

is the WebLogic product name that is used as part of the Windows service name for the **`nodemanager`** server.

weblogicReconfigured

is a Boolean value. This property is set to **`true`** if the last SAS Deployment Wizard run was a reconfiguration. This property is used to generate documentation only and is not used by the configuration scripting tool.

weblogicSelectedVersion

is used by SAS Deployment Wizard to generate documentation only. It is not used by the configuration scripting tool.

Credential Properties

All properties that are related to credentials are stored in the credentials.properties file. The tool prompts you for these properties. This properties file does not need to be edited directly. These values are cleared from the file after the tool completes if the global property `webappsrvScriptingCacheCredentials` is set to **`false`**. When stored, these values are stored in SAS base-64 encoding, not clear-text. If you chose to store passwords in this file, then they are updated when you use the Update passwords feature of the SAS Deployment Manager.

datasource.create_*resource*_passwd

is the data source user password.

datasource.create_*resource*_userid

is the data source user name.

domain.create_WeblogicAdmin_passwd

is the WebLogic Server administrator password.

domain.create_WeblogicAdmin_userid
is the WebLogic Server administrator user.

domain.createloginmodule_SASTrust_passwd
is the SAS Trusted User password.

domain.createloginmodule_SASTrust_userid
is the SAS Trusted User. This identity is used to configure the JAAS login module.

mailsession.create_SASMailSession_passwd
is the mail session user password.

mailsession.create_SASMailSession_userid
is the mail session user ID. This credential is used only if the mailsession property `mailsrvRequiresAuthentication` is set to **`true`**.

user.create_*resource*_passwd
is the WebLogic Server user's password.

user.create_*resource*_userid
is the WebLogic Server default realm user ID.

Resource Properties

Each property file governs the configuration of a specific resource. The next section lists and describes a group of properties that are common to many resources. The subsequent sections identify properties that are specific to each resource type.

Properties Common to Many Resources

The following properties are common to a number of resource types.

deleted
is a Boolean value. If set to **`true`**, then this resource has been marked as deleted.

deletedTargets
is a comma-separated list of target servers that contain this resource that are marked for deletion. A Delete operation removes these targets and removes the resource if no targets remain.

targets
is a comma-separated list of servers that this resource instance is targeted to.

thisOperation

is a field that is used internally by SAS Deployment Wizard and SAS Deployment Manager to manage resource files. It is not used by the configuration scripting tool.

thisTarget

is a field that is used internally by SAS Deployment Wizard and SAS Deployment Manager to manage resource files. It is not used by the configuration scripting tool.

Application Properties

These resources represent applications deployed in a WebLogic Server domain. The properties files are named in the pattern `application.`*`application_name`*`.properties`. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. The WebLogic Server 10.3.3 documentation for this resource is available at **http://download.oracle.com/docs/cd/E14571_01/apirefs.1111/e13952/taskhelp/applications/DeployEnterpriseApplications.html**.

applicationName

is the name of the SAS Web application.

applicationPath

identifies the fully qualified path to the application archive file or directory.

compileMaxMemory

is the -Xmx option used on the `weblogic.appc` command line when compiling a Web application.

docApplicationName

is the name of the application that is used in documentation. This property is used by SAS Deployment Wizard to generate documentation. It is not used by the configuration scripting tool.

loadOrder

is the application load order.

Data Source Properties

Data source properties are used to configure data source resources in WebLogic. The resource files are named in the pattern `datasource.`*`datasource_name`*`.properties`. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. The WebLogic Server 10.3.3 documentation for this resource is available at **`http://download.oracle.com/docs/cd/E14571_01/web.1111/e13737/toc.htm`**.

capacityIncrement
: is the number of connections that are created when new connections are added to the connection pool.

classPath
: is the classpath that includes the JAR files required for the JDBC driver. This classpath is used only to keep track of JDBC JAR files used by the various data sources and the JDBC providers.

databaseServerURL
: is the JDBC URL for communication with the database server.

datasourceName
: is the data source name. This name must be unique in a WebLogic Server domain.

driverName
: is the fully qualified JDBC driver class name.

globalTransactionsProtocol
: is the global transactions protocol. Values include **`TwoPhaseCommit`**, **`LoggingLastResource`**, **`OnePhaseCommit`**, **`EmulateTwoPhaseCommit`**, and **`None`**. SAS applications depend on correct settings. Do not change this property.

initialCapacity
: is the number of physical connections to create when creating the connection pool.

inputJarLocation
: identifies the fully qualified path for the directory where the JDBC driver JAR files have been staged.

jdbcDriverJarDir

identifies the fully qualified path for the directory where the JDBC driver JAR files are copied and used by the configuration.

jndiName

is the data source JNDI name. This name is configured in application configuration files and should not be changed without corresponding changes to the applications that use this datasource.

keepLogicalConnOpenOnRelease

is a Boolean value. If set to `true`, then it enables WebLogic Server to keep the logical JDBC connection open for a global transaction when the physical XA connection is returned to the connection pool.

keepXaConnTillTxComplete

is a Boolean value. If set to `true`, then it enables WebLogic Server to keep the logical JDBC connection open for a global transaction when the physical XA connection is returned to the connection pool. SAS applications might depend on particular JDBC transaction settings. Do not change this property.

loginDelaySeconds

is the number of seconds to delay before creating each physical database connection. This delay supports database servers that cannot handle multiple connection requests in rapid succession.

maxCapacity

is the maximum number of physical connections that this connection pool can contain.

needTxCtxOnClose

is a Boolean value. If set to `true`, it specifies whether the XA driver requires a distributed transaction context when closing various JDBC objects (result sets, statements, connections, and so on). This property applies only to connection pools that use an XA driver. SAS applications might depend on particular JDBC transaction settings. Do not change this property.

options

is a list of properties that are passed to the JDBC driver. The options are used to create physical database connections.

shrinkFrequencySeconds

is the number of seconds to wait before shrinking a connection pool that has incrementally increased to meet demand.

testConnectionsOnReserve

is a Boolean value. If set to `true` , then WebLogic Server can test a connection before giving it to a client. (This feature requires that you specify a value for testTableName.)

testTableName

is the name of the database table to use when testing physical database connections. This name is required when you specify a **Test Frequency** and enable **Test Reserved Connections**.

xaEndOnlyOnce

is a Boolean value. If set to `true`, then it specifies that XAResource.end() is called only once for each pending XAResource.start(). This option prevents the XA driver from calling XAResource.end(TMSUSPEND) and XAResource.end(TMSUCCESS) successively. This property applies to data sources that use an XA driver only. SAS applications might depend on particular JDBC transaction settings. Do not change this property.

Domain Properties

Most domain configuration properties are defined in global.properties. The file `domain.`*`domainName`*`.properties` contains properties needed exclusively to create a new domain and is not required by operations on other resources.

domainTemplatePath

identifies the fully qualified path to the template JAR file that is used to create the domain.

Foreign JNDI Provider Properties

Resources are stored in properties files that are named in the pattern `foreignjndiprovider.`*`resource`*`.properties`. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. The WebLogic Server 10.3.3 documentation for this resource is available at `http://download.oracle.com/docs/cd/E14571_01/apirefs.1111/e13952/taskhelp/jndi/ConfigureForeignJNDIProvider.html`.

foreignJNDIName
: is the foreign JNDI Name for a linked name.

foreignLinkName
: is the user-specified name of the foreign JNDI link MBean instance.

foreignProviderName
: is the user-specified name of the foreign JNDI MBean instance.

foreignProviderURL
: is the foreign provider URL that is used to make connections to the remote server.

initialContextFactory
: is the initial context factory to use to connect. This class name depends on the JNDI provider and the vendor that are being used. The value corresponds to the standard JNDI property, java.naming.factory.initial.

localJNDIName
: is the local JNDI name for a linked name.

JDBC Provider Properties

JDBC provider properties are used to configure JDBC drivers in WebLogic Server. The resource files are named in the pattern `jdbcprovider.`*`resource_name`*`.properties`. WebLogic Server does not use the concept of a JDBC provider. These properties are used by the SAS Deployment Wizard to manage the JDBC driver JAR files only.

classPath
: is the classpath that includes the JAR files required for the JDBC driver. This is used only to keep track of JDBC JAR files used by the various data sources and the JDBC providers.

inputJarLocation
: identifies the fully qualified path for the directory where the JDBC driver JAR files have been staged.

jdbcDriverJarDir

identifies the fully qualified path for the directory where the JDBC driver JAR files are copied and used by the configuration.

jdbcProvider

is a name that is used to keep track of the JAR files related to this JDBC driver by a particular application. This name must be unique in a WebLogic Server domain.

JMS Resource Properties

Three types of JMS resources are supported. Depending on the type of resource, they are stored in properties files that are named in the pattern `connectionfactory.`*`resource`*`.properties`, `queue.`*`resource`*`.properties`, or `topic.`*`resource`*`.properties`. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. The WebLogic Server 10.3.3 documentation for this resource is available at **`http://download.oracle.com/docs/cd/E14571_01/web.1111/e13738/toc.htm`**.

cfXAEnabled

is a Boolean value. If set to **`true`**, then it indicates whether an XA queue or XA topic connection factory is returned, instead of a queue or topic connection factory. This property applies to connection factories only. SAS applications might depend on particular JDBC transaction settings. Do not change this property.

jmsModuleName

is the name of the JMS system module to target this resource to.

jmsServerName

is the name of the JMS server instance to which this module is targeted.

jndiName

is the global JNDI name used to look up the destination within the JNDI namespace. This name is configured in application configuration files and should not be changed without corresponding changes to the applications that use this JMS resource.

resourceName

is the name of this JMS resource.

resourceType

is the type of JMS resource to be configured. Supported values are **`ConnectionFactory`**, **`Queue`**, and **`Topic`**.

subdeploymentName

is the name of the subdeployment with which this resource is associated.

JMS Server Properties

Resources are stored in properties files that are named in the pattern `jmsserver.`*`resource`*`.properties`. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. The WebLogic Server 10.3.3 documentation for this resource is available at **`http://download.oracle.com/docs/cd/E14571_01/web.1111/e13738/toc.htm`**.

dataSourceName

is the data source to use for a JDBC persistent store. If a data source is not configured, the value is **`not-set`**. SAS applications might depend on particular settings. Do not change this property.

jdbcStoreName

is the name of the file or database in which this JMS server stores persistent messages. If a data store is not configured, then the value of `dataSourceName` is **`not-set`**. SAS applications might depend on particular settings. Do not change this property.

jmsServerName

is the name of the JMS Server.

tablePrefix

is a name to prefix to the table name in this JDBC store. If a table prefix is not configured, the value is **`not-set`**.

targetServerName

is the name of the managed server that is associated with this JMS server.

Login Module Properties

JAAS login modules are configured in a flat file as documented at: `http://download.oracle.com/javase/6/docs/api/javax/security/auth/login/Configuration.html`. The module configuration properties are stored in properties files that are named in the pattern `loginmodule.`*`resource`*`.properties`. Modules are grouped together under an application name.

aliasdomain
: is the name of another domain that this module responds to. This domain is used when this module runs in a remote JVM and receives generated credentials from an environment that uses the trusted authentication module.

applicationPolicy
: is the application policy that these properties apply to.

debug
: set this property to **`true`** to generate debugging information to the System.out stream.

domain
: is the authentication domain that this module authenticates to. Requests to authenticate users outside this domain are ignored.

hasCredentials
: set this property to **`true`** if this module incorporates credentials found in the credentials property file.

holdOpenConnection
: is a Boolean value that controls how the login module interacts with the SAS Metadata Server. If set to **`false`**, then the login module opens a connection to the SAS Metadata Server and closes it when it is finished. Setting this property to **`true`** causes the module to store a handle to the connection object in the Subject object. This connection can then be reused by the UserContext object. This option should not be set to true if the module is being used by an application container. Otherwise, the connection is not closed until the Subject object is destroyed by garbage collection.

host
: is the host name for the SAS Metadata Server.

loginModuleCode

is the fully qualified class name for the login module.

loginModuleFlag

is one of the following values: **`required`**, **`requisite`**, **`sufficient`**, **`optional`**. For more information, see `http://download.oracle.com/javase/6/docs/api/javax/security/auth/login/Configuration.html`.

port

is the port number that the SAS Metadata Server is listening on for new connections.

repository

is the name of the repository that is set as the default repository. For the primary authentication, the typical value is Foundation.

Login Policy Properties

JAAS login modules are configured in a flat file as documented at : `http://download.oracle.com/javase/6/docs/api/javax/security/auth/login/Configuration.html`. The login policy configuration properties are stored in properties files that are named in the pattern `loginpolicy.`*`resource`*`.properties`. Modules are grouped together under an application name that is based on these policy names.

applicationPolicy

is the login policy name. Typical values for a SAS deployment are `PFS`, `SCS`, and `UsernamePassword`.

Mail Session Properties

Resources are stored in properties files that are named in the pattern `mailsession.`*`resource`*`.properties`. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. For example, the WebLogic Server 10.3.3 documentation is available at `http://download.oracle.com/docs/cd/E14571_01/apirefs.1111/e13952/taskhelp/mail/CreateMailSessions.html`.

mailSessionJNDIName
: is the JNDI name for the mail session. This name is configured in application configuration files and should not be changed without corresponding changes to the applications that use this mail session.

mailSessionName
: is the name of the mail session resource.

mailSessionSMTPHost
: is the host name of SMTP server for the mail session.

mailsrvRequiresAuthentication
: is a Boolean value. Set to **`true`** if credentials are required to access this mail server.

Policy Properties

These resources represent a WebLogic default realm policy that is configured in a WebLogic domain. The properties files are named in the pattern `policy.`*`policyname`*`.properties`. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. The WebLogic Server 10.3.3 documentation for this resource is available at **`http://download.oracle.com/docs/cd/E14571_01/apirefs.1111/e13952/taskhelp/security/UseRolesAndPoliciesToSecureResources.html`**.

policyExpression
: is the policy expression to set for the resource.

policyName
: is the policy name. This property is set but is not used.

securedResource
: is the resource ID.

Server Properties

Server resources are stored in properties files that are named in the pattern `server.`*`servername`*`.properties`. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. The WebLogic Server 10.3.3 documentation for this resource is available at `http://download.oracle.com/docs/cd/E14571_01/apirefs.1111/e13952/taskhelp/domainconfig/CreateManagedServers.html`.

JDKOptions
: is a list of JVM options for this server.

cmdLineChanges
: is a list of command line changes. This property is used by SAS Deployment Wizard to produce documentation. It is not used by the configuration scripting tool.

cmdLineScriptChanges
: is a list of command line script changes. This property is used by SAS Deployment Wizard to produce documentation. It is not used by the configuration scripting tool.

javaPolicySettings
: is a list of JVM options to use when a Java security manager is used. This option is not currently supported with WebLogic Server, and this property is ignored.

listenPort
: is the port number that this server uses for HTTP connections.

managedServerName
: is the name of the managed server.

scriptJDKOptions
: is a list of JVM options for this server. This property is used by velocity templates to create the setDomainEnv.cmd and setDomainEnv.sh scripts. The value is usually identical to JDKOptions.

serverChanges
: is used by SAS Deployment Wizard to produce documentation. It is not used by the configuration scripting tool.

serviceName
: is the Windows service name. This value is used to create a Windows service for the server.

sslListenPort
: is the port number that this server uses for SSL connections. The configuration scripting tool does not currently support SSL configuration.

startScript
: is the location of the domain setup script, setDomainEnv.cmd.

User Properties

These resources represent WebLogic Server users in the default realm. The properties files are named in the pattern `user.`*`servername`*`.properties`. The credentials are stored in the credentials.properties file. For information about how these properties control WebLogic Server configuration, see the online Help in the WebLogic Administration Console. More information is available in the WebLogic Server documentation on the Oracle Web site. The WebLogic Server 10.3.3 documentation for this resource is available at **`http://download.oracle.com/docs/cd/E14571_01/apirefs.1111/e13952/taskhelp/security/DefineUsers.html`**.

description
: is a description of the user.

Scripting Tool for JBoss Application Server

Building the Server Configuration on Another Machine

Some sites separate the administration of SAS applications and the administration of Web application servers. For sites that do not permit running the SAS Deployment Wizard on the Web application server machine, the configuration scripting tool can be used to configure JBoss. The configuration scripting tool is archived from the machine where the SAS Deployment Wizard was run and provided to the Web application server administrator. The configuration scripting tool can configure JBoss identically to what is created with an automated deployment with SAS Deployment Wizard. The configuration scripting tool is located in ***`SAS-config-dir`*****`\Lev1\Web\Scripts\JBoss`**. The name of the command is jbossScripting.bat. The jbossScripting.properties file in the same directory contains all the settings that are needed to configure JBoss. The following example shows the command syntax for creating or re-creating the JBoss configuration with the default properties file:

```
jbossScripting.bat
```

Note: For UNIX deployments, the command is named jbossScripting.sh.

1 On the Web application server machine, create the directory structure that was used on the machine where the SAS Deployment Wizard was run. The following commands are examples for a Windows environment:

```
mkdir c:\SAS\Config\Lev1\Web\Staging
mkdir c:\SAS\Config\Lev1\Web\Scripts
mkdir c:\SAS\Config\Lev1\Web\Common
mkdir c:\SAS\Config\Lev1\AppData
```

Note: These directory paths must be archived from the machine where the SAS Deployment Wizard was run. The archive must be transferred to the Web application server machine.

2 Extract the archive into the directories that were created in the previous step.

3 Open the **`Scripts\JBoss\jbossScripting.properties`** file in a text editor. Review the following properties to make sure that values for the JDK and JBoss installation directory are accurate:

- config.appserver.version
- config.host.type.win
- config.jboss.install.dir
- config.jdk.install.dir
- config.lev.dir

4 Begin the configuration by running jbossScripting.bat.

If the **Cache Credentials** check box was not selected on the Web Application Server: Scripting Configuration page in the SAS Deployment Wizard, monitor the progress because the tool prompts you for credentials. The following code is an example:

```
...
configJBoss: loginmodule - processing options: optionName=domain value=DefaultAuth
configJBoss: addAttribute: Set name
configJBoss: loginmodule - processing options: optionName=debug value=false
configJBoss: addAttribute: Set name
configJBoss: util - found java.io.Console, using for prompting

Enter Password
        LoginModule=com.sas.services.security.login.OMILoginModule
        trusteduser=sastrust@saspw
        Password=
```

After the script completes, JBoss is configured with all the resources that are needed for the SAS Web applications. All the applications are deployed. The servers are not started automatically.

After the configuration scripting tool runs and JBoss is configured, some additional tasks must be performed manually on the machine where the SAS Deployment Wizard was run. (For a multiple-machine deployment, this is the machine where the middle-tier configuration was performed.) These tasks are recorded in the Instructions.html file that is generated by the SAS Deployment Wizard. Before you perform those tasks, confirm or correct the JDK_HOME environment variable that is identified in ***SAS-config-dir*\Lev1\level_env.bat**. For UNIX deployments, the file is named level_env.sh. Open the file in an editor and make sure that the value for JDK_HOME identifies the path to a JDK or JRE.

Rebuilding the JBoss Configuration

You can rebuild the JBoss configuration by running the configuration scripting tool. The tool can re-create the entire JBoss configuration and restore it to the originally configured state. The tool reads the commands in the commands file and configures the resources according to the settings in the properties files.

Configuring a Single Resource (Preproduction)

You can execute a single command to configure a single resource from a command line. The following example shows how to use the **-s** command line option to configure servers and the **-n** command line option to configure the named instance only:

```
jbossScripting.bat -s -n server1
```

This example uses the default properties file, jbossScripting.properties. The properties file must include the configuration settings for the property key **server1**. If you are creating a resource that requires credentials, such as a data source, remember to create property keys in the jbossScripting.properties file.

Command Syntax

Optional Arguments

The jbossScripting.bat command has optional arguments:

```
jbossScripting.bat [propertiesFile] [resourceType] [-n resourceName]
```

propertiesFile

If you want to use the default properties file, jbossScripting.properties, then you do not need to provide this command argument. If you want to use a different properties file, then provide the fully qualified path to the properties file. It must be the first command argument.

resourceType

If you want to configure one type of resource only, then provide the command line option for that resource type. For example, to configure applications only, use the **-a** command line option. For the resource types, see the following table.

-n resourceName

If you are configuring one type of resource only, you can also choose to configure a single instance of that resource too. For example, to configure SASServer2 only, use the **-s -n server2** command line options to configure only the named server, SASServer2. The mapping between the property key (server2) and the server instance name (SASServer2) is performed in the jbossScripting.properties file.

Command Line Options

The command line options for the jbossScripting.bat file are provided in the following table:

Table 14.1 JbossScripting.bat Command Line Options

Short Option Name	Full Option Name	Description
	--unconfigure	This option is used internally by the configuration scripting tool. It cannot be used to unconfigure a resource such as a server or to undeploy an application.
-a	--applications	Use this option to configure all applications.
-c	--connectionFactories	Use this option to configure all connection factories.
-d	--datasources	Use this option to configure all data sources.
-e	--externalContexts	Use this option to configure all external contexts.
-h	--help	Use this option to see the command help.
-l	--loginmodules	Use this option to configure all login modules.
-m	--mailsessions	Use this option to configure all mail sessions.
-n	--resource-name	Use this option to configure a single named resource. For an example, see "Configuring a Single Resource (Preproduction)" on page 279.

Short Option Name	Full Option Name	Description
-q	--queues	Use this option to configure all queues.
-s	--servers	Use this option to configure all servers.
-t	--topics	Use this option to configure all topics.

Properties Reference

Common Properties

The following properties are common to a number of resource types.

config.jboss.install.dir
: is the fully qualified path to JBoss.

config.jdk.install.dir
: is the fully qualified path to the JDK.

config.jboss.bind.host
: is a string that represents bind host for JBoss. The default value is **`-b 0.0.0.0`**.

config.host.type
: is either `win` or `unx`.

config.tanuki.wrapper.dir
: is the fully qualified path of the Tanuki service wrapper for deployments that use Windows.

config.appserver.version
: is a string that represents the JBoss version.

config.java.version
: is a string that represents the JDK version.

config.lev.dir
: is the fully qualified path to the ***SAS-config-dir*/Lev*n*** directory.

config.loglevel
: identifies the logging level. Values are `DEBUG` or `INFO`.

config.type
: is either `auto` or `manual`. This value identifies whether the Web application server was configured automatically by the SAS Deployment Wizard or configured manually.

Server Properties

The resources are stored in the pattern `server.servern.`*`property`*

server
: is a space-separated list of server instances (for example, server1 server2 server3, and so on). This property is used by the configuration scripting tool to determine the servers instance to configure.

server.server*n*.name
: is the name of the server configuration such as SASServer1, SASServer2, and so on.

server.server*n*.options
: is a semicolon-separated list of JVM options for server instance *n*. Escape colon and equal sign characters with a backslash (\).

server.server*n*.portIncrement
: is an integer value that identifies the increment to add to the default set of port numbers such as 0, 100, 200, 300, and so on.

> **TIP** Do not set this property to a number other than zero and also set the other port number-related properties to unique values. Either use this property to set an offset from the default port numbers, or set this property to zero and set each of the other port-related properties to the values that you want.

server.server*n*.source
: identifies the template to use when creating server instance *n* (for example, default, standard, all, and so on).

server.server*n*.transaction

indicates whether local or distributed transactions are configured. Use `JTA` to indicate local transactions and `JTS` to indicate distributed transactions.

server.server*n*.jmssecurity

is a Boolean value that indicates whether JMS security needs to be configured. If set to true, then passwords are used on JMS calls.

server.server*n*.all.policy.file

is the fully qualified path to a Java policy file. SAS recommends using a policy file that has no restrictions.

server.server*n*.restrictive.policy.file

is the fully qualified path to a Java policy file with preset restrictions.

server.server*n*.port.webserverHttp

identifies the port to use for HTTP communication. The default value is 8080.

server.server*n*.port.webserverHttps

identifies the port to use for HTTPS communication. The default value is 8443.

server.server*n*.port.jndi

identifies the port to use for the JNDI naming server. The default value is 1099.

server.server*n*.port.rmi

identifies the port to use for RMI communication. The default value is 1098.

server.server*n*.service.dependency

is a string that is used to create a Windows Service dependency.

Application Properties

These properties represent the applications that are deployed in a JBoss server. The resources are stored in the pattern `application.application`*`n.property`*.

application

is a space-separated list of application instances such as application1 application2 application3, and so on. This property is used by the configuration scripting tool to determine the application instances to configure.

application.application*n*.appname
: is the name of application instance *n*.

application.application*n*.deploymentdir
: identifies the directory where the application is deployed

application.application*n*.pathtoear
: is the fully qualified path to the EAR file for the application.

application.application*n*.explode
: is a Boolean value. If set to `true`, then the EAR and WAR files contents are extracted in the deployment directory.

application.application*n*.servername
: identifies the name of the server configuration where the application is deployed, such as SASServer1, SASServer2, and so on. Do not supply more than one value for servername.

Credential Properties

All properties defining credentials are stored in the jbossScriptingCredentials.properties file. The tool prompts you for these properties. This properties file does not need to be edited directly. These values are cleared after the tool completes if the global property webappsrvScriptingCacheCredentials is set to false. When stored, they are stored in SAS base-64 encoding, not clear-text. If the option to cache credentials was enabled when the SAS Deployment Wizard was run, then the credentials are updated when the Update passwords feature of the SAS Deployment Wizard is used.

server.server*n*.jmssecurity.user
: is a string that identifies the jmssecurity user ID.

server.server*n*.jmssecurity.password
: is an encoded string that identifies the jmssecurity password.

server.server*n*.jmssecurity.encoding
: is a Boolean value. Use this property to indicate whether the password needs to remain encoded when used.

datasource.datasource*n*.user

is the user ID that is passed to the datasource driver. This property is not used if a security-domain is used as an option for the datasource.datasource*n*.options property.

datasource.datasource*n*.password

is the password that is passed to the datasource driver. This property is not used if a security-domain is used as an option for the datasource.datasource*n*.options property.

Data Source Properties

Data source properties are used to configure JDBC data source resources in JBoss. The resources are stored in the pattern `datasource.datasourcen.properties`.

datasource

is a space-separated list of datasource instances such as datasource1 datasource2 datasource3. This property is used by the configuration scripting tool to determine the datasource instances to configure.

datasource.datasource*n*.name

is the name of datasource*n*.

datasource.datasource*n*.classpath

is the fully qualified path to each of the JAR files that are required for the JDBC driver. For drivers that use more than one JAR file, use a semicolon to separate each of the paths.

datasource.datasource*n*.connectionUrl

is the JDBC connection URL for the datasource resource.

datasource.datasource*n*.driver

is the class name for the JDBC driver.

datasource.datasource*n*.jndiname

is the JNDI name for the datasource.

datasource.datasource*n*.servername
: is the name of the server configuration where the datasource is configured, such as SASServer1, SASServer2, and so on. Do not supply more than one value for servername.

datasource.datasource*n*.xa
: is a Boolean value. If set to `true`, then an xa-datasource-property is added as a datasource property. If set to any other value, then a connection-property is added as a datasource option. The default action is to add connection-property as the datasource option.

datasource.datasource*n*.options
: is a comma-separated list of options for the datasource.

External Context Properties

An external context enables you to access resources in another JVM through JNDI. The resources are brought into the JBoss server JNDI namespace. The term external refers to any naming service that is external to the naming service that is running in the JBoss server JVM.

The resources are stored in the pattern `externalcontext.externalcontextn.`*`property`*.

externalcontext
: is a space-separated list of externalcontext instances such as externalcontext1 externalcontext2 externalcontext3, and so on. This property is used by the configuration scripting tool to determine the externalcontext instances to configure.

externalcontext.externalcontext*n*.local
: is the local JNDI name for the externalcontext.

externalcontext.externalcontext*n*.remote
: is the remote JNDI name for the externalcontext.

externalcontext.externalcontext*n*.url
: is the connection URL for the external resource.

externalcontext.externalcontext*n*.initialcontextfactory
: is the JBoss context factory to use when creating the externalcontext.

externalcontext.externalcontext*n*.servername

is the name of the server configuration where the externalcontext is configured, such as SASServer1, SASServer2, and so on. Do not supply more than one value for servername.

JMS Connection Factory Properties

The resources are stored in the pattern `connectionfactory.connectionfactory`*`n.property`*.

connectionfactory

is a space-separated list of connectionfactory instances such as connectionfactory1 connectionfactory2 connectionfactory3, and so on. This property is used by the configuration scripting tool to determine the connectionfactory instances to configure.

connectionfactory.connectionfactory*n*.name

is the name for the connectionfactory.

connectionfactory.connectionfactory*n*.jndiname

is the local JNDI name for the connectionfactory.

connectionfactory.connectionfactory*n*.servername

is the name of the server configuration where the connectionfactory is configured, such as SASServer1, SASServer2, and so on. Do not supply more than one value for servername.

JMS Queue Properties

The resources are stored in the pattern `queue.queue`*`n.property`*.

queue

is a space-separated list of queue instances such as queue1 queue2 queue3, and so on. This property is used by the configuration scripting tool to determine what queue instances to configure.

queue.queue*n*.name

is the name for the queue.

queue.queue*n*.jndiname

is the local JNDI name for the queue.

queue.queue*n*.servername
: is the name of the server configuration where the queue is configured, such as SASServer1, SASServer2, and so on. Do not supply more than one value for servername.

JMS Topic Properties

The resources are stored in the pattern `topic.topicn.property`.

topic
: is a space-separated list of topic instances such as topic1 topic2 topic3, and so on. This property is used by the configuration scripting tool to determine which topic instances to configure.

topic.topic*n*.name
: is the name for the topic.

topic.topic*n*.jndiname
: is the local JNDI name for the topic.

topic.topic*n*.servername
: is the name of the server configuration where the topic is configured, such as SASServer1, SASServer2, and so on. Do not supply more than one value for servername.

Login Module Properties

The resources are stored in the pattern `loginmodule.loginmodulen.property`.

loginmodule
: is a space-separated list of loginmodule instances such as loginmodule1 loginmodule2 loginmodule3, and so on. This property is used by the configuration scripting tool to determine the loginmodule instances to configure.

loginmodule.loginmodule*n*.policy
: identifies the policy for the loginmodule.

loginmodule.loginmodule*n*.classmate
: identifies the class to use for the loginmodule.

loginmodule.loginmodule*n*.flag

is the flag for loginmodule*n*. Values include **`required`**, **`requisite`**, **`sufficient`**, and **`optional`**.

loginmodule.loginmodule*n*.options

is a comma-separated list of options for the loginmodule. Escape equal sign characters with a backslash (\).

loginmodule.loginmodule*n*.deleted

is a Boolean value that determines whether this entry needs to be deleted from the login_config.xml file.

loginmodule.loginmodule*n*.servername

is the name of the server configuration where the loginmodule is configured, such as SASServer1, SASServer2, and so on. Do not supply more than one value for servername.

Mail Session Properties

The resources are stored in the pattern `mailsession.mailsession`*`n`*`.`*`property`*.

mailsession

is a space-separated list of mailsession instances such as mailsession1 mailsession2 mailsession3, and so on. This property is used by the configuration scripting tool to determine the mailsession instances to configure.

mailsession.mailsession*n*.name

is the name for the mailsession.

mailsession.mailsession*n*.jndiname

is the JNDI name for the mailsession.

mailsession.mailsession*n*.mailhost

identifies the host name of the mail server for the mailsession.

mailsession.mailsession*n*.servername

is the name of the server configuration where the mailsession is configured, such as SASServer1, SASServer2, and so on. Do not supply more than one value for servername.

Scripting Tool for WebSphere Application Server

Building the WebSphere Application Server Cell on Another Machine

Some sites separate the administration of SAS applications and the administration of Web application servers. For sites that do not permit running the SAS Deployment Wizard on the Web application server machine, the configuration scripting tool can be used to configure WebSphere Application Server.. The configuration scripting tool is archived from the machine where the SAS Deployment Wizard was run and provided to the Web application server administrator. The configuration scripting tool can configure a cell, deployment manager, profiles, and servers, identically to what is created with an automated deployment with SAS Deployment Wizard. The configuration scripting tool is located in ***SAS-config-dir*\Lev1\Web\Scripts\WebSphere\Scripts**. The name of the command is WASDriver.bat. For UNIX deployments, the command is named WASDriver.sh.

The configuration scripting tool reads the commands listed in the ***SAS-config-dir*\Lev1\Web\Scripts\WebSphere\tasks\websphere.configure.tasks** file and then performs the tasks. Each command in the websphere.configure.tasks file, such as `create JDBCProvider`, uses the properties files that are stored in ***SAS-config-dir*\Lev1\Web\Scripts\WebSphere\props** to determine how to configure the resource.

If the **Cache Credentials** check box was not selected on the Web Application Server: Scripting Configuration page in the SAS Deployment Wizard, then you are prompted for credentials when you run the WASDriver.bat command.

1 On the Web application server machine, create the directory structure that was used on the machine where the SAS Deployment Wizard was run. The following commands are examples for a Windows environment:

```
mkdir c:\SAS\Config\Lev1\Web\Staging
mkdir c:\SAS\Config\Lev1\Web\Scripts
mkdir c:\SAS\Config\Lev1\Web\Common
mkdir c:\SAS\Config\Lev1\AppData
```

Note: These directory paths must be archived from the machine where the SAS Deployment Wizard was run. The archive must be transferred to the Web application server machine.

2. Extract the archive into the directories that were created in the previous step.

3. Open the **`Scripts\WebSphere\props\global.properties`** file in a text editor. Review the properties to make sure that values for the JDK path, WebSphere Application Server installation path, host names, and ports are accurate.

4. Begin the configuration by running `Scripts\WASDriver.bat`.

   If the **Cache Credentials** check box was not selected on the Web Application Server: Scripting Configuration page in the SAS Deployment Wizard, monitor the progress because the tool prompts you for credentials. The following code is an example:

   ```
   [12/19/11 12:28:28:181 EST] - WASDriver-prepareTask: Task(s) to be
   executed  indicate operations on resourceType(s) require userIds and passwords
   for authentication...

   *=*=*=*=*=*=*  BEGIN Prompting for credentials *=*=*=*=*=*=*

   ----------------------------------------------------------------------------
   Please enter credentials for: Data Source "SASServer1-SharedServices"
   database Connection
   Enter username:
   ```

When the configuration scripting tool is used to create the WebSphere Application Server cell, after the script completes, the environment is configured with all the resources that are needed for the SAS Web applications. The configuration scripting tool deploys the applications, but it does not start the servers.

After the configuration scripting tool runs and WebSphere Application Server is configured, some additional tasks must be performed manually on the machine where the SAS Deployment Wizard was run. (For a multiple-machine deployment, this is the machine where the middle-tier configuration was performed.) These tasks are recorded in the Instructions.html file that is generated by the SAS Deployment Wizard. Before you perform those tasks, confirm or correct the JDK_HOME environment variable that is identified in ***SAS-config-dir*\Lev1\level_env.bat**. For UNIX deployments, the file is named level_env.sh. Open the file in an editor and make sure that the value for JDK_HOME identifies the path to a JDK or JRE.

Rebuilding the WebSphere Application Server Configuration

You can rebuild the WebSphere Application Server configuration by running the configuration scripting tool. The tool can re-create the entire WebSphere Application Server configuration and restore it to the originally configured state. The tool reads the commands in the task files and configures the resources according to the settings in the properties files.

Adding, Updating, and Upgrading SAS Software

If the SAS Deployment Wizard runs to add, update, or upgrade SAS software that affects WebSphere Application Server, a backup of the configuration scripting tool is made. For example, the contents of ***SAS-config-dir*\Lev1\Web\Scripts\WebSphere** are backed up to directory like ***SAS-config-dir*\Lev1\Web\Scripts\WebSphere_2011-05-20-14.21.56_bak**. The original directory is then re-created, and configuration scripting tasks and properties are set for the additional software, update, or upgrade.

Executing an Alternative Batch Script

The WASDriver.bat command is configured to execute the commands in the websphere.configure.tasks file. You can override this behavior and supply the name of a file that contains the commands that you want to execute. The following steps describe how run in batch mode with the commands in the cmds.txt file:

1 Create a text file that is named ***SAS-config-dir*\Lev1\Web\Scripts\WebSphere\tasks\cmds.txt**. Include commands that are similar to the following example:

```
undeploy Application SASThemes9.3 SERVER
deploy Application SASThemes9.3 SERVER
```

TIP Put the commands file in the **tasks** directory. The WASDriver.bat file does not accept the fully qualified pathname to the commands file. It accepts the name of the commands file that must be in the **tasks** directory.

2 Invoke the command with the following command line options:

```
WASDriver.bat -e FILE -m AUTO -t cmds.txt
```

If you are creating a resource that requires credentials, such as a data source, remember to create property keys in the Credentials.CELL.credentials.properties file.

Executing a Single Task

You can use the configuration scripting tool to perform a single task. The following command demonstrates how to undeploy SAS Themes for Web Applications:

```
WASDriver.bat -e RUN -m AUTO -p TEXT -o undeploy -r Application
-n SASThemes9.3 -s SERVER
```

Before this operation can run and succeed, a properties file that is named Application.SERVER.SASThemes9.3.properties must exist. This properties file is used by the configuration scripting tool to determine how to undeploy the application.

TIP The case for the resource type (**-r**), name (**-n**), and scope (**-s**) matter. These arguments are used to locate properties files in the **props** directory as well as to look up keys within the properties files.

Command Syntax

Four Parts of the Command Syntax

The command syntax in a task file has four parts:

```
<operation> <resourceType> <resourceName> <scope>
```

The following example shows the commands for creating a deployment manager profile and a node profile:

```
create DmgrProfile SASDmgr01 CELL
create NodeProfile SAShostnameNode NODE
```

Executing a single task uses the same four parts for the command syntax. However, variables are used to indicate the operation, resource type, and so on.

Command Options

The command options for the WASDriver.bat file are provided in the following table:

Table 14.2 WASDriver.bat Command Options

Short Option Name	Full Option Name	Requir ed	Values	Description
-h	-help	No	None	Use this option to see the command help.
-e	-execType	Yes	FILE or RUN	Use FILE to execute the tasks that are listed in a task file. Use RUN to execute a single task. FILE is the default value.
-m	-execMode	Yes	AUTO or NOAUTO	Use NOAUTO to check the task syntax and not perform any configuration tasks. Use AUTO to perform the configuration tasks. AUTO is the default value.
-d	-directory	Yes		Provide the fully qualified path to the configuration scripting tool directory. The **props**, **scripts**, and **tasks** directories are subdirectories of the configuration scripting tool directory.

Short Option Name	Full Option Name	Required	Values	Description
-t	-taskFile	No		Provide the name of the task file to use when the execution mode is FILE. The default value is websphere.configuration.tasks.
-o	-operation	No	create, delete, start, stop, deploy, undeploy, checkAppStatus, syncNode	Provide the operation to perform when the execution mode is RUN.
-r	-resourceType	No		Provide the resource to use when the execution mode is RUN. See the resources in Table 14.3 on page 296.
-n	-resourceName	No	SASServer1, SAS_Messaging_Bus, and so on	Provide the name of the resource to use when the execution mode is RUN.
-s	-scope	No	SERVER, NODE, or CELL	Provide the scope for the resource to configure when the execution mode is RUN.
-p	-promptMode	No	TEXT or GRAPHIC	Use TEXT to provide a command line prompt for credentials when credentials are not stored in the credentials file. Use GRAPHIC to provide a dialog box for credentials when credentials are not stored in the credentials file.

Resource Types

The following table provides a list of resource types and identifies the operations and scope that apply to the resource type.

Table 14.3 Resource Types, Operations, and Scopes

Resource Type	Operations	Scopes
ActivationSpec	create, delete	SERVER, NODE, CELL
Application	deploy, undeploy	SERVER
DataSource	create, delete	SERVER, NODE, CELL
DmgrProfile	create	CELL
JDBCProvider	create, delete	SERVER
JmsConnectionFactory	create, delete	SERVER, NODE, CELL
JmsQueue	create, delete	SERVER, NODE, CELL
JmsTopic	create, delete	SERVER, NODE, CELL
LoginModule	create, delete	CELL
MailSession	create, delete	SERVER, NODE, CELL
NodeProfile	create	NODE
ObjectCache	create, delete	SERVER, NODE, CELL
Server	create, delete	SERVER
SIBus	create, delete	SERVER

Resource Properties Files

Each resource requires a set of properties that define how the configuration scripting tool should configure it. The default location for the properties files is ***SAS-config-dir***

\Lev1\Web\Scripts\WebSphere\props. The properties files are named according to the following pattern:

```
<resourceType>.<scope>.<resourceName>.properties
```

For example, the Server.SERVER.SASServer1.properties file describes settings for the SASServer1 application server instance. You could change a property such as WC_defaulthost or jvmOptions in the file and then re-create the server by executing only the server creation task. The following command is an example:

```
WASDriver.bat -e RUN -m AUTO -p TEXT -o create -n SASServer1 -t SERVER
```

Note: Many properties, such as the Web application server port number, are also stored in the SAS Metadata Server. The configuration scripting tool does not modify values in SAS metadata. Be careful that you do not create an inconsistency with SAS metadata.

Managing Credentials

Credentials are required to configure resources within a CELL, NODE, or SERVER. The following list identifies some of the credentials that might be needed:

- WebSphere Application Server console credentials
- the SAS trusted user password for SAS Web applications that connect to SAS servers
- database credentials for JDBC connections
- SMTP mail server credentials, if the SMTP mail server is secured

By default, the SAS Deployment Wizard does not persist any of these credentials. When you run the configuration scripting tool, you are prompted for all credentials that are required to configure the resources. The credentials are temporarily stored in the Credentials.CELL.credentials.properties file. The credentials are removed from the file when the configuration scripting tool exits unless you enabled the **Cache Credentials** check box on the Web Application Server: Scripting Configuration page in the SAS Deployment Wizard. By default, prompts appear on the command line as each credential is needed. An option is available to display a dialog box that prompts for credentials. To display the dialog box for credential prompts, add the following command option to the WASDriver.bat script:

```
-p GRAPHIC
```

If the option to cache credentials was enabled when the SAS Deployment Wizard was run, then the credentials are stored in the Credentials.CELL.credentials.properties file. In this case, the configuration scripting tool reads the credentials from the file rather than prompting for them. When the Update passwords feature of the SAS Deployment Manager is used, the passwords for the login modules and mail sessions are updated in the credentials file. Passwords for data source definitions are not updated.

Log File

Details for the command execution are stored in the ***SAS-config-dir*****\Lev1\Web\Scripts\WebSphere\logs\WASDriver.log** file. The SAS Deployment Wizard invokes the configuration scripting tool, so this already contains messages for an installed system. This file can be useful for troubleshooting middle-tier configuration tasks performed with the SAS Deployment Wizard and the SAS Deployment Manager.

Properties Reference

Modifying Properties

- Be careful when editing properties files. If you make a change to a property in one file, be sure to apply the same change to all occurrences of the property in all properties files.
- Do not change the value of properties that are not identified in this document. Some undocumented properties are used for the creation of the Instructions.html file.
- An asterisk (*) beside the property name indicates that the property value is stored in SAS metadata. If you change the property, then you create a difference with the information that is stored in SAS metadata.

Global Properties

The following list defines the properties that are used in the websphere.global.properties file.

appsrvnodename *

is the name of the node that contains the WebSphere Application Servers.

appsrvnodermiport *

is the RMI port number for the WebSphere Application Server node agent.

appsrvnodesoapport *

is the SOAP port number for the WebSphere Application Server node agent.

cellname *

is the name of the WebSphere Application Server cell.

config.lev.web.staging.dir *

identifies the fully qualified path to the SAS Web application EAR files. This path is ***SAS-config-dir***/**Lev1/Web/Staging**.

defaultsibusname *

is the name for the service integration bus. The default value is SAS_Messaging_Bus.

dmgrhttpport *

identifies the port to use for HTTP communication with the deployment manager server. The default value is 9060.

dmgrhttpsport *

identifies the port to use for HTTPS communication with the deployment manager server. The default value is 9043.

dmgrnodename *

is the name of the node that contains the deployment manager server. The default value is SASDmgr01Node.

dmgrport *

identifies the port to use for communication with the deployment manager server. The default value is 9060.

dmgrprofilename *

identifies the profile name for the deployment manager server. The default value is SASDmgr01.

dmgrprotocol *

identifies the default protocol to use for communication with the deployment manager server. Values are **SOAP** or **RMI**. The default value is SOAP.

dmgrrmiport *

identifies the RMI port number for the deployment manager server. The default value is 9809.

dmgrrmiprops *

identifies the fully qualified path to the sas.client.props file in the deployment manager profile. This file is used to set the RMI properties for the deployment manager server.

dmgrrmitimeout *

is the time-out value in seconds for RMI communication from the deployment manager server to the node agent. The default value is 900.

dmgrsoapport *

identifies the port to use for SOAP communication with the deployment manager server. The default value is 8879.

dmgrsoapprops *

identifies the fully qualified path to the soap.client.props file in the deployment manager profile. This file is used to set the SOAP properties for the deployment manager server.

dmgrsoaptimeout *

is the time-out value in seconds for SOAP communication from the deployment manager server to the node agent. The default value is 900.

globalPropsFileName

identifies the fully qualified path to the websphere.global.properties file.

mustCreateDmgrProfile

is a Boolean value. If set to `true`, then the configuration scripting tool creates the deployment manager profile.

nodermiprops *

identifies the fully qualified path to the sas.client.props file in the node profile. This file is used to set the RMI properties for the node.

nodesoapprops *

identifies the fully qualified path to the soap.client.props file in the node profile. This file is used to set the SOAP properties for the node.

os.localhost.host.name *

is the short host name for the machine where the configuration scripting tool runs.

profilename *

is the profile name for the node.

scriptingDirectory

identifies the fully qualified path to the configuration scripting tool for WebSphere Application Server.

webapp.auto_deploy*

is a Boolean value. If set to `true`, then the SAS Web applications are automatically deployed to WebSphere Application Server. If set to `false`, then you must deploy the SAS Web applications manually.

webappsrv.admin.host *

is the fully qualified domain name for the machine that is running the WebSphere Application Server administration server.

webappsrv.admin.security.is_enabled*

is a Boolean value. If set to `true`, then WebSphere Application Server administration security is enabled for the cell.

webappsrv.admin.url *

is the URL for the WebSphere Application Server administration console.

webappsrv.auto_configure*

is a Boolean value. If set to `true`, then the configuration scripting tool performs an automatic configuration of an application server instance. If set to `false`, then you must configure the application server instance manually.

webappsrv.host *

is the fully qualified domain name of the machine to configure with the configuration scripting tool.

webappsrv.policy.use_restrictive*

is a Boolean value. If set to `true`, then Java 2 security is enabled for application deployments.

webappsrv.scripting.cache_credentials*
: is a Boolean value. If set to `true`, then the credentials that are required for configuring resources are saved in a file.

webappsrv.server.admin.http.port *
: identifies the port to use for HTTP communication with the deployment manager server. The default value is 9060.

webappsrv.server.admin.https.port *
: identifies the port to use for HTTPS communication with the deployment manager server. The default value is 9043.

websphere.appsrv.logs *
: identifies the fully qualified path to the directory for WebSphere Application Server logs.

websphere.dmgr.logs *
: identifies the fully qualified path to the directory for the deployment manager server logs.

websphere.install.dir *
: identifies the fully qualified path to the directory where WebSphere Application Server is installed. Set this property to the same value that is used for the WAS_INSTALL_ROOT variable.

websphere.profile.dir *
: identifies the fully qualified path to the directory where the WebSphere Application Server profiles are stored.

websphere.scripting.classpath
: is the class path to use for the configuration scripting tool.

websphere.scripting.credentials
: identifies the fully qualified path to the file that contains the credentials (user IDs and passwords) that are required to configure resources.

websphere.scripting.dir
: identifies the fully qualified path to the configuration scripting tool for WebSphere Application Server.

websphere.scripting.jython
: identifies the fully qualified path to the directory for the Jython procedures.

websphere.scripting.lib
: identifies the fully qualified path for directory that contains the JAR file for the configuration scripting tool.

websphere.scripting.logs
: identifies the fully qualified path to the directory for the configuration scripting tool logs.

websphere.scripting.props
: identifies the fully qualified path to the directory for the configuration scripting tool properties files.

websphere.scripting.scripts
: identifies the fully qualified path to the directory for the configuration scripting tool, WASDriver.sh or WASDriver.bat.

websphere.scripting.src
: identifies the fully qualified path to the directory for the configuration scripting tool Groovy source modules.

websphere.scripting.tasks
: identifies the fully qualified path to the configuration scripting tool tasks directory.

websphere.scripting.tasks.file
: identifies the fully qualified path to the configuration scripting tool tasks file.

websphere.temp.dir *
: identifies the fully qualified path to the temporary directory for the configuration scripting tool.

websphere.wsadmin.classpath
: is the class path to use for the WebSphere Application Server wsadmin client application.

websphere.wsadmin.jython
: identifies the fully qualified path to the directory for the WebSphere Application Server wsadmin client application Jython procedures.

websphere nd.is_installed*

is a Boolean value. Set to **`true`** if WebSphere Application Server is installed on this machine. Set to **`false`**, if it is installed on a remote machine.

wsadminProps

is a string that identifies common command-line options that are used to run the wsadmin client application.

Credentials Properties

The following list defines the properties that are used in the Credentials.CELL.credentials.properties file.

DataSource.create_*scope*_*resource-identifier*_passwd

is the data source user password.

DataSource.create_*scope*_*resource-identifier*_userid

is the data source user ID.

LoginModule.create_CELL_SAS-Trusted-user_passwd

is the password for the SAS trusted user identity. It is used for creating the JAAS login module.

LoginModule.create_CELL_SAS-Trusted-user_userid

is the user ID for the SAS trusted user identity. It is used for creating the JAAS login module.

MailSession.create_*scope*_SMTP-Mail-Server_passwd

is password for the user ID that is used to communicate with the SMTP mail server.

MailSession.create_*scope*_SMTP-Mail-Server_userid

is the user ID that is used to communicate with the SMTP mail server.

Application Properties

This section defines the properties that are needed to deploy a SAS Web application. The properties files are named in the pattern `Application.SERVER.`*`applicationName`*`.properties`.

appname

is the Web application name.

classloaderMode

identifies the class loader mode. Values are **`PARENT_LAST`** or **`PARENT_FIRST`**. The default value is **`PARENT_LAST`**.

classloaderPolicy

identifies the class loader policy. Values are **`MULTIPLE`** or **`SINGLE`**. The default value is **`MULTIPLE`**.

deployejb

is a Boolean value. If set to **`true`**, then Enterprise Java Bean (EJB) support is requested for the installation.

deployws

is a Boolean value. If set to **`true`**, then Web services support is requested for the installation.

loadorder

is an integer value that identifies the load order. The default value is 100.

pathtoear

is the fully qualified path to the EAR file for the Web application.

servername

is the name of the target WebSphere Application Server instance where the Web application is installed.

Data Source Properties

This section defines the properties that are needed to configure a data source. The properties files are named in the pattern `DataSource.`*`scope`*`.`*`dataSourceIdentifier`*`.properties`. For more information about connection pool properties, see the WebSphere Application Server product documentation.

dataSourceIdentifier

is the unique identifier for this datasource.

pCpAgedTimeout

is the value in seconds for the database connection pool aged time-out.

pCpConnectionTimeout
: is the value in seconds for the database connection pool time-out.

pCpMaxConnections
: is the maximum number of connections for the database connection pool.

pCpMinConnections
: is the minimum number of connections for the database connection pool.

pCpPurgePolicy
: identifies the database connection pool purge policy.

pCpReapTime
: is the value for the database connection pool reap time-out.

pCpTestConnection
: is a Boolean value. If set to **`true`**, then the database connection pool is tested when it is configured.

pCpTestConnectionInterval
: is the value in seconds for the database connection pool testing interval.

pCpUnusedTimeout
: is the value in seconds for the time-out that controls when unused connections are returned to the connection pool.

pDsClassName
: is the class name for the JDBC provider.

pDsClassPath
: is the fully qualified path to each of the JAR files that are required for the JDBC provider.

pDsConnectionUrl
: is the JDBC connection URL.

pDsDataSourceName
: is the name of the data source.

pDsDatabase
: is the database product name.

pDsHelperClass
: is the WebSphere Application Server helper class name for the JDBC provider.

pDsHost
: is the host name for the machine with the database.

pDsJaasAliasName
: is the name that is used to construct a JAAS alias entry. The entry contains the user ID and password for the database connection.

pDsJdbcProviderName
: is the name of the JDBC provider that is associated with this data source.

pDsJdbcProviderReuse
: is a Boolean value. If set to `true`, then an existing JDBC provider definition with the same name is reused. If set to `false`, then the existing definition is deleted and all data sources associated with it, and a new JDBC provider is created.

pDsJdbcProviderType
: identifies the JDBC provider type. It is a unique description for the JDBC provider, such as "DB2 Universal JDBC Driver Provider."

pDsJndiName
: is the JNDI name for this data source.

pDsOptions
: is a comma-separated list of data source options for the data source.

pDsPort
: is the port number for the database.

pDsPropEnableMultithreadedAccessDetection
: is a Boolean value that controls whether to enable multi-threaded access detection to the database using this data source.

pDsPropPreTestSQLString
: is an SQL command that is used to test the database connection.

pDsPropValidateNewConnection
: is a Boolean value. If set to `true`, then the configuration scripting tool attempts to validate the new database connection.

pDsPropValidateNewConnectionRetryCount
: identifies the number attempts to perform for validating a new connection.

pDsPropValidateNewConnectionRetryInterval
: identifies the number of seconds to wait between attempts to validate a new connection.

pDsStatementCacheSize
: identifies the SQL statement cache size.

pDsXADataSource
: is a Boolean value. Set to **`true`** if the data source supports JDBC XA.

scope
: identifies the cope of the data source. Values are **`CELL`**, **`NODE`**, or **`SERVER`**.

servername
: is the name of the server configuration where the data source is configured, such as SASServer1, SASServer2, and so on.

Deployment Manager Profile Properties

This section defines the properties that are used with the global properties to configure a WebSphere Application Server deployment manager profile. The properties files are named in the pattern `DmgrProfile.CELL.`*`dmgrProfileName`*`.properties`. Along with the global properties that are related to the deployment manager, these properties contain information that is needed to configure a WebSphere Application Server deployment manager profile.

BOOTSTRAP_ADDRESS
: is the RMI bootstrap address for the deployment manager server.

SOAP_CONNECTOR_ADDRESS
: is the SOAP port for the deployment manager server.

WC_adminhost
: is the port number for the deployment manager server administrative console.

WC_adminhost_secure
: is the port number for secure access to the deployment manager server administrative console.

WC_defaulthost
: is the HTTP transport port for the deployment manager server.

WC_defaulthost_secure
: is the HTTPS transport port for the deployment manager server.

create.dmgrprofile.response.file
: identifies the fully qualified path for the file that contains all the responses that are needed to create a deployment manager profile (dmgr) with the manageprofiles command. For more information, see the description of the create.DmgrProfile.CELL.response*dmgrProfileName*.properties file in the next section.

jvmOptions
: is the list of JVM options for the deployment manager server.

Deployment Manager manageprofiles Command Response File Properties

The WebSphere Application Server manageprofiles command uses properties from three sources to create the deployment manager server profile:

- global properties
- deployment manager profile properties
- properties in the create.DmgrProfile.CELL.response.*dmgrProfileName*.properties file

This section defines the properties in the create.DmgrProfile.CELL.response.*dmgrProfileName*.properties file.

create
: must have a null value so that the manageprofiles command creates the deployment manager server profile.

cellName
: use the value for cellname from the websphere.global.properties file.

defaultPorts
: must have a null value so that the manageprofiles command configures the deployment manager server profile to use the default ports.

isDefault
: must have a null value so that the deployment manager server profile becomes the default profile.

nodeName
: use the value for dmgrnodename from the websphere.global.properties file.

profileName
: use the value for dmgrprofilename from the websphere.global.properties file.

profilePath
: concatenate the values for websphere.profile.dir and dmgrprofilename from the websphere.global.properites file. Here is an example:**`C\:\\Program Files\\IBM\\WebSphere\\AppServer\\profiles\\SASDmgr01`**.

templatePath
: concatenate the values for websphere.install.dir from the websphere.global.properties file with the "profileTemplates\\management." Here is an example:**`C\:\\Program Files\\IBM\\WebSphere\\AppServer\\profileTemplates\\management`**.

winserviceCheck
: set to **`true`** when the deployment manager server profile is being created on Windows.

winserviceStartupType
: set to **`automatic`** when the deployment manager server profile is being created on Windows.

JMS Connection Factory Properties

This section defines the properties that are needed to configure a JMS connection factory resource. The properties files are named in the pattern `JMSConnectionFactory.`*`scope`*`.`*`jmsConnectionFactoryIdentifier`*`.properties`.

SIBusname
: is the name of the service integration bus. This property is required if a data source must be constructed as a message data store.

connectionFactoryId
: is a unique identifier for this JMS connection factory.

pagedTimeout
: is the value in seconds for the JMS connection pool aged time-out.

pconnectionFactoryName
: is the JMS connection factory name.

pconnectionFactoryType
: is the JMS connection factory type. Values are **`Queue`** or **`Topic`**.

pconnectionTimeout
: is the value in seconds for the JMS connection pool time-out.

pdataSource
: is the name of a data source that has already been created. This data source is used as a messaging data store.

pjaasAliasName
: is the name of the JAAS alias definition that contains the user ID and password for the data source when a messaging data store is used.

pjndiName
: is the JNDI name for this JMS connection factory.

pmaxConnections
: is the maximum number of JMS connection pool connections.

pminConnections
: is the minimum number of JMS connection pool connections.

pproviderEndPoints
: is the JMS provider endpoints string that is used for remote connections.

ppurgePolicy
: is the JMS connection pool purge policy.

preapTime
: is the value for the JMS connection pool reap time.

pschemaName
: is the schema name for the data store when a messaging data source is used.

punusedTimeout
: is the JMS connection pool unused connection time-out.

scope
: is the scope for this JMS connection factory. Values are **`SERVER`**, **`NODE`** or **`CELL`**.

servername
: is the name of the server configuration where the JMS connection factory is configured, such as SASServer1, SASServer2, and so on.

JMS Queue Properties

This section defines the properties that are needed to configure a JMS queue resource. The properties files are named in the pattern `JMSQueue.`*`scope`*`.`*`jmsQueueIdentifier`*`.properties`.

SIBusname
: is the name of the service integration bus to which this JMS queue is associated.

pdeliveryMode
: is the type of message delivery for this JMS queue destination. Values are **`Application`**, **`Nonpersistent`**, or **`Persistent`**. The default value is **`Application`**.

pjndiName
: is the JNDI name for this JMS queue.

ppriority
: is an integer between 0 and 9. If a value is not provided, then the priority must be assigned by the producing application.

pqueueName
: is the name of the JMS queue.

preadAhead
: identifies the read ahead optimization. Values are **`AsConnection`**, **`Enabled`**, or **`Disabled`**. The default value is **`AsConnection`**.

psibusdestname

is the service integration bus destination name for this JMS queue.

psibusdesttype

identifies the service integration bus destination type. Set this property to **`Queue`** for this resource.

ptimeToLive

is the time that a message has to live.

scope

identifies the scope for this JMS queue. Values are **`SERVER`**, **`NODE`**, or **`CELL`**.

servername

is the name of the server configuration where the JMS queue is configured, such as SASServer1, SASServer2, and so on.

JMS Topic Properties

This section defines the properties that are needed to configure a JMS topic resource. The properties files are named in the pattern `JMSTopic.`*`scope`*`.`*`jmsTopicIdentifier`*`.properties`.

SIBusname

is the name of the service integration bus to which this JMS topic is associated.

pdeliveryMode

is the type of message delivery for this JMS topic destination. Values are **`Application`**, **`Nonpersistent`**, or **`Persistent`**. The default value is **`Application`**.

pjndiName

is the JNDI name for this JMS topic.

ppriority

is an integer between 0 and 9. If a value is not provided, then the priority must be assigned by the producing application.

preadAhead

identifies the read ahead optimization. Values are **`AsConnection`**, **`Enabled`**, or **`Disabled`**. The default value is **`AsConnection`**.

psibusdestname

is the service integration bus destination name for this JMS topic.

psibusdesttype

identifies the service integration bus destination type. Set this property to **`TopicSpace`** for this resource.

ptimeToLive

is the time that a message has to live.

ptopicSpace

is the name for this topic space. This value is typically the same as the ptopicname value.

ptopicname

is the name of for this topic definition.

scope

identifies the scope for this JMS topic. Values are **`SERVER`**, **`NODE`**, or **`CELL`**.

servername

is the name of the server configuration where the JMS topic is configured, such as SASServer1, SASServer2, and so on.

Login Module Properties

This section defines the properties that are needed to configure a JAAS login module. The properties files are named in the pattern `LoginModule.CELL.`*`loginModuleIdentifier`*`.properties`.

JaasAlias

is the JAAS alias name for this login module.

JaasAliasDomain

identifies an additional domain to which this login module responds. This property is used when this login module is running in a remote JVM and receives generated credentials from an environment using the trusted authentication module.

JaasCredentialsRequired

is a Boolean value. If set to **`true`**, then the login module requires credentials to construct custom properties for the module.

JaasDebug

set this property to **`true`** to generate debugging information to the System.out stream.

JaasDomain

identifies the domain in which this login module is authenticating. Requests to authenticate users outside this domain are ignored.

JaasHoldOpenConnection

is a Boolean value. If set to **`true`**, then the authentication connection is held open after the login module is driven to avoid TCP/IP overhead.

JaasHost

is the fully qualified domain name for the metadata server. Authentication requests are sent to this host name.

JaasModuleClassName

is the class name for the login module.

JaasModuleFlag

identifies the flag for the login module configuration. Valid values are **`required`**, **`requisite`**, **`sufficient`**, or **`optional`**.

JaasPort

identifies the network port that the metadata server is listening on for new connections.

JaasRepository

identifies the repository name to use as the default repository when the connection is returned. For the primary authentication, this repository is usually the foundation repository.

Mail Session Properties

This section defines the properties that are needed to configure a mail session resource. The properties files are named in the pattern `MailSession.`*`scope`*`.`*`mailSessionIdentifier`*`.properties`.

mailSessionJndiName

is the JNDI name for this mail session resource.

mailSessionName
: is the name for this mail session.

mailSessionSmtpHost
: is the SMTP host name for this mail session.

scope
: identifies the scope for this mail session. Values are **`SERVER`**, **`NODE`**, or **`CELL`**.

server.mailsrv.requires.authentication
: is a Boolean value. Set to **`true`** if the SMTP server requires credentials for authentication.

servername
: is the name of the server configuration where the mail session is configured, such as SASServer1, SASServer2, and so on.

Node Profile Properties

This section defines the properties that are needed to configure a node profile. The properties files are named in the pattern `NodeProfile.NODE.`*`profileName`*`.properties`.

BOOTSTRAP_ADDRESS
: is the RMI bootstrap address for the node agent server.

SOAP_CONNECTOR_ADDRESS
: is the SOAP port for the node agent server.

create.nodeprofile.response.file
: identifies the fully qualified path to the file that contains all the responses that are needed to create the node profile with the manageprofiles command.

jvmOptions
: is the list of JVM options for the node agent server.

Node Profile manageprofile Command Response File Properties

The WebSphere Application Server manageprofiles command uses properties from three sources to create the node profile:

- the global properties

- the node profile properties file
- properties in the `create.NodeProfile.NODE.response.`*`profileName`*`.properties` file

create

must have a null value so that the manageprofiles command creates the node agent profile.

cellName

use the value for cellname from the websphere.global.properties file

federateLater

must have a value of **`true`** so that the manageprofiles command does not federate the node into the cell during the profile creation. The node is automatically federated by the configuration scripting tool with processing that occurs later.

hostname

use the value for webappsrv.admin.host from the websphere.global.properties file.

nodeDefaultPorts

must have a null value to force the manageprofiles command to create the default ports for the nodeagent server.

nodeName

use the value for appsrvnodename from the websphere.global.properties file.

profileName

use the value for profilename from the websphere.global.properties file.

profilePath

use the value for websphere.profile.dir and the value for profilename. Both values are read from the websphere.global.properites file. For example: **`c\:\\Program Files\\IBM\\WebSphere\\AppServer\\profiles\\SAShost01Node`**.

templatePath

use the value for websphere.install.dir from websphere.global.properties file and the characters "profileTemplates\\management." For example: **`c\:\\Program Files\\IBM\\WebSphere\\AppServer\\profileTemplates\\management`**.

winserviceCheck

used only when the node profile is being created on Windows. This value must be set to `true`.

winserviceStartupType

used only when the node profile is being created on Windows. This value must be set to `automatic`.

Server Properties

This section defines the properties that are needed to configure a WebSphere Application Server. The properties files are named in the pattern `Server.SERVER.`*`serverName`*`.properties`.

BOOTSTRAP_ADDRESS

is the RMI bootstrap address for the Web application server.

SOAP_CONNECTOR_ADDRESS

is the SOAP port for the Web application server.

WC_adminhost

is the port number for the deployment manager server administrative console.

WC_adminhost_secure

is the port number for secure access to the deployment manager server administrative console.

WC_defaulthost

is the HTTP transport port for the deployment manager server.

WC_defaulthost_secure

is the HTTPS transport port for the deployment manager server.

enforceJava2Security

is a Boolean value. Set to `true` to indicate that Java 2 security must be enforced for all Web applications on this Web application server.

jvmOptions

is the list of JVM options for the Web application server.

scope
: set this value to **`SERVER`**.

serverid
: identifies the server ID of the server configuration where the application is deployed, such as server1, server2, and so on.

servername
: identifies the name of the server configuration where the application is deployed, such as SASServer1, SASServer2, and so on.

SIBus Properties

This section defines the properties that are needed to configure the SAS Service Integration Bus. The properties files are named in the pattern `SIBus.SERVER.`*`SIBusIdentifier`*`.properties`.

SIBusname
: is the name for the Service Integration Bus. The default value is **`SAS_Messaging_Bus`**.

reuseSIBusMember
: is a Boolean value. Set to **`true`** to indicate that if a definition with the same name already exists, then reuse the existing definition.

servername
: identifies the name of the server configuration where the service integration bus is deployed, such as SASServer1, SASServer2, and so on. The Web application server with the name is added as a new member.

Appendix 1

Configuring the SAS Environment File

About the SAS Environment File

A SAS environment file defines the available set of SAS environments for SAS client applications, and is generated during the configuration of the SAS Web Infrastructure Platform. The SAS Logon Manager includes a servlet that provides default information for the initial deployment. When you have validated that your client applications work successfully with a deployment, it is recommended that you deploy the sas-environment.xml file to an HTTP server. This step ensures that you can customize the sas-environment.xml file to specify the name that you want to use and to account for the IT topology at your site.

Your site might have requirements that application clients interact with separate development, test, and production environments. Or, you might elect to have separate SAS deployments to support distinct business units. In either scenario, when multiple environments are required, you can customize and deploy the `sas-environment.xml` file as needed.

Configuring the SAS Environment File

Customizing the SAS Environment File

The sas-environment.xml is located in the **_SAS-config-dir_\Lev1\Web\Common** directory.

Because Web application servers are likely to be rebooted, it is not recommended that this file be placed in a Web application server. Instead, place the customized file on an HTTP server.

Here is a sample sas-environment.xml file that is configured for two environments:

```
<?xml version="1.0"  encoding="UTF-8">
<environments xmlns="http://www.sas.com/xml/schema/sas-environment-9.2"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.sas.com/xml/schema/sas-environment-9.2
    http://www.sas.com/xml/schema/sas-environment-9.2/sas-environment-9.2.xsd">
  <environment name="Red" default="false">
    <desc>test server Red for SAS Financial Management Studio</desc>
    <service-registry>http://red.na.sas.com:8080/SASWIPClientAccess/
remote/ServiceRegistry</service-registry>
  </environment>
  <environment name="Blue" default="true">
    <desc>test server Blue for SAS Financial Management Studio</desc>
    <service-registry>http://blue.na.sas.com:7001/SASWIPClientAccess/
remote/ServiceRegistry</service-registry>
  </environment>
</environment>
```

The service registry that is specified in the file enables desktop client applications to determine the location of required services on the middle tier. It also enables the applications to obtain a list of services available in the environment. Note that this sas-environment.xml file resides on an HTTP server, but the configuration in the file refers to the Web application servers and their port numbers.

If SSL is configured at your site, specify the https protocol and the SSL port number for the service registry.

If your site has multilingual users, you can configure the sas-environment.xml file to include localized descriptions. In the next example, the Blue environment is specified in German:

```
<environment name="Blue">
  <desc>test2 Blue</desc>
  <desc xml:lang="de">Blau</desc>
  <service-registry>http://blue.na.sas.com:7001/SASWIPClientAccess
/remote/ServiceRegistry</service-registry>
</environment>
```

When the customized sas-environment.xml file is available for multiple environments, refer to the documentation for your SAS application or solution for instructions about how to enable the availability of these environments for the users. If you change the location of the sas-environment.xml file, be aware that SAS desktop applications such as SAS Enterprise Miner need to be updated with the new location. The SAS desktop applications that integrate with the middle tier use the -Denv.definition.location JVM option in INI files to identify the location of the sas-environment.xml file. Refer the documentation for the SAS desktop applications that you use. The ***SAS-install-dir*/sassw.config** file is also used to identify the location of the sas-environments.xml file. Update the `SASENVIRONMENTSURL=` value in the sassw.config file.

Element Description

The following list identifies and describes the elements that can be used in the sas-environment.xml file:

environment

has a name attribute that cannot contain space characters. This attribute is used internally by SAS software to identify each of the environments that are available in the deployment. This element has an attribute that is named default. This attribute is used to identify a default environment for client applications. If more than one environment element has this attribute set to true, then the last environment in the file with the attribute set to true is set as the default environment. It is not necessary to set the attribute to false for all other environments.

desc

used in the client applications to provide a menu of environment choices. As shown in the previous example, this field can provide a localized message when the xml:lang attribute is set.

service-registry

contains the URL to the service registry for the environment. Use the protocol, host name, and port number of the Web application server that is running the SAS Web Infrastructure Platform.

Glossary

alert

an automatic notification of an electronic event that is of interest to the recipient.

authentication

See client authentication

authentication domain

a SAS internal category that pairs logins with the servers for which they are valid. For example, an Oracle server and the SAS copies of Oracle credentials might all be classified as belonging to an OracleAuth authentication domain.

authentication provider

a software component that is used for identifying and authenticating users. For example, an LDAP server or the host operating system can provide authentication.

base path

the location, relative to a WebDAV server's URL, in which packages are published and files are stored.

client authentication

the process of verifying the identity of a person or process for security purposes.

client-side pooling

a configuration in which the client application maintains a collection of reusable workspace server processes.

content mapping

the correspondence of the SAS metadata folder structure to a content repository system. SAS metadata folders are generally mapped to a WebDAV such as the SAS Content Server repository, or to a local file system.

credentials

the user ID and password for an account that exists in some authentication provider.

deploy

to install an instance of operational SAS software and related components. The deployment process often includes configuration and testing as well.

foundation repository

the metadata repository that is used to specify metadata for global resources that can be shared by other repositories. For example, a foundation repository is used to store metadata that defines users and groups on the metadata server.

foundation services

See SAS Foundation Services

hot deployment

the process of upgrading an application or component in a client-server environment while the server is running. Hot-deployed components are made available immediately, and do not require the server to be restarted.

identity

See metadata identity

Java Development Kit

See JDK

Java RMI

See remote method invocation

Java Virtual Machine

See JVM

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.

JVM

a program that interprets Java programming code so that the code can be executed by the operating system on a computer. The JVM can run on either the client or the server. The JVM is the main software component that makes Java programs portable across platforms. A JVM is included with JDKs and JREs from Oracle Corporation, as well as with most Web browsers. Short form: JVM.

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.

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.

pool

a group of server connections that can be shared and reused by multiple client applications. A client-side pool consists of one or more puddles.

portal

a Web application that enables users to access Web sites, data, documents, applications, and other digital content from a single, easily accessible user interface.

A portal's personalization features enable each user to configure and organize the interface to meet individual or role-based needs.

portlet

a Web component that is managed by a Web application and that is aggregated with other portlets to form a page within the application. Portlets can process requests from the user and generate dynamic content.

puddle

a group of servers that are started and run using the same login credentials. Each puddle can also allow a group of clients to access the servers.

remote method invocation

a Java programming feature that provides for remote communication between programs by enabling an object that is running in one Java Virtual Machine (JVM) to invoke methods on an object that is running in another JVM, possibly on a different host. Short form: RMI.

remote service deployment

a service deployment that supports shared access to a set of SAS Foundation Services that are deployed within a single Java Virtual Machine (JVM), but which are available to other JVM processes. Applications use the remote service deployment to deploy and access remote foundation services.

repository

a storage location for data, metadata, or programs.

RMI

See remote method invocation

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 batch server

a SAS Application Server that is running in batch mode. In the SAS Open Metadata Architecture, the metadata for a SAS batch server specifies the network address of a SAS Workspace Server, as well as a SAS start command that will run jobs in batch mode on the SAS Workspace Server.

SAS BI Web service

a Web service that adheres to the XML for Analysis (XMLA) specification for executing SAS Stored Processes.

SAS Content Server

a server that stores digital content (such as documents, reports, and images) that is created and used by SAS client applications. To interact with the server, clients use WebDAV-based protocols for access, versioning, collaboration, security, and searching.

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 Framework Data Server

a database server that is the default location for middle-tier data such as alerts, comments, and workflows, as well as data for the SAS Content Server and SAS Service Parts Optimization. The server is provided as an alternative to using a third-party DBMS. The server cannot be used as a general-purpose data store.

SAS Management Console

a Java application that provides a single user interface for performing SAS administrative tasks.

SAS Metadata Repository
a container for metadata that is managed by the SAS Metadata Server.

SAS Web Infrastructure Platform
a collection of middle-tier services and applications that provide infrastructure and integration features that are shared by SAS Web applications and other HTTP clients.

SAS Workspace Server
a SAS IOM server that is launched in order to fulfill client requests for IOM workspaces.

server-side pooling
a configuration in which a SAS object spawner maintains a collection of reusable workspace server processes that are available for clients. The usage of servers in this pool is governed by the authorization rules that are set on the servers in the SAS metadata.

service
one or more application components that an authorized user or application can call at any time to provide results that conform to a published specification. For example, network services transmit data or provide conversion of data in a network, database services provide for the storage and retrieval of data in a database, and Web services interact with each other on the World Wide Web.

service configuration
a set of values that can be customized for a particular service in SAS Foundation Services. By editing a service configuration, you can override the default configuration for the foundation service.

service deployment
a collection of SAS Foundation Services that specifies the data that is necessary in order to instantiate the services, as well as dependencies upon other services. Applications query a metadata source (a SAS Metadata Server or an XML file) to

obtain the service deployment configuration in order to deploy and access foundation services.

session context

a context that serves as a control structure for maintaining state within a bound session. 'State' includes information about the latest status, condition, or content of a process or transaction. Session Services, User Services, and Logging Services use the session context to facilitate resource management and to pass information among services.

single sign-on

an authentication model that enables users to access a variety of computing resources without being repeatedly prompted for their user IDs and passwords. For example, single sign-on can enable a user to access SAS servers that run on different platforms without interactively providing the user's ID and password for each platform. Single sign-on can also enable someone who is using one application to launch other applications based on the authentication that was performed when the user initially logged on.

SSO

See single sign-on

theme

a collection of specifications (for example, colors, fonts, and font styles) and graphics that control the appearance of an application.

trust

to accept the authentication or verification that has been performed by another software component.

trust relationship

a logical association through which one component of an application accepts verification that has already been performed by another component.

trusted user

a privileged service account that can act on behalf of other users on a connection to the metadata server.

unrestricted identity

a user or group that has all capabilities and permissions in the metadata environment due to membership in the META: Unrestricted Users Role (or listing in the adminUsers.txt file with a preceding asterisk).

user context

a set of information about the user who is associated with an active session. The user context contains information such as the user's identity and profile.

Web-distributed authoring and versioning

a set of extensions to the HTTP protocol that enables users to collaboratively edit and manage files on remote Web servers. Short form: WebDAV.

WebDAV

See Web-distributed authoring and versioning

WebDAV repository

a collection of files that are stored on a Web server so that authorized users can access them.

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