


# SAS® Forecast Server 1.4

## Administrator's Guide

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**SAS® Forecast Server 1.4: Administrator's Guide**



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## Chapter Contents

# Chapter 1
# Overview of the SAS Forecast Server Administrator's Guide

## Welcome to SAS Forecast Server

### Why Is SAS Forecast Server Important?

Businesses must understand the markets that they serve. In order to understand their markets, businesses must be able to analyze, model, and forecast the demand for their products and services. These products and services can be driven by many sales drivers, which might include input time series and calendar events. Business leaders must be able to interpret the results of these analyses and make decisions based on these results.

When the various products and services, categories, and geographies are considered, the number of time series, sales drivers, models, forecasts, and decisions can be tremendous. It is not uncommon that millions of time series must be modeled and forecast, and millions of decisions must be made based on these models and forecasts. Given the scale of the problem, customizing a time series model for each time series might not be feasible. An automated system that selects appropriate models and chooses influential sales drivers is required. The automated system must manage the time series data, time series models, calendar events, and results of the forecasting process in a scalable way. The results of the automated system must allow for "what-if" analysis, stochastic optimization, and goal-seeking support for making decisions.

Often businesses want to generate a large number of forecasts based on time-stamped data stored in their transactional or time series databases. Transactional databases contain data from sources such as Web sites, point-of-sale (POS) systems, call centers, and inventory systems. A skilled analyst can forecast a single time series from such data by applying good judgment based on his or her knowledge and experience, by using various time series analysis techniques, and by utilizing good software based on proven statistical theory. Generating frequent forecasts or large numbers of forecasts, however, requires some degree of automation. Common forecasting problems that businesses face include the following:

- No skilled analyst is available.
- Many forecasts must be generated.
- Frequent forecast updates are required.
- Time-stamped data must be converted to time series data.
- Several sales drivers might, or might not, influence the time series.
- Several calendar events might, or might not, influence the time series.
- The forecasting model is not known for each time series.

# What Is SAS Forecast Server?

## *Introduction to SAS Forecast Server*

SAS Forecast Server is a client application that provides market-driven planning through accurate, dynamic demand forecasting and decision making. SAS Forecast Studio is the client component that provides a graphical interface to the high-performance forecasting procedures developed for the SAS High-Performance Forecasting software. This software provides a large-scale, automatic, dynamic forecasting system for time-stamped data. For more information about these procedures and about the models underlying these procedures, refer to the *SAS High-Performance Forecasting User's Guide*.

By using SAS Forecast Server, you can do the following tasks:

- generate models automatically to fit your time-stamped data
- create your own forecasting models
- view and create additional models to determine the model that best fits your data
- perform hierarchical forecasting and reconciliation
- analyze and diagnose your time series data
- override forecasts
- include and manage calendar events
- export projects as SAS code for processing in a batch environment

Given a time-stamped data set, the software provides the following automatic forecasting process:

1. accumulates the time-stamped data to form a fixed-interval time series
2. diagnoses the time series using time series analysis techniques
3. creates a list of candidate model specifications based on the diagnostics
4. fits each candidate model specification to the time series
5. generates forecasts for each candidate fitted model
6. selects the most appropriate model specification based on either in-sample or holdout-sample evaluation using a model selection criterion
7. refits the selected model specification to the entire range of the time series
8. creates a forecast score from the selected fitted model
9. generates forecasts from the forecast score
10. evaluates the forecast using in-sample analysis, and/or provides for out-of-sample analysis of forecast performance

### SAS High-Performance Forecasting Procedures Used by SAS Forecast Server

SAS Forecast Server uses the following SAS High-Performance Forecasting procedures that form the basis for the automatic forecasting capabilities:

HPFARIMASPEC

The HPFARIMASPEC procedure is used to create an Autoregressive Integrated Moving Average (ARIMA) model specification file. The output of the procedure is an XML file that stores the intended ARIMA model specification. This XML specification file can be used to populate the model repository used by the HPFENGINE procedure. (Likewise, the XML files generated by the other model specification procedures in this section can also be used to populate the model repository used by PROC HPFENGINE.)

HPFDIAGNOSE

The HPFDIAGNOSE procedure is an automatic modeling procedure to find the best model among ARIMA Models, Exponential Smoothing Models, and Unobserved Component Models.

The HPFDIAGNOSE procedure has the following functionality:

- intermittency test
- functional transformation test
- simple differencing and seasonal differencing test
- tentative simple ARMA order identification
- tentative seasonal ARMA order identification
- outlier detection
- significance test of events
- transfer functions identification
- intermittent demand model
- exponential smoothing model
- unobserved component model

HPFENGINE

The HPFENGINE procedure provides large-scale automatic forecasting of transactional or time series data. The HPFENGINE procedure extends the foundation built by PROC HPF, enabling the user to determine the list of models over which automatic selection is performed.

The use of many forecast model families is supported when HPFENGINE is used in conjunction with new experimental procedures that generate generic model specifications. Among these models are

- ARIMA
- Unobserved Component Models (UCM)

- Exponential Smoothing Models (ESM)
- Intermittent Demand Models (IDM)
- External Models (EXM)

Furthermore, users may completely customize the operation by defining their own code to generate forecasts.

For models with inputs, the STOCHASTIC statement is especially helpful for automatically forecasting those inputs that have no future values.

Also supported is the generation of a portable forecast score. The output of the SCORE statement is a file or catalog entry which, when used with the new function HPFSCSUB, can be used to efficiently generate forecasts outside of the HPFENGINE procedure.

The new HPFDIAGNOSE procedure produces output that is compatible with HPFENGINE. As a result, the task of candidate model specification can be entirely automated.

HPFESMSPEC — The HPFESMSPEC procedure is used to create an Exponential Smoothing Model (ESM) specification file. The output of the procedure is an XML file that stores the intended ESM model specification.

HPFEVENTS — The HPFEVENTS procedure provides a way to create and manage events associated with time series. The procedure can create events, read events from an events data set, write events to an events data set, and create dummies based on those events, if date information is provided.

A SAS event is used to model any incident that disrupts the normal flow of the process that generated the time series. Examples of commonly used events include natural disasters, retail promotions, strikes, advertising campaigns, policy changes, and data recording errors.

An event has a reference name, a date or dates associated with the event, and a set of qualifiers. The event exists separately from any time series; however, the event may be applied to one or more time series. When the event is applied to a time series, a dummy variable is generated that may be used to analyze the impact of the event on the time series.

HPFEXMSPEC — The HPFEXMSPEC procedure is used to create an External Model (EXM) specification file. The output of the procedure is an XML file that stores the intended EXM model specification.

HPFIDMSPEC — The HPFIDMSPEC procedure is used to create an Intermittent Demand Model (IDM) specification file. The

| | |
|---|---|
| | output of the procedure is an XML file that stores the intended IDM model specification. |
| HPFRECONCILE | The HPFRECONCILE procedure reconciles forecasts of time series data at two different levels of aggregation. The procedure enables the user to specify the direction and the method of reconciliation, equality constraints and bounds on the reconciled values at each point in time. |
| HPFSELECT | The HPFSELECT procedure is used to create model selections lists. A model selection list contains references to candidate model specifications stored in the model repository. The output of the procedure is an XML file that stores the intended model selection list. |
| HPFUCMSPEC | The HPFUCMSPEC procedure is used to create an Unobserved Component Model (UCM) specification file. The output of the procedure is an XML file that stores the intended UCM model specification. |

## How Does SAS Forecast Server Help You?

SAS Forecast Server provides a tool for a wide variety of applications in business, government, and academia. Major uses of SAS Forecast Server include the following:

- perform forecasting
- provide input to market response modeling applications
- provide input to time series data mining applications

SAS Forecast Server provides automation and analytical sophistication to the forecasting process. By using SAS Forecast Server, which employs SAS High-Performance Forecasting, you can generate millions of forecasts in the turnaround time that is necessary to run your business. You can also uncover previously undetected trends, and you can predict future seasonal fluctuations. These capabilities create ample opportunities for you to reduce costs and increase revenues. The solution enables you to do the following:

- produce trustworthy forecasts that reflect realities of your business
- focus your attention on the most critical forecasts by providing automatic, reliable forecasts on a large scale
- significantly reduce forecasting error
- improve inventory management
- improve forecasts for items that rarely sell

# Accessibility and Compatibility Features

SAS Forecast Server 1.4 supports with some exceptions the U.S. Section 508 software standards. SAS currently plans for SAS Forecast Server software to have increased accessibility compliance in a future version. If you have specific questions about the accessibility of SAS Forecast Server, then send them to **accessibility@sas.com** or call SAS Technical Support.

# Using This Documentation

## Purpose

This Administrator's Guide describes the processes for installing, configuring, and administering a SAS solution. Administration of the solution includes the following tasks:

- understanding and installing your solution within the SAS Intelligence Platform
- setting up an additional server and security administration that is required by your SAS solution
- planning and authorizing solution users who will access the servers, if necessary
- planning and configuring additional resources, such as libraries

## Intended Audience

The SAS Forecast Server Administrator's Guide is for administrators who need to install, configure, and optimize a SAS solution that is installed on different operations systems. SAS and other programming expertise is not required.

## Required Skill Sets

To install, configure, administer, and use the SAS Intelligence Platform and solutions, the following individuals with the necessary skill sets are required for each administrative activity and use.

- System Administrator

  SAS Forecast Server uses the SAS Intelligence Platform. The system administrator should be familiar with the information provided in the SAS Intelligence Platform documentation set that can be found in SAS OnlineDoc at the following Web address:
  `http://support.sas.com/onlinedoc/913/docMainpage.jsp`

  The system administrator should have the skills to perform the following types of installation, configuration, and administration tasks:

  - installation and configuration of the SAS Intelligence Platform and solution

    The system administrator should install and configure the required SAS Intelligence Platform software on the required operating system.

    To install the SAS Intelligence Platform on the Microsoft Windows operating system, the administrator should meet the following prerequisites:

    * be an administrator of the machine
    * be familiar with Windows concepts
    * know how to create folders
    * know how to run DOS BAT files
    * be familiar with Windows domain concepts in order to create user accounts and groups
  - administration of the solution metadata

    The system administrator must use the SAS Management Console software to maintain the metadata for servers, users, and other global resources that are required by the solution.
  - administration of the SAS Data Integration Studio metadata

    The system administrator must use the SAS Management Console software to maintain the metadata for servers, users, and other global resources that are required by SAS Data Integration Studio if your solution uses ETL processes.

- Solution Administrator

  The solution administrator should have the skills to perform the following types of administration:

  - administration of the solution metadata (optional)

    The solution administrator, or the system administrator, must maintain the metadata for servers, users, and other global resources that are required by the solution.
  - administration of the solution

    The solution administrator must maintain the solution's data, and perform other solution administration to enable users to analyze data.

- Solution User

  The solution user should understand the data to be analyzed, the requirements for analysis, and the results of the data analyses.

## Organization

This Administrator's Guide is organized as follows:

**Overview**
introduces you to your SAS solution, explains how the guide is organized and presented, provides you with a road map for implementing your solution, and provides additional resources for you to explore if you need more information about your SAS solution software. It also provides a quick overview of the SAS Intelligence Platformand how your SAS solution integrates into the SAS Intelligence Platform.

**System Requirements**
describes the environment, hardware, software, data, and network requirements for implementing your SAS solution.

**Installation and Configuration**
provides an overview of the planned and software index installations. It also provides post-installation tasks and a process for verifying a successful installation and configuration of your SAS solution.

**Administration**
discusses the necessary system administration tasks, such as administration security that your SAS solution requires.

**Appendixes**
contains tables that are referenced from within sections of the documentation.

## Typographical Conventions

The following list explains the meaning of the typographical conventions used in this document:

roman
is the standard type style used for most text.

UPPERCASE ROMAN
is used for table names, column names, specification names, SAS statements, SAS options, and other SAS language elements when they appear in the text.

**UPPERCASE BOLD**
is used in the "Syntax" sections' initial lists of statements and options.

*oblique*
is used for user-supplied values in the syntax definitions. In the text, these values are written in *italic*.

**bold**
is used for user interface elements such as the names of menus, fields, and buttons.

*italic*
is used for terms that are defined in the text, for emphasis, and for references to publications.

`monospace`
: is used for names of variables, data sets, and example code when they appear in the text. In most cases, this book uses lowercase type for code.

**`monospace bold`**
: is used for URLs, path names, and operating environment commands for case-sensitive platforms.

# Where to Go for More Information

## Most Current Documentation

For the most current installation and configuration information, see the following Web site and select SAS Forecast Server as your product:
`http://support.sas.com/documentation/onlinedoc/index.html`

## SAS Notes

It is highly recommended that for additional information and support fixes, you check the SAS Notes that are available on the SAS Technical Support Web site. Search for available SAS Notes for SAS Forecast Server or SAS Forecast Studio at the following Web address:
`http://support.sas.com/techsup/search/sasnotes.html`

## SAS Technical Support Services

As with all SAS products, the SAS Technical Support staff is available to respond to problems and answer technical questions.

## Online Help

For information about how to operate your software, select **Help** -> **Topics** from within the application.

For information about the version of the software that you are running, select **Help** -> **About** from within the application.

## Other Related SAS Publications

- *SAS High-Performance Forecasting User's Guide* provides reference information for a large-scale automatic forecasting system. The software provides for the automatic selection of time series models that are used in forecasting time-stamped data.

  SAS also publishes the *HPF Software Applications Guide*, which is a companion to the *SAS High-Performance Forecasting User's Guide*. The *HPF Software Applications Guide* provides information about the applications for which SAS High-Performance Forecasting procedures are useful.

- *SAS System for Forecasting Time Series* provides information about how you can use SAS to forecast time series.
- *SAS/ETS User's Guide* provides information about econometric analysis, time series analysis, and time series forecasting procedures. In addition to SAS procedures, SAS/ETS software includes interactive environments for time series forecasting and investment analysis.

  SAS also publishes the following books, which are companions to the *SAS/ETS User's Guide*:

  - *SAS/ETS Software: Applications Guide 1, Version 6, First Edition* discusses features of SAS/ETS software for time series modeling and forecasting, financial reporting, and loan analysis.
  - *SAS/ETS Software: Applications Guide 2, Version 6, First Edition* discusses features of SAS/ETS software for econometric modeling and simulation.

- *SAS Analytics Platform Administrator's Guide* provides information about the SAS Analytics Platform and its configuration wizard that enables you to manage the configuration settings. You can access the *SAS Analytics Platform User's Guide* at the following Web address:
  **`http://support.sas.com/documentation/onlinedoc/apcore`**

# Related SAS Software

## For More Features and Functionality

Many features not found in this solution software are available in other SAS solutions or in SAS products that are used with this SAS solution. If you do not find a feature that you need in this software, you might find it in one of the following SAS solutions or products.

## SAS High-Performance Forecasting

SAS High-Performance Forecasting software provides a large-scale automatic forecasting system. The software provides for the automatic selection of time series models for use in forecasting time-stamped data. For more information about SAS High-Performance Forecasting, refer to the *SAS High-Performance Forecasting User's Guide*.

## SAS/ETS

SAS/ETS software provides SAS procedures that perform econometric and time series analysis and forecasting, as well as financial analysis and reporting. The software also provides an interactve environment for time series forecast and investment analysis. For more information about SAS/ETS software, refer to the *SAS/ETS User's Guide*.

## SAS Enterprise Data Integration Server

SAS Enterprise Data Integration Server is an application that enables you to manage ETL process flows, which are sequences of steps for the extraction, transformation, and loading of data. SAS Enterprise Data Integration Server enables you to do the following:

- specify metadata for sources, such as tables in an operational system
- specify metadata for targets, such as tables and other data stores in a data warehouse
- create jobs that specify how data are extracted, transformed, and loaded from a source to a target

Chapter 2

# SAS Forecast Server Architecture and the SAS Intelligence Platform

## Chapter Contents

Chapter 2

# SAS Forecast Server Architecture and the SAS Intelligence Platform

## Overview of SAS Forecast Server Architecture

### Architecture Diagram

Figure 2.1 shows how the SAS Forecast Studio client and SAS Forecast Server Mid-Tier pieces fit with the SAS Analytics Platform, and the SAS Intelligence Platform. Also, the diagram shows the SAS data sets that are stored on the data tier of the architecture.

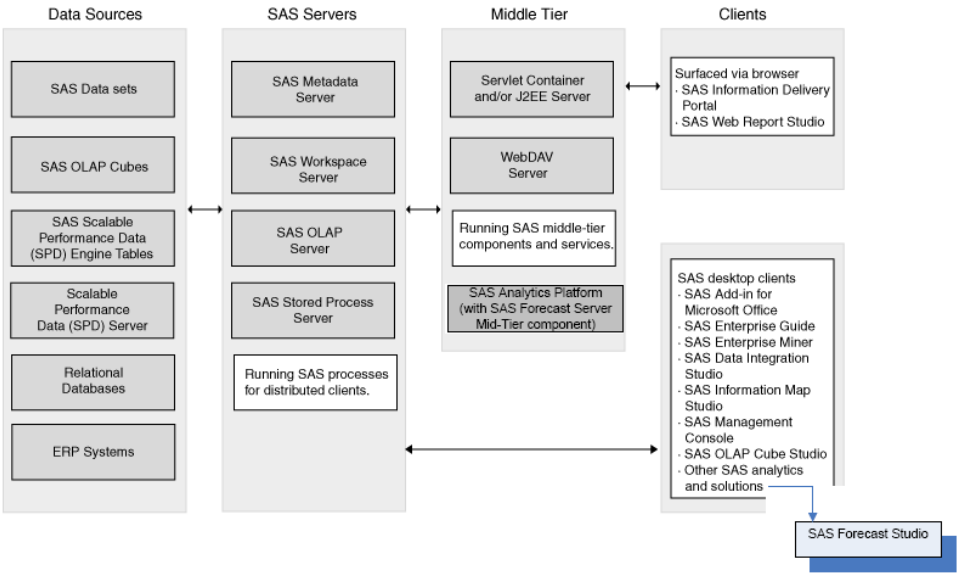


**Figure 2.1.** SAS Forecast Server Architecture

### SAS Intelligence Platform Components

SAS Forecast Server uses the following components of the SAS Intelligence Platform:

**SAS Metadata Server**

The SAS Metadata Server provides an enterprise-level repository for SAS server configurations and application management metadata. Products such as SAS Forecast Server store metadata concerning users and other resources. Administrators use the SAS Management Console application to administer the SAS Metadata Server, including SAS server configurations. SAS Forecast

Server uses the SAS Metadata Server to obtain metadata about SAS libraries and the SAS Workspace Server and SAS Object Spawner, and to authenticate users. SAS Forecast Server accesses the SAS Metadata Server through the SAS Analytics Platform. A SAS System installation is required.

**SAS Workspace Server and SAS Object Spawner**

The SAS Workspace Server provides all computation and intermediate data storage services. A SAS System installation is required.

SAS Forecast Server uses the SAS Workspace Server to execute the SAS High-Performance Forecasting procedures and to save data to SAS data sets. SAS Forecast Server accesses the SAS Workspace Server and SAS Object Spawner through the SAS Analytics Platform.

**SAS Analytics Platform**

The SAS Analytics Platform is a middle tier application that enables clients to share access to the server tier of the SAS Intelligence Platform. While the SAS Analytics Platform is considered a middle tier application, it does not need to be installed on the Web tier machine. Furthermore, the SAS Analytics Platform does not require a local SAS System installation.

The SAS Forecast Studio client calls the SAS Forecast Server Mid-Tier, which uses the SAS Analytics Platform to access the SAS Metadata Server and SAS Workspace Server. Shared access enables you to do the following:

- share the same SAS Forecast Server projects
- run long processes in a server application instead of the client application. This enables you to terminate client sessions while the server process runs.

SAS Forecast Server uses the SAS Analytics Platform to access servers in order to obtain metadata (SAS Metadata Server), execute the SAS High-Performance Forecasting procedures, and save data to SAS data sets (SAS Workspace Server.)

The SAS Forecast Server Mid-Tier is configured with the SAS Analytics Platform. Therefore, the SAS Forecast Server Mid-Tier does not run unless the SAS Analytics Platform is started first. For information about configuring the SAS Analytics Platform as a Windows service, see "Configure the SAS Analytics Platform as a Windows Service."

For more information about the SAS Analytics Platform, see the *SAS Analytics Platform Administrator's Guide* at the following Web address:
`http://support.sas.com/documentation/onlinedoc/`

**SAS Data Integration (optional)**

Administrators can use SAS Data Integration to create an input data set and library for the solution. For more information about SAS Data Integration, see the *SAS Data Integration User's Guide* in the SAS Online Doc at the following Web address:
`http://support.sas.com/onlinedoc/913/docMainpage.jsp`

## SAS Forecast Server Components

SAS Forecast Server consists of the following components:

**SAS Forecast Server Mid-Tier**

The SAS Forecast Server Mid-Tier is installed as an application within the SAS Analytics Platform. If you have SAS applications that use the SAS Analytics Platform and its Web server, then you must install the SAS Analytics Platform on the middle tier. The SAS Forecast Server Mid-Tier must be installed on the same machine as the SAS Analytics Platform.

**SAS Forecast Studio client**

SAS Forecast Server has a thin client component (SAS Forecast Studio) that is the graphical user interface for the user. A SAS System installation is not required for a client configuration. The SAS Forecast Studio client installation includes only the Java files needed for display. All other files are installed on the middle tier server with the SAS Forecast Server Mid-Tier and SAS Analytics Platform.

The SAS Forecast Studio client calls the SAS Forecast Server Mid-Tier, which uses the SAS Analytics Platform to access the SAS Metadata Server and SAS Workspace Server.

# SAS Forecast Server Integration

Figure 2.2 shows the access points for the SAS Forecast Studio client application and the SAS Analytics Platform, which includes the SAS Forecast Server Mid-Tier, and SAS High-Performance Forecasting components.

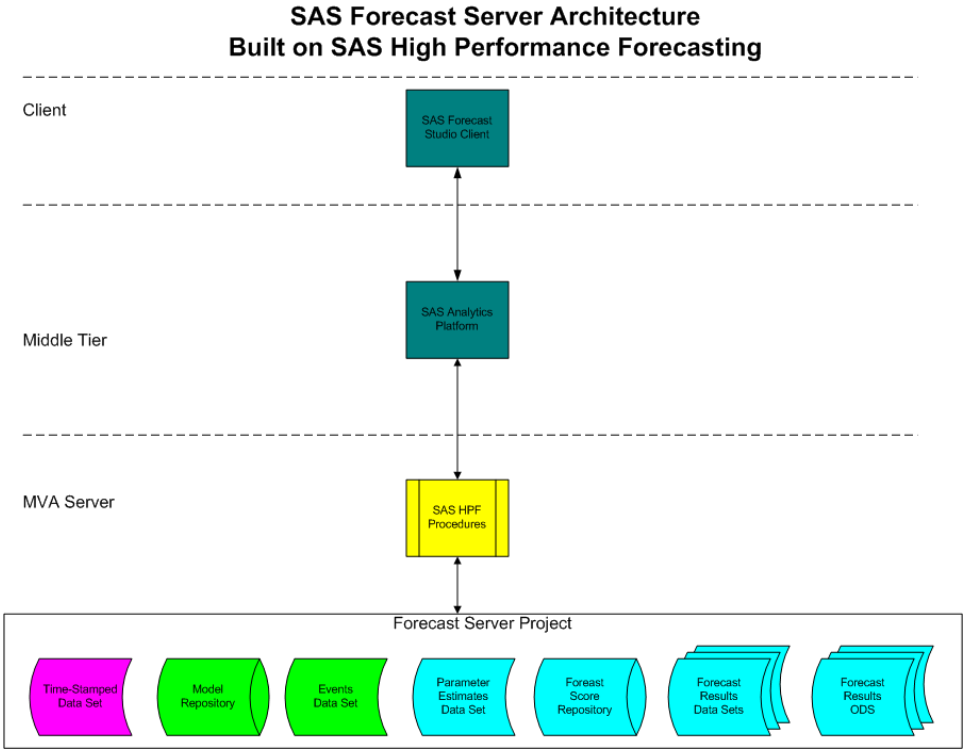


**Figure 2.2.** SAS Forecast Server and SAS Analytics Platform

The SAS Forecast Server application uses the following libraries and data sets:

- A SAS library, which is provided by SAS and contains sample SAS data sets, stores information and data about input SAS data sets that you can use for the SAS Forecast Server application.
- A user-defined library, which you create at your site, stores information and data about input SAS data sets for the SAS Forecast Server application.

The following conditions must be true for SAS Forecast Server to run:

- SAS Metadata Server is running. You use the SAS Management Console to administer metadata on the SAS Metadata Server.
- SAS Object Spawner is running.
- SAS Analytics Platform is running.
- A SAS input data set is defined in a SAS library or a user-defined SAS library by using SAS Management Console. The input data set contains the appropriate SAS Forecast Server data, and is used within SAS Forecast Server to generate forecasts.

The SAS Forecast Studio client accesses the SAS Forecast Server Mid-Tier when it needs to access the SAS Metadata Server or SAS Workspace Server. The SAS

Forecast Server Mid-Tier then accesses the SAS Analytics Platform which uses the SAS Intelligence Platform (SAS Metadata Server and SAS Workspace Server) for the following purposes:

- access and return SAS library metadata from the SAS Metadata Server
- execute SAS High-Performance Forecasting procedures and return results
- authenticate users on the SAS Metadata Server

For more information about the SAS Intelligence Platform, see the SAS Intelligence Platform documentation set in the SAS Online Doc at the following Web address: `http://support.sas.com/onlinedoc/913/docMainpage.jsp`

# Part 2
# SAS Forecast Server System Requirements

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Chapter 3

# System Requirements for SAS Forecast Server

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Chapter 3

# System Requirements for SAS Forecast Server

## Hardware Requirements

### Memory Requirements

- SAS Forecast Studio client installation requires 500 megabytes of memory.
- SAS Forecast Server Mid-Tier and SAS Analytics Platform, SAS servers (SAS Metadata Server and SAS Workspace Server), and client installation require 2 gigabytes of memory.

### Operating System Requirements

The SAS Forecast Server Mid-Tier is a Java-based, middle-tier component that enables automatic forecasting of time series data. The SAS Forecast Server Mid-Tier is installed as an application within the SAS Analytics Platform, and can be installed on the following operating systems:

- Windows XP (32-bit)
- Windows Server 2003 (Standard Edition)
- Windows Server 2003 (Enterprise Edition)
- UNIX AIX (64-bit), Release 5.1 or later
- Solaris (64-bit)
- HP-UX (64-bit)
- HP-Itanium

SAS Forecast Studio is a Java-based, client-tier application that is based on SAS High-Performance Forecasting procedures. The SAS Forecast Studio client can be installed only on the Windows XP operating system.

# Software Requirements for SAS Forecast Server

## SAS Software Requirements

### Required SAS Software

Your software bundle includes the following required SAS products and software:

- SAS/OR (unless SAS/OR is explicitly licensed, use of SAS/OR is limited to licensed users of SAS Forecast Server)
- SAS Forecast Server bundle

**CAUTION:** SAS Forecast Server 1.4 must be used with SAS High-Performance Forecasting 2.2 that is available in your software bundle. If you use SAS Forecast Server 1.4 with any earlier versions of SAS High-Performance Forecasting, then you might get unexpected results.

### Optional SAS Software

The following SAS products and components are often used with SAS Forecast Server, but are not required to operate SAS Forecast Server:

- SAS Data Integration Studio
- SAS BI Server
- SAS Enterprise Miner

## Third-Party-Vendor Software Requirements

In addition to the licensed SAS products required to support SAS Forecast Server, some third-party software is required. For information about the third-party software and to access downloads of the software, see the following Web site:
`http://support.sas.com/documentation/configuration/thirdpartysupport/`

**Note:** For full functionality, installation of the Java Runtime Environment 1.4.2_09 is required on both the client tier and the middle tier.

## Web Browser

Internet Explorer 5.5 (or later) is required.

# Data Requirements

## Overview of SAS Forecast Server Data Flow

Figure 3.1 shows the general flow of data in SAS Forecast Server.

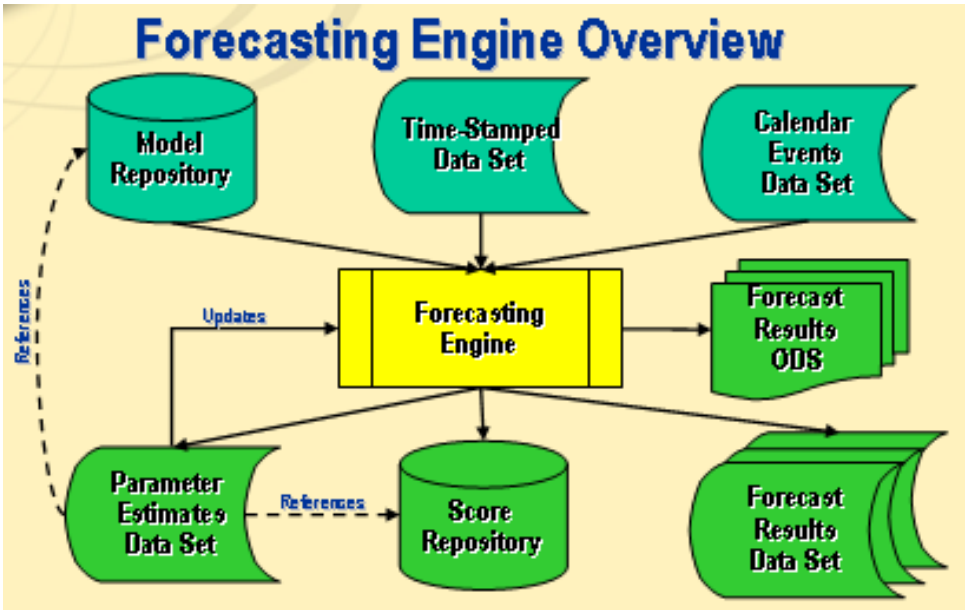


**Figure 3.1.** Data Flow in SAS Forecast Server

When using SAS Forecast Server, you create or update forecasts by using the following general data flow:

1. Create or generate an input SAS data set, which you store in a pre-assigned SAS library. For information about pre-assigning a SAS library, see the section "Pre-assign Libraries in SAS Management Console" on page 88 in Chapter 9, "Post-installation Tasks."
2. Open SAS Forecast Studio (client), and perform the following steps:
   (a) Create a project.
   (b) Select your input library and SAS data set.
   (c) Specify how to forecast your data.
   (d) Assign variables to roles.
   (e) Configure the hierarchy.
   (f) Enter project properties.
   (g) Perform additional steps.
3. Create the forecasting model database.
4. Select the default model selection list.
5. Create events.

6. Generate forecasting results.
7. Modify estimates and forecast data again, if necessary, and repeat steps 3-6 (iterative process).
8. Store forecasting results and parameter estimates.

For a more information about using SAS Forecast Studio, see the SAS Forecast Studio Help System.

## Input Data Set Requirements

### Overview

In order for SAS Forecast Server to generate a forecast, the input SAS data set must contain one variable for each time series. SAS Forecast Server requires a date or datetime variable in the data set in order to generate forecasts. SAS Forecast Server generates forecasts from timestamped data that consists of unique and equally spaced data over time. If the data are not equally spaced with regard to time, then SAS Forecast Server uses the date or datetime variable to accumulate the data into a time series before forecasting. The input data set must be a single SAS data set that is pre-assigned. For information about pre-assigning libraries, see the section "Pre-assign Libraries in SAS Management Console" on page 88 in Chapter 9, "Post-installation Tasks."

You can use transactional data to generate a forecast. You can use the accumulation options in SAS Forecast Studio to prepare the time series data.

### Data Set Variables

You can have the following variables in the input data set:

- The time ID variable must contain the date or datetime value of each observation.
- BY variables enable you to group observations into a hierarchy.
- Dependent variables are the variables used to model and forecast.
- Independent variables are the explanatory or input variables that are used to model and forecast the dependent variable.
- Reporting variables are not used for analysis but for reports only.
- Indicator variables are used to signify any unusual event in the model, such as holidays and promotions.

The names of the variables cannot match any of the reserved variable names that are used in the output data set. The variable names in your input data set cannot start with an underscore and cannot match any of the variable names in the output data sets that SAS Forecast Server creates. The following table lists the variables that are created by the output data sets. For more information about the output data sets that are created, see the *SAS High-Performance Forecasting User's Guide*.

If your input data set contains one of the variables listed in Table 3.1 and you try to assign this variable to a role in SAS Forecast Studio then an error message appears.

**Table 3.1.** Reserved Variable Names

| Variable Name | Description |
|---|---|
| _*VariableName* | Any variable name that begins with an underscore |
| _ACTUAL_ | Dependent series value |
| _COMP_ | Name of the component |
| _COMPONENT_ | Model component |
| _CROSS_ | Cross variable name |
| _DSVAR_ | Data set variable mapping |
| _EST_ | Parameter estimate |
| _FACTOR_ | Model factor |
| _LABEL_ | Parameter or statistic label |
| _LAG_ | Lag of input |
| _LOWER_ | Lower confidence limit |
| _MODE_ | Mode of decomposition |
| _MODEL_ | Name of model |
| _MODELVAR_ | Model variable mapping |
| _NAME_ | Variable name |
| _PARM_ | Parameter name |
| _PREDICT_ | Component forecast |
| _PVALUE_ | Parameter estimate *p*-value |
| _SEASON_ | Seasonal index |
| _SELECT_ | Name of selection list |
| _SHIFT_ | Shift |
| _STAT_ | Statistic name |
| _STATUS_ | Indicates success/failure in estimating parameter |
| _STD_ | Prediction standard error |
| _STDERR_ | Parameter estimate standard error |
| _TIME_ | Time ID |
| _TIMEID_ | Time ID values |
| _TVALUE_ | Parameter estimate *t*-value |
| _TRANSFORM_ | Transformation applied |
| _UPPER_ | Upper confidence limit |
| AADJRSE | Amemiya's adjusted R-Square |
| ACF | Autocorrelations |
| ACF2STD | Indicates ACF beyond two standard errors |
| ACFLPROB | Autocorrelation log probabilities |
| ACFNORM | Normalized autocorrelations |
| ACFPROB | Autocorrelation probabilities |
| ACFSTD | Autocorrelation standard errors |
| ACOV | Autocovariances |
| ADJRSQ | Adjusted R-Square |
| AIC | Akaike information criterion |
| APC | Amemiya's prediction criterion |
| AVG | Average value |
| CC | Cycle component |

**Table 3.1.** (continued)

| Variable Name | Description |
|---|---|
| CCF | Cross-correlations |
| CCF2STD | Indicates cross-correlations beyond two standard errors |
| CCFNORM | Normalized cross-correlations |
| CCFLPROB | Cross-correlation log probabilities |
| CCFPROB | Cross-correlation probablities |
| CCFSTD | Cross-correlation standard errors |
| CCOV | Cross-covariances |
| CSS | Corrected sum of squares |
| ERROR | Prediction errors |
| IACF | Inverse autocorrelations |
| IACF2STD | Indicates inverse autocorrelations beyond two standard errors |
| IACFNORM | Normalized inverse autocorrelations |
| IACFLPROB | Inverse autocorrelation log probabilities |
| IACFPROB | Inverse autocorrelation probabilities |
| IACFSTD | Inverse autocorrelation standard errors |
| IC | Irregular component |
| LAG | Time lag |
| LAG*h* | Correlation or cross-correlation statistics for lag *h* |
| LOWER | Lower confidence limits |
| MAE | Mean absolute error |
| MAPE | Mean absolute percent error |
| MAXERR | Maximum error |
| MAXIMUM | Maximum value |
| MAXPE | Maximum percent error |
| ME | Mean error |
| MEAN | Mean value |
| MEDIAN | Median value |
| MINERR | Minimum error |
| MINIMUM | Minimum value |
| MINPE | Minimum percent error |
| MPE | Mean percent error |
| MSE | Mean square error |
| N | Number of non-missing observations or Number of variance products |
| NAME | Variable name |
| NMISS | Number of missing observations |
| NOBS | Number of observations |
| ORIGINAL | Original series index |
| PACF | Partial autocorrelations |
| PACF2STD | Indicates PACF beyond two standard errors |
| PACFLPROB | Partial autocorrelation log probabilities |
| PACFNORM | Partial normalized autocorrelations |
| PACFPROB | Partial autocorrelation probabilities |
| PACFSTD | Partial autocorrelations standard errors |
| PCSA | Percent change seasonal adjusted component |
| PERIOD*t* | Decomposition component value or trend statistic for time period *t* |

**Table 3.1.** (continued)

| Variable Name | Description |
|---|---|
| PREDICT | Predicted values |
| RANGE | Maxinum value |
| RMSE | Root mean square error |
| RSQUARE | R-Square |
| RWRSQ | Random walk R-Square |
| SA | Seasonal adjusted component |
| SBC | Schwarz Bayesian information criterion |
| SC | Seasonal component |
| SCSTD | Seasonal component standard errors |
| SIC | Seasonal-irregular component |
| SEASON*s* | Season statistic value for season *s* |
| SSE | Sum of squares error |
| STD | Prediction standard errors |
| STDDEV | Standard deviation |
| SUM | Summation value |
| TC | Trend component |
| TCC | Trend-cycle component |
| TCS | Trend-cycle-seasonal component |
| UMSE | Unbiased mean square error |
| URMSE | Unbiased root mean square error |
| UPPER | Upper confidence limits |
| USS | Uncorrected sum of squares |
| WN | White noise test statistics |
| WNLPROB | White noise test log probabilities |
| WNPROB | White noise test probabilities |

## Additional Information

Often your data are not in the appropriate format for SAS Forecast Server. To avoid misleading or incorrect analyses from your time series data, you should preprocess your data.

- For general information about working with time series data, see the *SAS/ETS User's Guide*.
- For more information about creating time series data from transactional data, see "The TIMESERIES Procedure" and "The EXPAND Procedure" documentation in the *SAS/ETS User's Guide*.
- For more information about creating SAS data sets from Excel files, see the IMPORT Procedure documentation in the *Base SAS Procedures Guide*.
- For more information about transposing data for statistical analysis, see "The TRANSPOSE Procedure" documentation in the *Base SAS Procedures Guide*.

# National Language Support

SAS Forecast Server is available in the following languages:

- Chinese (Simplified)
- English
- French
- Italian
- Japanese
- Korean

# Part 3
# Installation and Configuration of SAS Forecast Server

## Contents

Chapter 4

# Overview of Installation and Configuration

## Chapter Contents

# Chapter 4
# Overview of Installation and Configuration

## Before Installation

To understand the architecture and components of SAS Forecast Server and how it fits into the SAS Intelligence Platform, see Chapter 2, "SAS Forecast Server Architecture and the SAS Intelligence Platform."

Before you install SAS Forecast Server, be sure that you have met the system requirements described in Chapter 3, "System Requirements for SAS Forecast Server."

## Overview of Installation and Configuration

### Installation Methods

When you deploy your business intelligence system, you install your software using a tool called the SAS Software Navigator. The SAS Intelligence Platform documentation set provides you with pre-installation steps and instructions for installation and configuration for a SAS Software Navigator installation. For more information about the SAS Intelligence Platform, see the documentation set in the SAS OnlineDoc at:
`http://support.sas.com/onlinedoc/913/docMainpage.jsp`

The SAS Analytics Platform documentation provides additional information about installing and configuring the SAS Analytics Platform. For information about SAS Analytics Platform, see the *SAS Analytics Platform User's Guide* at the following Web address:
`http://support.sas.com/documentation/onlinedoc/apcore/`
You can install your solution, along with the SAS Analytics Platform and other SAS products by using one of the following types of installations:

Personal
: uses a sample deployment plan to install and configure SAS software on a single machine. For SAS Forecast Server, you can choose from the following sample plans:

  - Forecast Server, one machine
  - Forecast Server and Enterprise Miner, one machine

Advanced
: uses a sample deployment plan or a customized deployment plan made specifically for your site to install and configure SAS software on a single or as part

of a multiple machine deployment. For SAS Forecast Server, you can choose from the following sample plans:

- Forecast Server, two machines
- Forecast Server and Enterprise Miner, two machines

SAS Software Index Installation
: uses an index to select individual SAS products that you want to install and configure. The SAS Software Index installation is recommended only when you want to add a product to an existing SAS deployment. When you perform a Software Index installation, you do not follow a plan; rather, you can choose to install any product from a CD that you licensed from SAS. Although the SAS Configuration Wizard is mainly used with Personal or Advanced installations, you can use the SAS Configuration Wizard to configure your Software Index installation. For more information and instructions about the Software Index installation of SAS Forecast Server, see Chapter 8, "Alternate Installation and Configuration Using the Software Index Installation."

You should select the installation that is appropriate for your environment. If you require a customized deployment plan, then contact your SAS representative.

## Overview of Installation and Configuration Steps

Regardless of which installation method (planned or Software Index) that you use, you must perform the installation and configuration steps in the following order:

1. Install the SAS Intelligence Platform.
2. Install the SAS Analytics Platform.
3. Install the SAS Forecast Server Mid-Tier.
4. Install the SAS Forecast Studio client.
5. Configure all components for each tier.

Depending on your machine requirements, there are several ways to distribute the servers, services, and solution components across machines.

**Note:** With a Planned installation, which is the recommended approach, all required components are included and installed in the correct order.

## Location of Installation Files

Table 4.1 shows the location of the installation files for SAS Forecast Server.

**Table 4.1.** Location of Installation Files

| File | Windows Location | UNIX Location |
|---|---|---|
| !SASROOT | C:\Program Files\SAS\SAS 9.1 | <*install-dir*>/SAS_9.1 |
| SAS_HOME | C:\Program Files\SAS | <*install-dir*> |
| SAS Analytics Platform | SAS_HOME\SASAPCore | SAS_HOME/SASAPCore |
| SAS Forecast Server Mid-Tier | SAS_HOME\SASAPCore\apps \Forecasting | SAS_HOME/SASAPCore/apps/ Forecasting |
| SAS Forecast Studio client | SAS_HOME\ SASForecastStudio\1.4 | Not supported on UNIX |
| SAS Forecast Server configuration file | SAS_HOME\SASAPCore\apps \Forecasting\app.config | SAS_HOME/SASAPCore/apps/ Forecasting/app.config |
| SAS Forecast Server Startup script | SAS_HOME\SASAPCore\apps \Forecasting\bin\ ForecastStudioSetup.bat | SAS_HOME/SASAPCore/apps/ Forecasting/bin/ForecastStudioSetup.sh |

**Note:** The client is installed in a SAS Forecast Studio 1.4 folder, so it is easy to determine the version number of the client. The middle tier does not have such a directory structure. To identify the version number of the middle tier, navigate to the !SAS_HOME\SASAPCore\apps\Forecasting directory (Windows default) and view the app.config file with a text editor. The following highlighted text shows the version number of the SAS Forecast Server Mid-Tier.

```
application.name=Forecasting
application.version=1.4
application.build.date=20060511.20.10
application.build.number=1
application.version.major=1
application.version.minor=1
application.remote.class=com.sas.analytics.forecasting.rmi.
RemoteForecastingApplicationRmiImpl
application.local.class=com.sas.analytics.forecasting.rmi.
ForecastingApplicationRmi
application.startup.class=com.sas.analytics.forecasting.
ForecastingApplicationInitializer
application.war=sas.forecasting.war
application.war.link=Y
application.jnlp=main.jnlp
```

## Location of SAS Forecast Server Application Files

For SAS Forecast Server, there is a central physical repository of workspace server project files that must be accessible to the SAS Workspace Server. In a multiple-machine environment, the following files are located on the SAS Workspace Server machine. Table 4.2 shows the location of the application files for SAS Forecast Server.

**Table 4.2.** SAS Forecast Server Project File Locations

| **Files** | **Windows Location** | **UNIX Location** |
|---|---|---|
| <*forecast-studio-project*> | c:\SAS\ForecastStudio | <*config-dir*>/SAS/ForecastStudio <*config-dir*> is the home directory of the user who installed SAS Forecast Server. |
| Archives | <*forecast-studio-project*>\Archives | <*forecast-studio-project*>/Archives |
| Data Specifications | <*forecast-studio-project*>\DataSpecifications | <*forecast-studio-project*>/DataSpecifications |
| Projects | <*forecast-studio-project*>\Projects | <*forecast-studio-project*>/Projects |
| Stored processes | <*forecast-studio-project*>\StoredProcesses | <*forecast-studio-project*>/StoredProcesses |
| Reports | <*forecast-studio-project*>\Reports | <*forecast-studio-project*>/Reports |

# SAS Intelligence Platform Installation and Configuration

Before you install the SAS Analytics Platform, SAS Forecast Server Mid-Tier, and SAS Forecast Studio client, you must install the SAS Intelligence Platform as one of the following types of installation:

- single machine, stand-alone environment

  For a platform installation, you install and configure the SAS Metadata Server and a SAS Workspace Server. For a single-machine installation, servers and the SAS Analytics Platform server are installed on a single machine. All components, including client components, are installed on a single machine. If you want to use a single-machine deployment, then you can use one of the following sample plans that SAS provides:

  - Forecast Server, one machine
  - Forecast Server and Enterprise Miner, one machine

- multiple machine, distributed environment

  For a platform installation, you can install the SAS Metadata Server, SAS Workspace Server, and the SAS Analytics Platform on separate machines. The following two-machine planned installations install servers on one machine, and the client on another machine. If you want to use a multiple-machine deployment, then you can use one of the following sample plans that SAS provides:

  - Forecast Server, two machines
  - Forecast Server and Enterprise Miner, two machines

# SAS Analytics Platform Installation and Configuration

After the SAS Intelligence Platform is installed, depending on your machine distribution for the SAS Intelligence Platform installation and your machine requirements for the SAS Forecast Server installation, you can install the SAS Analytics Platform on one of the following machines:

- For a single-machine platform environment, you install the SAS Analytics Platform on the same machine where you installed the SAS Metadata Server and SAS Workspace Server.
- For a multiple-machine platform environment, you can install the SAS Analytics Platform on either the SAS Metadata Server machine or the SAS Workspace Server machine.

- For a multiple-machine installation, you can install the SAS Analytics Platform on a different machine from either of the machines that you used in the single-machine or multiple-machine installation of the SAS Intelligence Platform.

# SAS Forecast Server Installation and Configuration

After the SAS Intelligence Platform and SAS Analytics Platform are installed, you can install the components of SAS Forecast Server. The installation location depends on your previous installations of the SAS Intelligence Platform and SAS Analytics Platform, and on your machine distribution requirements for SAS Forecast Server:

- SAS Forecast Server Mid-Tier
  You must install the SAS Forecast Server Mid-Tier component on the same machine that you installed and configured the SAS Analytics Platform.
- SAS Forecast Studio client
  You can install the SAS Forecast Studio client in one of the following ways:
  - client and middle-tier server on the same machine
    You can install the SAS Forecast Studio client, SAS Forecast Server Mid-Tier component, and SAS Analytics Platform on the same machine.
  - separate client and middle tier server machine environment
    You can install the SAS Forecast Studio client on a separate machine from the machine that you installed the SAS Forecast Server Mid-Tier component and SAS Analytics Platform (which must be installed on the same machine.)

**Note:** You are not required to install SAS on any machine where you install the SAS Analytics Platform, SAS Forecast Server Mid-Tier, or the SAS Forecast Studio client. SAS is only required on the machine that has the SAS Metadata Server and the SAS Workspace Server.

# After Installation

After you complete your installation, you should perform the following steps:

1. Perform the required post-installation tasks. For more information, see Chapter 9, “Post-installation Tasks.”
2. Perform any additional administration. For more information, see Chapter 12, “Administration Tasks.”
3. Verify your installation. For more information, see Chapter 10, “Verify SAS Forecast Server Installation.”
4. If you have problems, troubleshoot your installation. For more information, see Chapter 13, “Troubleshooting SAS Forecast Server.”

# Chapter 5
# Upgrading from SAS Forecast Server 1.2 to SAS Forecast Server 1.4

## Chapter Contents

Chapter 5

# Upgrading from SAS Forecast Server 1.2 to SAS Forecast Server 1.4

## Upgrade from SAS Forecast Server 1.2 to 1.4 Tasks Checklist

**Table 5.1.** Pre-installation Tasks Checklist

| Task |
|---|
| Create a copy of your SAS metadata. |
| Create a copy of the stored processes. |
| Stop the SAS Analytics Platform, SAS Metadata Server, and SAS Object Spawner. |
| Create a copy of your current SAS Forecast Server directories. |
| Install SAS Forecast Server 1.4 software. |
| Start the SAS Forecast Studio client. |

## Upgrade Installation Tasks

### Create a Copy of Your SAS Metadata

For information about how to create a copy of your entire metadata repository, see the section about managing the SAS Metadata Server in the *SAS Intelligence Platform: Administration Guide* that can be found in SAS OnlineDoc at the following Web address:
http://support.sas.com/onlinedoc/913/docMainpage.jsp

### Create a Copy of the Stored Processes

For information about how to create a copy of the stored processes, see the section about the BI Manager Import and Export Wizard in the *SAS Intelligence Platform: Administration Guide* that can be found in SAS OnlineDoc at the following Web address:
http://support.sas.com/onlinedoc/913/docMainpage.jsp

# Stop the SAS Analytics Platform, SAS Metadata Server, and SAS Object Spawner

## *SAS Analytics Platform*

To stop the SAS Analytics Platform, perform the following steps:

**UNIX:**

1. Open a terminal session and have an X server running.
2. Navigate to the !SASROOT/SASAPCore/bin path.
3. Execute the following command:

```
./apserver stop
```

**Windows:**
From the **Start** menu, select
**Programs** →**SAS**→**SAS Analytics Platform**→**Stop AP Server**

Alternatively, you can stop the SAS Analytics Platform by executing a .bat file. At a DOS prompt, navigate to the
!SASROOT\SASAPCore\bin directory and use the following command:

```
apserver.bat stop
```

## SAS Metadata Server

To stop the SAS Metadata Server, perform the following steps:

**UNIX:**

1. Navigate to the following path:
   <*path-to-config-dir*>/Lev1/SASMain/MetadataServer
2. Execute the script in the directory that stops the SAS Metadata Server.

**Windows:**
From the **Start** menu, select
**Programs** →**SAS**→ <*configuration-directory*>→**Stop SAS Metadata Server**

Alternatively, you can stop the SAS Metadata Server by executing a .bat file. You find the .bat file in the following folder:
<*path-to-config-dir*>\Lev1\SASMain\MetadataServer

### SAS Object Spawner

To stop the SAS Object Spawner, perform the following steps:

**UNIX:**

1. Navigate to the following path:
   <*path-to-config-dir*>/Lev1/SASMain/ObjectSpawner
2. Execute the script in the directory that stops the SAS Object Spawner.

**Windows:**
From the **Start** menu, select
**Programs** →**SAS**→ <*configuration-directory*>→**Stop SAS Object Spawner**

Alternatively, you can stop the SAS Object Spawner by executing a .bat file. You find the .bat file in the following folder:
<*path-to-config-dir*>\Lev1\SASMain\ObjectSpawner

## Create a Copy of Your SAS Forecast Server Directories

### Installation Directories

To create a backup copy of your SAS Forecast Server installation directories, follow the methods that satisfy the security requirements at your site. The installation directories are found in the following default location:

**UNIX:**
<*install-dir*>/SASAPCore/apps/Forecasting

**Windows:**
!SASROOT\SASAPCore\apps\Forecasting

### Forecast-studio-project Directories

The <*forecast-studio-project*> directories are the central physical repository of workspace server project files that must be accessible to the SAS Workspace Server. To create a backup copy of your <*forecast-studio-project*> directories, follow the methods that satisfy the security requirements at your site. The <*forecast-studio-project*> directories are found in the following default location:

**UNIX:**
<*config-dir*>/SAS/ForecastStudio

<*config-dir*> is the home directory of the user who installed SAS Forecast Server.

**Windows:**
c:\SAS\ForecastStudio

# Install SAS Forecast Server 1.4

## *All Platform Tasks*

To install the new version of SAS Forecast Server software on any operating system, you must perform the following steps:

1. If your site has created a SAS Software Install Depot, then start the SAS Software Navigator. Alternatively, start the software installation by using the setup.exe script in the Windows operating environment or the setup.sh script in UNIX operating environments.
2. Select the **Advanced** deployment option and the path to your SID that contains the upgraded version of SAS Forecast Server software. Click **Next**.
3. Verify the SID information and click **Next**.
4. Select a standard deployment plan or browse to the location of your customized plan. For information about installation methods and plans, see "Installation Methods." Click **Next**.
5. Continue the installation instructions by following the tasks specified for the operating environment in which you are installing SAS Forecast Server software.

**Note:** During your installation, in the Select Your Installation Options window, be sure to **deselect** the SAS Configuration Wizard component.

## *UNIX Tasks*

1. Complete the preceding installation instructions for all platforms. See "All Platform Tasks."
2. In the Select Your Installation Options window, **deselect** the SAS Configuration Wizard component.
3. Select the installation path and click **Next**. If you specify an alternate default location, then browse to the location before you click **Next**.
4. Select the set of Help files to install, and click **Next**.
5. Review the options before starting the installation process, and click **Install**.
6. Click **OK** in the SAS User Account window.
7. Press ENTER in the SAS Installation Setup window.
8. Type **2** to select the option that updates an existing installation, and press ENTER.
9. Specify the target directory. If the path is correct, then press ENTER. If the path is not correct, then specify the correct installation path and press ENTER.
10. Press ENTER if the path displayed is correct.
11. Press ENTER to load all new licensed software.
12. Select your preferred language, and press ENTER.

13. If asked whether you want to be prompted for a root password later during this run, then type **Y**. Press ENTER to continue.
14. Verify the log to check for errors. Warnings can be ignored. Press ENTER to return to SAS Software Navigator.
15. Click **Yes** to continue with the installation. The rest of the installation is in silent mode.
16. Click **Next** in the Welcome to the InstallShield Wizard for SAS Forecast Server Mid-Tier 1.4 window.
17. Click **Next** in the window that specifies the installation directory.
18. Click **Yes to All** when asked if you want to replace the files.
19. Click **Finish** to continue.
20. Install the current hot fixes for SAS 9.1.3 on the machine that is running the SAS Workspace Server (server tier). You must install the hot fixes on the server tier before you start configurations on the middle tier.

    The required hot fixes can be downloaded from the following Web address: `http://ftp.sas.com/techsup/download/hotfix/op_home.html`

    **CAUTION:** At the minimum, you must install the following system hot fixes in order for the system to function:

    - E9BA16 (Base SAS)
    - E9BA20 (Base SAS)
    - E9BA26 (Base SAS)
    - E9BA27 (Base SAS)
    - E9IH01 (SAS Integration Technologies)

    **CAUTION:** Service Pack 4 for SAS 9.1.3 and the hot fixes for Service Pack 4 are required in order for SAS Forecast Server to function correctly.
21. Start SAS Metadata Server and SAS Object Spawner. For information about starting the SAS Metadata Server, see "SAS Metadata Server." For information about starting the SAS Object Spawner, see "SAS Object Spawner."
22. Import the stored processes for SAS Forecast Server 1.4 by using the StoredProcesses.spk file.
23. Start the SAS Analytics Platform. For information about starting the SAS Analytics Platform, see "SAS Analytics Platform."

### *Windows Tasks*

1. Complete the preceding installation instructions that apply to all platforms. See "All Platform Tasks."
2. In the Select Your Installation Options window, **deselect** the SAS Configuration Wizard component.
3. Select the installation path and click **Next**.

4. Select the set of Help files to install and click **Next**.
5. Click **Install**.
6. The System Requirement Wizard runs to verify your operating system components. You might have to restart the machine and start the installation again by using the setup.exe script, which starts SAS Foundation installation. For more information, see the SAS Intelligence Platform documentation set that can be found at the following Web address:
   http://support.sas.com/onlinedoc/913/docMainpage.jsp
7. In the Existing SAS Installation Found window, select **Add components to SAS** and click **Next**.
8. Select required components for SAS installation.
9. Complete the SAS Foundation installation. The rest of the components and products are installed automatically in silent mode.
10. During SAS Forecast Server Mid-Tier installation, specify the SASAPCore directory location.
11. Finish the SAS installation.
12. Install the current hot fixes for SAS 9.1.3 on the machine that is running the SAS Workspace Server (server tier). You must install the hot fixes on the server tier before you start configurations on the middle tier.

    The required hot fixes can be downloaded from the following Web address: http://ftp.sas.com/techsup/download/hotfix/op_home.html

    **CAUTION:** At the minimum, you must install the following system hot fixes in order for the system to function:

    - E9BA16 (Base SAS)
    - E9BA19 (Base SAS)
    - E9BA20 (Base SAS)
    - E9BA26 (Base SAS)
    - E9BA27 (Base SAS)
    - E9IH01 (SAS Integration Technologies)

    **CAUTION:** Service Pack 4 for SAS 9.1.3 and the hot fixes for Service Pack 4 are required in order for SAS Forecast Server to function correctly.
13. Start the SAS Metadata Server and SAS Object Spawner. For information about starting the SAS Metadata Server, see "SAS Metadata Server." For information about starting the SAS Object Spawner, see "SAS Object Spawner."
14. Import the stored process for SAS Forecast Server 1.4 by using the StoredProcesses.spk file.
15. Start the SAS Analytics Platform. For information about starting the SAS Analytics Platform, see "Start the SAS Analytics Platform." For information about configuring the SAS Analytics Platform, see the *SAS Analytics Platform User's Guide* at the following Web address:
    http://support.sas.com/documentation/onlinedoc/apcore

## Start the SAS Forecast Studio Client

For information about starting the SAS Forecast Studio client, see Chapter 11, "Start the SAS Forecast Studio Client."

# Chapter 6
# Pre-installation Tasks

## Chapter Contents

# Chapter 6
# Pre-installation Tasks

## Pre-installation Checklist

**Table 6.1.** Pre-installation Tasks Checklist

| Task |
|---|
| **All Operating Environments** |
| Create all user accounts in the operating environment. |
| Create a SAS Forecast Server administrative user. |
| Create a SAS Forecast Server User Group. |

## Administration Tasks for All Operating Environments

### Create User Accounts in the Operating Environment

A pre-installation checklist is referenced in the index.html file that comes with your planning package. You should either print the Pre-installation Checklist and fill in the blanks, or edit the checklist with an HTML editor to fill in the blanks. The remaining installation steps call for this information, and your installation is easier if you complete the checklist before starting your installation process.

**Note:** In order to grant specific permissions, be sure that you create the following SAS user IDs on the server tier machine:

- sasadm
- sasdemo
- sasguest
- sassrv
- sastrust
- fsadm (SAS Forecast Server administrative user)
  **Note:** The SAS Forecast Server administratiiven user is specific to SAS Forecast Server, and you are not prompted for this administrative user during configuration. You must add this administrative user because it is needed to perform some post-installation tasks.)

### Create a SAS Forecast Server Administrative User

In order to perform some installation and configuration tasks, you need to create a SAS Forecast Server administrative user on the SAS Workspace Server machine.

Alternatively, you can grant administrative permissions later to an existing user in SAS Metadata Server. Do NOT use the SAS Administrative user (e.g., sasadm).

When creating the user ID for Windows, it is recommended that you do the following:

- Clear the **User must change password at next logon** check box.
- Select the **User cannot change password** check box.
- Select the **Password never expires** check box.
- Grant the user permission **Log on as a Batch Job**.

**Note:** In the Windows user manager, you cannot enter *<domain>\username* (you enter the user name only), but you must enter *<domain>\username* in the SAS Configuration Wizard and SAS Management Console.

You can create a SAS Forecast Server administrative user that must be authenticated on the SAS Metadata Server and the SAS Workspace Server, as shown in Table 6.2. This account is used by the SAS Forecast Server Mid-Tier to access the servers, data, and user credentials.

**Table 6.2.** SAS Forecast Server Administrative User Information

| **SAS Forecast Server Administrative User Information** | | **Done** |
|---|---|---|
| User Name: | _____<br>Example:<br>For Windows, <**domain**>**fsadm**, where <domain> is the Windows domain qualifier<br>For UNIX, **fsadm** | [ ] |
| Full Name: | _____<br>Example: SAS Forecast Server Administrative User | [ ] |
| Password: | _____ | [ ] |

## Create a SAS Forecast Server User Group

Different users have different operating system privileges when using the SAS Workspace Server. By defining operating system user groups, you can grant permissions to all of the SAS Forecast Server users who log on to the SAS Metadata Server as members of the group with the same credentials.

Later in the post-installation instructions, you must grant SAS Forecast Server users Read, Write, and Execute access on the .../SAS/ForecastStudio/ directory that is created during installation. The exact details of how to do this varies according to which operating system groups are defined, and how restrictive you want your security to be.

For a more secure deployment, you can create a SAS Forecast Server user group and ensure that the group contains all of the SAS Forecast Server users. In the UNIX operating environment, the physical central repository of saved projects must have Write permissions by all SAS Forecast Server users. Therefore, the SAS Forecast Server users' UNIX logons must be in the same UNIX OS group. UNIX users can be members of multiple groups, but one of the groups is primary. In this case, the SAS Forecast Server group must be the primary group. In the UNIX operating environment, the following conditions must be met:

- The UNIX OS group of forecasting users is created.
- The UNIX forecasting user IDs are members of the OS group and it becomes the primary group.
- The SAS scripts are updated to specify the umask options when the SAS Workspace Server and SAS Stored Process Server are running under the forecasting group user identities.
- The central physical project repository (*forecast-studio-project-directory*) has the correct ownership and group Write permissions applied on behalf of the forecasting group.

You must include any user who might run code that is created from a SAS Forecast Server project in a SAS session as part of the group.

Chapter 7

# Installation and Configuration Using a Planned Deployment

## Chapter Contents

# Chapter 7
# Installation and Configuration Using a Planned Deployment

## Preparation Steps

**Note:** If you are upgrading from SAS Forecast Server 1.2 to SAS Forecast Server 1.4, then DO NOT use the following instructions. To upgrade from SAS Forecast Server 1.2 to 1.4, see Chapter 5, "Upgrading from SAS Forecast Server 1.2 to SAS Forecast Server 1.4."

To prepare for a Personal or an Advanced Plan installation for the SAS Forecast Server Mid-Tier and the SAS Forecast Studio client, perform the following steps:

1. Review the SAS Intelligence Platform documentation set. The SAS Intelligence Platform documentation set introduces you to the SAS architecture and concepts, and provides you with an overview and instructions for the SAS deployment process. You can access the SAS Intelligence Platform documentation set in SAS OnlineDoc at the following Web address: `http://support.sas.com/onlinedoc/913/docMainpage.jsp`
2. Determine your deployment architecture. You can install SAS Forecast Server as a single-machine deployment or as a multiple-machine deployment. A Personal deployment uses a sample deployment plan to install and configure SAS software on a single machine. SAS provides you with the following sample plans for a single-machine deployment:

   - Forecast Server, one machine
   - Forecast Server and Enterprise Miner, one machine

   An Advanced deployment uses a sample deployment plan or a customized deployment plan made specifically for your site to install and configure SAS software on a single machine or as part of a multiple-machine deployment. SAS provides you with the following sample plans for a multiple-machine deployment:

   - Forecast Server, two machines
   - Forecast Server and Enterprise Miner, two machines

   Alternatively, you can customize your deployment plan by contacting your SAS representative. When you and your SAS representative initially plan the deployment of SAS Forecast Server, your SAS representative uses a SAS planning tool (Web application) to record your decisions about what software you need and on what hardware that software is to be installed. Subsequently, SAS sends you an e-mail message with either a set of files or a ZIP file that contains a set of files. The ZIP file contains the following files:

**Planning file (plan.xml)**
: a key file in the SAS project directory that is used throughout the rest of the deployment process to customize your installation and configuration experience. The plan.xml file serves as input to both the SAS Software Navigator and the SAS Configuration Wizard. Copy this set of files to your project directory.

**index.html**
: a file that provides high level guidance to the remainder of the deployment process. The index.html file includes a reference to a pre-installation checklist for items that you need to know during the remainder of the process. Information that you enter in the checklist is requested in later stages of the installation process. It is important that you record the information for later use as an aid in consistency and as documentation of decisions that you made.

3. Ensure that you have a valid SAS Installation Data (SID) file. You receive one or more Software Order Emails (SOE), which contain a SID file. This file contains information about the SAS products that you have licensed. The e-mails instruct you to store these files in a particular location. Place a copy of each SID file in the project directory. During your software installation, when you are prompted for a project directory in the SAS Software Navigator, enter the location of the project directory where you stored your SID file.If you need to request a SID file or have your SID file sent to you again, then contact your SAS representative.
4. Complete the pre-installation checklist as specified in Chapter 6, "Pre-installation Tasks."

# Installation and Configuration Steps

To start a personal or advanced planned installation for the SAS Forecast Studio client and SAS Forecast Server Mid-Tier, perform the following steps:

1. For each machine where you need to install software, log on to your computer and start the SAS Software Navigator from your SAS Software Depot, or from the CD that contains the navigator. The SAS Software Navigator is the entry point for you to start the installation and configuration part of the deployment process.

2. After the SAS Software Navigator starts, navigate the screens and enter the following information at the prompts:

   - preferred language
   - Advanced or Personal installation (It is highly recommended that you use an Advanced installation deployment.)
   - location of the SAS Installation Data (SID) file
   - deployment plan (See "Installation Methods")

- options, which include the following:
  - the machine on which you will be installing software
  - products you want to install on that machine
  - whether you want installation programs to run silently, if they can run in that mode.
- installation location
- preferred Help language

3. After you have navigated through the SAS Software Navigator screens, the **Review options before starting the installation process** window appears. Review the list of products that you are about to install, and click **Install**. At this point, the SAS Software Navigator switches from its information gathering mode to an installation mode. In its installation mode, the SAS Software Navigator leads you through the following tasks:

   - verification of system requirements on Windows systems

   - installation of your software. The navigator installs each product that is shown in the list of products in the order shown. In addition, the installations are chained. That is, you do not need to initiate the installation programs; after installing the first product, the navigator automatically proceeds with the installation of the next product.

     The installation of a particular product can be one of three types: a quiet installation, an interactive installation, or a nonstandard installation. For more information, see the SAS Intelligence Platform documentation set, which can be found at the following Web address: `http://support.sas.com/onlinedoc/913/docMainpage.jsp`.

     **Note:** During the SAS Forecast Studio client installation, you might be prompted for the location of the SAS Analytics Platform installation. Enter the machine name and port number for the SAS Analytics Platform.

   - configuration of your software. The last product in the SAS Software Navigator's list of products is the SAS Configuration Wizard. The SAS Configuration Wizard attempts to configure all the software the you installed. Like an interactive installation program, the SAS Configuration Wizard relies on you to supply certain information:
     - For information about entering SAS Configuration Wizard information for the SAS Intelligence Platform products, see the SAS Intelligence Platform documentation set, which can be found at the following Web address: `http://support.sas.com/onlinedoc/913/docMainpage.jsp`.
     - For information about entering SAS Configuration Wizard information for other solutions, see the solution documentation.

- For the most recent information about the post-installation tasks for SAS Forecast Server, see the post-installation tasks document, which can be found by selecting SAS Forecast Server as your product at the following Web address:
  `http://support.sas.com/documentation/onlinedoc/index.html`

**Note:** Machines on which you install only client-tier software might not require configuration. The SAS Forecast Studio client does not use the SAS Configuration Wizard for client configuration.

Chapter 8

# Alternate Installation and Configuration Using the Software Index Installation

## Chapter Contents

# Chapter 8
# Alternate Installation and Configuration Using the Software Index Installation

## Important Notes

**Note:** The following instructions do not include installation and configuration instructions for the SAS Intelligence Platform or the SAS Analytics Platform. If you do not install and configure these components, then you cannot use SAS Forecast Server.

**Note:** If you are upgrading from SAS Forecast Server 1.2 to SAS Forecast Server 1.4, then DO NOT use the following instructions. To upgrade from SAS Forecast Server 1.2 to 1.4, see Chapter 5, "Upgrading from SAS Forecast Server 1.2 to SAS Forecast Server 1.4."

**Note:** It is highly recommended that you use an Advanced or Personal planned deployment for installing and configuring SAS Forecast Server software.

## Overview

A SAS Software Index installation uses an index to select individual SAS products that you want to install and configure. The SAS Software Index installation is recommended only when you want to add a product to an existing SAS deployment. If you have not installed the SAS Intelligence Platformand SAS Analytics Platform, then you must select these components as well. If you do not install and configure these components, then you cannot use SAS Forecast Server.

When you perform a Software Index installation, you do not follow a plan; rather, you can choose to install any product from a CD-ROM that you license from SAS. In addition, you can use the SAS Configuration Wizard to configure your Software Index installation by selecting the SAS Configuration Wizard in your list of products to install.

## Start the Software Index Installation

To start the software index installation for either the SAS Forecast Studio client or the SAS Forecast Server Mid-Tier, perform the following steps:

1. Review the SAS Intelligence Platform documentation set.
   The SAS Intelligence Platform documentation set introduces you to the SAS architecture and concepts, and provides you with an overview of the SAS

Intelligence Platform deployment. You can access the SAS Intelligence Platform documentation set at the following Web address: http://support.sas.com/onlinedoc/913/docMainpage.jsp

2. Ensure that you have a valid SAS Installation Data (SID) file.

   If you need to request a SID file or have your SID file sent to you again, then contact your SAS representative.

   **Note:** Save the SID file, which was e-mailed to your site, in the project directory. During your software installation, when you are prompted for a project directory in the SAS Software Navigator, enter the location of the project directory where you stored your SID file —for example, **`c:\SAS9_Install_Projects\FSInstall`**.

3. Start the SAS Software Navigator from your SAS Software Depot or from the CD that contains the navigator. The SAS Software Navigator is the entry point for you to start the installation and configuration part of the deployment process.

   When the SAS Software Navigator starts, specify the following information at the prompts:

   - language: select the language version of the software that you want to install
   - Software Index Install
   - location of the SAS Installation Data (SID) file and SAS Project

     **Note:** If you saved the SID file in a project directory as recommended, then enter the location of the project directory where you stored your SID file.

   After you have navigated the installation screens, the Software Index folder in the left pane displays two subfolders:

   - Licensed Software folder
   - CD Index folder

4. Expand the CD Index folder. You should see a list of subfolders, each of which represents a CD in your Installation Kit.
5. Open a CD folder to display a list of the products on that CD.

   **Note:** : If you do not know which CD contains a particular product, then you might need to expand the folders. Use the names of the folders to guide your search.

6. Select the product that you want to install.

   In the right pane of the SAS Software Navigator, you see an HTML page that contains a description of the product, a link to installation instructions, and a link that starts an installation program.

7. Install the product by clicking the **Install** link for your operating system, and run the installation wizard. You can install the SAS Forecast Server Mid-Tier

on a Windows or UNIX (AIX) machine. You can install the SAS Forecast Studio client on a Windows machine only. To see the product installation instructions, click the link for the appropriate installation instructions:

- SAS Forecast Server Mid-Tier installation instructions
- SAS Forecast Studio client installation instructions

# UNIX Installation Instructions

## Before Installation

Before you install SAS Forecast Server software, you must install and configure the SAS Analytics Platform. For information about installing and configuring the SAS Analytics Platform, see the *SAS Analytics Platform User's Guide* at the following Web address:
http://support.sas.com/documentation/onlinedoc/apcore

## Install SAS Forecast Server Mid-Tier on UNIX

### *Notes*

1. The SAS Analytics Platform must be installed before you install the SAS Forecast Server Mid-Tier.
2. If you are using an X Emulator to display the InstallShield Wizard, then the GUI might not appear or behave as it should. Most notably, there might be no window manager borders. It is recommended that you use a more native X window manager, such as the Motif Window Manager.
3. If some of the default filenames and locations that are used in the InstallShield Wizard include embedded blanks, then it is suggested that you remove blanks from the filenames and directory names.
4. By default, an error log is created in the **`$userhome$/SAS/SASAPCore/logs`** directory.

### *Java Runtime Environment (JRE)*

#### SAS Private JRE

Before installing the software, the appropriate Java Runtime Environment (JRE) must be installed on your computer. The SAS Private JRE is a fully functional Java Runtime Environment provided by the JRE vendor for installation and runtime use of SAS applications requiring the JRE. For information about the required JRE and to access downloads of the JRE, see the following Web site:
http://support.sas.com/documentation/configuration/thirdpartysupport/

### SAS Private JRE Default Installation Location

The SAS Private JRE installation defaults to the locations below. It is highly recommended that you install the SAS Private JRE in the default location.

The location for JRE should be the following:

**`/usr/local/SAS_9.1/sasjre/1.4.2`**

When a Java Runtime Environment (JRE) is required, each software installation program searches the computer to locate the required JRE. The installation program searches first for the SAS Private JRE, and then searches for a Standard Public JRE if the SAS Private JRE is not detected. If the recommended version of the JRE is not located in one of the paths specified below, then the installation program requests that you enter a path to a valid JRE.

The search is performed recursively in the order specified below:

| | |
|---|---|
| **SAS Private JRE** | **`/usr/local/SAS_9.1/sasjre/1.4.2`** |
| **Standard Public JRE** | **`/usr/java`** |

**WARNING:** SAS highly recommends that you run your SAS software by using the Java Runtime Environment version required for the software. The following procedure allows you to bypass this requirement, and should only be used in special circumstances and at your own risk. SAS does not provide support for an alternate JRE version that has not been tested fully by SAS.

If the correct Java version cannot be found, then the installation program asks you to specify the path to the JRE, or if you want to install it. If at any time the installation program finds a Java version that matches the SAS recommended version of Java, then the installation program uses that version and does not allow you to go back and change it. You have to exit and start the installation over in order to use a different Java version.

## *Install the SAS Forecast Server Mid-Tier*

The SAS Forecast Server Mid-Tier installs as an application within the SAS Analytics Platform.

1. Run the setup shell script.
2. Choose your preferred language and click **OK**.
3. In the Welcome window, click **Next**.
4. In the SAS Analytics Platform Location window, if you installed the SAS Analytics Platform in the default location, then click **Next**. If you installed the SAS Analytics Platform in a different location, then specify the location of the SAS Analytics Platform and click **Next**.

5. In the SAS Forecast Server Mid-Tier Location window, click **Next** to begin the installation. The SAS Forecast Server Mid-Tier must be installed in the same location as the SAS Analytics Platform.
6. After you install the SAS Forecast Server Mid-Tier successfully, click **Finish** to exit the InstallShield Wizard.

### *Start the SAS Forecast Server Mid-Tier*

The SAS Forecast Server Mid-Tier is started automatically when you start the SAS Analytics Platform.

Start the SAS Analytics Platform Server by performing the following steps:

1. Navigate to the path **`!SASROOT/SASAPCore/bin`**
2. Run the apserver program with the following command:

   ```
   apserver start
   ```

   **Note:** Depending on how the SAS Analytics Platform is configured, you might be prompted for logon information when the SAS Analytics Platform runs for the first time. You should log on as the SAS Administrator (e.g., sasadm) who has administrative privileges so that the SAS Analytics Platform has full access to the metadata server. It is recommended that you check **Remember this password**.

There is no indication that the SAS Analytics Platform is running. Remember that the SAS Forecast Server Mid-Tier is installed as an application within the SAS Analytics Platform. Therefore, when the SAS Analytics Platform starts, the SAS Forecast Server Mid-Tier starts, too.

For information about configuring the SAS Analytics Platform as a background process, see Chapter 9, “Post-installation Tasks.”

## The SAS Forecast Studio Client on UNIX

The SAS Forecast Studio client is not supported on UNIX. For information about installing the SAS Forecast Studio client on a Windows operating system, see “Install the SAS Forecast Studio Client on Windows.”

# Windows Installation Instructions

## Before Installation

Before you install SAS Forecast Server software, you must install and configure the SAS Analytics Platform. For information about installing and configuring the SAS Analytics Platform, see the *SAS Analytics Platform User’s Guide* at the following Web address:
`http://support.sas.com/documentation/onlinedoc/apcore`

## Install the SAS Forecast Server Mid-Tier on Windows

### *Java Runtime Environment (JRE)*

The InstallShield Wizard guides you through the installation process. You must have a Java Runtime Environment (JRE) installed. First the installation program searches for the SAS Private JRE, and then searches for a Standard Public JRE if the SAS Private JRE is not detected. If the recommended version of Java is not located in one of the paths specified below, then the installation program asks you to enter a path to a valid JRE.

The installation program searches for a valid JRE in the following locations and order:

- Windows Registry Key
  - **HKEY_ LOCAL_MACHINE\SOFTWARE\SAS Institute Inc.\SAS JRE\1.4.2**
- SAS Private JRE
  - **<rootdrive> \Program Files\SAS**
  - **< rootdrive> \Program Files\SAS Institute**
  - **< rootdrive> \Program Files\Java**
  - **< rootdrive> \Program Files\JavaSoft**
- Standard Public JRE
  - **< rootdrive> \Program Files\Java**
  - **< rootdrive> \Program Files\JavaSoft**
  - **C:\j2re1.4.2**
  - **C:\j2sdk1.4.2**
  - **C:\jre1.4.2**
  - **C:\jdk1.4.2**
  - **C:\java1.4.2**
  - **C:\java**
- User Specified JRE
  - **<location-specified-by-user>**

**WARNING:** It is highly recommended that you run your SAS software by using the Java Runtime version required for the software. The following procedure allows you to bypass this requirement, and should only be used in special circumstances and at your own risk. SAS does not provide support for an alternate JRE version that has not been subjected to full testing by SAS.

If the correct Java version cannot be found, then the installation program asks you if you want to specify the path to the JRE or if you want to install it. If at any time the installation program finds a Java version that matches the SAS recommended version of Java, then the installation program uses that version and does not allow you to go back and change it. You have to exit and start the installation over in order to use a different Java version.

### Install SAS Forecast Server Mid-Tier

To install the SAS Forecast Server Mid-Tier, perform the following steps:

1. Run the installation program.
2. Choose your language, and click **OK**.
3. In the Welcome window, click **Next**.
4. In the SAS Analytics Platform Location window, if you installed the SAS Analytics Platform in the default location, then click **Next**. If you installed the SAS Analytics Platform in a different location, then specify the location of the SAS Analytics Platform and click **Next**.
5. In the SAS Forecast Server Mid-Tier Location window, click **Next** to begin the installation. The SAS Forecast Server Mid-Tier must be installed in the same location as the SAS Analytics Platform.
6. After you install the SAS Forecast Server Mid-Tier successfully, click **Finish** to exit the InstallShield Wizard.

### Start the SAS Forecast Server Mid-Tier

The SAS Analytics Platform can run as a service. For information about configuring the SAS Analytics Platform as a service, see Chapter 9, "Post-installation Tasks." . The SAS Forecast Server Mid-Tier is then started automatically when you start the SAS Analytics Platform.

## Install the SAS Forecast Studio Client on Windows

### Java Runtime Environment (JRE)

The InstallShield Wizard guides you through the installation process. You must have a Java Runtime Environment (JRE) installed. First the installation program searches for the SAS Private JRE, and then searches for a Standard Public JRE if the SAS Private JRE is not detected. If the recommended version of Java is not located in one of the paths specified below, then the installation program asks you to enter a path to a valid JRE.

The installation program searches for a valid JRE in the following locations and order:

- Windows Registry Key
  - **HKEY_ LOCAL_MACHINE\SOFTWARE\SAS Institute Inc.\SAS JRE\1.4.2**
- SAS Private JRE
  - **<rootdrive> \Program Files\SAS**
  - **< rootdrive> \Program Files\SAS Institute**
  - **< rootdrive> \Program Files\Java**
  - **< rootdrive> \Program Files\JavaSoft**

- Standard Public JRE
  - **< rootdrive> \Program Files\Java**
  - **< rootdrive> \Program Files\JavaSoft**
  - **C:\j2re1.4.2**
  - **C:\j2sdk1.4.2**
  - **C:\jre1.4.2**
  - **C:\jdk1.4.2**
  - **C:\java1.4.2**
  - **C:\java**
- User Specified JRE
  - **<location specified by user>**

**WARNING:** It is highly recommended that you run your SAS software by using the Java Runtime Environment version required for the software. The following procedure allows you to bypass this requirement, and should only be used in special circumstances, and at your own risk. SAS does not provide support for an alternate JRE version that has not been subjected to full testing by SAS.

If the correct Java version cannot be found, then the installation program asks you if you want to specify the path to the JRE or if you want to install it. If at any time the installation program finds a Java version that matches the SAS recommended version of Java, then the installation program uses that version and does not allow you to go back and change it. You have to exit and start the installation over in order to use a different Java version.

### *Install SAS Forecast Studio Client*

You must have JRE 1.4.2_09 installed on the client machine. You need to either install the required JRE version or configure Web Start to use the required version.

The JRE 1.4.2_09 is used as the Web Start run-time version, which does not need to be the same version as Web Start itself. You can use J2SE 5.0 for Web Start and launch the SAS Forecast Studio client by using the SAS Private JRE 1.4.2_09. If you use different JRE versions, then Web Start must be configured to include the JRE 1.4.2_09 version. This can be done by using the **Preferences** menu option in the Java Web Start Application Manager.

There is no automatic installation available for JRE 1.4.2_09 from Sun. You must first install a JRE version that contains Web Start. This prevents you from using the SAS Private JRE, because it does not contain Web Start. It is recommended that you install either JRE 1.4.2_09 from Sun or the latest JRE available from Sun at the following Web address:
http://java.sun.com/products/archive/j2se/1.4.2_09/index.html

To install the SAS Forecast Studio client perform the following steps:

1. Start the installation program.
2. Choose your preferred language and click **OK**.
3. In the Welcome window, click **Next**.
4. Install the SAS Forecast Studio client in the default location and click **Next**.
5. In the SAS Forecast Studio Location window, click **Next**.
6. After you install the SAS Forecast Studio client successfully, click **Finish**.

## Start the SAS Forecast Studio Client

For information about how to start the SAS Forecast Studio client, see Chapter 11, “Start the SAS Forecast Studio Client.” .

# Chapter 9
# Post-installation Tasks

## Chapter Contents

# Chapter 9
# Post-installation Tasks

## Post-installation Tasks Checklist

There are tasks that you must perform manually after you successfully install your SAS Forecast Server software and after you complete the SAS Configuration Wizard tasks. Table 9.1 is a tool that you can use to keep track of your progress. You can print this checklist and add check marks in the Done column after you complete each task.

**Table 9.1.** Post-installation Tasks Checklist

| Step | Tier | Task | Done |
|---|---|---|---|
| **Before You Begin** | | | |
| 1 | | Review most current documentation. | [ ] |
| 2 | Server tier | Install current hot fixes. | [ ] |
| **UNIX Operating Environments** | | | |
| 1 | Server tier | Define a user group and permissions to access metadata. | [ ] |
| 2 | Middle tier | Configure the SAS Analytics Platform to run as a background process. | [ ] |
| 3 | | Complete the post-installation tasks for all environments. | [ ] |
| **All Operating Environments** | | | |
| 1 | Server tier | Pre-assign libraries in SAS Management Console. | [ ] |
| 2 | Server tier | Configure a server for SAS Add-In for Microsoft Office functionality. | [ ] |
| 3 | Middle tier | Create the file directory. | [ ] |
| 4 | Middle tier | Import the default set of stored processes. | [ ] |
| 5 | Middle tier | Configure the stored process service. | [ ] |
| 6 | Middle tier | Enable the Search for Servers functionality (optional). | [ ] |
| **Windows Operating Environment** | | | |
| 1 | | Complete the post-installation tasks for all environments. | [ ] |
| 2 | Server tier | Set file system permissions. | [ ] |
| 3 | Middle tier | Configure the SAS Analytics Platform as a Windows service. | [ ] |

# Before You Begin

## Most Current Documentation

For the most current installation and configuration information, see the following Web site and select SAS Forecast Server as your product:
http://support.sas.com/documentation/onlinedoc/index.html

## Server Tier

### *Install Current Hot Fixes*

You must install the current hot fixes for SAS 9.1.3 on the machine that is running the SAS Workspace Server (server tier). You must install the hot fixes on the server tier before you start the SAS Forecast Server post-installation tasks.

The required hot fixes can be downloaded from the following Web address:
http://ftp.sas.com/techsup/download/hotfix/e9_sbcs_home.html

1. Select **Sorted by SAS Product** and then **Base SAS** or **SAS Integration Technologies**.
2. To search for SAS Forecast Server hot fixes, select **Hot Fixes for Additional SAS Products and Solutions** and scroll to **Forecast Server 1.4**. If no hot fixes exist, then you will not see a Forecast Server 1.4 selection. Do NOT install any previous versions of SAS Forecast Server hot fixes. These hot fixes already exist in SAS Forecast Server 1.4 software.

**CAUTION:** At the minimum, you must install the following system hot fixes in order for the system to function:

- E9BA16 (Base SAS)
- E9BA20 (Base SAS)
- E9BA26 (Base SAS)
- E9BA27 (Base SAS)
- E9BB05 (Base SAS —Windows only)
- E9IH01 (SAS Integration Technologies)

**CAUTION:** Service Pack 4 for SAS 9.1.3 and the hot fixes for Service Pack 4 are required in order for SAS Forecast Server to function correctly.

In order to receive Problem Alert Notices or Problem Correction Notices (hot fix notifications) when they are made available, you can subscribe to the TSNEWS-L mailing list. To subscribe, send e-mail to LISTSERV@VM.SAS.COM. The body of the e-mail should read SUBSCRIBE TSNEWS-L. To subscribe through the SAS Technical Support Web site, complete the Web form located at:
http://support.sas.com/techsup/news/tsnews.html.

# UNIX Administration Tasks

## Server Tier

### *Define a User Group and Permissions to Access Metadata*

Different users have different operating system privileges when using the SAS Workspace Server. By defining operating system user groups, you can grant host permissions to all of the SAS Forecast Server users as members of the same group. For SAS Forecast Server, there is a central physical repository of workspace server project files (forecast-studio-project-directory) that must be accessible to the SAS Workspace Server.

For a more secure deployment, you can create a SAS Forecast Server user group, and ensure that the group contains all of the SAS Forecast Server users. You must include any user who might run code that is created from a SAS Forecast Server project in a SAS session as part of the group. Also, the group should be the primary group. For more information about SAS Intelligence Platform security, see the SAS Intelligence Platform documentation set at the following Web site:
`http://support.sas.com/onlinedoc/913/docMainpage.jsp`

If you already created a SAS Forecast Server user group as a pre-installation task, then you can grant the same permissions to everyone in the user group. Later when you create the SAS Forecast Server directories, you must grant Write permission on the SAS Forecast Server directory on all machines where you installed SAS Forecast Server. Be sure to verify that SAS Forecast Server users have Read, Write, and Execute permissions on the SAS Forecast Server file directory. The exact details of how to do this varies according to which operating system groups are defined and how restrictive you want your security to be.

The following method is one suggestion. This method might not be applicable to your situation. Typically, you can create an operating system group for SAS Forecast Server users. The following examples might require changes as per your server configurations. In particular, these examples could result in changed permissions on other SAS files, such as OLAP cubes. For example, if you are working with multiple UNIX groups and have a SAS OLAP Server, you must ensure that the account under which the SAS OLAP Server runs still has read and execute permissions to OLAP files.

You can grant permissions to the SAS Forecast Server users by specifying the umask option on a conditional basis if the user is part of the SAS Forecast Server user group.

1. Set the umask option in the following shell scripts only if the user is a member of the SAS Forecast Server user group:
   - sas.sh
     (located in the **`!SASROOT/`**<*your-configuration-directory*>**`/Lev1/SASMain`** path)
   - sas_SPS.sh
     (located in the **`!SASROOT/`**<*your-configuration-directory*>**`/Lev1/SASMain/StoredProcessServer`** path)

2. A umask setting of 007 is recommended.

On a UNIX operating environment, several lines that are shown in the following script need to be updated based on your machine-specific information.

```
CMD=<your-operating-system-path>
CURR_GID=eval $CMD -g
GID=<solution-group-id>
if [$CURR_GID -eq $GID]; then umask 007 fi
```

1. CMD=<*your-operating-system-path*>
   Replace the CMD= command with the full path on your server where the ID command is stored. This information can be obtained by typing a **`which id`** or **`whence id`** command on your console.
2. GID=<*solution-group-id*>
   Replace the GID variable setting with your group ID. You can type **`id`** on your console in order to get the GID and UID information.

By using the preceding example values, the resulting command lines look like the following for each of the platforms on which you can install SAS Forecast Server:

- AIX:
  ```
  CMD=/usr/bin/id
  CURR_GID=eval $CMD -g
  GID=201
  if [$CURR_GID -eq $GID]; then umask 007
  fi
  ```
- H64 (HP-Risc):

  ```
  CMD=/usr/bin/id
  CURR_GID=eval $CMD -g
  GID=201
  if [ $CURR_GID -eq $GID ] ; then umask 007
  fi
  ```
- H64I (HP-Itanium):
  ```
  CMD=/usr/bin/id
  CURR_GID=eval $CMD -g
  GID=201
  if [ $CURR_GID -eq $GID ] ; then umask 007
  fi
  ```
- S64 (Solaris):
  **Note:** The following code uses grave accents and not quotation marks.

```
CMD=/usr/xpg4/bin/id
CURR_GID=`$CMD -g`
GID=201
if [ $CURR_GID -eq $GID ] ; then umask 007
fi
```

## Middle Tier

### *Configure the SAS Analytics Platform to Run as a Background Process*

By default, the SAS Analytics Platform server terminates when the X Window session that starts the server is closed. In order for the SAS Analytics Platform server to continue to run after the X Window session is closed, perform the following steps:

1. If the SAS Object Spawner is not running, then start the SAS Object Spawner, which starts the SAS Metadata Server and SAS Workspace Server.
2. If other SAS products that you licensed include a Web tier with Remote Services, then start the Remote Services.
3. Run the SAS Analytics Platform Configuration Wizard by submitting the command **`./apserver config`**. Use the sasadm user account and be sure to check the box **Remember password** in order to store your credentials. If you do not store your credentials, then you cannot run the SAS Analytics Platform as a background process.
4. Accept all the default values and settings. For more information about the SAS Analytics Platform, see *SAS Analytics Platform User's Guide* at the following Web address:
   http://support.sas.com/documentation/onlinedoc/apcore

   **Note:** The apserver script is typically found in the following location:
   !SASROOT/SASAPCore/bin
5. Edit the apserver script by adding the **`nohup`** command to the beginning of the Java command. Add an ampersand (**&**) at the end of the Java command as shown in the following example:

   **Note:** The values shown in these examples may differ slightly from the values in the script at your site.
   Original command:

```
# was $JAVACMD
/SAS_9.1/sasjre/1.4.2/bin/java $CLOPTS
-Djava.rmi.server.hostname=10.16.150.72 -Dap.home="${AP_HOME}"
$OPTIONS com.sas.apps.session.server.Main"$@"
```

   Revised command:

```
 # was $JAVACMD
nohup /SAS_9.1/sasjre/1.4.2/bin/java $CLOPTS
 -Djava.rmi.server.hostname=10.16.150.72 -Dap.home="${AP_HOME}"
 $OPTIONS com.sas.apps.session.server.Main"$@" &
```

6. Stop and restart the SAS Analytics Platform platform server by submitting the following commands:

   ```
   ./apserver stop
   ./apserver start
   ```

   After the SAS Analytics Platform server is restarted, the server remains active even when the X Window session closes.

## Complete the Post-installation Tasks for All Operating Environments

After you compete the post-installation tasks for the UNIX operating environment, you must complete the post-installation tasks for all operating environments. For information about these post-installation tasks, see "All Operating Systems Administration Tasks."

# All Operating Systems Administration Tasks

## Server Tier

### *Pre-assign Libraries in SAS Management Console*

To use your SAS data sets with SAS Forecast Server, you must enable SAS Forecast Server to access the SAS data sets that contain appropriate input data. To enable SAS Forecast Server to access the input data sets, you must define a SAS library that specifies the data set location. All data sets that exist in selected libraries are displayed. Therefore, to enable SAS Forecast Server to access your data, you must create the following:

- an input SAS data set that contains the appropriate time series data.
- a SAS library that specifies the SAS libref, engine, and path of the input data set

To create an input data set and user-defined library, perform the following steps:

1. Create a SAS data set.
   To enable SAS Forecast Server to read a SAS data set, you can create a SAS program that reads your raw data into a SAS data set.

2. Define the library for the SAS Forecast Server input data set.
   To enable SAS Forecast Server to read the input data set, use SAS Management Console to define a library that specifies the SAS libref, engine, and path of the input data set.

   Use the **Data Library Manager** plug-in of SAS Management Console to define a library that is pre-assigned to a server or servers, and specify the location of the input data set. To specify a library as pre-assigned for a server or servers, perform the following steps:

   (a) Open SAS Management Console as the SAS Administrator (e.g., sasadm), and connect to a metadata repository.
   (b) Expand the **Data Library Manager** node, and select **SAS Libraries**.
   (c) Right-click the library that you want to pre-assign, and select **Properties**.
   (d) Select the **Options** tab.
   (e) Click **Advanced Options**.
   (f) Select the **Library is Pre-Assigned** checkbox. This window is accessible from the Library Options window of the New Library Wizard when you create a new data library.
   (g) Ensure that the library is assigned to the correct SAS server(s). The selected library is assigned whenever one of the selected servers starts.
   (h) Click **OK**.

3. Add the METAAUTOINIT option to the server definitions. You need to add the METAAUTOINIT option only once in order to retrieve any pre-assigned library definitions.

   When a SAS Workspace Server starts and the METAAUTOINIT option is specified, the SAS Workspace Server connects to the SAS Metadata Server to retrieve any pre-assigned library definitions. The SAS Workspace Servers that are used by SAS Forecast Server require the METAAUTOINIT option in order to retrieve pre-assigned library definitions from the SAS Metadata Server.

   To add the METAAUTOINIT option to a workspace server definition that is used by SAS Forecast Server, perform the following steps:

   (a) In SAS Management Console, expand the **Server Manager** node. Fully expand all three levels of **SASMain** and any other logical servers that you defined.
   (b) Select a server that is used by SAS Forecast Server
   (e.g., SASMain - Workspace Server, or any other workspace servers that you defined).
   (c) Right-click, and select **Properties**.
   (d) Select the **Options** tab.
   (e) In the **Object Server Parameters** field, enter METAAUTOINIT as shown in Figure 9.1, and click **OK**.
   (f) Repeat the preceding steps for all workspace servers that SAS Forecast Server uses.

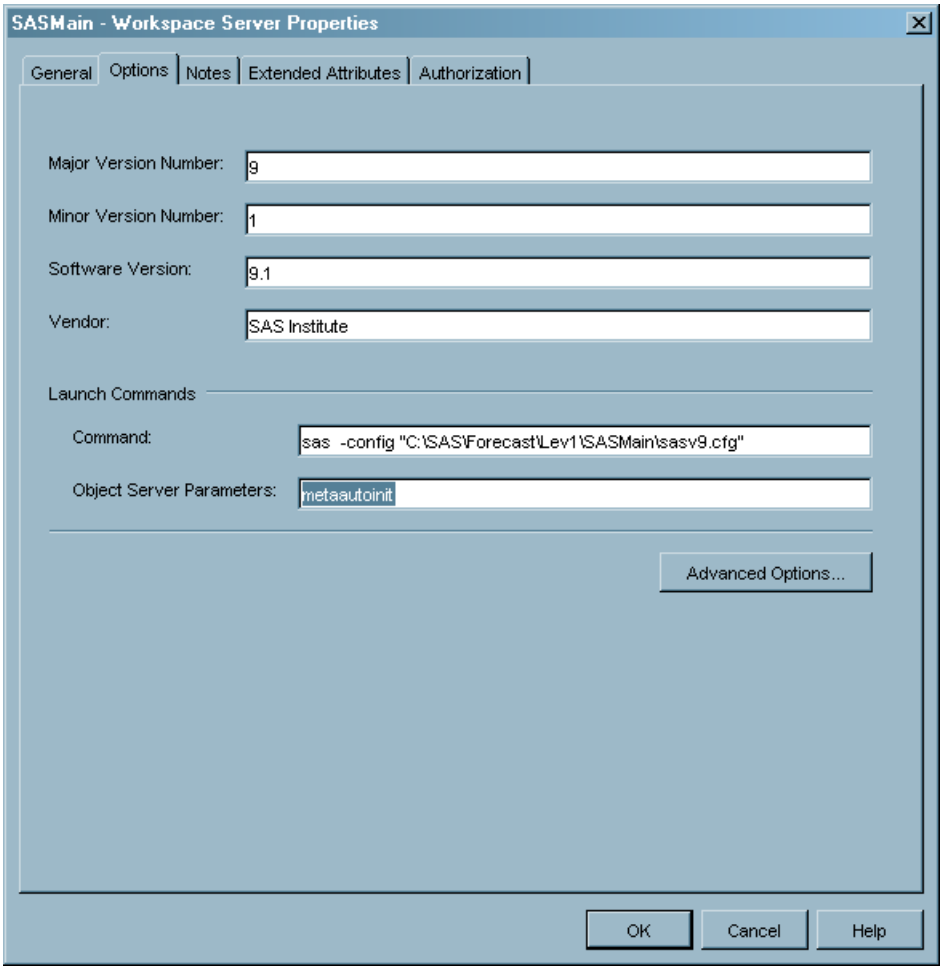


**Figure 9.1.** METAAUTOINIT Option in a Workspace Server Definition

4. Create the metadata identity for the SAS Forecast Server administrative user (e.g., fsadm). To create the necessary account, metadata identity, and group membership assignments, complete the following steps:

   (a) Log on to SAS Management Console by opening a metadata profile with your administrative user account (or with the unrestricted user account).Access the foundation repository. You should create all of your user and group definitions in a single foundation metadata repository.

   (b) In the navigation panel of SAS Management Console, select **User Manager**.

   (c) Open the **New User properties** dialog box by selecting this path from the menu bar:
   **Actions**→ **New**→ **User**

   (d) On the **General** tab, enter the user's name in the **Name** field. The other fields on this tab are optional.

(e) On the **Logins** tab, add a login that the metadata server can use to determine the SAS Forecast Server administrative user's metadata identity. This login must contain the fully qualified form of the user ID for the primary account that you created for the SAS Forecast Server administrative user.

(f) On the **Groups** tab, define the user's group memberships. Each user can belong to multiple groups.

(g) Click **OK** to save and close the user definition.

**Note:** By default, only administrative users, unrestricted users, and the user who is represented by a particular user definition can make changes to that user definition.

5. Set the metadata permissions on the libraries for the administrator.

(a) In SAS Management Console, expand the **Data Library Manager** node, and select **SAS Libraries**.

(b) Right-click on the library that you want to grant permissions, and select **Properties**.

(c) Select the **Authorization** tab.

(d) Select the SAS Forecast Server administrative user (e.g., fsadm) and grant permissions to the administrative user by checking the **Grant** boxes. All the libraries that you want to use with SAS Forecast Server must have Read and ReadMetadata permissions granted.

6. Set the metadata permissions on the libraries for users.
**Note:** For a more secure deployment, you can create a SAS Forecast Server group. For information about creating a group, see "Secure Access to SAS Forecast Server."

(a) In SAS Management Console, expand the **Data Library Manager** node, and select **SAS Libraries**.

(b) Right-click on the library to which you want to grant permissions, and select **Properties**.

(c) Click the **Authorization** tab.

(d) If the user does not exist in the list when you open the Authorization tab, then perform the following the steps:

i. Click **Add**.

ii. Select the user from the Available Identities list in the left pane, and move the user to the Selected Identities list in the right pane by clicking the right arrow.

iii. Click **OK**.

(e) Select the list of user IDs, and grant permissions to the users by selecting the **Grant** boxes. All the libraries that you want to use with SAS Forecast Server must have Read and ReadMetadata permissions granted. For all users that you want to have access at the data library level, grant Read and ReadMetadata permissions.

7. Restart the SAS Object Spawner.

## *Configure SAS Forecast Server and SAS Add-In for Microsoft Office*

In order to use the SAS Add-in for Microsoft and SAS Enterprise Guide with SAS Forecast Server, you must use the SAS Analytics Platform that provides an embedded Web server. By default, the SAS Analytics Platform is shipped and configured with an embedded Web server.

In order for the SAS Add-In for Microsoft Office functionality to work, you must configure a server in the SAS metadata server by using SAS Management Console. To configure a server, perform the following steps:

1. Open SAS Management Console as the SAS Administrator (e.g., sasadm) and connect to a metadata repository.
2. Right-click on **Server Manager** and select **New Server**.
3. Select the Http Server template and click **Next**.
4. Select **HPF** as the name and click **Next**.
5. Add a new base path by clicking **New**.
6. Type a forward slash (**/**) in the **Base Path** field, and click **OK**.
7. Click **Next**.
8. Provide the host name of the SAS Analytics Platform and port number of the embedded Web server. The default port is 6098 unless you changed it in the SAS Analytics Platform configuration. Click **Next**.
9. Click **Finish**.

## Middle Tier

### Create the SAS Forecast Server File Directory

1. Create a `Forecast Studio` directory and `Projects` folder in the BI Manager by performing the following steps:

   (a) In SAS Management Console, right-click on the **BI Manager** and select **New Folder**.
   (b) Enter `Forecast Studio` as the name of the folder and click **Next**.
   (c) Select **No content mapping** and click **Finish**.
   (d) Right-click on the **Forecast Studio** folder and select **New Folder**.
   (e) Enter `Projects` as the name of the new folder and click **Finish**.

2. If you have not created a SAS Forecast Server administrative user metadata identity, then you must create a SAS Forecast Server administrative user metadata identity or grant administrative permissions to an existing user in the metadata.

   **CAUTION:** Do NOT use the SAS Administrator (e.g., sasadm) account as the SAS Forecast Server Administrator (e.g., fsadm) account.

3. Grant folder privileges to the SAS Forecast Server administrative user.

   (a) Start SAS Management Console by logging on with the SAS administrator account (e.g., sasadm).
   (b) Expand BI Manager.
   (c) Expand the `Forecast Studio` folder.
   (d) Right-click on the **Projects** folder and select **Properties**.
   (e) Select the **Authorization** tab and click **Add**.
   (f) Move the SAS Forecast Server administrator account (fsadm) to the right hand pane by selecting the administrator account in the left pane and click the single arrow icon between the two panes. Click **OK**.
   (g) With the SAS Forecast Server administrator's account selected in the upper pane, click to select all available check boxes under the Grant heading in the lower pane. Click **OK**.

4. If the SAS Analytics Platform is not started already, then start the SAS Analytics Platform by performing the following steps:
   **Note:** If you installed the SAS Metadata Server on a different machine from the one where you installed the middle tier, then you must change the server information by reconfiguring the SAS Analytics Platform. For information about configuring the SAS Analytics Platform, see the *SAS Analytics Platform Administrator's Guide* at the following Web address:
   http://support.sas.com/documentation/onlinedoc/

**Windows operating environment**:

(a) Navigate a shortcut that is created to where the SAS Analytics Platform is installed:
Start→ Programs→ SAS→ SAS Analytics Platform→ Start AP Server

(b) If you are prompted for the user name and server location, then specify the following values:
**User name:** sasadm (SAS Administrative account) and click **Remember my password**.

**Server:** The server is the name of the server where the SAS Analytics Platform is running.

(c) Click **LogOn** to start the SAS Analytics Platform.

**UNIX operating environment:**

(a) Navigate to the installation directory of the SAS Analytics Platform (e.g., !SASROOT/SASAPCore/bin)

(b) Run the command **`./apserver start`**. The server is ready to receive clients when the message "Waiting for clients" appears at the bottom of the screen.
**Note:** If you are running the SAS Analytics Platform as a background process, then you do not see this message.

(c) If you chose not to persist the user credentials needed to start the server, then you are prompted for a user ID and password. Specify the SAS Administrator user ID (e.g., sasadm) and password. However, for this to work you need an X display session.

5. Run the SAS Forecast Server setup file, which executes the SAS Forecast Server administrative setup. This process must be executed on the physical machine that is running the SAS Analytics Platform. However, the script creates a directory structure on the server that contains your SAS Workspace Server, and metadata structures are modified to point to it. By default, the location of the SAS Forecast Server (*forecast-studio-project*) directory is the following:
**UNIX:** <*config-dir*>/SAS/ForecastStudio
**Windows:** c:\SAS\ForecastStudio

   The SAS Forecast Server administrative user's credentials must be used when running this script, so that the physical path on the SAS Workspace Server machine is created by the SAS Forecast Server administrative user (e.g., fsadm). If the folders are not created by the SAS Forecast Server administrative user, then an error is displayed. You can specify a different default location of the forecast-studio-project directory when you run the SAS Forecast Server setup file.

   **Note:** If you change the project location after you created projects in SAS Forecast Server, then using the ForecastStudioSetup script to change the project location only changes the location for new projects. All of your existing

projects still reference the original location because this physical location is stored in metadata with the project information, as well as in the project.xml file found in the project directory.

**Windows:** Run the ForecastStudioSetup.bat script that is located in the following directory:
**!SASROOT\SASAPCore\apps\Forecasting\bin**

**Note:** If you want to change the file location, then specify a new directory pathname when you execute the ForecastStudioSetup.bat file with the following option:
ForecastStudioSetup.bat "location=<new-directory-pathname>ForecastStudio"

Example:

```
ForecastStudioSetup.bat "location=D:\myprojects\ForecastStudio"
```

**UNIX:** Run the ForecastStudioSetup.sh script that is located in the following directory:
**!SASROOT/SASAPCore/apps/Forecasting/bin**

**Note:** If you want to change the file location, then specify a new directory pathname when you execute the ForecastStudioSetup.sh script with the following option:
ForecastStudioSetup.sh "location=<new-directory-pathname>/ForecastStudio"

Example:

```
ForecastStudioSetup.sh "location=/myprojects/ForecastStudio"
```

A logon dialog box appears. Log on as the SAS Forecast Server administrative user (e.g., fsadm) to the server where you installed the SAS Analytics Platform.If you specify the server, then use the form hostname:port.

### *Import the Default Set of SAS Forecast Server Stored Processes*

You can write SAS Stored Processes in order to extend the functionality of SAS Forecast Server. The solution ships with a default set of stored processes that provide report programs, or you can use the default set of stored processes as illustrations of how to use stored processes with SAS Forecast Server.

**Tip:** Before you modify any of the stored processes that SAS provides, it is recommended that you make a copy of the stored process and make your changes to the copied version of the stored process. You can save your changes to the stored process by saving the stored process with a new name. If you make changes to the original version of the stored process that SAS provides without saving the stored process with a new name, and you want to restore the stored process back to the original version, then you can import the stored process from the solution CD that contains the SAS Forecast Server stored processes.

**Note:** If the SAS Forecast Server Mid-Tier and server tier are installed on two different machines, then you need to copy the StoreProcesses.spk

file to the server tier and then import the stored processes by using BI Manager. The default location of the StoreProcesses.spk file is **`!SASROOT\SASAPCore\apps\Forecasting\samples\StoredProcess.spk`**

You import the default set of SAS Forecast Server stored processes by performing the following steps:

After the default directory structure for the SAS Forecast Server stored processes is created, you can import the stored processes by using the BI Manager. The BI Manager is part of SAS Management Console. The default SAS Forecast Server stored processes are provided in a SAS Package file with an extension of .spk, which is created when the SAS Forecast Server Mid-Tier is installed.

1. Start SAS Management Console on the server host and connect to a metadata repository as the SAS Forecast Server Administrator (e.g., fsadm).

   **CAUTION:** If you have a SAS Management Console session open from a preceding task, then close SAS Management Console and open a new session. You must be logged on to SAS Management Console as the SAS Forecast Server Administrator (e.g., fsadm).

2. Expand the BI Manager as shown in Figure 9.2.

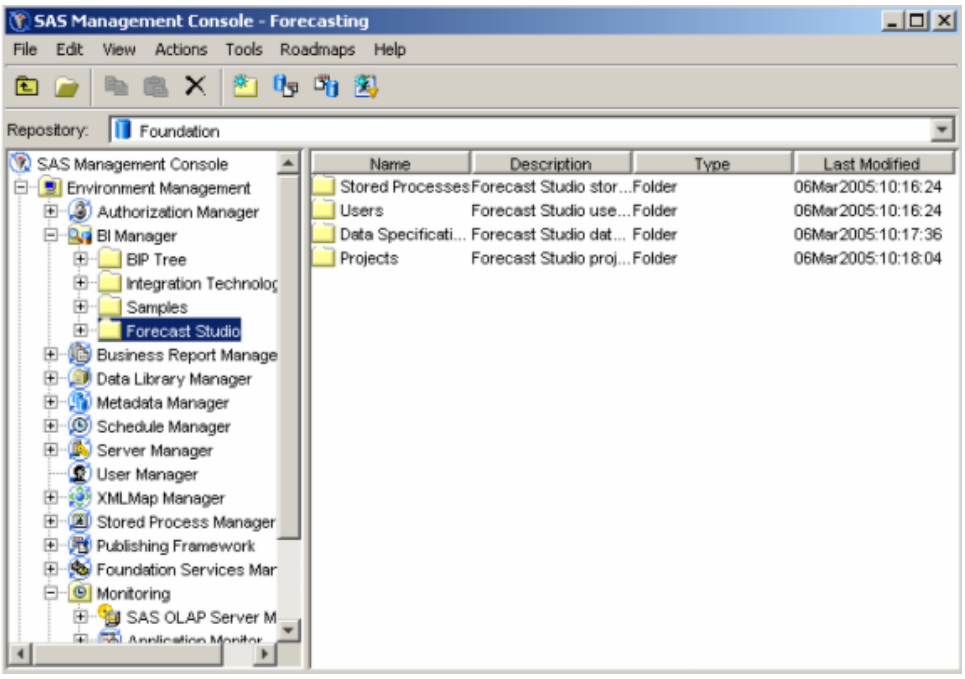


**Figure 9.2.** BI Manager

3. Right-click the **Forecast Studio** folder, and select **Import**.

4. Browse to the Forecast Server Mid-Tier installation directory to import the StoredProcesses.spk file:
   **`!SASROOT\SASAPCore\apps\Forecasting\samples\StoredProcesses.spk`**

   **Note:** Because the SAS Forecast Server Mid-Tier is installed as a SAS Analytics Platform application, it is located under the **`SASAPCore`** directory.
5. Select **All Objects** as the Import Options and click **Next**.
6. Click **Next** to confirm the selected objects.
7. Click **Next** to select the application server and source code repository.
8. Select the appropriate server and click **Next**. Typically, the server is SASMain. The window where you specify the application servers appears as shown in Figure 9.3.

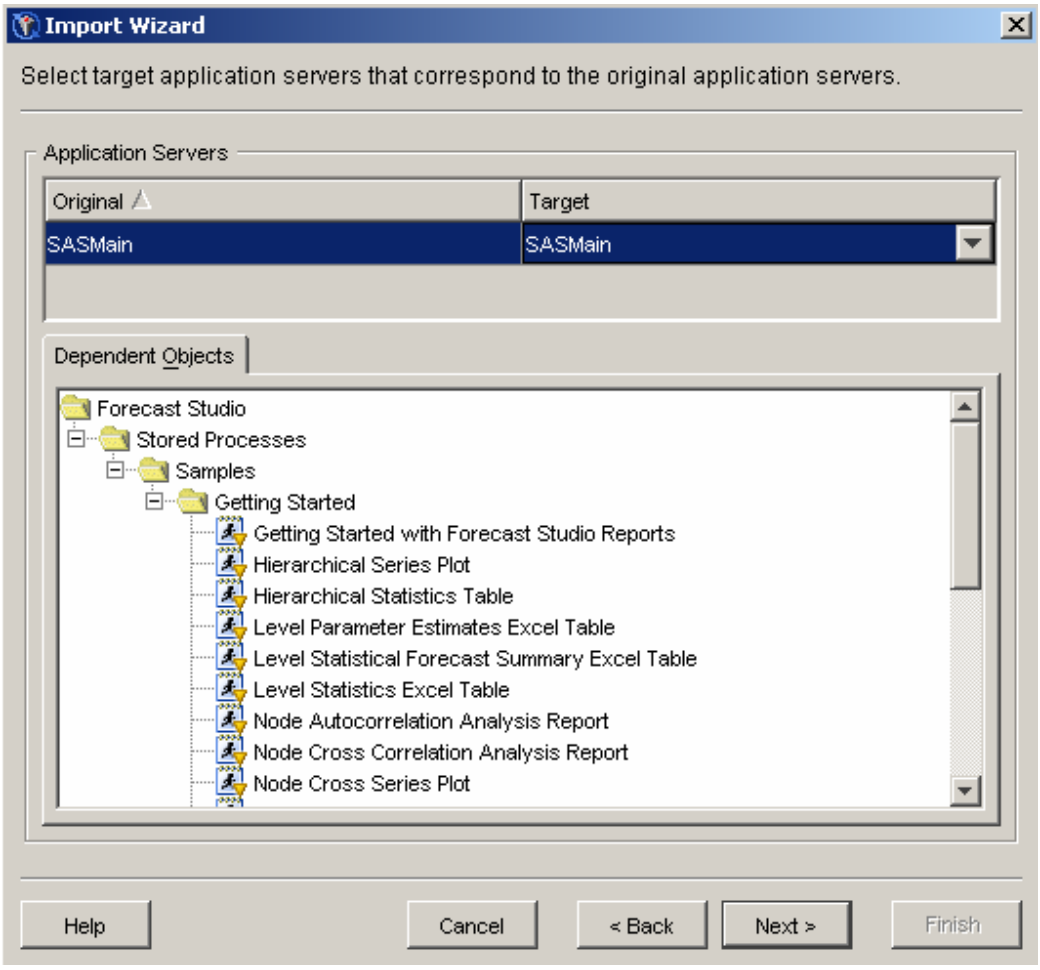


**Figure 9.3.** Import Wizard: Original and Target Application Servers

9. Keep the default value in the **Original Path** field. When the stored process directory structure was created in the previous post-installation task, a new

source code repository was created as well. Select this entry to specify the target path where you want the stored processes to be imported. This location is the path that you specified above. Click **Next**.

Figure 9.4 shows the window where you specify the target path for the new source code repository.

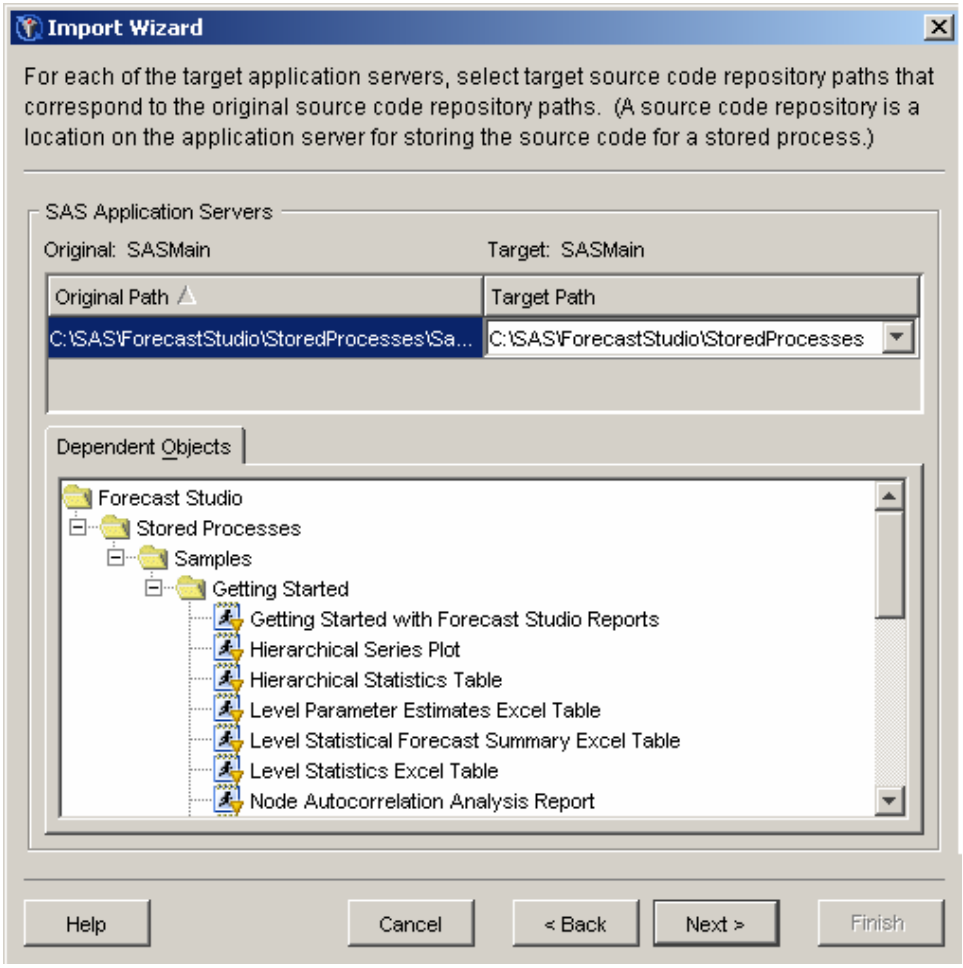


**Figure 9.4.** Import Wizard: Target Source Code Repository Paths

10. Click **Import** at the information step.
    **Note:** You might need to re-authenticate to the metadata server by logging on again. Use the SAS Forecast Server administrative user account (e.g., fsadmin).
11. As the BI Manager imports the sample stored processes from the SAS Package file, you see a progress dialog box similar to the one in Figure 9.5.

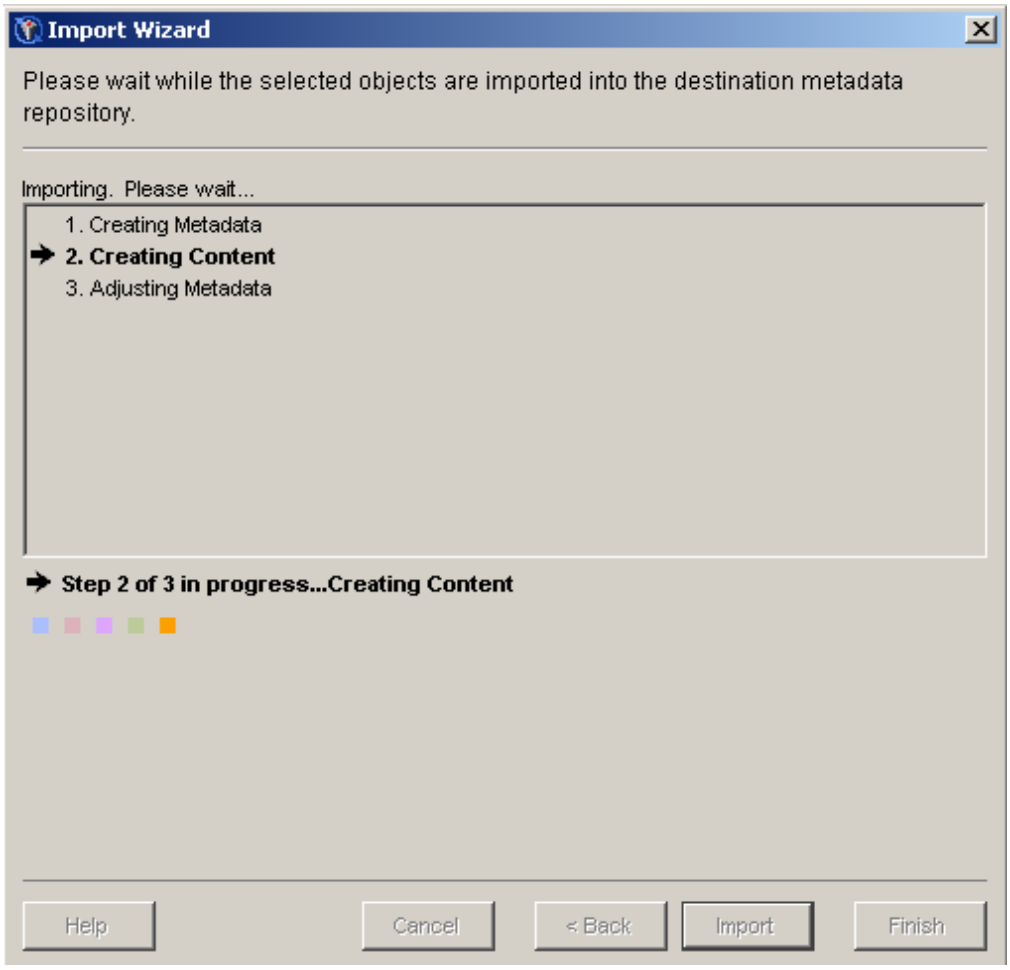


**Figure 9.5.** Import Wizard: Information Summary

12. When the import is done, you get a summary as shown in Figure 9.6. If everything imported properly, then click **Finish**.
13. Close SAS Management Console.

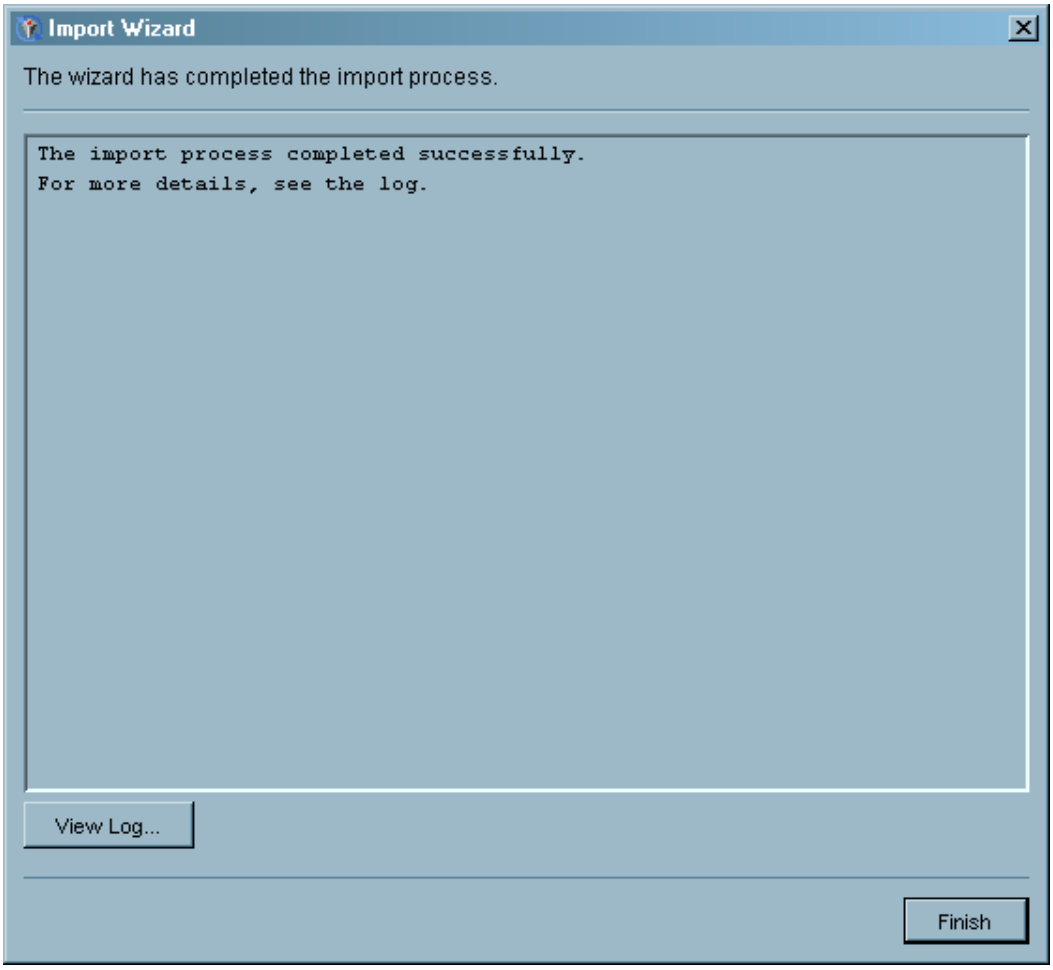


**Figure 9.6.** Import Wizard: Summary Window

## *Configure the Stored Process Service*

After you import the SAS Forecast Server stored processes, then you must configure the stored process service by using SAS Management Console.

1. Open SAS Management Console and connect to a metadata repository as the SAS Administrator (e.g., sasadm).
2. Expand the **Foundation Services Manager** folder.
3. Expand the **Analytics Platform - Foundation Services** folder.
4. Expand the **Core Services** folder. If there is a **Stored Process Service**, then you do not need to continue.
5. Right-click on the **Core Services** folder, and select **New Service**.

   If prompted, then permit SAS Management Console to import the foundation service prototypes.

6. In the New Service wizard, select **service: Stored Process**. Click **Next**.
7. Enter **`Stored Process Service`** as the name and a description if you like. Click **Next**.
8. Click **Next** until you reach the last step and click **Finish** to complete the configuration process.
9. Restart the SAS Analytics Platform.

### *Enable the Search for Servers Functionality (Optional)*

By default, the server discovery functionality is disabled. When you install the SAS Analytics Platform, the default value is false. If you want users to be able to discover the server, then you can use the **AP Server Advanced Configuration** tool to enable the discovery functionality. To enable the server discovery functionality, perform the following steps:

1. Start the Analytics Platform Configuration Wizard tool.
   Windows: Open the AP Server Advanced Configuration tool by selecting **Start→Programs→SAS→SAS Analytics Platform→ AP Server Advanced Configuration**

   UNIX: Open the AP Server Advanced Configuration tool by performing the following steps:

   (a) Open a terminal session with an X server running and available.
   (b) Navigate to the . . . /SASAPCore/bin directory.
   (c) Issue the following command:
   **`./apserver config`**
2. After the Analytics Platform Configuration Wizard starts, proceed to step 2 of the wizard.
3. Check the **Allow clients to discover this server** checkbox as shown in Figure 9.7.

   **Note:** There are limitations to the server discovery. Servers must be on the same subnet as the client and if there are firewalls that restrict UDP multicast messages, then the discovery does not function.

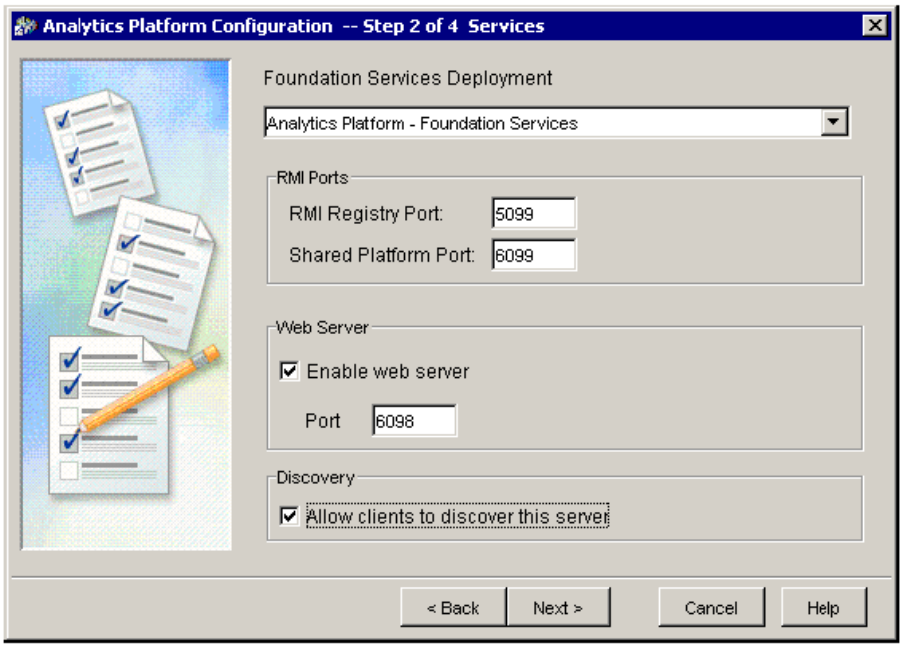


**Figure 9.7.** SAS Analytics Platform Configuration Wizard —Step 2 of 4

4. Click **Next** until you reach the last step. Click **Finish**.

# Windows Administration Tasks

## Complete the Post-installation Tasks for All Operating Environments

Before you compete the post-installation tasks for the Windows operating environment, you must complete the post-installation tasks for all operating environments. For information about these post-installation tasks, see "All Operating Systems Administration Tasks."

## Server Tier

### *Set File System Permissions*

On a Windows server, allowing SAS users with differing permissions to update a file creates a security setup issue that needs to be corrected. You must set file system permissions for all SAS users to be the same in the areas that are used by SAS Forecast Server.

To set file system permissions for all SAS users to be the same, perform the following steps:

1. Open Windows Explorer and select the root directory used by SAS Forecast Server. By default, the directory is `c:\SAS\ForecastStudio`.

2. Right-click and select **Properties**.
3. Click the **Security** tab.
4. Select the users for the current machine.
5. Enable **Full Control** for the specified group of users.
6. Click **OK**.

**Note:** Because temporary files are created in the BI directory as well, you should apply the appropriate security to this directory. The default directory is `c:\SAS`. By default, the BI directory is the parent of the `ForecastStudio` folder. If this is true, then you need to set the security on the parent directory only.

# Middle Tier

## *Configure the SAS Analytics Platform as a Windows Service*

By default, the SAS Analytics Platform is not installed as a Windows service. It is recommended that you install the SAS Analytics Platform as a Windows service. When you install the SAS Analytics Platform as a Windows service, the SAS Analytics Platform restarts when its machine reboots and runs even when users log off of the machine.

You can install and start the SAS Analytics Platform as a Windows service by performing the following steps:

1. If the SAS Metadata Server is installed on the same machine as the SAS Analytics Platform, then modify the `!SASROOT\SASAPcore\conf\wrapper.conf` file.

   (a) Open your Windows services by selecting **Start**→**Settings**→**Control Panel**→**Administrative Tools**→**Services**. Look for the SAS metadata service (i.e. SAS Lev1 MS - Forecast), as shown in the example in Figure 9.8. You must use the exact name of the service in the next step.


**Figure 9.8.** SAS Lev1 MS - Forecast Service

   (b) Near the end of the file, you see a property `wrapper.ntservice.dependency.1=` *value*. The *value* must be the exact name of the metadata service from the preceding step, as shown in the example in Figure 9.9.

```
111 # Service dependencies.  Add dependencies as needed starting from 1
112 # rjc - service dependency.
113 # NOTE: If you are running the metadata server on another machine,
114 # comment out the following line:
115 wrapper.ntservice.dependency.1=SAS Lev1 MS - Forecast
116
117 # Mode in which the service is installed.  AUTO_START or DEMAND_START
118 wrapper.ntservice.starttype=AUTO_START
119
120 # Allow the service to interact with the desktop.
121 wrapper.ntservice.interactive=false
```

**Figure 9.9.** Property Value for **`wrapper.ntservice.dependency.1=`** Entry

By default, the SAS Analytics Platform service is configured to include the SAS Metadata Server as a dependency. If you choose to run the metadata server on another machine, then this dependency must be removed. To remove the dependency, perform the following steps:

(a) Navigate to the **`!SASROOT\SASAPcore\conf\`** directory.

(b) Edit the wrapper.conf file. Comment out the following line that is located near the end of the file by adding a # character at the start of the line as follows:
**# wrapper.ntservice.dependency.1=***value*

2. Navigate to **`!SASROOT\SASAPCore\bin`** at a DOS prompt, and run the **`AnalyticsPlatformService.bat install`** command. This script installs the SAS Analytics Platform as an automatic service, but does not start the SAS Analytics Platform initially.
3. Start the service from the Services application as shown in Figure 9.10, or by using the **`AnalyticsPlatformService start`** command, or by rebooting the machine.

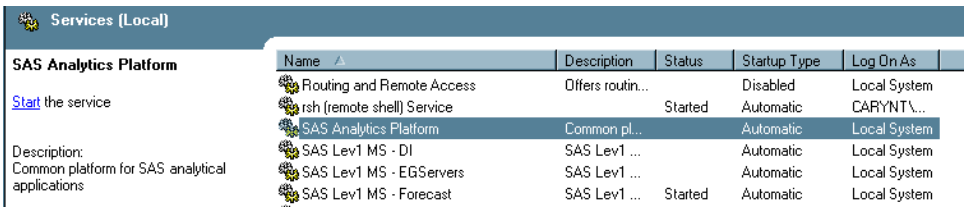


**Figure 9.10.** SAS Analytics Platform Starts as a Service

The SAS Analytics Platform is configured to start automatically when your computer boots, so you should not have to start the SAS Analytics Platform manually in the future.

**Note:** To uninstall a server that is installed as a service, perform the following steps:

1. Navigate to **`!SASROOT\SASAPCore\bin`** at a DOS prompt, and run the **`AnalyticsPlatformService.bat stop`** command.

2. Run the **`AnalyticsPlatformService.bat remove`** command.

# Chapter 10
# Verify SAS Forecast Server Installation

## Chapter Contents

# Chapter 10
# Verify SAS Forecast Server Installation

## Start and Verify the SAS Servers

### What Are the SAS Servers?

For more information about the SAS servers, refer to the SAS Intelligence Platform documentation set. You can access the SAS Intelligence Platform documentation set in the SAS OnlineDoc at the following Web address:
http://support.sas.com/onlinedoc/913/docMainpage.jsp

Before you start your client application, you must have the following SAS servers and object spawner running:

- SAS Metadata Server
- SAS Object Spawner
- SAS Workspace Server(started by the SAS Object Spawner)
- SAS Stored Process Server (started by the SAS Object Spawner)
- SAS Analytics Platform

Each server or object spawner is represented by a directory inside the **SASMain** directory. For example, you might see a **WorkspaceServer** folder or an **ObjectSpawner** folder. If you choose to start the servers by using scripts, then each directory for a server that you can start directly contains a script called start*server-type.extension*.

- On UNIX operating environments, you call these scripts directly to start servers and spawners.
- On Windows operating environments, you can call these scripts directly by using the Start menu. For example, select
  **Start**→**Programs**→**SAS**→*configuration-directory*→ **Start SAS Object Spawner**.

### SAS Metadata Server

#### *Definition*

The SAS Metadata Server controls access to a central repository of metadata, which is shared by all of the applications in the system. This repository contains metadata that represents items such as SAS servers, users, libraries, and data sets. For more information about the SAS Metadata Server, refer to the SAS Intelligence Platform documentation set, which can be found in the SAS OnlineDoc at
http://support.sas.com/onlinedoc/913/docMainpage.jsp.

### *Verify the SAS Metadata Server Is Running*

#### Windows Operating Environment

If your SAS Metadata Server is running on a Windows machine and you choose to run the servers as services, then the servers start automatically when you restart your machine. However, you can use the services window to stop or restart services by performing the following steps:

1. Navigate to the Services window by selecting: **`Settings`**→**`Control Panel`**→**`Administrative Tools`**→**`Services`**.
2. Right-click the server item.
3. Select **Start**, **Stop**, or **Restart**.

If your server is running on a Windows machine and you choose to start the servers by using scripts, then start the servers by using the **Start** menu and selecting: **`Start`**→**`Program`**→**`SAS`**→ *configuration-directory*→**`Start SAS Metadata Server`**.

**Note:** You can start a server by executing a .bat file. You find the .bat file for a particular server in the following folder:
*path-to-config-dir***`Lev1`****`SASMain`****`MetadataServer`**

#### UNIX Operating Environment

On a UNIX operating environment, you start a server by performing the following steps:

1. Log on using the SAS installer account.
2. Navigate to the following path:
   *path-to-config-dir*`/Lev1/SASMain/MetadataServer`
3. Execute the script in the directory that starts the server.

## SAS Workspace Server

### *Definition*

The SAS Workspace Server executes any type of SAS program. The SAS Object Spawner starts the SAS Workspace Server. For more information about the SAS Workspace Server, see the *SAS Integration Technologies Administrator's Guide*.

### *Test the SAS Workspace Server Connection*

You can test your connection to the SAS Workspace Server by performing the following steps:

1. Start a SAS Management Console session, and log on as a SAS Administrator (e.g., *sasadm*).
2. Expand the **Server Manager** node.

3. Expand the **SASMain** node.
4. Expand the **SASMain-Logical Workspace Server** node.
5. Select **SASMain-Workspace Server**.
6. In the right panel, right-click **Connection: SASMain - Workspace Server**.
7. Select **Test Connection** as shown in Figure 10.1.
8. Enter the SAS Demo User account (e.g., sasdemo). A Test Connection Successful message appears.

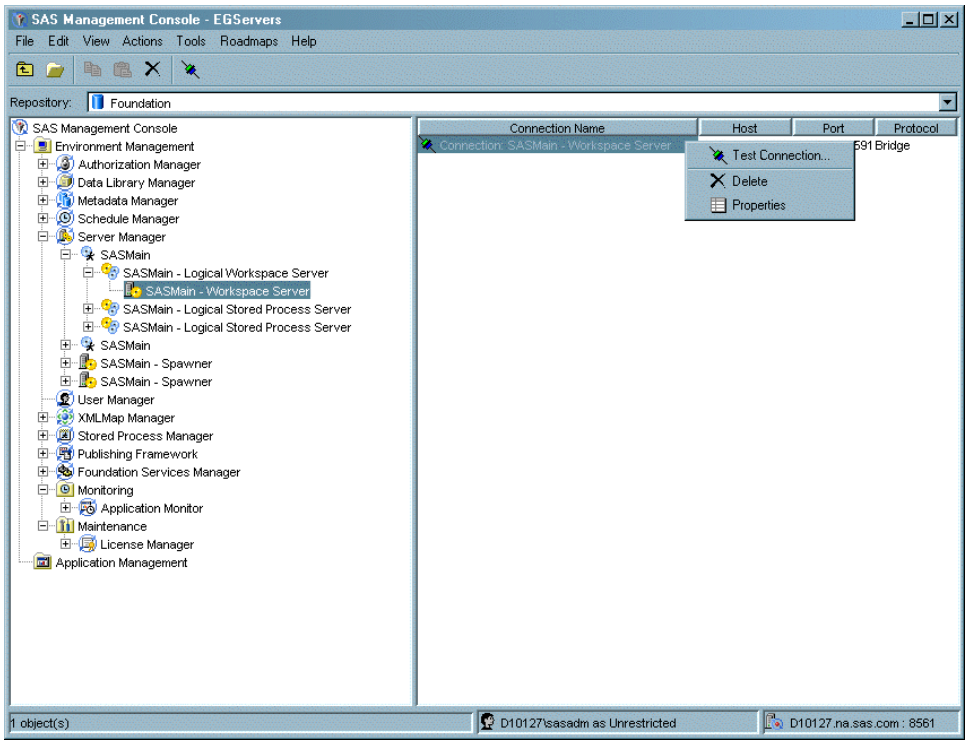


**Figure 10.1.** SAS Workspace Server: Test Connection

## SAS Stored Process Server

### *Definition*

The SAS Stored Process Server executes stored processes, which support input parameters. The SAS Object Spawner starts the SAS Stored Process Server. For more information about the SAS Stored Process Server, see the *SAS Integration Technologies Administrator's Guide*.

### *Test the SAS Stored Process Server Connection*

You can test your connection to the SAS Stored Process Server by performing the following steps:

1. Start a SAS Management Console session, and log on as a SAS Administrator (e.g. *sasadm*).

2. Expand the **Server Manager** node.
3. Expand the **SASMain** node.
4. Expand the **SASMain-Logical Stored Process Server** node.
5. Select **SASMain-Stored Process Server**.
6. In the right panel, right-click **Connection: SASMain - Stored Process Server**.
7. Select **Test Connection** as shown in Figure 10.2. A Test Connection Successful message appears.

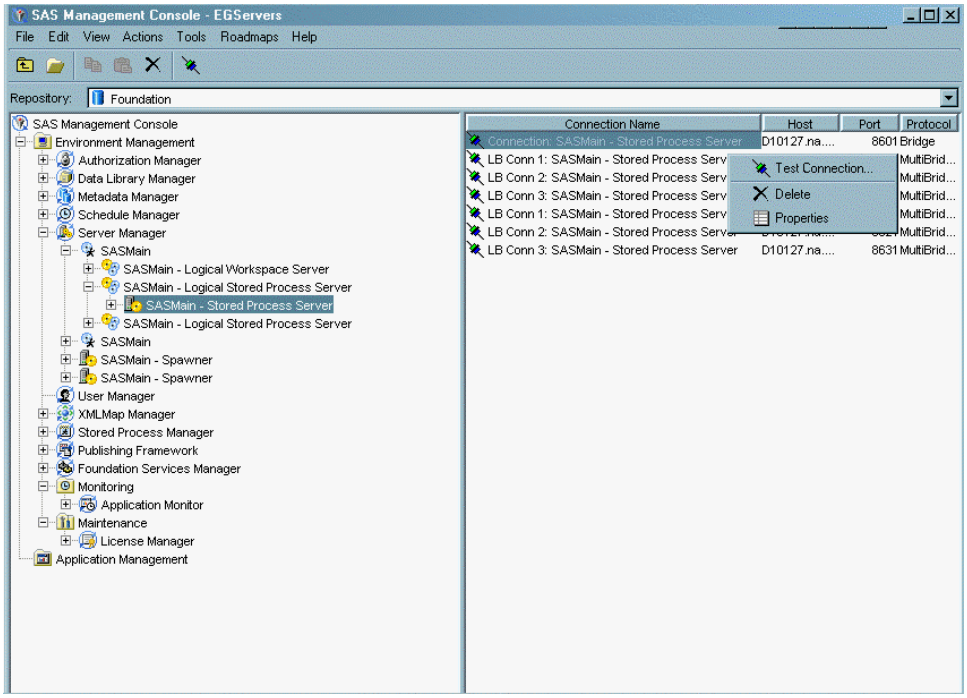


**Figure 10.2.** Stored Process Server: Test Connection

# SAS Analytics Platform

## *Definition*

The SAS Analytics Platform is a RMI middle-tier server that enables SAS Forecast Server to use the SAS Foundation Services. The SAS Forecast Server Mid-Tier must be installed on the same machine as the SAS Analytics Platform. You must start the SAS Analytics Platform before you start the SAS Forecast Studio client. For information about the SAS Analytics Platform, see the *SAS Analytics Platform User's Guide* at the following Web address:
`http://support.sas.com/documentation/onlinedoc/apcore`

# SAS Object Spawner

## Definition

The SAS Object Spawner is a process-spawning service that represents object servers that use the IOM bridge protocol engine, such as the SAS Workspace Server and the SAS Stored Process Server. In effect, the object spawner is a daemon on the server that listens for incoming client requests for IOM services. When the daemon receives a request from a new client, it launches an instance of either a SAS Workspace Server or a SAS Stored Process Server to fulfill the request. After the request is fulfilled, and nothing else is in the spawner's queue, then the spawner returns to its wait state. For more information about the SAS Object Spawner, refer to the *SAS Integration Technologies Administrator's Guide*.

## Start the SAS Object Spawner, SAS Workspace Server, and SAS Stored Process Server

### Windows Operating Environments

If the SAS Object Spawner is running on a Windows machine and you choose to run the servers as services, then the servers start automatically when you restart your machine. When the SAS Object Spawner starts, then the SAS Workspace Server and the SAS Stored Process Server start automatically. However, you can stop or restart services by performing the following steps:

1. Navigate to the Services window:
   **Settings** → **Control Panel** → **Administrative Tools** → **Services**.
2. Right-click the server item.
3. Select **Stop** or **Restart**.

If your server is running on a Windows machine and you have chosen to start the servers by using scripts, then start the servers by using the **Start** menu and selecting: **Start** → **Program** → **SAS** → *configuration-directory* → **Start SAS Object Spawner**.

### UNIX Operating Environments

On a UNIX environment, you start a server by performing the following steps:

1. Log on using the SAS installer account.
2. Change directories to *path-to-config-dir*/**Lev1/SASMain/**ObjectSpawner.
3. Execute the script in the directory that starts the server.

# Verify Your SAS Forecast Server Installation

You can verify the successful installation of SAS Forecast Server by starting the client on a Windows machine where you installed the client, and by creating a project.

1. You can start the SAS Forecast Studio client by performing the following steps:
   (a) Navigate to the SAS Forecast Studio client by selecting:
   **Start** → **Programs** → **SAS** →**SAS Forecast Studio** → **SAS Forecast Studio 1.4**.
   (b) In the Log On dialog box, enter your user ID and password, and specify a server with a fully qualified <*server-name:port-number*> name.
   (c) Click **Log On**.
   **Note:** For more information about different ways to start the SAS Forecast Studio client, see Chapter 11, "Start the SAS Forecast Studio Client."
2. To create a new project when you open SAS Forecast Studio, select **Create a new project** in the Welcome to SAS Forecast Studio dialog box.
3. Specify the name of the project such as **Test_Project**. By default, the project name is Project*n* , where *n* is the lowest available integer value. The project name must be a valid SAS name. The project name can be 32 characters long, and it must start with a letter (A-Z). Subsequent characters can be letters or numeric digits (0-9). Both upper- and lowercase letters are valid. Click Next.
4. In the New Project Wizard, select a data set by double-clicking the library **SASHELP**.
5. Select the data set **ORSALES**.
6. Assign variables to the following roles:
   (a) Move the YEAR variable to the TIME_ID role.
   (b) Move the PROFIT variable to the DEPENDENT VARIALBE role.
   (c) Click **Next**.
7. Click **Next** to move to the next step.
8. Click **Next** to move to the next step.
9. Select **Produce Forecasts** and click **Finish**.

One series is forecasted, and your installation is complete and verified. For information about ongoing and optional administrative tasks, see Chapter 12, "Administration Tasks." For information about troubleshooting SAS Forecast Server, see Chapter 13, "Troubleshooting SAS Forecast Server."

# Chapter 11
# Start the SAS Forecast Studio Client

## Chapter Contents

# Chapter 11
# Start the SAS Forecast Studio Client

## Required Servers

Before running the SAS Forecast Studio client application, you must have the following servers running:

- SAS Metadata Server
- SAS Workspace Server
- SAS Analytics Platform

Because the SAS Analytics Platform starts the SAS Forecast Server Mid-Tier automatically, you must be running the SAS Analytics Platform on the middle tier before you start the SAS Forecast Studio client. If the SAS Analytics Platform is not running as a service, then the SAS Forecast Server Mid-Tier is started automatically when you start the SAS Analytics Platform.

## Start the SAS Analytics Platform

### Windows Environment

If you did not configure the SAS Analytics Platform to run as a service, then to start the SAS Analytics Platform in a Windows environment, perform the following steps:

1. On the middle tier server, start the SAS Analytics Platform by selecting: **Start** → **Programs** → **SAS** → **SAS Analytics Platform** → **Start AP Server**.
2. In the Log On dialog box, verify the following values:
   - User name: If you would like the user name and password values to persist whenever you start the SAS Analytics Platform, then click **Remember my password**.
   - Server: The server should be the hostname:port of the server where the SAS Analytics Platform is running.
3. Click **Log On** to start the SAS Analytics Platform.

## UNIX Environment

To start the SAS Analytics Platform in a UNIX environment, perform the following steps:

1. On the middle tier server, navigate to the installation directory of the SAS Analytics Platform
   (e.g., **`!SASROOT/SASAPCore/bin`**)
2. Run the command **`./apserver start`**. The server is ready to receive clients when the message "Waiting for clients" appears at the bottom of the screen.
3. If you chose not to persist the user credentials needed to start the server, then you are prompted for a user ID and password. However, for this to work you need either an X display session or you must pass the user ID and password as command line arguments:
   **`./apserver start -u`** *admin-user-id* **`-p`** *admin-password*

**Note:** After you complete the installation of Service Pack 4, the `apserver.sh` script might not be able to find the correct Java version. You might need to update the script to specify the new JRE 1.4.2 path. To update the `apserver.sh` script, perform the following steps:

1. Navigate to the location of the `apserver.sh` script. By default, the path is the following:
   **`!SASROOT/SASAPCore/bin`**
2. Locate the following command lines in the script:
   ```
   # was $JAVACMD
   !SASROOT/sasjre/1.4.2/bin/java
   ```
3. Change the above lines to the following:
   ```
   # was $JAVACMD
   !SASROOT/sasjre/1.4.2/jre/bin/java
   ```
   **Note:** !SASROOT is the path where you installed SAS.
4. Save these changes to `apserver.sh`.

# Start the SAS Forecast Studio Client

The SAS Forecast Studio client can be run on a Windows operating system only. To start the SAS Forecast Studio client, perform the following steps:

1. Navigate to the SAS Forecast Studio client by selecting:
   **Start → Programs → SAS → SAS Forecast Studio → SAS Forecast Studio 1.4**.
2. In the Log On dialog box, enter your user ID and password, and specify a SAS Forecast Server Mid-Tier location.

- User name: If you would like the user name and password values to persist whenever you start SAS Forecast Studio, then click **Remember my password**.
- Server: The server should be the name of the server where the SAS Analytics Platform is running.

3. Click **Log On** to start the SAS Forecast Studio client.

# Anonymous Logon (Optional)

## Configure the Anonymous Logon Feature

Both the SAS Analytics Platform and SAS Forecast Server applications support anonymous logons. By default, the anonymous logon feature is disabled. To enable anonymous logons, you must configure the SAS Analytics Platform by using the **AP Server Advanced Configuration** wizard:

1. On the middle tier, access the **AP Server Advanced Configuration** wizard:
   **Windows:** Select
   **Start** → **Program** → **SAS** → **SAS Analytics Platform** → **AP Server Advanced Configuration**
   **UNIX:** Run the **`apserver.sh`** command
2. In step 3 of the wizard, specify the user ID and password for which you want to enable anonymous logon ability. The user ID and password are used for authentication.

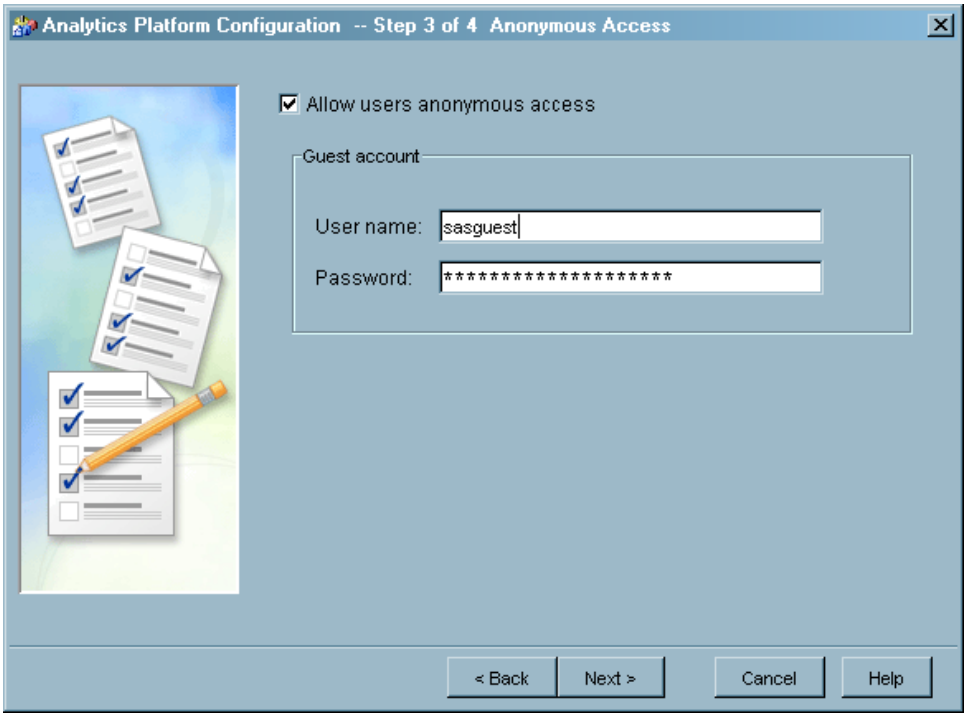


**Figure 11.1.** Anonymous Access Screen

3. If the anonymous logon feature is enabled while the SAS Analytics Platform is running, then you must restart the SAS Analytics Platform.

## Start the SAS Forecast Studio Client with an Anonymous Logon

Once you enabled the anonymous logon feature, then you can log on to a SAS Forecast Studio client by leaving the user name blank.

1. Navigate to the SAS Forecast Studio client by selecting:
   **Start** → **Programs** → **SAS** → **SAS Forecast Studio** → **SAS Forecast Studio 1.4**.
2. In the Log On dialog box, leave your user ID and password blank, and specify a SAS Forecast Server Mid-Tier location. You must specify the **Server**. The server is the name of the server where the SAS Analytics Platform is running. If you do not remember which server to use, then you can search for a server by performing the following steps:
   (a) Select **Search for Servers** from the **Server** drop-down menu.
   (b) Once the search is complete, click on the drop-down menu arrow for the list of valid servers that you can choose. The valid servers are indicated by green check marks.
3. Click **Log On** to start the SAS Forecast Studio client.

# SAS Forecast Studio Java Web Start

SAS Forecast Server supports automatic downloads of the SAS Forecast Studio client by using Java Web Start. You no longer need to install the client application manually.

You can use the Java Web Start in one of two ways:

- Launch the SAS Forecast Studio client from the **SAS Analytics Platform Server Status** Web page.

  The SAS Analytics Platform has a status and configuration Web page that is installed on the SAS Forecast Server Mid-Tier. The SAS Analytics Platform already contains an HTTP server, which is used to deliver the Web pages that contain links to Java Web Start at **`http://`***your-server-name*`:6098`. By default, the HTTP port for the SAS Analytics Platform is 6098. If you installed the SAS Analytics Platform by using a different port, then you must specify the port number that you used.

  From the **Welcome** page, you can click on the **Configuration** tab to view not only the SAS Analytics Platform configuration details, but also any applications that have been configured on the server. To launch a configured application, simply click on the **Launch** link.

- Launch the SAS Forecast Studio client from a direct link to the SAS Forecast Server Java Web Start

  The direct link to launch the SAS Forecast Studio client is the following:
  **`http://`***your-server-name*`:8080/Forecasting/main.jnlp`

For more information about Java Web Start, see the Sun Web site at the following Web address:
`http://java.sun.com/products/javawebstart/`

For information about Java Web Start and SAS applications, see the *SAS Analytics Platform User's Guide* at the following Web address:
`http://support.sas.com/documentation/onlinedoc/apcore`

For information about troubleshooting the SAS Forecast Studio Java Web Start, see Chapter 13, "Troubleshooting SAS Forecast Server."

# Part 4
# Administration and Troubleshooting

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# Chapter 12
# Administration Tasks

## Chapter Contents

# Chapter 12
# Administration Tasks

## Administration Tasks Checklist

There are administration tasks that you can perform manually after you successfully install and configure your SAS Forecast Server software. Some of the administration tasks can be done as needed, while other tasks can be done in anticipation of future needs. Table 12.1 is a tool that you can use to navigate to the task that you need.

**Table 12.1.** Required Post-installation Tasks Checklist

| All Operating Environments | Task |
|---|---|
| Server tier | Enable users to access SAS Forecast Server. |
| Server tier | Secure access to SAS Forecast Server. |
| Server tier | Configure a SAS Forecast Server report as a stored process. |
| Server tier | Use a customized format in SAS Forecast Server. |
| Middle tier | Change the location where user projects are saved. |

# Administration Tasks for All Operating Environments

## Server Tier

### *Enable Users to Access SAS Forecast Server*

#### Authentication versus Authorization

Before learning about authorizations within SAS Forecast Server, first you need to understand the difference between user authentication and user authorization.

- User authentication is an identity verification process that attempts to determine whether users are who they say they are.
- User authorization is the process of determining which users have which permissions for which resources. User authorization happens after user authentication.

For more information about the SAS security scheme, see the security section of the SAS Intelligence Platform documentation set. You can access the SAS Intelligence Platform documentation set in the SAS OnlineDoc at the following Web address: `http://support.sas.com/onlinedoc/913/docMainpage.jsp`

### Initial Authentication

Initial authentication is the verification of your identity based on information that you provide when you log on to SAS Forecast Server. Initial authentication requires that you have an account with the authentication provider that verifies the user ID and password that you submit. The account can be any of the following:

- a local user account in the operating system of the computer on which the authenticating server is running
- a network user account that provides access to the operating system of the computer on which the authenticating server is running
- a user account with any authentication provider that your Web application server uses (for applications that are configured to use Web authentication)

After the user ID and password that you submit are verified by the appropriate authentication provider, the proof-of-identity is complete. None of the user information that is stored in the metadata repository is used to prove your identity. The metadata server must discover your metadata identity for these reasons:

- In order to provide authorization decisions and credential management, the metadata server needs to know who you are.
- SAS Forecast Server has an additional requirement beyond proof-of-identity and does not allow you to log on unless you have a metadata identity.

  In order to discover your metadata identity, the metadata server examines the user IDs that are stored in the metadata repository. Passwords that are stored in the metadata repository are not examined at any point during initial authentication.

### SAS Metadata Authorization

SAS Forecast Server uses the metadata server for metadata authorization. Access permissions are defined and stored in the metadata repository. SAS Forecast Server checks for access permissions in the following ways:

- The current user must have Read permission to the input SAS data set that is used for forecasting.
- The current user must have Read permission to all of the variables within the SAS data set if the variables are to have assigned roles in the forecasting.

SAS Forecast Server silently filters any data sets and variables to which the current user does not have Read permissions granted. Users who attempt to open an existing project for which they do not have Read permissions get an error that says that they are not authorized to view the forecasts.

**Note:** Because all SAS Intelligence applications use the SAS Metadata Server when accessing resources, permissions that are enforced by the SAS Metadata Server provide the strongest protections that are available in the metadata authorization layer.

## Initial Users

After you install and configure the SAS Intelligence Platform, SAS Analytics Platform, and SAS Forecast Server, you have some initial users and group definitions.

Figure 12.1 shows the initial users and groups in the User Manager plug-in of SAS Management Console:

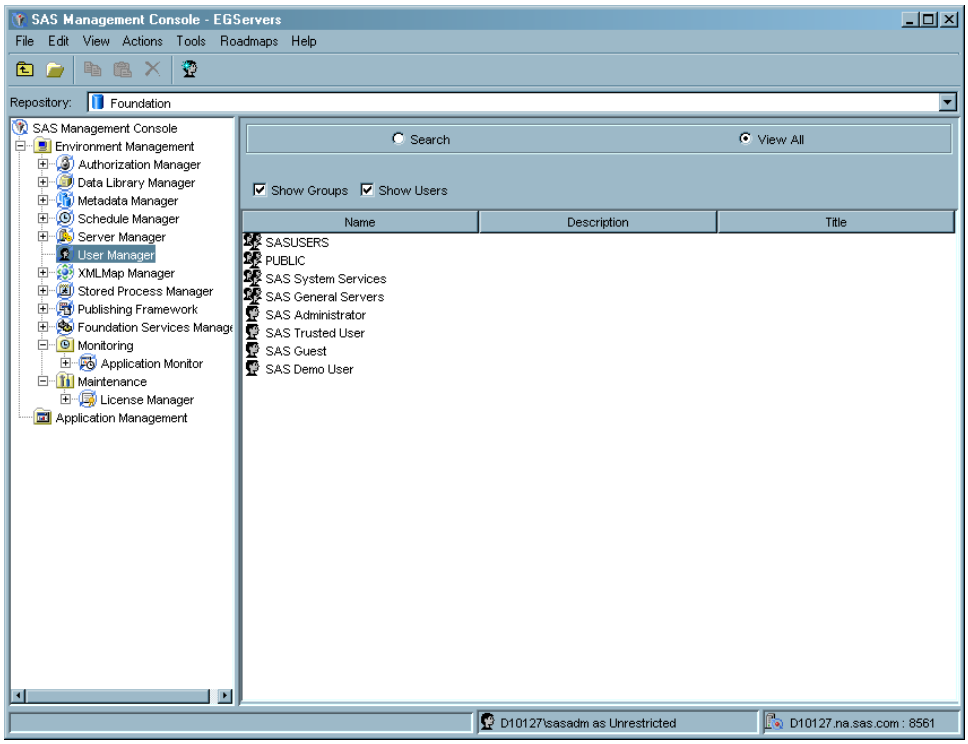


**Figure 12.1.** Initial Users and Groups for SAS Forecast Server

## Define Additional Users

If you want to log on to the SAS Forecast Studio client as a different user, then you must define the user ID on the authentication provider and in SAS Management Console. By using the User Manager plug-in of SAS Management Console, you can define additional users and groups for SAS Forecast Server. You must define new users on the appropriate authentication provider.

You can define a new user or group by performing the following steps:

1. Start SAS Management Console, and connect to a metadata repository as a SAS Administrator (i.e., sasadm).
2. From the SAS Management Console navigation tree, right-click **User Manager** and select **New→User** (or **Group** if you are defining a new group of users). Figure 12.2 shows the General tab of the User Manager definition for a new user.

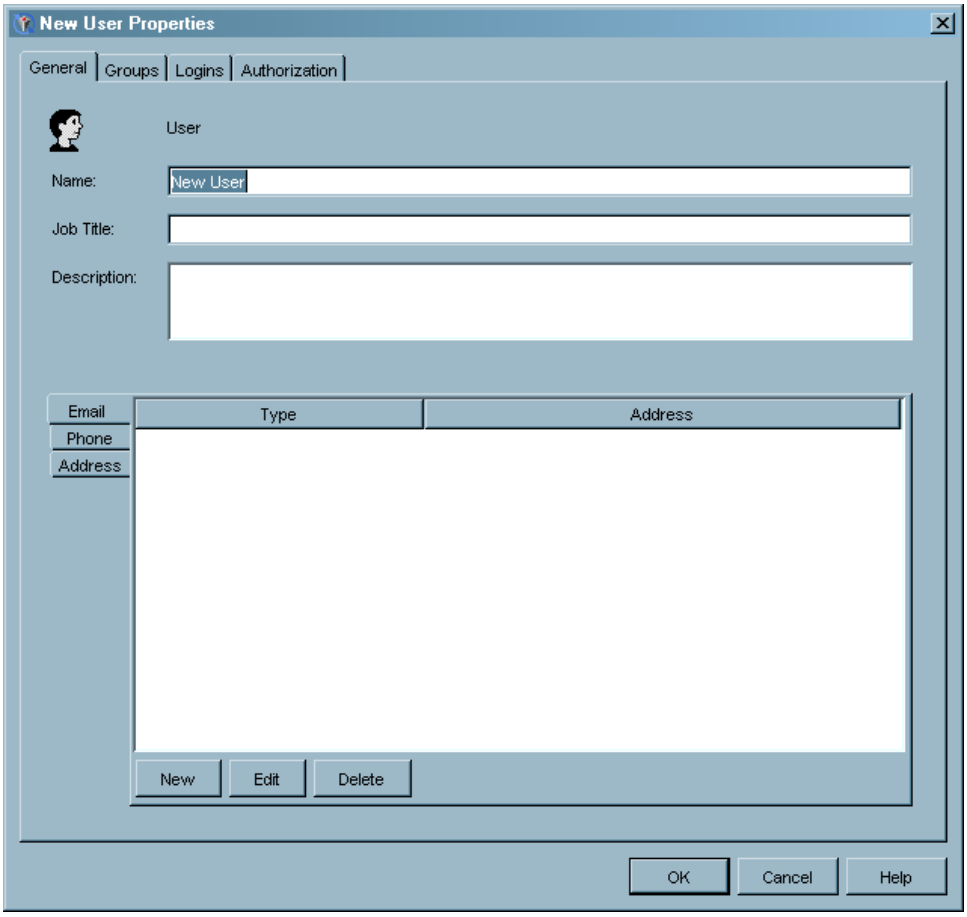


**Figure 12.2.** New User Definition for SAS Forecast Server

For more information about how to define users and groups in SAS Management Console, see the *SAS Management Console User's Guide* and the Online Help for the User Manager.

3. Associate this metadata identity with a specific account that is valid on the metadata server. By default, the SAS Metadata Server uses host-based authentication. Unless you configured your system differently, the metadata server requires a user ID and password that is valid on the host operating system of the metadata server. You can associate a metadata identity with a user ID by performing the following steps:

   (a) Within the New User wizard, select the **Login** tab and click **New**.

   (b) In the dialog box, enter the user ID that you plan to use to log on to the SAS Metadata Server. Figure 12.3 shows an example of associating an identity with the user ID *newuser*.

   **Note:** Typically, a password is not required.

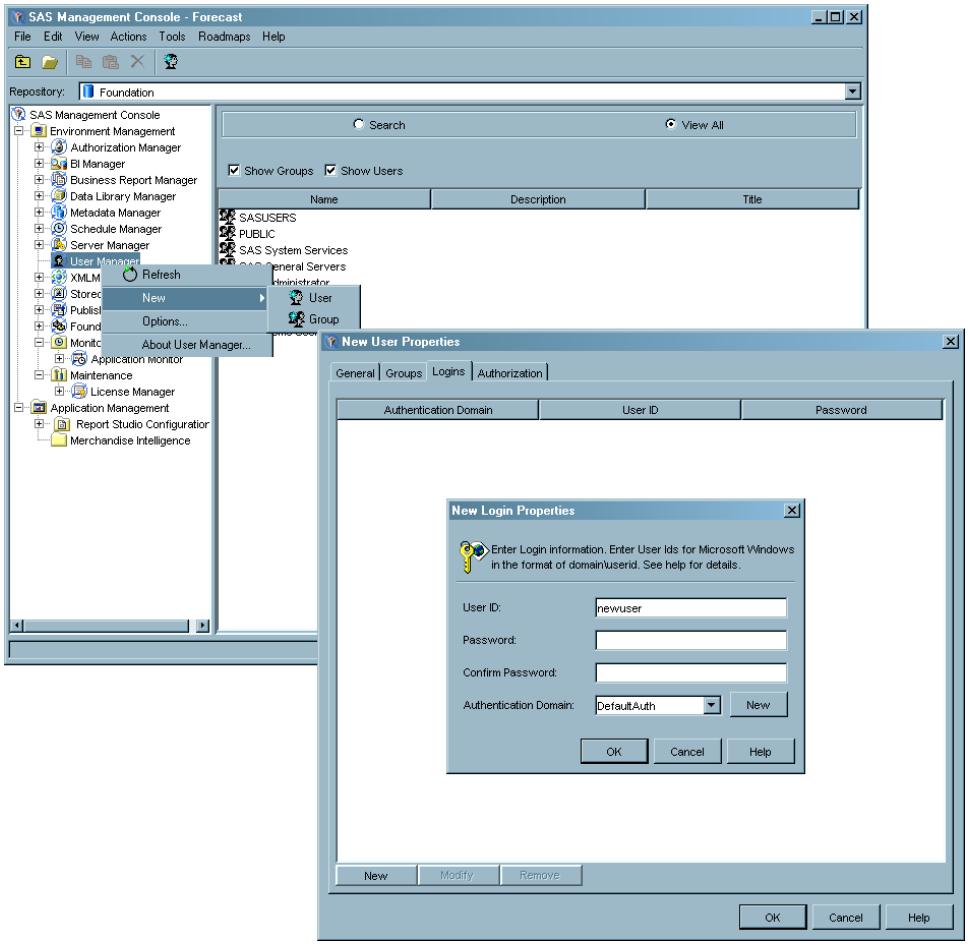


**Figure 12.3.** Associated Metadata Identity for a User ID

For more information about planning and defining new users and groups, see the security section of the SAS Intelligence Platform documentation set that you can access in the SAS OnlineDoc at the following Web address:
`http://support.sas.com/onlinedoc/913/docMainpage.jsp`

## *Secure Access to SAS Forecast Server*

### What Permissions Can You Control?

To secure access to metadata objects that represent SAS Forecast Server data, you can grant or deny permissions to individuals or groups by using the Authorization tab for the following metadata objects:

- SAS data sets
- variables within SAS data sets

### View User Permissions

The following example illustrates how to set user permissions and how SAS Forecast Server reacts to these permissions. In the example, you can use the following users and library:

sasadm
: specifies the SAS Administrator (e.g., sasadm). By default, the SAS Administrator is authorized to read all data.

sasdemo
: specifies the SAS Demo User (e.g., sasdemo). By default, the SAS Demo User is *not* authorized to read any data.

TESTLIB
: specifies the test library for SAS Forecast Server. It is assumed that this library is pre-assigned. For information about pre-assigning libraries, see Chapter 9, "Post-installation Tasks."

The following exercise shows the differences between the sasadm user and the sasdemo user when each user creates a new project. When the **TESTLIB** library is selected, Figure 12.4 shows all of the SAS data sets that are available to the sasadm user for selection.

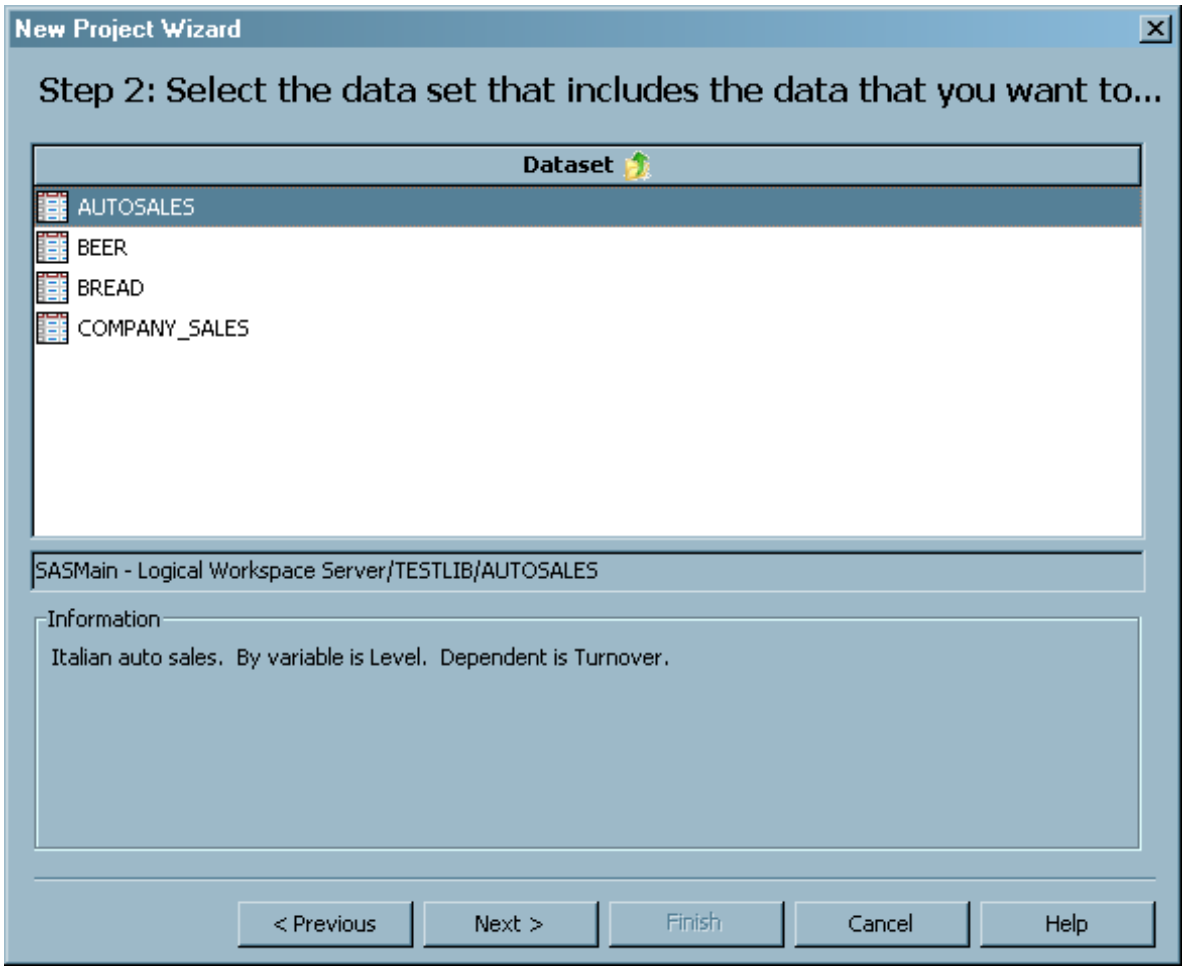


**Figure 12.4.** Available SAS Data Sets for sasadm User

Conversely, Figure 12.5 shows that no SAS data sets are available to the sasdemo user for selection.

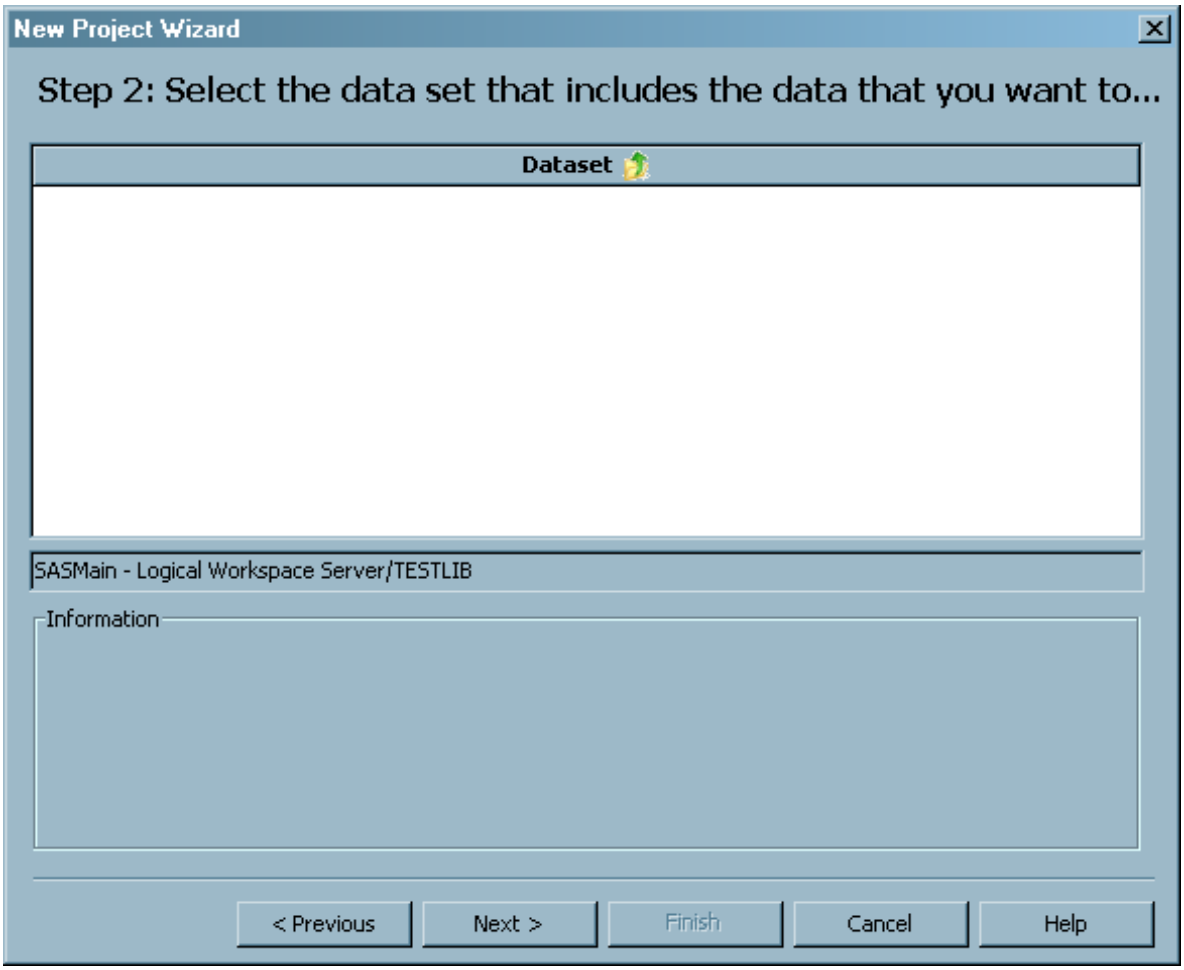


**Figure 12.5.** Available SAS Data Sets for sasdemo User

By default, the sasadm user has permissions to read all resources, and the sasdemo user does not have permissions.

Permissions are defined in the SAS Metadata Server, and are maintained through SAS Management Console. If you log on to SAS Management Console as the sasadm user, then you can investigate how permissions are set through the Authorization Manager.

1. Start a SAS Management Console session, and log on as the SAS Administrator (e.g., sasadm).
2. Expand the **Authorization Manager** node.
3. Select the **Access Control Templates** node as shown in Figure 12.6.

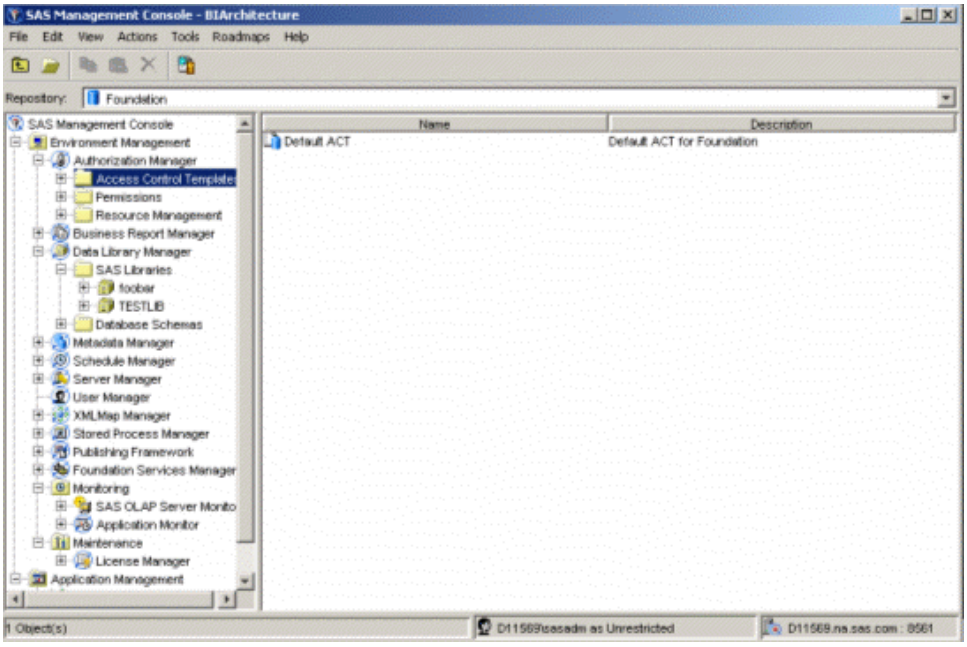


**Figure 12.6.** SAS Management Console Authorization Manager

4. Right-click **Default ACT** and select **Properties**, which enables you to modify the default template for the various SAS users.
5. Select the **Authorization** tab, which controls the permissions for the various users and groups as shown in Figure 12.7.

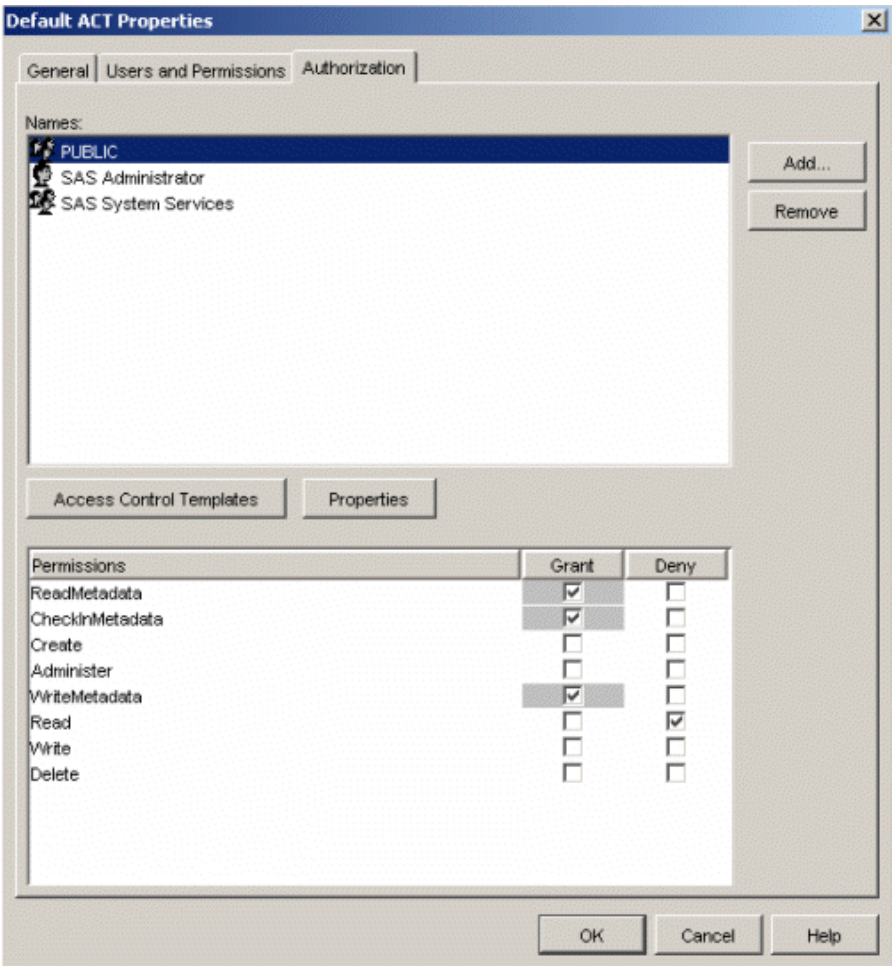


**Figure 12.7.** Default Act Properties

The sasdemo user is a member of the PUBLIC group. The Read permissions for this group are denied. If you click on the SAS Administrator, then you see that the Read permissions are granted. The sasadm user can view all of the SAS data sets in the TESTLIB library, and the sasdemo user cannot view the SAS data sets. SAS Forecast Server filters out any SAS data sets that the user is not authorized to read.

### Grant User Permissions to Specific SAS Data Sets

For a more secure deployment, you can secure SAS data sets at a user level. Typically, security is set at the library level. For standard security, see "Pre-assign Libraries in SAS Management Console." You can grant Read permissions to a group or user in two ways:

- grant Read permissions to all resources
- grant Read permissions to specific data sets or variables

In the example, you can grant the PUBLIC group Read permissions in the Default Access Control template, but this would open up all the resources. You want to be

more specific in granting access. For example, you can grant permissions for sasdemo only to read specific data sets in the TESTLIB library.

1. Start a SAS Management Console session, and log on as the SAS Administrator (e.g., sasadm).
2. Click the **Data Library Manager** node.
3. Right-click the **SAS Libraries** entry.
4. Select **New Library**. The New Library Wizard appears, as shown in Figure 12.8.

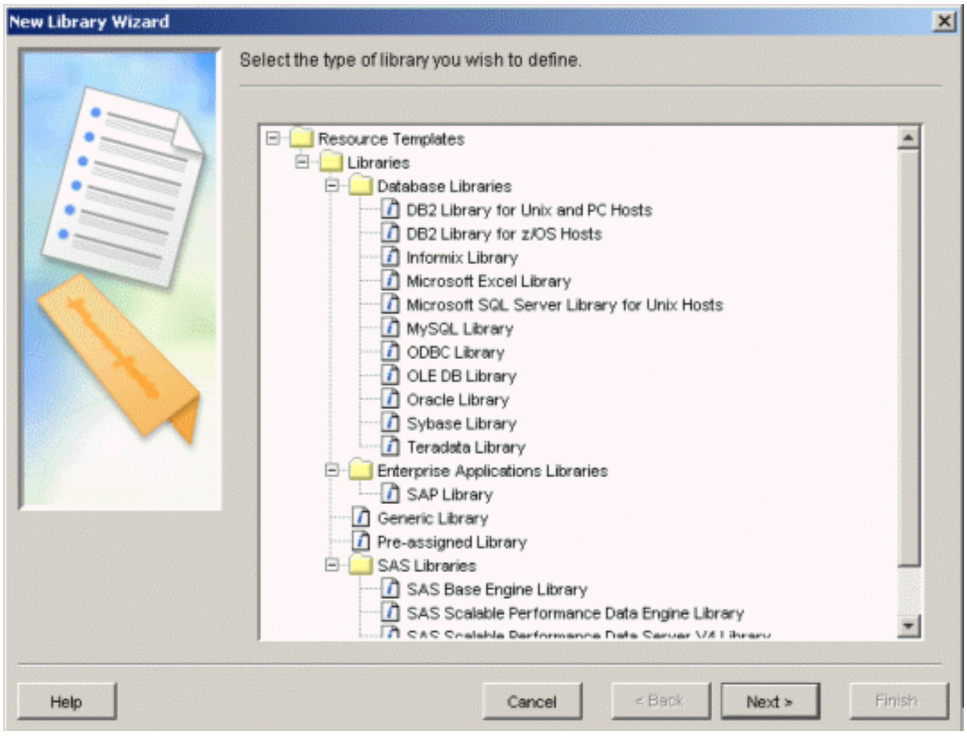


**Figure 12.8.** New Library Wizard

5. Select **SAS Base Engine Library**, and click **Next**.
6. Enter **TESTLIB** for the name, and click **Next**.
7. Enter the following information:
   - Specify **TESTLIB** as the Libref.
   - Specify the path that points to the physical location of your data.
   - Click **Next**.
8. Click to select **SASMain** as the SAS server, and click **Next**.
9. Click **Finish** to return to SAS Management Console.

   **Note:** SAS Forecast Server does not currently use this defined library for the current project because you are defining only a library where you can apply permissions.

10. After the library is defined, expand **SAS Libraries** in SAS Management Console by double-clicking on the **SAS Libraries** entry.
11. Right-click on **TESTLIB** entry, and select **Import Tables**.
12. Click to select **SASMain** as the server, and click **Next**.
13. Optional: If you are prompted for a user ID and password, then enter your user ID and password.
14. Verify the LIBNAME (TESTLIB) and the physical location of the data, and click **Next**. The Define Tables wizard appears as shown in Figure 12.9.

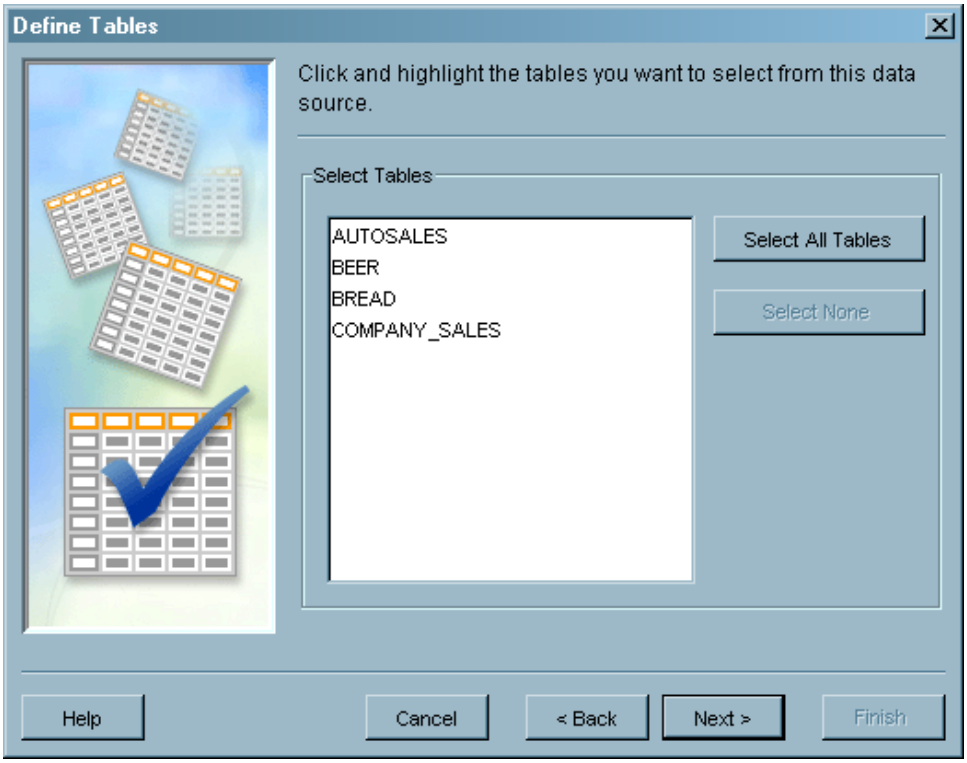


**Figure 12.9.** Define Tables

15. Select some data sets and click **Next**. (This example uses the BREAD data set.)
16. Click **Finish**.

You imported the definitions of your data sets into the metadata server. In SAS Management Console, you should see your data sets listed under the TESTLIB library as shown in Figure 12.10.

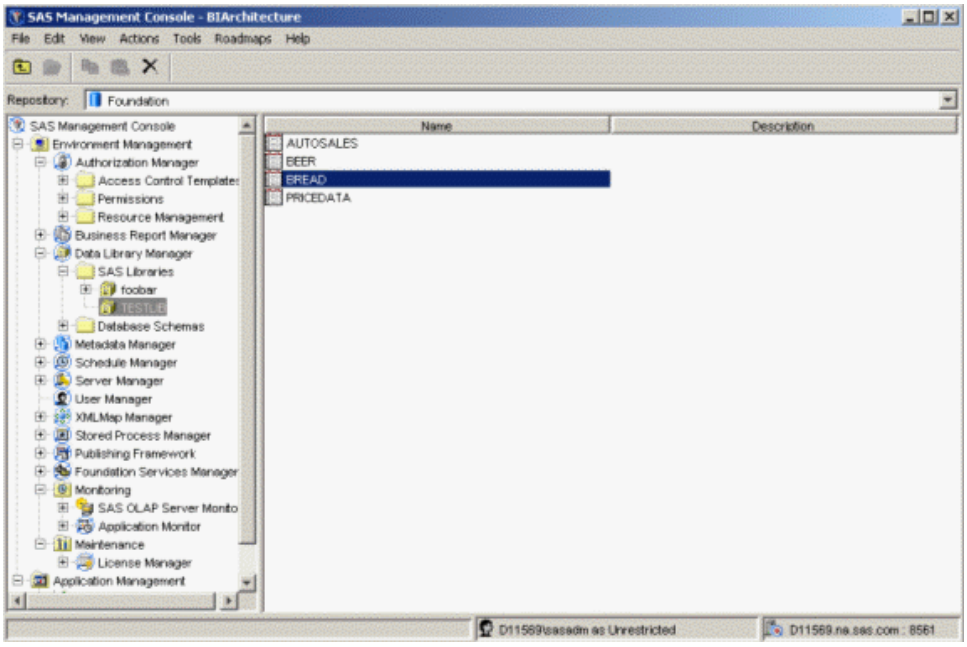


**Figure 12.10.** Selecting the BREAD Data Set

17. Set the permissions for the BREAD data set by performing the following steps:

    (a) Right-click the data set, and select **Properties**.
    (b) Select the **Authorization** tab as shown in Figure 12.11.

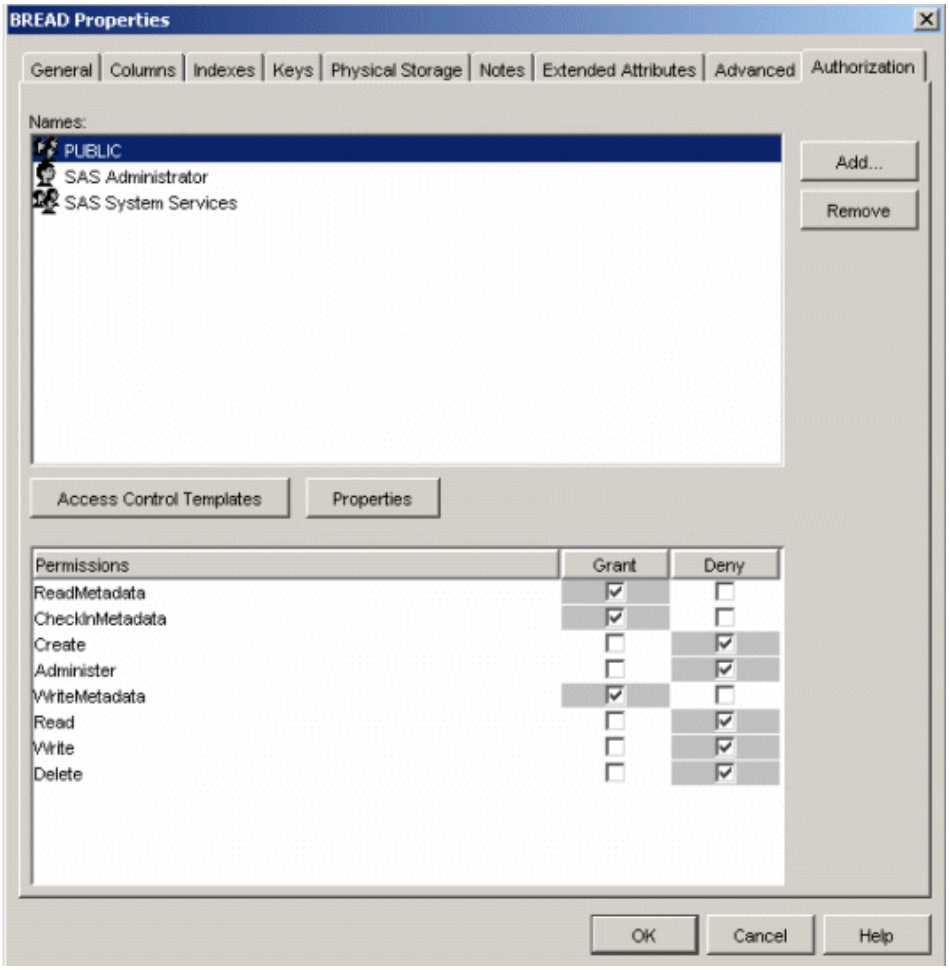


**Figure 12.11.** Setting Permissions for the BREAD Data Set

**Note:** The data set inherits the permissions from the Default Access Control template.

(c) In order to grant permissions for the PUBLIC group to read the BREAD data set, select the PUBLIC name and check the **Grant** checkbox for the Read column. The line should become highlighted as shown in Figure 12.12.

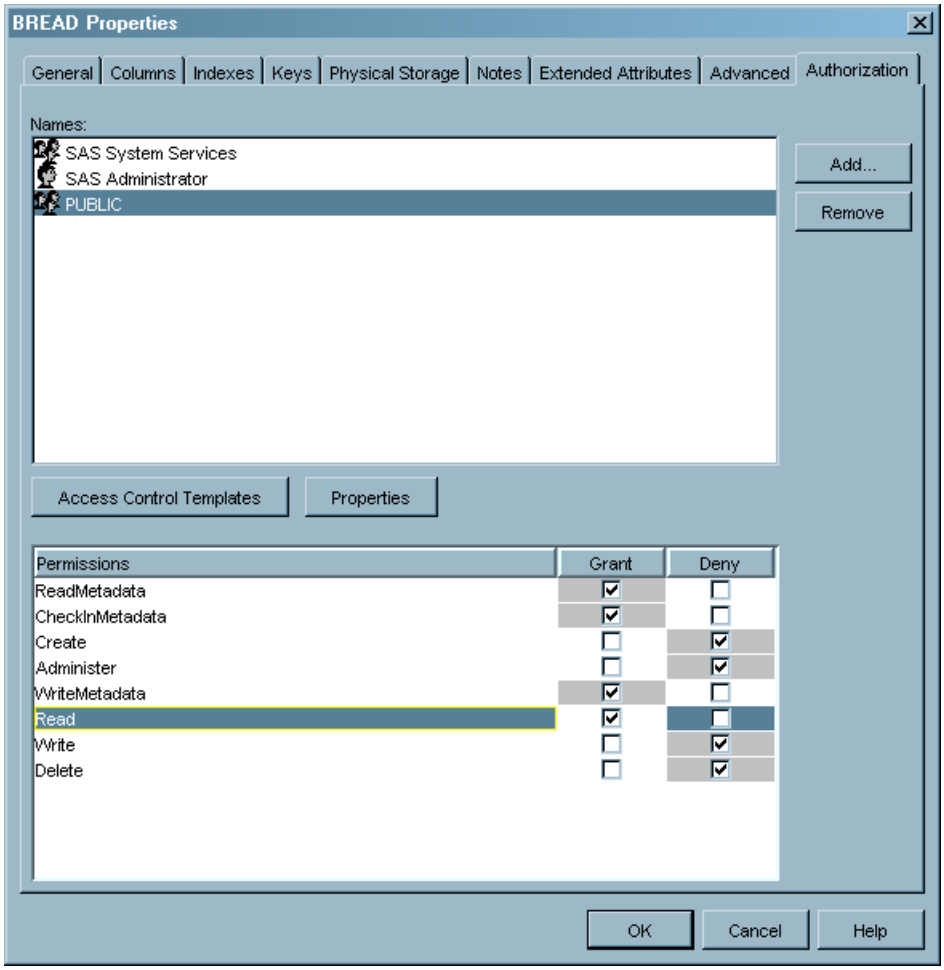


**Figure 12.12.** Setting Permissions for the PUBLIC Group

(d) Click **OK** to save the changes.

### Grant Permissions to All Data Sets in a Library

If you want to grant Read permissions for all of the data sets in the TESTLIB library, then perform the following steps:

1. Start a SAS Management Console session and log on as the SAS Administrator (e.g., sasadm).
2. Right-click the **TESTLIB** library and select **Properties**.
3. Repeat the following steps for granting permissions to all of the data sets, similar to how you granted Read permission to the BREAD data set:

   (a) Select the **Authorization** tab, select the PUBLIC name, and check the **Grant** checkbox for the Read column. The line should become highlighted.

   (b) Click **OK** to save the changes.

### Verify Permissions

In order to verify that the permissions you defined really do exist, perform the following steps:

1. Start the SAS Forecast Studio client, and log on as the sasdemo user.

   **Note:** If you have an existing SAS Forecast Studio client open, then close the session because the client caches data set information.

2. Create a new project by selecting the **TESTLIB** library. You should now be able to see and select the BREAD data set as shown in Figure 12.13.

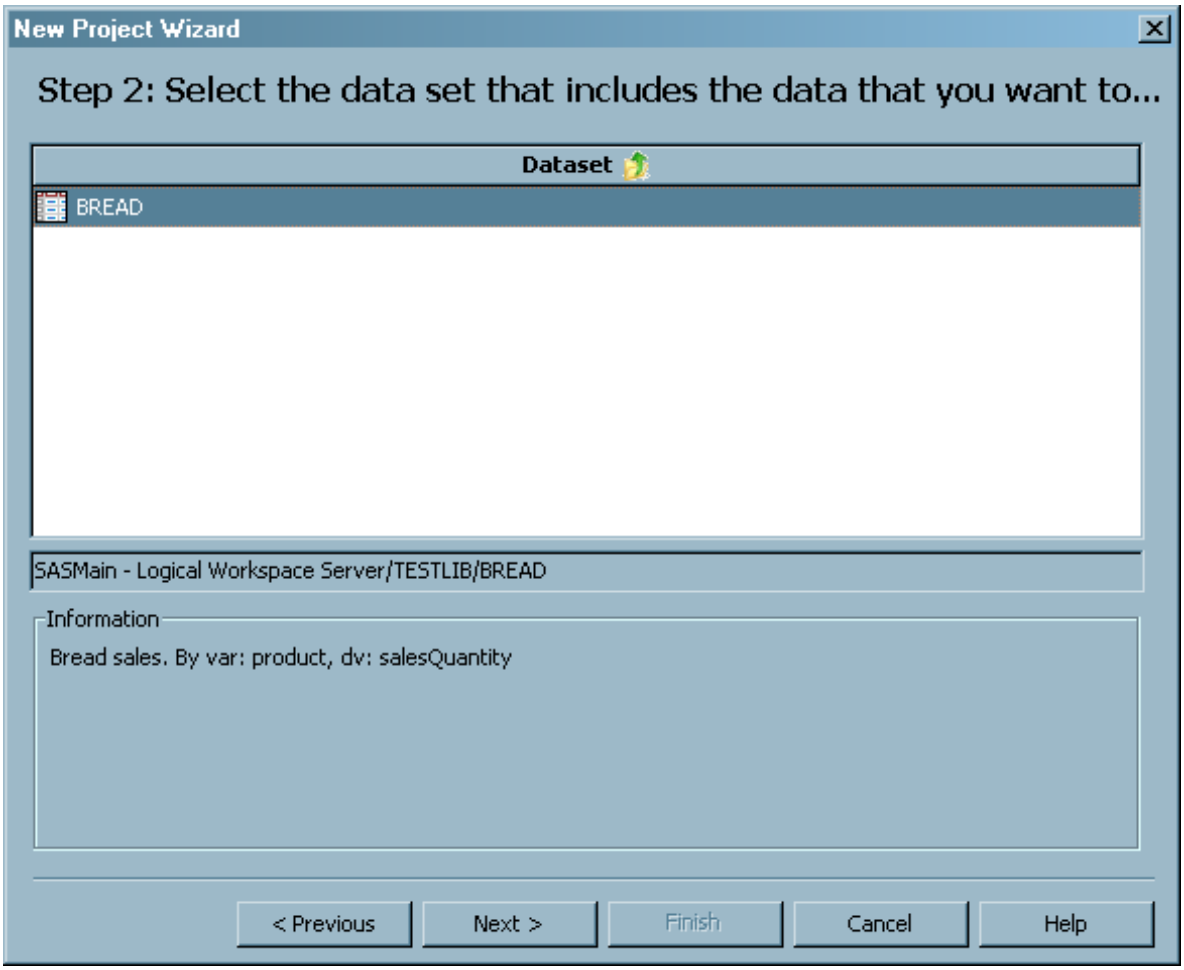


**Figure 12.13.** BREAD Data Set Available for Selection

**Note:** By default, the SASHELP, SASUSER, and WORK libraries have Read permissions granted. This is a feature of SAS Forecast Server.

### Restrict User Access to Variables

If you want to restrict a user from reading particular variables in a data set, then perform the following steps:

1. Grant Read permissions for the BREAD data set in the SAS Management Console as described in "Grant User Permissions to Specific SAS Data Sets."
2. Right-click the **BREAD** data set, and select **Properties**.
3. Select the **Columns** tab as shown in Figure 12.14.

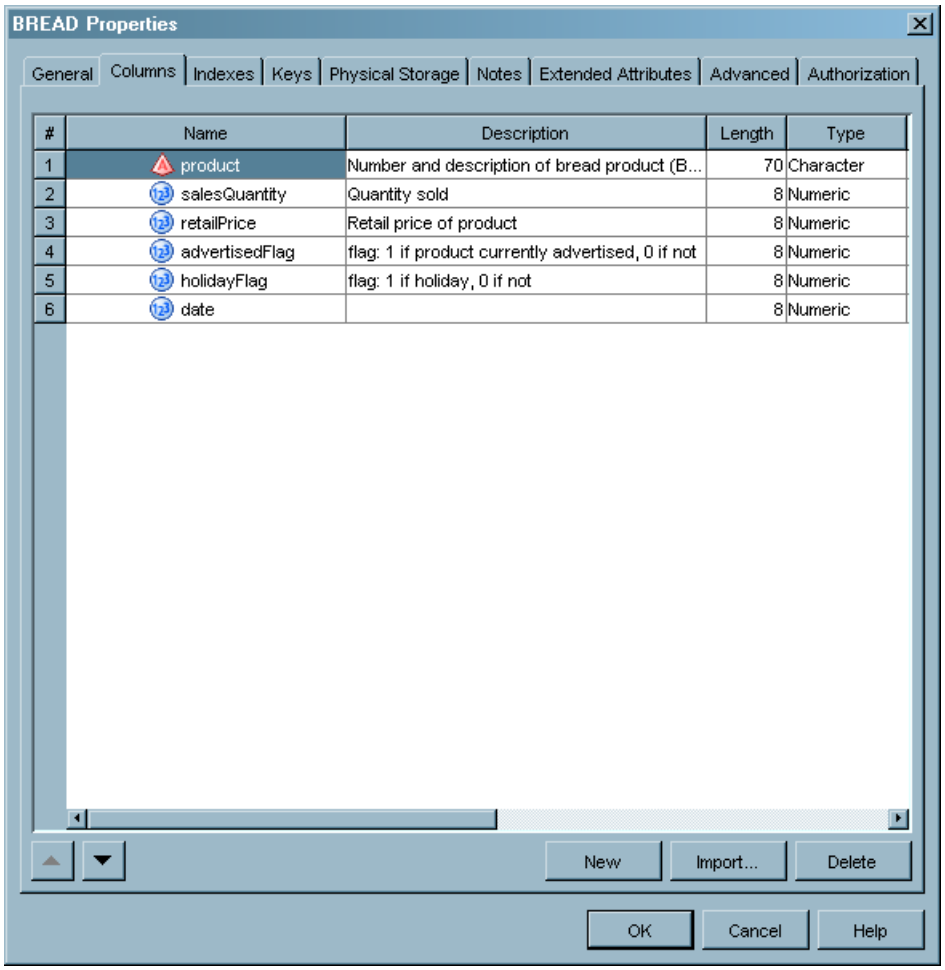


**Figure 12.14.** Setting Variable Permissions

4. To restrict the user from seeing the retailPrice variable, right-click on the **retailPrice** variable.
5. Select the **Authorization** tab, select the PUBLIC name, and check the **Deny** checkbox for the Read column. The line should become highlighted as shown in Figure 12.15.
6. Click **OK** to exit.

7. Click **OK** to save the changes.

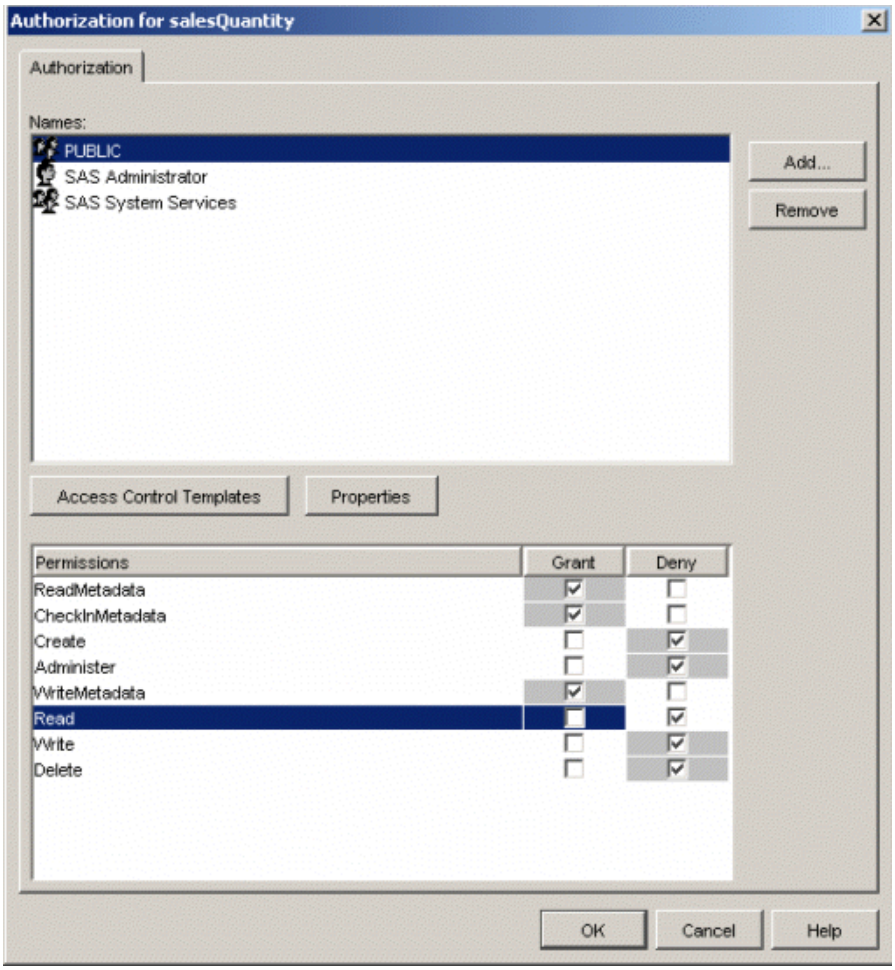


**Figure 12.15.** Restricted Variable Permissions

To verify that the sasdemo user does not have permissions to read the retailPrice variable, try to create a new project while logged on as the sasdemo user. Figure 12.16 shows that if you select the TESTLIB library and the BREAD data set, then you are not able to see the retailPrice variable because of the restrictions that you defined on the retailPrice variable. Because you do not have Read permissions to the retailPrice variable, you cannot use it in your forecasting project.

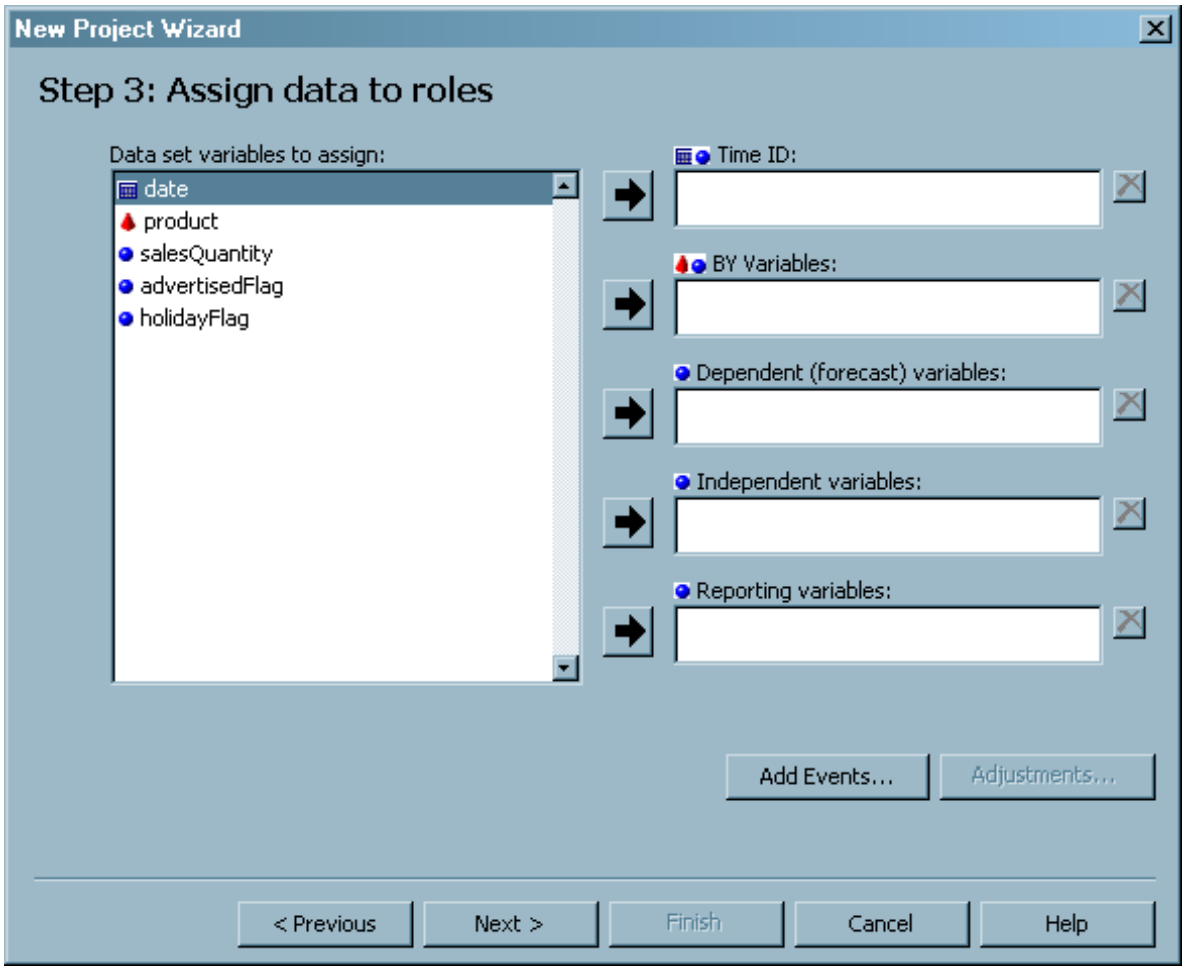


**Figure 12.16.** Available Variables Based on Permissions

## *Configure a SAS Forecast Server Report as a Stored Process*

### What Is a Stored Process?

A stored process is a SAS program that is stored centrally on a server. A client application can then execute the program, and can receive and process the results. Stored processes enable you to maintain and manage code centrally, give you better control over changes, enhance security and application integrity, and ensure that every client executes the latest version of code that is available. Stored processes are like other SAS programs, except that they have an additional feature that enables you to customize the program's execution. This feature enables the invoking application to supply parameters at the time that the stored process is invoked. For example, if you have a stored process that analyzes monthly sales data, you could create a MONTH variable in the stored process. At execution time, you would supply the parameter MONTH=MAY to analyze May sales data. For more information about how to create a stored process and to invoke it in a client application, see the stored process section of the *SAS Integration Technologies: Developer's Guide*.

### Configure SAS Forecast Server Stored Processes

**Note:** Before you configure any of the stored processes, it is recommended that you make a copy of the stored process and store them in a different directory.

A SAS Forecast Server project stores information hierarchically in project directories, or folders, depending on the server's operating system. For an opened project, you can execute a stored process interactively by using the information stored in the project, and by using the level and node of the hierarchy that currently is selected.

To configure a SAS Forecast Server stored process, perform the following steps:

1. Save your SAS code in the `!SASROOT\ForecastStudio\Reports\Samples` directory. If the folder does not exist, then create a new folder named **Samples**.
2. Open SAS Management Console and connect to a metadata repository as the SAS Administrator (e.g., sasadm).
3. Expand the **Stored Process Manager** folder.
4. Expand the **Forecast Studio** folder.
5. Expand the **Stored Processes** folder.
6. If there is not a **Samples** folder, then right-click the **Stored Processes** folder, select **New Folder**, and create a new folder named **Samples**.
7. Right-click the **Samples** folder and select **New Stored Process**.
8. Enter the name of your SAS program and a description (optional), and click **Next**.
9. Select **SASMain** as the SAS server. You need to add a source repository, which is a directory where the programs can be found.
   (a) Click **Manage**.
   (b) Click **Add**.
   (c) Enter `C:\SAS\ForecastStudio\Reports\Samples` as the location, which is the same location where you saved your .sas file, and a description (optional).
   (d) Click **OK**.
   (e) Click **OK** again.
10. Select or enter the directory where you saved your SAS code as the source repository, enter the name of your SAS program as the source file, select **Transient result package** as the output, and click **Next**.
11. Click **Finish** on the Parameter panel.

You can find your new report in SAS Forecast Server from the **Tools** → **Reports and Stored Processes** menu option. If you have a project opened, then you can run the report.

### Pre-defined Macro Variables to Use with Stored Processes

To assist you with creating stored processes, SAS provides pre-defined macro variables. These macro variables contain information about the project as well as the location in the hierarchy that you are viewing currently. In general, the pre-defined macro variables that are used by SAS Forecast Server can be grouped into two categories:

- project macro variables
- interactive macro variables

You can use the project macro variables outside of SAS Forecast Server in SAS programs and stored processes by including the &HPF_INCLUDE file. You cannot use interactive macro variables outside of SAS Forecast Server in SAS programs and stored processes unless you define these macro variables yourself.

Interactive macro variables depend on the node of the tree (table) that currently is selected. Project macro variables do not depend on the tree node.

**Note:** If the number of variables is very large (BY, dependent, independent, reporting, etc.), the stored process macro variables can exceed the default maximum macro variable value length of 4096. The maximum length can be increased to 65534 by using the MVARSIZE= system option.

Table 12.2 lists the macro variables and their descriptions. You can use these macro variables in any stored process which you create for a SAS Forecast Server project.

**Table 12.2.** Pre-defined Macro Variables

| Name | Description | Format |
|---|---|---|
| **Macro Variables for Project Information** | | |
| HPF_DESC | Description of the Forecast Studio Project. | SAS label |
| HPF_PROJECT | The name of the project. | SAS name |
| HPF_PROJECT_LOCATION | System path to the project directory or folder. | System path |
| HPF_PROJECT_SERVER | SAS Workspace Server name. | Host name |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_INCLUDE | Project include file.<br>This macro variable specifies the system path and file name that contains the SAS code to assign SAS libraries and catalogs associated with the project.<br>By default, all libraries and catalogs are assigned with Read Only access (ACCESS=READONLY).<br>For example, the following SAS code assigns project library names with Read Only access:<br>%include "&HPF_INCLUDE";<br>For example, the following SAS code assigns project library names with Read and Write access:<br>%let HPF_READ_ONLY = 0;<br>%include "&HPF_INCLUDE"; | System file name |
| **Macro Variables for Project Input Data Information** | | |
| HPF_INPUT_LIBNAME | SAS library reference for the input data set. | SAS name |
| HPF_INPUT_DATASET | SAS member for the input data set. | SAS name |
| **Macro Variables for Project Variable Information** | | |
| HPF_NUM_BYVARS | Number of BY variables.<br>If there are no BY variables, HPF_NUM_BYVARS is set to zero. | Nonnegative integer |
| HPF_BYVARS | List of BY variable names.<br>The order of the BY variable names is the same as specified in the project.<br>The macro variable is always defined; but if there are no BY variables, HPF_BYVARS is set to NULL. | List of SAS names separated by a single space |
| HPF_BYVAR&n | BY variable name listed in the $n^{th}$ position of the ordered list of BY variables (HPF_BYVARS).<br>The first BY variable name is stored in HPF_BYVAR1, the second in HPF_BYVAR2, and the last is stored in HPF_BYVAR&HPF_NUM_BYVARS.<br>If there are no BY variables (&HPF_NUM_BYVARS is zero), these macro variables are not defined. | SAS name |
| HPF_NUM_DEPVARS | Number of dependent variables.<br>There is always at least one dependent variable. | Positive integer |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_DEPVARS | List of all dependent variable names.<br>The order of the dependent variable names is the same as specified in the project. | List of SAS names separated by a single space |
| HPF_DEPVAR&n | Dependent variable name listed in the $n^{th}$ position of the ordered list of dependent variables (HPF_DEPVARS).<br>The first dependent variable name is stored in HPF_DEPVAR1, the second in HPF_DEPVAR2, and the last is stored in HPF_DEPVAR&HPF_NUM_DEPVARS.<br>Since there is always at least one dependent variable associated with a project, HPF_DEPVAR1 is always defined. | SAS name |
| HPF_NUM_INDEPVARS | Number of independent variables.<br>If there are no independent variables, HPF_NUM_INDEPVARS is set to zero. | Nonnegative integer |
| HPF_INDEPVARS | List of all independent variable names.<br>The order of the independent variable names is the same as specified in the project.<br>The macro variable is always defined; but if there are no independent variables, HPF_INDVARS is set to NULL. | List of SAS names separated by a single space |
| HPF_INDEPVAR&n | Independent variable name listed in the $n^{th}$ position of the ordered list of independent variables (HPF_INDEPVARS).<br>The first independent variable name is stored in HPF_INDEPVAR1, the second in HPF_INDEPVAR2, and the last is stored in HPF_INDEPVAR&HPF_NUM_<br>INDEPVARS.<br>If there are no independent variables (&HPF_NUM_INDVARS is zero), these macro variables are not defined. | SAS name |
| HPF_NUM_REPORTVARS | Number of reporting variables.<br>If there are no reporting variables, then HPF_NUM_REPORTVARS is set to zero. | Nonnegative integer |
| HPF_REPORTVARS | List of all reporting variable names.<br>The order of the reporting variable names is the same order as specified in the project.<br>The macro variable is always defined; but if there are no reporting variables, then HPF_REPORTVARS is set to NULL. | List of SAS names separated by a single space |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_REPORTVAR&n | Report variable name listed in the $n^{th}$ position of the ordered list of report variables (HPF_REPORTVARS).<br>The first report variable name is stored in HPF_REPORTVAR1, the second in HPF_REPORTVAR2, and the last is stored in HPF_REPORTVAR&HPF_NUM_REPORTVARS.<br>If there are no reporting variables (&HPF_NUM_REPORTVARS is zero), then these macro variables are not defined. | SAS name |
| **Macro Variables for Project Time ID Information** | | |
| HPF_TIMEID | Time ID variable name | SAS name |
| HPF_TIMEID_FORMAT | Time ID format name | SAS format name |
| HPF_SEASONALITY | Length of the seasonal cycle<br>A seasonality of 1 implies no seasonality. | Positive integer |
| HPF_INTERVAL | Time interval name | SAS time interval |
| HPF_DATASTART | Start date/date-time/time value of the project<br>The starting time ID value of the project input data set (&HPF_LIBNAME.&HPF_DATASET). | SAS date/ date-time/ time value |
| HPF_DATAEND | End date/date-time/time value of the project<br>The ending time ID value of the project input data set (&HPF_LIBNAME..&HPF_DATASET). | SAS date/ date-time/ time value |
| **Macro Variables for Project Data Options** | | |
| HPF_SETMISSING | Missing value interpretation | |
| HPF_TRIMMISS | Missing value trimming | |
| HPF_ZEROMISS | Zero value interpretation | |
| **Macro Variables for Project Diagnostic Options** | | |
| HPF_DIAGNOSE_INTERMITTENT | Intermittency threshold value | Positive number |
| HPF_DIAGNOSE_SEASONTEST | Seasonality significance level | P-value |
| **Macro Variables for Project Selection Options** | | |
| HPF_SELECT_CRITERION | Model selection criterion | |
| HPF_SELECT_HOLDOUT | Holdout sample absolute size<br>Zero implies that the model fit is used for selection. | |
| HPF_SELECT_HOLDOUTPCT | Holdout sample percent size | Positive integer |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_SELECT_MINOBS_NON_MEAN | Minimum number of observations required before a non-mean model is selected | Positive integer |
| HPF_SELECT_MINOBS_TREND | Minimum number of observations required before a trend model is selected | Positive integer |
| **Macro Variables for Project Forecast Options** | | |
| HPF_LEAD | Length of the forecast horizon or lead | Nonnegative integer |
| HPF_BACK | Number of time periods to omit | Positive integer |
| HPF_FORECAST_ALPHA | Confidence level size | P-value |
| **Macro Variables for Project Hierarchy Information** | | |
| HPF_NUM_LEVELS | Number of levels in the hierarchy<br>The levels of the hierarchy are numbered from 1 (the top of the hierarchy) to &HPF_NUM_LEVELS (the leaves of the hierarchy).<br>If there is no hierarchy, then the number of levels is 1. | Positive integer |
| HPF_LEVEL_DATAWHERE&n | Input data WHERE clause for the n$^{th}$ level, where $n$ ranges from 1 to &HPF_NUM_LEVELS<br>These WHERE clauses can be used to subset the input data sets for each level in the hierarchy to obtain information about the currently selected node.<br>The WHERE clause at level 1 (the top) is stored in HPF_LEVEL_DATAWHERE1, the WHERE clause at the lowest level (the leaves) is stored in HPF_LEVEL_DATAWHERE&HPF_NUM_LEVELS.<br>**Note:** You must unquote this macro variable. For example,<br>%unquote (&&HPF_CURRENT_DATAWHERE&n); | SAS WHERE clause |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_LEVEL_OUTWHERE&n | Output data WHERE clause for the $n^{th}$ level where n ranges from 1 to &HPF_NUM_LEVELS<br>These WHERE clauses can be used to subset the input data sets for each level in the hierarchy to obtain information about the currently selected node.<br>The WHERE clause at level 1 (the top) is stored in HPF_LEVEL_OUTWHERE1, the WHERE clause at the lowest level (the leaves) is stored in HPF_LEVEL_OUTWHERE&HPF_NUM_LEVELS.<br>**Note:** You must unquote this macro variable. For example,<br>%unquote (&&HPF_LEVEL_OUTWHERE&n); | SAS WHERE clause |
| HPF_LEVEL_RECONCILE_DATASET&n | Reconciled forecast data set for the $n^{th}$ level | SAS name |
| HPF_LEVEL_RECONCILE_STATISTICS&n | Reconciled statistics data set for the $n^{th}$ level | SAS name |
| HPF_LEVEL_RECONCILE_SUMMARY&n | Reconciled summary data set for the $n^{th}$ level | SAS name |
| HPF_LEVEL_BYVARS&n | List of BY variable names associated with the $n^{th}$ level, where $n$ ranges from 1 to &HPF_NUM_LEVELS<br>The variables names are separated by a single space.<br>The BY variables at level 1 (the top) are stored in HPF_LEVEL_BYVARS1, the BY variables for the lowest level (the leaves) are stored in HPF_LEVEL_BYVARS&HPF_NUM_LEVELS. | SAS name |
| HPF_LEVEL_LIBNAME&n | SAS library reference for the $n^{th}$ level, where $n$ ranges from 1 to &HPF_NUM_LEVELS<br>The library reference at level 1 (the top) is stored in HPF_LEVEL_LIBNAME1, the library reference at the lowest level (the leaves) is stored in HPF_LEVEL_LIBNAME&HPF_NUM_LEVELS. | SAS LIBNAME |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_LEVEL_NSERIES&n | Number of series associated with the n$^{th}$ level, where $n$ ranges from 1 to &HPF_NUM_LEVELS<br>The number of series at level 1 (the top) is stored in HPF_LEVEL_NSERIES1, the number of series at the lowest level (the leaves) is stored in HPF_LEVEL_NSERIES&HPF_NUM_LEVELS. | Positive integer |
| **Macro Variables for Project Event Information** | | |
| HPF_EVENTS | List of all event names | SAS name |
| HPF_EVENT_n | Name of the n$^{th}$ event | SAS name |
| HPF_NUM_EVENTS | Number of events | Positive integer |
| **Macro Variables for Project Reconcile Information** | | |
| HPF_RECONCILE_LEVEL | Number of the reconciliation level<br>The reconciliation level number ranges from 1 to &HPF_NUM_LEVELS, depending on the level of reconciliation. | Positive integer |
| HPF_RECONCILE_BYVAR | BY variable of reconciliation level | SAS name |
| HPF_RECONCILE_METHOD | Reconciliation method | SAS name |
| **Macro Variables for Interactive Current Level Information** | | |
| HPF_CURRENT_LEVEL | The level number associated with the current level.<br>The current level number ranges from 1 to &HPF_NUM_LEVELS, depending on the currently selected level of the hierarchy. | Positive integer |
| HPF_CURRENT_LIBNAME | SAS library reference for the currently selected level of the hierarchy | SAS LIBNAME |
| HPF_CURRENT_LEVEL_ START | Start date/date-time/time value of the current level<br>The starting time ID value of the input data set for the currently selected level of the hierarchy. | SAS date/ date-time/ time value |
| HPF_CURRENT_LEVEL_END | End date/date-time/time value of the current level<br>The ending time ID value of the input data set for the currently selected level of the hierarchy. | SAS date/ date-time/ time value |
| HPF_CURRENT_LEVEL_NSERIES | Number of series (or nodes) associated with the currently selected level of the hierarchy | Positive integer |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_CURRENT_DATAWHERE | Input data WHERE clause for the currently selected node<br>This WHERE clause can be used to subset the input data set to obtain information about the currently selected node of the hierarchy.<br>**Note:** You must unquote this macro variable. For example,<br>%unquote<br>(&HPF_CURRENT_DATAWHERE); | SAS WHERE clause |
| HPF_CURRENT_OUTWHERE | Output data WHERE clause for the currently selected node<br>This WHERE clause can be used to subset the output data sets to obtain information about the currently selected node.<br>**Note:** You must unquote this macro variable. For example,<br>%unquote<br>(&HPF_CURRENT_OUTWHERE); | SAS WHERE clause |
| HPF_NUM_CURRENT_BYVARS | Number of BY variable names for the currently selected level of the hierarchy | Nonnegative integer |
| HPF_CURRENT_BYVARS | List of BY variable names for the currently selected level of the hierarchy<br>The macro variable is always defined; but if there are no BY variables, HPF_CURRENT_BYVARS is set to NULL. | List of SAS names separated by a single space |
| HPF_CURRENT_BYVARS&n | $n^{th}$ BY variable name for the current level | SAS name |
| HPF_CURRENT_DEPVAR | Dependent variable name associated with the currently selected node of the hierarchy. This variable is contained in the list of dependent variables (HPF_DEPVARS). | SAS name |
| HPF_CURRENT_SERIESSTART | Start date/date-time/time value of the current node<br>The starting time ID value of the series for the currently selected node of the hierarchy. | SAS date/ date-time/ time value |
| HPF_CURRENT_SERIESEND | End date/date-time/time value of the current node<br>The ending time ID value of the series for the currently selected node of the hierarchy. | SAS date/ date-time/ time value |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_CURRENT_HORIZON | Horizon date/date-time/time value of the current node<br>The time ID value of the start of the multi-step ahead forecast for the currently selected node of the hierarchy. | SAS date/ date-time/ time value |
| **Macro Variables for Filters** | | |
| HPF_EXCEPTIONS_WHEREn | All of the current filters marked as exceptions for each level in the hierarchy (n specifies the hierarchy level)<br>**Note:** If any of the exceptions use BY variables which are not present in the hierarchy level, then the exception contains 'where (1=0)'; This causes no observations to match the WHERE clause instead of generating an error.<br>If a BY variable is being used in the exception, only a hierarchy level with that BY variable present can use the exception. All others use a dummy WHERE clause, which will exclude all observations. | SAS WHERE clause |
| HPF_FILTER | When used as a parameter name in SAS Management Console, the list of filter names is presented to you for choice. Only one filter name can be chosen at a time. As a macro variable, this represents the filter name that you chose. | SAS WHERE clause |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_FILTER_WHEREn | The filter WHERE clause for the given level in the hierarchy<br>The filter WHERE clause is valid for the selected filter (represented in HPF_FILTER) and behaves the same as HPF_EXCEPTIONS_WHEREn when a BY variable is used that is not present in the current hierarchy level.<br>**Example:**<br>A filter exists named MapeGT4 for a project using SASHELP.PRICEDATA. A stored process is created using HPF_FILTER as a parameter. When the stored process is executed, you are presented with a list of filter names. If you select MapeGT4, then the following macro variables are generated:<br><br>%LET HPF_FILTER = MapeGT4; %LET HPF_FILTER_WHERE1 = %nrstr(where %(MAPE > 4.0%);); %LET HPF_FILTER_WHERE2 = %nrstr(where %(MAPE > 4.0%);); %LET HPF_FILTER_WHERE3 = %nrstr(where %(MAPE > 4.0%);); %LET HPF_FILTER_WHERE4 = %nrstr(where %(MAPE > 4.0%);); | SAS WHERE clause |
| HPF_FILTER_<*filter-name*>_WHEREn | A valid WHERE clause for use on the OUTSTAT option and/or OUTSTATSELECT option<br>The contents are the definition of the filter in WHERE clause form, such as:<br>where (MAPE > 6);<br>where (MAPE > 6) and (MAE < 12);<br>where (MAPE > 6) and (regionName = 'Region1');<br><br>**Note:** that a filter definition may contain statistics of fit and/or BY variable values. If the filter contains a BY variable that does not exist in the level being generated, then the WHERE clause is where (1 = 0). This means that there are no matches at all. | SAS WHERE clause |
| **Macro Variables for Metadata Repository Information** | | |
| HPF_METADATA_HOST | Metadata server host name | Host name |
| HPF_METADATA_PORT | Metadata server port number | Port number |

**Table 12.2.** Pre-defined Macro Variables (continued)

| Name | Description | Format |
|---|---|---|
| HPF_METADATA_REPNAME | Metadata repository name | Repository name |
| **Macro Variables for Other Information** | | |
| HPF_READ_ONLY | Project access Read Only flag<br>By default, stored processes have Read Only access with respect to the project libraries. This macro variable changes this access to Write.<br>For example, the following SAS code assigns project library names with Read Only access:<br>%include "&HPF_INCLUDE";<br>For example, the following SAS code assigns project library names with Write access:<br>%let HPF_READ_ONLY = 0;<br>%include "&HPF_INCLUDE"; | Boolean |
| HPF_DEFAULT_LOCATION | Default path to the system directory where the SAS Forecast Server projects are currently stored | System path name |
| HPF_ODSDEST | Used inside a stored process to control the output destination of ODS<br>By default, HPF_ODSDEST is set to HTML, which means that the ODS output is in HTML format. You can change this value by adding a stored process parameter with the macro variable name of HPF_ODSDEST, which provides a choice at runtime. The valid values are the following:<br>HTML (default)<br>PDF<br>RTF<br>XML | ODS destinations |

### Use a Customized Format in SAS Forecast Server

To use a customized format that you defined with the data set in SAS as well as in SAS Forecast Server, you must make the user-written format accessible to the SAS Workspace Server. You can accomplish this by using one of the following methods:

- You can store the user-written format in the default formats catalog location: **<*config-dir*>/Lev1/SASMain/SASEnvironment/SASFormats**
- You can modify the SAS configuration file to search for your customized format in its own library as well as search the default formats library.

To use a customized format, perform the following steps:

1. Verify that the format matches the data values. For example, the following format statement needs to contain line names with a capitalized L (Line1, Line2, etc.).
   ```
   value $ line
   Line1='Product Line1'
   Line2='Product Line2'
   Line3='Product Line3'
   Line4='Product Line4'
   Line5='Product Line5';
   ```
2. The format must be stored in a persistent format library that is accessible to SAS. This requires that you use the LIBRARY= option with the PROC FORMAT statement.

   To store the format in the default location, the SAS code is written as follows:
   ```
   libname library
   "<config-dir>/Lev1/SASMain/SASEnvironment/SASFormats";
   proc format library=library;
   ...
   ```
   If you want to store the user-defined formats in the **C:\myfmts** location on the SAS server, then the SAS code is written as follows:
   ```
   libname library "c:\myfmts";
   proc format library=library;
   ...
   ```
   The catalog name in this library defaults to formats.
3. The format library must be defined to the SAS Workspace Server session that is used by SAS Forecast Server. If the customized format is stored in the default location, then no further modifications are required. If the customized format is in a different location, then you must configure SAS to search that library in addition to the default library.

   To search a different format library, you edit the configuration file that can be found in the following default location:

Windows:
**C:\SAS\Forecast\Lev1\SASMain\sasv9.cfg**

UNIX:
**<*config-dir*>/Lev1/SASMain/sasv9.cfg**

Add the library definition, and include the library definition in the format-search parameter:

```
-set FSFMTS ("c:\myfmts")
-fmtsearch (FSFMTS)
```

When the SAS Workspace Server is restarted, the system resolves references to the customized formats that are stored in the formats catalog in **c:\myfmts**.

# Middle Tier

## *Change the Location Where User Projects Are Saved*

The current user interface does not support a project location to be specified. The only location known to the system is stored in the metadata, and the user cannot customize this location either in the user interface or in the metadata.

However, an optional file can be created to define a mapping for users and the default SAS workspace server location where projects, data specifications, and archives are created. The user_locations.properties file must reside on the SAS Analytics Platform middle tier in the following directory (Windows operating environment example):
**!SASROOT\SASAPCore\apps\Forecasting**

The user_locations.properties file contains the workspace server locations by user ID, or by user ID and workspace session ID. SAS Forecast Server uses this mapping file to determine where workspace server project files should be saved physically. SAS Forecast Server first attempts to find the user ID and SAS workspace server ID entries, and if it does not find them, then attempts to find just the user ID. If neither ID is found, then the default location in the metadata is used. The user ID and SAS workspace server ID entries are case insensitive, as shown in the following Window operating environment examples:

```
myuser=C:\SAS\ForecastStudio

myuser\A5PITA0F.AT000001=D:\myuser\ForecastStudio

brenda=c:\users\brenda\ForecastStudio

mike=c:\users\mike\ForecastStudio

george=c:\users\george\ForecastStudio
```

**brian=\\myserver\myprojects** (UNC path name example)

The user_locations.properties file is read dynamically, and can be modified while the SAS Analytics Platform is running. Changes are reflected without having to restart the SAS Analytics Platform.

A mapped drive letter such as **U:\<***foldername***>** is not supported. Given that this directory path is resolved by the SAS Workspace Server, the logon script for that user is NOT executed when a SAS Workspace Server starts. As a result, a drive letter that would be mapped automatically in a logon script would never be defined.

# Chapter 13
# Troubleshooting SAS Forecast Server

## Chapter Contents

# Chapter 13
# Troubleshooting SAS Forecast Server

## Gathering Information

### Overview

When you are troubleshooting unexpected application behavior, it is important to isolate the problem and gather all the pertinent information regarding the unexpected behavior. The following are the general classes of information that can expedite resolution of a technical problem:

- environmental and configuration information
- detailed problem description
- log files
- other files or screen shots
- sample test data

You can use Table 13.1 to help you gather as much information as possible, so that SAS Technical Support will be better able to reproduce and fix your problem.

**Table 13.1.** Information Gathering Checklist

| Task | Done |
|---|---|
| Does SAS Technical Support have the details of your operating environment? | [ ] |
| Have you provided a detailed description of the problem, including what it takes to reproduce the problem? | [ ] |
| Have you provided any sample data that would help reproduce the problem? | [ ] |
| Have you captured all the log files? | [ ] |
| Have you provided the full Java stack trace from the error page? | [ ] |

### Environmental and Configuration Information

If you request help from SAS Technical Support, then providing the following information about your installation can result in faster resolution of the problem:

- a copy of the SAS Forecast Server configuration files:
  Windows: `SAS_HOME\SASAPCore\apps \Forecasting\app.config`
  UNIX: `SAS_HOME/SASAPCore/apps/Forecasting/app.config`
- hardware platform, operating environment (including SAS version and SAS service pack/patch level), amount of physical memory, and number of processors

- JDK version
- application server version number and patch level
- application server command line parameters
- application server startup script
  Windows: **SAS_HOME\SASAPCore\apps\Forecasting\bin\ForecastStudioSetup.bat**
  UNIX: **SAS_HOME/SASAPCore/apps/Forecasting/bin/ForecastStudioSetup.sh**
- SAS Forecast Server version number and patch level
- JDBC driver
- server language and locale

**Note:** You must provide the preceding information only once, unless it has changed from previous reports.

## Problem Description

Provide a scenario description that includes as much information as possible. Include a description of the general task that you are trying to accomplish, your role and permissions, and what has happened during the session. Provide details such as the following:

- Are you working with new data or updating existing data?
- How easy is the problem to reproduce?
- What browser and version are you using?
- Is the problem locale-specific? If so, which locales are having problems?

## Sample Test Data

If possible, capture the information entered that caused the problem. In certain situations, SAS Technical Support might request your data load files so that they can better replicate your operating environment.

## Log Files

When you are troubleshooting unexpected behavior in SAS Forecast Server, you can use the log files written by the SAS System. Typically, the system log files contain important data for diagnosing any problems. If you need to contact SAS Technical Support, then you should provide the system log to assist the staff in resolving the problem.

## Java Stack Traces and Screen Shots

SAS Forecast Server attempts to catch and log any problem and route you to the application error page, where the detailed exception information can be captured and sent to SAS Technical Support. It can be very helpful if you copy and send the Java stack trace in the error page.

**Note:** The complete text of the Java stack trace is preferable to a screen shot of the error page, which often does not include the full Java stack trace.

Screen shots of the page or sequence of pages that precede the error can be quite helpful. If possible, capture the screen shots and send them with the Java stack traces to SAS Technical Support.

# Cannot Log On to the SAS Forecast Studio Client

**Problem:**
If you cannot log on to the SAS Forecast Studio client, then there might be a problem with the SAS Analytics Platform.

**Error:**
You can get multiple errors when attempting to log on to a SAS Forecast Studio client. You can encounter the following types of logon states:

- No new user can log on to a SAS Forecast Studio client.
- You could log on to a SAS Forecast Studio client yesterday, but you cannot log on today.
- Some users can log on to a SAS Forecast Studio client, but other users cannot log on.

**Solution:**
Because the SAS Analytics Platform starts the SAS Forecast Server Mid-Tier, you should review the SAS Analytics Platform documentation for possible remedies. You can access the SAS Analytics Platform documentation by selecting SAS Analytics Platform as your product at the following Web address:
`http://support.sas.com/documentation/onlinedoc/index.html`

# SASGUEST Cannot Log On to the SAS Forecast Studio Client

**Problem:**
User manager profile identity is incorrect. The sasguest user ID cannot log on from the application.

**Error Message:**

```
2004-11-23 16:40:52,111 [RMI TCP Connection(4)-10.28.11.224]
INFO com.sas.apps.session.AppServerImpl -
com.sas.services.user.UserInitializationException:com.sas.services.
ServiceException:  User SAS Guest is not connected to
correct profile repository
(omi://<host1>.<domain>.com:8561) for application
global.

2004-11-23 16:40:52,127 [RMI TCP Connection(4)-10.28.11.224]
INFO com.sas.apps.session.AppServerImpl - Failed to log
in userid sasguest
```

**Solution:**
The first time the SAS Analytics Platform is connected to the metadata server, the SAS Analytics Platform tries to open the Foundation Services deployment. If there is none, it will add one.

If you log on to the client before defining a three-tier configuration, then the deployment records that you are trying to authenticate based on a profile that is defined in the User Services section of the deployment that specifies “omi://localhost:8561” as the address of the metadata server OMI profile. To change the profile, perform the following steps:

1. Verify the configuration of the **`login.config`** file. The entry in **`AP/conf/login.config`** depends on the previous installation of the metadata server.

   Example: PFS com.sas.services.security.login.OMILoginModule optional-host=“D8359.na.sas.com”

   If the default value for host is *localhost*, then the host specifications do not match and SAS Forecast Studio will not work.

   On a machine where the metadata server is already installed and you used the default host as *localhost*, specify the following machine address:

   host=“localhost”

   **Note:** If you continue to have a problem, then you might want to try the host=*host1.domain.com* setting to see which host address works for your configuration.

2. If you change the SAS Analytics Platform configuration later to be an actual network address like *host1.domain.com*, then you need to change the deployment profile because the BI authentication cannot know that *host1.domain.com* is *localhost*. To change the profile, perform the following steps:

   (a) Launch SAS Management Console.
   (b) Expand **Foundation Services Manager**.
   (c) Expand **SAS Forecast Studio - Foundation Services** fully.
   (d) Right-click **User Services** and select **Properties**.
   (e) Select the **Service Configuration** tab and click **Edit Configuration**.
   (f) Select the **Profiles** tab.
   (g) Select the **global** profile and click **Edit**.
   (h) Change the machine name in the **Domain URL** field from *omi://localhost:8561* to *omi://host1.domain.com:8561* or whatever your machine name is. The default value for host is *localhost*, and this value does not work unless it is modified.
   (i) Click **OK** until the configuration is complete.

# Cannot Launch SAS Forecast Server from the SAS Analytics Platform Web Page

**Problem:**
After you click **Launch for Forecasting** on the SAS Analytics Platform Web page, the SAS Forecast Studio client does not launch. Instead, an XML file appears in the Internet Explorer window.

**Error Message:**
The following errors are observed in the SAS Analytics Platform Server window:

```
2005-08-30 15:17:43,796 [Thread-10]
ERROR com.sas.analytics.forecasting.webapp.JNLPProvider
- File sas.graph.nld.jar not found.  2005-08-30
15:17:43,796 [Thread-10]
ERROR com.sas.analytics.forecasting.webapp.JNLPProvider
- File sas.sg.datadef.jar not found.  2005-08-30
15:17:43,796 [Thread-10]
ERROR com.sas.analytics.forecasting.webapp.JNLPProvider
- File sas.sg.dataimpl.jar not found.  2005-08-30
15:17:43,796 [Thread-10]
ERROR com.sas.analytics.forecasting.webapp.JNLPProvider
- File sas.graph.j2d.jar not found.
```

**Solution:**
If an XML file appears in your browser, then the Java Web Start feature is not available on your client machine because the required JRE version is not installed on the client machine. You receive a warning that the required JRE version is not installed, and you are asked to specify the location of the required JRE version. You must install the required version of JRE on the client machine in order for SAS Forecast Server Java Web Start to work.

For more information about SAS Forecast Server system requirements, see Chapter 3, "System Requirements for SAS Forecast Server."

For more information about Java Web Start, see the following Web site:
**http://java.sun.com/products/javawebstart/**

# Cannot Access Libraries from a Newly Added Workspace Server

**Problem:**
You added another workspace server, and you cannot access the libraries from the newly added workspace server.

**Error Message:**
The message "Errors were found in the report" appears, and no report is generated.

**Solution:**
If you added a new workspace server for SAS Forecast Server, then the SAS Forecast

Server projects must be stored in a location that is accessible to all workspace servers (i.e., on a shared drive). Storing projects on the workspace server local file system results in configuration issues when using stored processes. You need to configure the server where the stored process executes.

# Cannot Access a SAS Library from SAS Forecast Server

**Problem:**
From within SAS Forecast Server, your SAS library is not listed as a possible selection in order for you to access the data set that you want as input for your project.

**Solution:**
To enable SAS Forecast Server to read the input data set, use SAS Management Console to define a library that specifies the SAS libref, engine, and path of the input data set. Use the Data Library Manager Plug-in of SAS Management Console to define a library that is pre-assigned to a server or servers, and specify the location of the input data set. To specify a library as pre-assigned for a server or servers, perform the following steps:

1. Open SAS Management Console as the SAS Administrator (e.g., sasadm), and connect to a metadata repository.
2. Expand the Data Library Manager node, and select **SAS Libraries**.
3. Right-click the library that you want to pre-assign, and select **Properties**.
4. Click the **Options** tab.
5. Click **Advanced Options**.
6. Select the **Library is pre-assigned** check box. This window is accessible from the Library Options window of the New Library Wizard when you create a new data library.
7. Ensure that the library is assigned to the correct SAS server(s). The selected library is assigned whenever one of the selected servers starts.
8. Click **OK**.

# Incorrect Version of SAS Installed for SAS Forecast Server

**Problem:**
The version of SAS installed on your system is not suitable for the version of SAS Forecast Server being run. SAS Forecast Server executes a syntax check on SAS High-Performance Forecasting software. If the syntax check fails, indicating that the feature being checked is not present, then an exception is sent to the client. The client displays the following error message, and the SAS Forecast Studio client then closes automatically.

**Error Message:**
`Forecast Studio requires a minimum of SAS` *version-number*`. Please close Forecast Studio and contact your system administrator.`

**Solution:**
If you receive the preceding error message, then contact your SAS representative to inquire about updating your version of SAS.

**Note:** The client is installed in a SAS Forecast Studio 1.4 folder, so it is easy to determine the version number of the client. The middle tier does not have such a directory structure. To identify the version number of the middle tier, navigate to the !SASROOT\SASAPCore\apps\Forecasting directory and view the `app.config` file with a text editor. The following text line shows the version number of the SAS Forecast Server Mid-Tier:
`application.version=1.4`

# Cannot Find Correct Java Version

**Problem:**
After you complete the installation of Service Pack 4, the `apserver.sh` script might not be able to find the correct Java version.

**Error Message:**
```
apserver[64]:
/projects/fs/installse20/SAS_9.1/sasjre/1.4.2/bin/java:
not found
```

**Solution:**
You might need to update the script to reflect the new JRE 1.4.2 path. To update the `apserver.sh` script, perform the following steps:

1. Navigate to the location of the `apserver.sh` script. By default, the path is the following:
   **`!SASROOT/SASAPCore/bin`**
2. Locate the following command lines in the script:
   ```
   # was $JAVACMD
   !SASROOT/sasjre/1.4.2/bin/java
   ```
3. Change the preceding lines to the following:
   ```
   # was $JAVACMD
   !SASROOT/sasjre/1.4.2/jre/bin/java
   ```
   **Note:** !SASROOT is the path where you installed SAS.
4. Save these changes to `apserver.sh`.

# Cannot Determine Which Version of SAS Forecast Server Is Running

The client is installed in a SAS Forecast Studio 1.4 folder, so it is easy to determine the version number of the client. The middle tier does not have such a directory structure. To identify the version number of the middle tier, navigate to the !SASROOT\SASAPCore\apps\Forecasting directory (default installation directory) and view the `app.config` file with a text editor. The following highlighted text shows the version number of the SAS Forecast Server Mid-Tier:

**application.version=1.4**

```
application.build.date=2005.11.07
application.build.number=1
application.version.major=1
application.version.minor=3
application.remote.class=com.sas.analytics.forecasting.rmi.
RemoteForecastingApplicationRmiImpl
application.local.class=com.sas.analytics.forecasting.rmi.
ForecastingApplicationRmi
application.startup.class=com.sas.analytics.forecasting.
ForecastingApplicationInitializer
application.war=sas.forecasting.war
application.war.link=Y
application.jnlp=main.jnlp
```

If you need to reference the version number of the client, then the default location of the client is in the installation directory:
**`c:\Program Files\SAS\SASForecastStudio`**

The SAS Forecast Studio client application is installed in a folder named for its version number.

# Java Version Missing for Java Web Start

**Problem:**
Java Web Start does not work because the required version of JRE is not installed on the client tier.

**Error:**
You get a message indicating that the required Java version 1.4.2_09 could not be found. The message is something like "Missing version field in response from server when accessing resource ..." This is most likely due to the proxy settings for Web Start. Start the Java Web Start Application Manager, and try changing the proxy settings to either **Use Browser** or **None**.

**Solution:**
You must have JRE 1.4.2_09 installed on the client machine. You need to either install the required JRE version or configure Web Start to use the required version.

JRE 1.4.2_09 is used as the Web Start run-time version, which does not need to be the same version as Web Start itself. You can use J2SE 5.0 for Web Start and launch the SAS Forecast Studio client by using the SAS Private JRE 1.4.2_09. If you use different JRE versions, then Web Start must be configured to include the JRE 1.4.2_09 version. This can be done by using the Preferences menu option in the Java Web Start Application Manager.

There is no automatic installation available for JRE 1.4.2_09 from Sun. You must first install a JRE version that contains Web Start. This prevents you from using the SAS Private JRE, because it does not contain Web Start. It is recommended that you install either JRE 1.4.2_09 from Sun or the latest JRE available from Sun at the following Web address:
`http://java.sun.com/products/archive/j2se/1.4.2_09/index.html`

# Part 5
# Glossary

## Contents

# Glossary

client application
: an application that runs on a client machine.

client tier
: the portion of a distributed application that requests services from the server tier. The client tier typically uses a small amount of disk space, includes a graphical user interface, and is relatively easy to develop and maintain.

descriptor information
: information about the contents and attributes of a SAS data set. For example, the descriptor information includes the data types and lengths of the variables, as well as which engine was used to create the data. SAS creates and maintains descriptor information within every SAS data set.

IOM server
: a SAS object server that is launched in order to fulfill client requests for IOM services. See also IOM (Integrated Object Model).

metadata object
: a set of attributes that describe a table, a server, a user, or another resource on a network. The specific attributes that a metadata object includes vary depending on which metadata model is being used.

middle tier
: in a SAS business intelligence system, the tier in which J2EE Web applications and J2EE enterprise applications execute.

object spawner
: a program that instantiates object servers that are using an IOM bridge connection. The object spawner listens for incoming client requests for IOM services. When the spawner receives a request from a new client, it launches an instance of an IOM server to fulfill the request. Depending on which incoming TCP/IP port the request was made on, the spawner either invokes the administrator interface or processes a request for a UUID (Universal Unique Identifier).

planning file
: an XML file that contains a list of the products to be installed and the components to be configured at a site. This file serves as input to both the SAS Software Navigator and the SAS Configuration Wizard.

SAS data set
: a file whose contents are in one of the native SAS file formats. There are two types of SAS data sets: SAS data files and SAS data views. SAS data files contain data values in addition to descriptor information that is associated with the data. SAS data views contain only the descriptor information plus other information that is required for retrieving data values from other SAS data sets or from files whose contents are in other software vendors' file formats. See also descriptor information.

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. See also service.

SAS Management Console
: a Java application that provides a single user interface for performing SAS administrative tasks.

SAS Metadata Server
: a multi-user server that enables users to read metadata from or write metadata to one or more SAS Metadata Repositories. The SAS Metadata Server uses the Integrated Object Model (IOM), which is provided with SAS Integration Technologies, to communicate with clients and with other servers.

SAS Workspace Server
: a SAS IOM server that is launched in order to fulfill client requests for IOM workspaces. See also IOM server, workspace.

server tier
: in a SAS business intelligence system, the tier in which the SAS servers execute. Examples of such servers are the SAS Metadata Server, the SAS Workspace Server, the SAS Stored Process Server, and the SAS OLAP Server. These servers are typically accessed either by clients or by Web applications that are running in the middle tier.

service
: a collection of one or more Application Servers. A service definition determines how requests are routed to these servers and sometimes describes how to start new Application Servers as they are needed. Services are defined in the Application Broker configuration file.

# Index

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