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SAS[®] Forecast Studio 1.2

Administrator's Guide

The correct bibliographic citation for this manual is as follows: SAS Institute Inc. 2005. *SAS® Forecast Studio 1.2: Administrator's Guide*. Cary, NC: SAS Institute Inc.

SAS® Forecast Studio 1.2: Administrator's Guide

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SAS Institute Inc., SAS Campus Drive, Cary, North Carolina 27513.

1st printing, October 2005

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Part 1

Overview of SAS Forecast Studio

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Chapter 1

Overview of the SAS Forecast Studio Administrator's Guide

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Chapter 1

Overview of the SAS Forecast Studio Administrator's Guide

Welcome to SAS Forecast Studio

Why Is SAS Forecast Studio 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 Studio?

Introduction to SAS Forecast Studio

SAS Forecast Studio is a client application that provides market-driven planning through accurate, dynamic demand forecasting and decision making. SAS Forecast Studio 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 Studio, 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 Studio

SAS Forecast Studio 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.)
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.
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.
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.
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.
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 dummy variables 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

Overview of the SAS Forecast Studio Administrator's Guide

	<p>series, a dummy variable is generated that can be used to analyze the impact of the event on the time series.</p>
HPFDIAGNOSE	<p>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:</p> <ul style="list-style-type: none">• intermittency testing• functional transformation testing• simple differencing and seasonal differencing testing• tentative simple ARMA order identification• tentative seasonal ARMA order identification• outlier detection• significance testing of events• transfer functions identification• intermittent demand modeling• exponential smoothing modeling• unobserved component modeling
HPFENGINE	<p>The HPFENGINE procedure provides large-scale automatic forecasting of transactional or time series data. The HPFENGINE procedure extends the foundation built by PROC HPF, which enables you to determine the list of models over which automatic selection is performed.</p> <p>The use of many forecast model families is supported when HPFENGINE is used in conjunction with procedures that generate generic model specifications. Among these models are the following:</p> <ul style="list-style-type: none">• Autoregressive Integrated Moving Average (ARIMA)• Unobserved Component Models (UCM)• Exponential Smoothing Models (ESM)• Intermittent Demand Models (IDM)

How Does SAS Forecast Studio Help You?

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

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

SAS Forecast Studio provides automation and analytical sophistication to the forecasting process. By using SAS Forecast Studio, 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

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 Studio 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 Studio 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 ETL 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 ETL 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 Platform and 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

This document uses several type styles for presenting information. The following list explains the meaning of the typographical conventions used in this document:

Overview of the SAS Forecast Studio Administrator's Guide

`roman`

is the standard type style used for most text.

UPPERCASE ROMAN

is used for SAS statements, options, and other SAS language elements when they appear in the text. However, you can enter these elements in your own SAS programs in lowercase, uppercase, or a mixture of the two.

UPPERCASE BOLD

is used in the “Syntax” sections’ initial lists of SAS statements and options.

oblique

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

bold

is used to refer to matrices and vectors.

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 SAS code.

`monospace bold`

is used for URL and path names.

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 Studio as your product:

<http://support.sas.com/documentation/onlinedoc/index.html>

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.

SAS Technical Support Services

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

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 interactive 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 is extracted, transformed, and loaded from a source to a target

Chapter 2

SAS Forecast Studio Architecture and the SAS Intelligence Platform

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Chapter 2

SAS Forecast Studio Architecture and the SAS Intelligence Platform

Overview of the SAS Intelligence Platform

What Is the SAS Intelligence Platform?

SAS creates and delivers enterprise intelligence through the SAS Intelligence Platform. This platform fully integrates SAS technology into a single cohesive platform that supports the following capabilities:

- data extraction, transformation, and loading
- data storage
- business intelligence
- analytic intelligence

These capabilities provide the complete infrastructure that is needed for exploring, analyzing, optimizing, and understanding your data and business.

The SAS Intelligence Platform is built to provide enterprise-class performance. By using the multiple layers of this n -tier architecture, SAS software efficiently can process large amounts of data while simultaneously delivering relevant content to users throughout your organization.

Figure 2.1 shows the layers and components of the SAS Intelligence Platform:

SAS Forecast Studio Architecture and the SAS Intelligence Platform

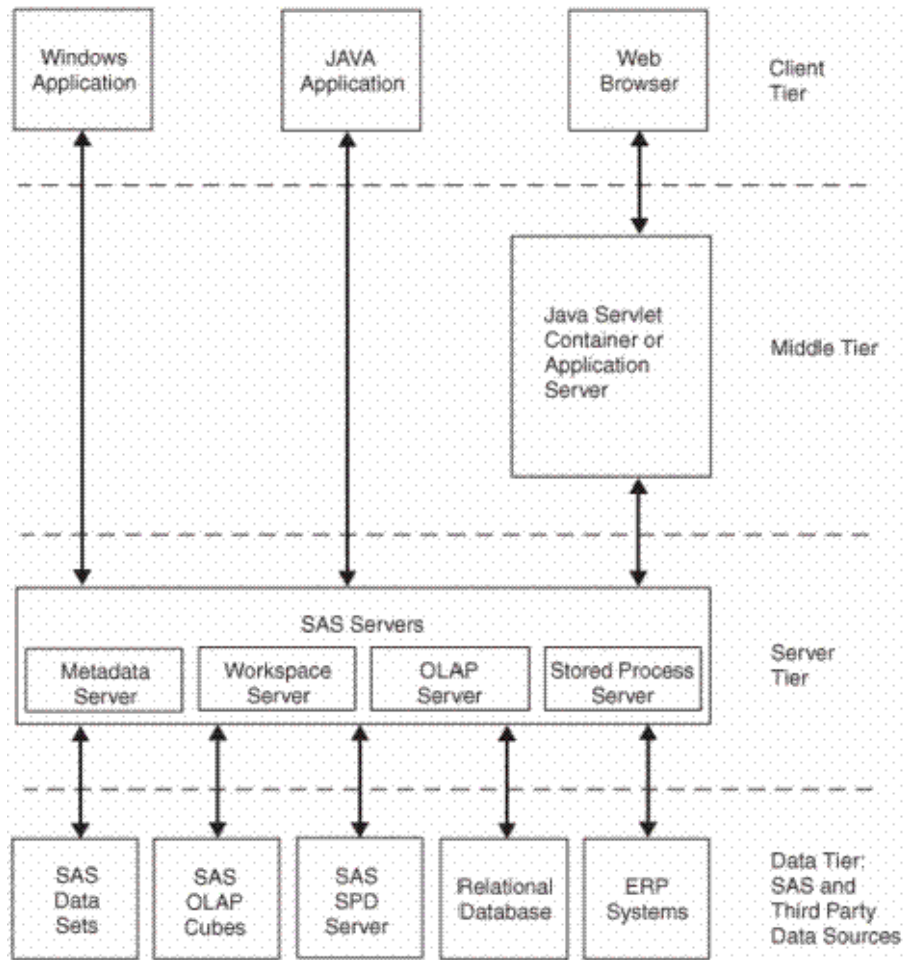


Figure 2.1. SAS Intelligence Platform

Client Tier

The SAS Client Services layer provides a suite of Web-based and desktop front- end interfaces to the content and applications based on the SAS Intelligence Platform infrastructure and the SAS Foundation. In today's business environment, organizations need to enable all levels of decision makers to have direct access to information in order to improve decision making and to enhance the effectiveness of operations. SAS Client Services can provide centralized access to content, appropriate query and reporting interfaces, and business intelligence functionality to all decision makers within an enterprise.

Middle Tier

SAS Foundation Services

SAS Foundation Services is a suite of Java-based APIs that provide core middleware infrastructure services, including user authentication, profile management, session management, activity logging, metadata and content repository access, and connection management. Extension services for information publishing, event management, and SAS stored process execution are provided.

SAS Application Services

SAS Application Services provide business-oriented query and reporting services to calling clients. By using a business metadata layer and a universal report definition, SAS Query and Reporting Services provide a solid foundation for enterprise reporting and application development. Java and COM-based interfaces to SAS Application Services surface the functionality provided by the SAS Query and Reporting Services to calling clients. SAS Application Services can be used by application developers to provide custom business intelligence capabilities within their solutions.

Server Tier

SAS Foundation

The SAS Foundation layer consists of SAS products such as Base SAS, SAS/CONNECT, SAS/GRAPH, SAS/ACCESS, SAS/STAT, SAS/ETS, SAS/OR, SAS/QC, and other SAS products that deliver the data processing, statistical, and analytical power of SAS. These products provide a wide range of core data manipulation functions, such as distributed data management, data access across multiple database sources, data visualization, data mining, and advanced analytical modeling applications.

SAS Foundation Servers

The SAS Foundation Servers include the following servers:

- SAS Metadata Server

The SAS Metadata Server enables centralized, enterprise-wide metadata delivery and management. The SAS Metadata Server contains data concerning users, projects, and results. One metadata server provides metadata to SAS applications across the enterprise, and is administered by using the SAS Management Console application. A server system must be configured with a SAS Metadata Server process.

- SAS OLAP Server

The SAS OLAP Server delivers pre-summarized cubes of data to OLAP clients, such as SAS Enterprise Guide using OLE DB for OLAP. The SAS OLAP Server is a multidimensional database server that is designed to

SAS Forecast Studio Architecture and the SAS Intelligence Platform

reduce the load on traditional back-end storage systems by providing quick, secure, and instant delivery of different summarized views of data to business intelligence applications, no matter how much data underlies these summaries.

- **SAS Stored Process Server**

The SAS Stored Process Server generates and delivers results from SAS stored processes in a multiple client environment. A SAS stored process is a SAS program that can be called through the SAS Stored Process Server. By using the SAS Stored Process Server, clients can execute and parameterize SAS programs without having to know the SAS Language.

- **SAS Workspace Server**

The SAS Workspace Server surfaces the SAS programming environment through an API to calling clients.

Data Tier

SAS provides all the products that you need to build your data tier. SAS provides for intelligent storage by supporting the following:

- SAS data sets, which are analogous to relational database tables
- SAS SPD Engine tables, which can be read or written by multiple threads
- SAS OLAP cubes

In addition, SAS provides products that enable you to access data in existing third-party Data Base Management Systems (DBMS) and Enterprise Resource Planning (ERP) systems. The SAS/ACCESS interfaces provide direct access to DBMSs such as the following:

- DB2
- Informix
- MS SQL Server
- Oracle
- Sybase

Also, the SAS/ACCESS interfaces provide direct access to ERP systems, such as the following:

- SAP
- PeopleSoft
- Baan

Overview of SAS Forecast Studio Architecture

Architecture Diagram

Figure 2.2 shows how the SAS Forecast Studio client and SAS Forecast Mid-Tier Server 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.

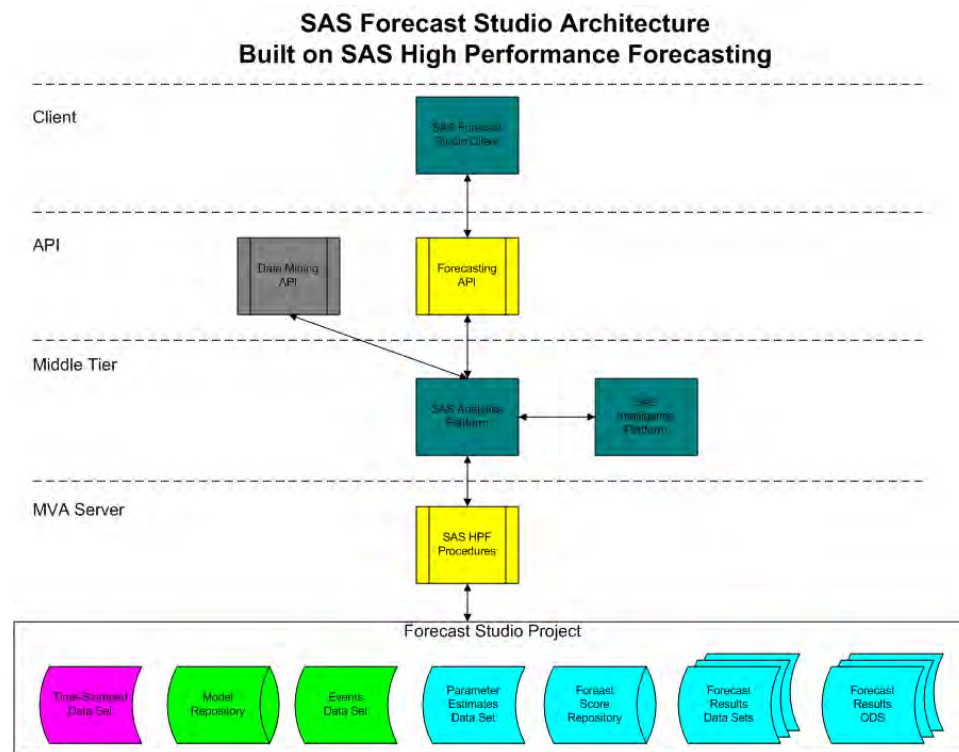


Figure 2.2. SAS Forecast Studio Architecture

SAS Intelligence Platform Components

SAS Forecast Studio 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 Studio 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 Studio uses the SAS Metadata Server to obtain metadata about SAS libraries and the SAS Workspace Server and SAS Object Spawner, and to authenticate

SAS Forecast Studio Architecture and the SAS Intelligence Platform

users. SAS Forecast Studio 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 Studio uses the SAS Workspace Server to execute the SAS High-Performance Forecasting procedures and to save data to SAS data sets. SAS Forecast Studio 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. 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 Studio 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 Studio 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.)

A SAS server system must be configured with the SAS Analytics Platform. 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 service, see ??

For more information about the SAS Analytics Platform, refer to the *SAS Analytics Platform Administrator's Guide* at the following Web address:

<http://support.sas.com/documentation/onlinedoc/>

SAS ETL Enterprise Server (optional)

Administrators can use SAS ETL Enterprise Server to create an input data set and library for the solution. For more information about SAS ETL Enterprise Server, refer to the *SAS DataIntegration Studio* in the SAS OnlineDoc at the following Web address:

<http://support.sas.com/onlinedoc/913/docMainpage.jsp>

SAS Forecast Studio Components

SAS Forecast Studio consists of the following components:

SAS Forecast Server Mid-Tier

The SAS Forecast Server Mid-Tier is installed on the middle tier. The SAS

Forecast Studio client uses the SAS Forecast Server Mid-Tier to access the SAS Analytics Platform and SAS servers.

SAS Forecast Studio client

SAS Forecast Studio has a thin client component 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 Studio Integration

Figure 2.3 shows the access points between the SAS Forecast Studio client application and the SAS Analytics Platform, and the SAS Intelligence Platform.

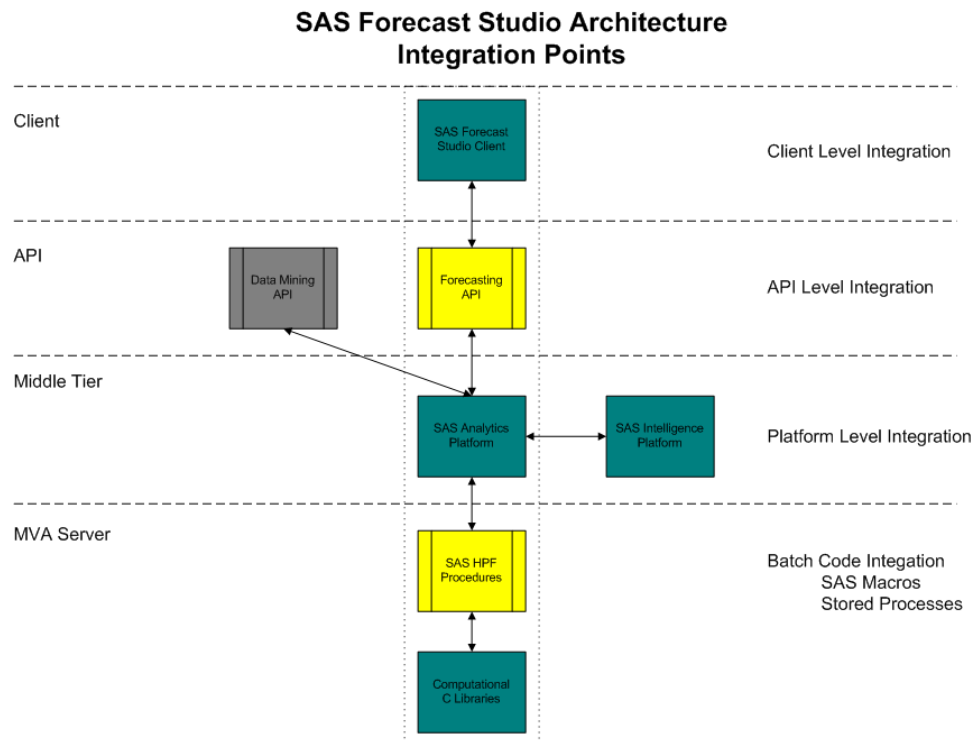


Figure 2.3. SAS Forecast Studio and SAS Analytics Platform

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

- A SAS library stores information and data about the input data set for the SAS Forecast Studio application.
- A user-defined library stores information and data about the input data set for the SAS Forecast Studio application.

SAS Forecast Studio Architecture and the SAS Intelligence Platform

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

- SAS Metadata Server is running. You use the SAS Management Console to administer metadata on the SAS Metadata Server.
- SAS Workspace Server is running.
- SAS Analytics Platform is running.
- A SAS input data set is defined in a SAS library or a user-defined SAS library. The input data set contains the appropriate SAS Forecast Studio data, and is used within SAS Forecast Studio 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, refer to the SAS Intelligence Platform documentation set in the SAS OnlineDoc at the following Web address:

<http://support.sas.com/onlinedoc/913/docMainpage.jsp>

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Chapter 3

System Requirements for SAS Forecast Studio

Hardware Requirements

Memory Requirements

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

Operating System Requirements

The Forecast Server Mid-Tier is a Java-based, middle-tier component that enables automatic forecasting of time series data. The Forecast Server Mid-Tier 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 greater
- 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.

National Language Support

Currently, SAS Forecast Studio is available only in English. Later releases can include more language translations if demand warrants such translations.

Software Requirements for SAS Forecast Studio

SAS Software Requirements

Required SAS Software

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

- current Service Pack of the following SAS 9.1.3 SAS Intelligence Platform products:
 - Base SAS, which includes the SAS Metadata Server
 - SAS High-Performance Forecasting software
 - SAS/ETS software
 - SAS/GRAPH software
 - SAS Integration Technologies software, which includes the following SAS servers and services:
 - * SAS Workspace Server
 - * Foundation Services
 - * SAS Stored Process Server
 - SAS Management Console
- SAS Analytics Platform

Optional SAS Software

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

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

Third-Party Vendor Software Requirements

In addition to the SAS licensed products required to support SAS Forecast Studio, the following software is required:

- Java Runtime Environment (JRE), which is included on the Third-Party Software Components CDs in your installation kit.
 - Windows: JRE 1.4.2_07 or greater
 - UNIX: JRE 1.4.2 or greater

Note: For full functionality, the Java Runtime Environment component must be installed on the same machine as the SAS Forecast Studio client and the SAS Forecast Server Mid-Tier machine.

- A web server can be configured to deliver the thin client files on demand. Also, when using the SAS Forecast Studio Model Repository in a distributed environment, the following additional servers can be configured:

- a JSP server, such as Tomcat
- a WebDav Server

Note: If you run the Java Web Start client or model viewer from a Web server, then the Web server must be installed on the same machine where the SAS Forecast Studio client is installed.

Web Browser

Internet Explorer 5.5 or greater is required.

Data Requirements

Overview of SAS Forecast Studio Data Flow

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

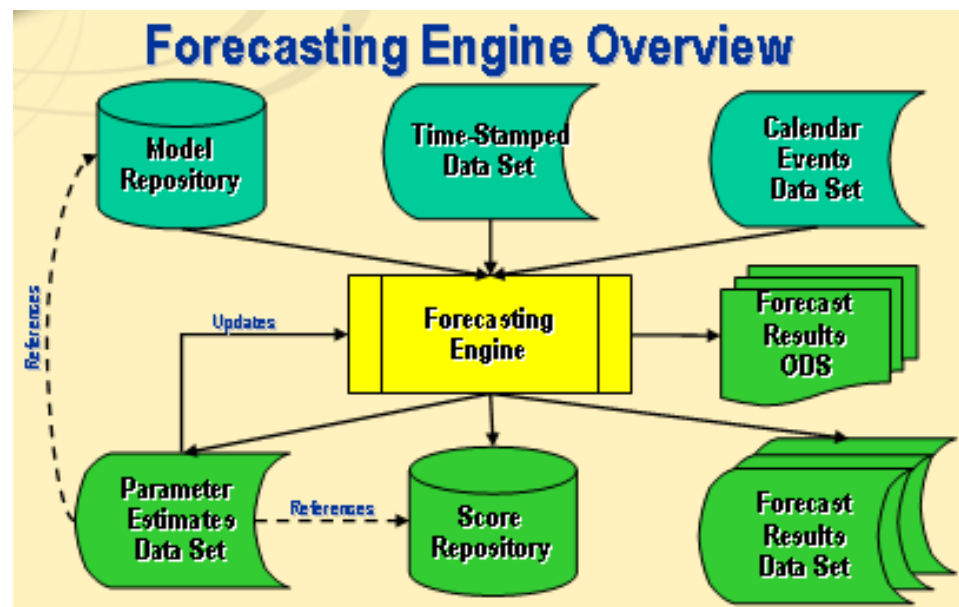


Figure 3.1. Data Flow in SAS Forecast Studio

When using SAS Forecast Studio, 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 ??
2. Open SAS Forecast Studio, and perform the following steps:

System Requirements for SAS Forecast Studio

- (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, refer to the SAS Forecast Studio Help System.

Input Data Set Requirements

In order to generate forecasts from your data, SAS Forecast Studio requires both of the following data conditions:

- a SAS data set that contains your input data
- a SAS library that specifies the location of the input SAS data set

To use SAS Forecast Studio to calculate forecasts, SAS Forecast Studio must access a SAS data set that contains appropriate input data. For SAS Forecast Studio to access an input data set, you must store your SAS data set on a SAS server, such as SASMain or one that you defined.

SAS Forecast Studio requires the following input data set format:

- a single SAS data set
- time series data
- time periods that are equally spaced intervals

Note: You get an error message if the time stamps in the input data set are not equally spaced.

Required Data Set Variables

In SAS Forecast Studio, you can forecast only one variable in a project. If you want to forecast more than one variable in a data set, then you must create separate projects for each one of the variables that you want to forecast. You can have the following variables in the input SAS data set, and all these variables must be stored in a single SAS data set:

dependent variable

specifies the variable that you want to model and forecast.

independent variables

specify the explanatory variables that you use to model and forecast the dependent variable.

time ID variable

specifies the time, or time interval, of an observation.

hierarchy (BY) variables

specifies a group of observations based on the values of the hierarchy (BY) variables. Hierarchy (BY) variables are required if you want to have a hierarchy in the forecasting analysis.

other variables

specify activities such as holiday promotions or external forecasts.

Missing Values in the Input Data Set

SAS Forecast Studio checks for the existence of missing values in the time ID variable when you create the project. If missing values exist, then you get an error message. You cannot have any missing values in your time ID variable.

For missing values in other variables, such as the dependent, independent, and external forecast variables, you specify the missing value policy (regardless of the variable roles) when you create a project.

Examples of Input SAS Data Sets

SAS Data Set with No Hierarchy Variables

The following SAS data set contains monthly sales information for the past 12 months. The variable **Holiday** indicates whether there is a holiday during the month.

Date	Revenue	Avg. Price	Holiday
JAN2003	18817	26.3	0
FEB2003	52573	25.3	0
.	.	.	.
DEC2003	44205	20.3	1

System Requirements for SAS Forecast Studio

SAS Data Set with Hierarchy Variables

The following SAS data set contains monthly sales information from different regions and product categories for the past 12 months. You can use the **Region** and **Product** variables to create a hierarchy for a sales forecast.

Date	Sales	Avg. Price	Holiday	Region	Product
JAN2003	355	25.3	0	Region 1	Product 1
FEB2003	398	25.3	0	Region 1	Product 1
.
JAN2003	555	19.8	0	Region 1	Product 2
FEB2003	390	25.3	0	Region 1	Product 2
.
JAN2003	301	27.1	0	Region 2	Product 1
FEB2003	350	25.3	0	Region 2	Product 1
.
JAN2003	314	27.2	0	Region 2	Product 2
FEB2003	388	25.3	0	Region 2	Product 2
.
DEC2003	518	20.3	1	Region 2	Product 2

SAS Data Set with External Forecast Variables

The following SAS data set contains forecast information for the last six months. You can use forecast parameters as input into SAS Forecast Studio if the parameters are in a SAS data set.

Date	Forecasts	Standard Error	UCL	LCL
JUL2003	6786.1094	985.9738	4853.6362	8718.5826
AUG2003	5853.9650	1045.6953	3804.4399	7903.4900
SEP2003	7517.0144	1102.2949	5356.5561	9677.4728
OCT2003	7100.2489	1156.2315	4834.0769	9366.4210
NOV2003	7224.6449	1207.8618	4857.2793	9592.0106
DEC2003	6357.1556	1257.4701	3892.5594	8821.7518

Creating SAS Data Sets for SAS Forecast Studio

Reading Column Input Data

Input data:

JAN2003 18817 26.3 0
FEB2003 52573 25.3 0
DEC2003 44205 20.3 1

With column data input, data values occupy the same fields within each data record. When your raw data is in fixed columns, you can use the SAS DATA step to create a SAS data set. The following table lists the variables and the columns where the data values are located in this example.

Variable	Columns
Date	1-7
Average Price	9-13
Revenue	15-18
Holiday	20

For more information about reading aligned or unaligned column input data, refer to *Step-by-Step Programming with Base SAS Software* and *SAS Language Reference: Concepts*.

Reading Row Input Data

Input data:

```
JAN2003
18817
26.3
0
FEB2003
52573
25.3
0
DEC2003
44205
20.3
1
```

With row data input, data values occupy the beginning fields of each data record, but represent different variable values. When your raw data is in rows, you can use the TRANSPOSE procedure to create a SAS data set. The following table lists the variables and the columns where the data values are located.

Variable	Columns
Date	1-7
Average Price	1-5
Revenue	1-4
Holiday	1

For more information about the TRANSPOSE procedure, refer to *Base SAS Procedures Guide*.

System Requirements for SAS Forecast Studio

Reading Microsoft Excel Input Data

If your input data is in a Microsoft Excel spreadsheet, as shown in the example in [Figure 3.2](#), then you can use the SAS Add-In for Microsoft Office (AMO) functionality, or the IMPORT procedure to create a SAS data set. For more information about the IMPORT procedure, refer to *Base SAS Procedures Guide*.

	A	B	C	D	E
1	DATE	REVENUE	AVG. PRICE	HOLIDAY	
2	Jan-03	18817	26.3	0	
3	Feb-03	52573	25.3	0	
4	Dec-03	44205	20.3	1	

Figure 3.2. Data in a Microsoft Excel Spreadsheet

Reading Transactional Data

Transactional data are time-stamped data collected over time at no particular frequency. Some examples of transactional data are Internet data, point-of-sale (POS) data, inventory data, call center data, and trading data. Because SAS Forecast Studio requires a single SAS data set that contains equally spaced interval periods of time series data, you might need to create time series data from transactional data before you use the data in SAS Forecast Studio. To create time series data from transactional data, you can use the TIMESERIES and EXPAND procedures in SAS/ETS software. For more information about these procedures, refer to *SAS/ETS User's Guide*.

Reading Data from External Databases

If your data is stored in external databases, such as Oracle, SAS provides tools that can help you create SAS data sets from your data. By using SAS Data Integration Studio, you can extract, transform, and load your data into a SAS data set that SAS Forecast Studio can use to generate forecasts. SAS Data Integration Studio enables you to design the flow of data into a SAS data set that SAS Forecast Studio can use as the input data set. Also, SAS Data Integration Studio enables you to create and schedule ETL jobs that run the ETL processes. For more information about SAS Data Integration Studio, see the *SAS Data Integration Studio User's Guide*.

Chapter 4

Software Requirements for the SAS Intelligence Platform and SAS Analytics Platform

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Chapter 4

Software Requirements for the SAS Intelligence Platform and SAS Analytics Platform

Required Software for SAS Components

Server Tier

The following table shows the software requirements for the server tier:

Table 4.1. Server Tier: Software Requirements

Software	Required Server or Data Configuration	Required Security Configuration: Authentication	Required Security Configuration: Authorization	Purpose
Base SAS	SAS Metadata Server	The SAS Administrator must authenticate.	No additional security is required.	Provides the Base SAS procedures and SAS Metadata Server, which stores metadata for the solution.
SAS Integration Technologies	SAS Workspace Server, SAS Object Spawner, and SAS Stored Processes Server	The SAS Administrator's user ID must authenticate.	No additional security is required.	Executes SAS code for the solution.
SAS High-Performance Forecasting	SAS Forecast Studio	Uses the SAS Administrator to log in.	No additional security is required.	Provides the SAS procedures used by the solution.
SAS/ETS	SAS Forecast Studio	Uses the SAS Administrator to log in.	No additional security is required.	Provides the SAS procedures used by the solution.

Middle Tier

The following table shows the software requirements for the middle tier:

Table 4.2. Middle Tier: Software Requirements

Software	Purpose
SAS Analytics Platform	Enables integrated access to SAS servers (SAS Metadata Server and SAS Workspace Server).
SAS Forecast Server Mid-Tier	Uses the SAS Analytics Platform to access the SAS servers (SAS Metadata Server and SAS Workspace Server).
SAS Private JRE	Provides Java Runtime Environment.

Client Tier

The following table shows the software requirements for the client tier:

Table 4.3. Client Tier: Software Requirements

Software	Purpose
SAS Forecast Studio client	Provides the graphical user interface to the SAS Forecast Server solution.
SAS Management Console	Manages server, library, foundation service, user, and security metadata.
SAS Private JRE	Provides Java Runtime Environment for client applications.
SAS Data Integration Studio (optional)	Creates a SAS data set and a SAS library for access to an input data set.

Data Tier

The following table shows the software requirements for the data tier:

Table 4.4. Data Tier: Software Requirements

Software	Purpose
SAS data set	Provides access to the data required by SAS Forecast Studio.

Part 3

Installation and Configuration of SAS Forecast Studio

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Chapter 5

Overview of Installation and Configuration

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Chapter 5

Overview of Installation and Configuration

Before Installation

To understand the architecture and components of SAS Forecast Studio and how it fits into the SAS Intelligence Platform, see [Chapter 2, “SAS Forecast Studio Architecture and the SAS Intelligence Platform.”](#)

Before you install SAS Forecast Studio, be sure that you have met the system requirements described in [Chapter 3, “System Requirements for SAS Forecast Studio.”](#)

In addition, you must be sure that your installation plan includes the SAS Intelligence Platform configuration defined in [Chapter 4, “Software Requirements for the SAS Intelligence Platform and SAS Analytics Platform.”](#)

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, refer to 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. You can install your solution, along with the SAS Analytics Platform and other SAS products, using either one of the following types of installations:

- Personal or Advanced Installation

Use a personal or an advanced installation to install on a single or multiple machine deployment by using a sample or customized deployment plan. After installation, you use the SAS Configuration Wizard to configure your deployment. For an overview, see [Chapter 7, “Install and Configure as a Personal or Advanced Installation.”](#)

Overview of Installation and Configuration

- SAS Software Index Installation

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 for the SAS Forecast Studio Software Index installation, see [Chapter 8, “Install and Configure by Using the Software Index Installation.”](#)

You should select the installation that is appropriate for your environment. The SAS System CDs and the SAS Ancillary CD contain all the components that you need to install your solution.

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: SAS Workspace Server, SAS Metadata Server, and all required components of the server tier, such as Base SAS, SAS High-Performance Forecasting, SAS Integration Technologies, SAS/ETS and SAS/GRAPH.
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.

Location of Installation Files

[Table 5.1](#) shows the location of the installation files for SAS Forecast Studio.

Table 5.1. SAS Forecast Studio File Locations

File	Location
SAS Analytics Platform	!SASROOT\SASAPCore
SAS Forecast Server Mid-Tier	!SASROOT\SASAPCore\apps\Forecasting
SAS Forecast Studio client	!SASROOT\SASForecastStudio\1.2

Note: The client is installed in a 1.2 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 highlighted text shows the version number of the SAS Forecast Server Mid-Tier.

Overview of Installation and Configuration

```
application.name=Forecasting
application.version=1.2
application.build.date=2004.08.10
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
```

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, both servers are installed on a single machine.

- multiple machine, distributed environment

For a platform installation, you install and configure the SAS Metadata Server and a SAS Workspace Server. For a multiple-machine installation, the SAS Metadata Server and a SAS Workspace Server are installed on two different 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 Studio installation, you can install the SAS Analytics Platform on one of the following machines:

- For a single-machine platform environment, you can 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 either a single-machine or 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 Studio Installation and Configuration

After the SAS Intelligence Platform and SAS Analytics Platform are installed, you can install the components of SAS Forecast Studio. 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 Studio:

- **SAS Forecast Server Mid-Tier**
You must install the SAS Forecast Server Mid-Tier component on the same machine where 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 where you installed the SAS Forecast Server Mid-Tier component and SAS Analytics Platform (which must be installed on the same machine.) You are not required to install SAS on any machine where you only install the SAS Forecast Studio client.

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, “Additional 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 Studio.”](#)

Chapter 6

Pre-Installation Tasks

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Chapter 6

Pre-Installation Tasks

All Operating Systems Administration Tasks

Create a SAS Forecast Studio Administration User

In order to perform some installation and configuration tasks, you need to create a SAS Forecast Studio administration user or grant administrative permissions to an existing user in SAS Metadata Server.

Note: You can change the installation's home directory or grant Write permissions for the SAS Forecast Studio administrator to the installation home directory by following the instructions found in the SAS Intelligence Platform documentation set at the following Web address:

<http://support.sas.com/onlinedoc/913/docMainpage.jsp>

Note: Do NOT use the SAS Administrator *sasadm* account.

Define a SAS Forecast Studio User Group

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

For a more secure deployment, you can create a SAS Forecast Studio user group, and ensure that the group contains all of the SAS Forecast Studio users. You must include any user who runs code in the batch mode as part of the group. Also, the group should be the primary group.

SAS Forecast Studio users must have Read, Write, and Execute access on the `.../SAS/ForecastStudio/` 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.

Chapter 7

Install and Configure as a Personal or Advanced Installation

Chapter Contents

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Chapter 7

Install and Configure as a Personal or Advanced Installation

Pre-Installation Steps

To prepare for a personal or an advanced planned installation for the SAS Forecast Studio client and 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 and instructions for the SAS deployment process. 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`

2. Generate the Deployment Plan.

A Planning Tool guides you through the process of preparing an installation plan, and e-mails you the files that you must save in a project directory that you created. The Planning Tool can e-mail individual files or all files in one ZIP file. Your SAS consultant can help you develop a Deployment Plan.

The ZIP file that is created by the Planning Tool contains the following files:

planning file (plan.xml)

a key file which is used throughout the rest of the deployment process to customize your installation and configuration experience.

pre-installation checklist file (preInstallationChecklist_ <platform>.html)

a file that provides a checklist for the items that you need to know during the remainder of the installation and configuration process.

HTML page for each machine listed in the planning file

a place holder for any specific instructions the administrator, or person creating the project, wants to provide to the people doing the installation and configuration on that machine. The HTML page is named *machine-name.html*, where *machine-name* is the name given to your machine in the planning file.

SID file

a file that contains your SAS Installation Data (SID).

Install and Configure as a Personal or Advanced Installation

3. 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 has been 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.

4. Complete the Pre-Installation Checklist.

One of the files that you saved to the SAS project directory is the Pre-Installation Checklist. 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
- sasdmo
- sasguest
- sastrust
- sassrv

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:
 - language
 - Advanced or Personal installation
 - location of the SAS Installation Data (SID) file
 - deployment plan
 - 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
 - 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 product 1, the navigator automatically proceeds with the installation of product 2.

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, refer to 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 are 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. When the navigator reaches this point in its list, it starts the SAS Configuration Wizard, which configures the software that you installed on the current machine. 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, refer to 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, refer to the solution documentation.
 - For SAS Forecast Studio, follow the HTML instructions provided in the SAS Configuration Wizard.

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.

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Install and Configure by Using the Software Index Installation

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Chapter 8

Install and Configure by Using the Software Index Installation

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 an 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 in step 2, 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

Install and Configure by Using the Software Index Installation

- 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

Install SAS Forecast Server Mid-Tier on UNIX

Notes

1. 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. We suggest that you use a more native X window manager, such as the Motif Window Manager.
2. If some of the default filenames and locations that are used in the InstallShield Wizard include embedded blanks, then we suggest that you remove blanks from the filenames and directory names.
3. By default, an error log is created in the ttb \$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 required JRE can be installed from the *Third Party Software Components CD* by using the SAS® Private JRE installations.

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.

It is the JRE version upon which the SAS products are developed and tested. We strongly encourage you to use the SAS Private JRE with SAS products. Other JRE versions may not work with the SAS products.

SAS Private JRE Default Installation Location

The SAS Private JRE installation will default 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	<code>/usr/local/SAS_9.1/sasjre/1.4.2</code>
Standard Public JRE	<code>/usr/java</code>

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.

The basic installer requires you to supply the following values to complete the installation:

Server Name

is the machine name where the SAS Forecast Server Mid-Tier has been installed.

Port Number

is the RMI Server Listening port that is used by the SAS Forecast Server Mid-Tier.

Install and Configure by Using the Software Index Installation

Install the SAS Forecast Server Mid-Tier

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

1. Run `setup_s64.sh`
2. Choose your language, and click **OK**.
3. On the *Welcome* screen, click **Next**.
4. On the *SAS Analytics Platform Location* screen, 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. On the *SAS Forecast Server Mid-Tier Location* screen, 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.

If the SAS Analytics Platform does not start as a service, then start the SAS Analytics Platform Server by performing the following steps:

1. Navigate to the path `c:/Program Files/SAS/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 with a user ID that has administrative privileges so that the SAS Analytics Platform has full access to the metadata server. The SAS Administrator (*sasadm*) and the SAS Trusted User (*sastrust*) both have administrative privileges. 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 service, 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

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>

Install and Configure by Using the Software Index Installation

WARNING: SAS highly recommends that you run your SAS Software 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. On the *Welcome* screen, click **Next**.
4. On the *SAS Analytics Platform Location* screen, 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. On the *SAS Forecast Server Mid-Tier Location* screen, 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

If the SAS Analytics Platform does not run as a service, then the SAS Forecast Server Mid-Tier is started automatically when you start the SAS Analytics Platform.

For information about configuring the SAS Analytics Platform as a service, see [Chapter 9, “Post-Installation Tasks.”](#)

Uninstall the SAS Forecast Server Mid-Tier

Uninstall Files

In order for a new version of the SAS Forecast Server Mid-Tier to be installed, the previous version must be removed. To uninstall the SAS Forecast Server Mid-Tier, you can run one of the following uninstall files:

- UninstFSS.exe
- uninstall.jar

The uninstall files are located in the SAS Forecast Server Mid-Tier Install directory:

- `c:\Program Files\SAS\SASAPCore\apps\Forecasting_uninstFSS\UninstFSS.exe`
- `c:\Program Files\SAS\SASAPCore\apps\Forecasting_uninstFSS\uninstall.jar`

Add/Remove Programs

You can remove the SAS Forecast Server Mid-Tier by using the **Add/Remove Programs** feature.

1. Navigate to the **Add/Remove Programs** feature by selecting **Start** → **Settings** → **Control Panel**.
2. Select **Add/Remove Programs**.
3. Select **SAS Forecast Server**, and click **Change/Remove**.

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`

Install and Configure by Using the Software Index Installation

- C:\jre1.4.2
- C:\jdk1.4.2
- C:\java1.4.2
- C:\java

- User Specified JRE

- <location specified by user>

WARNING: SAS highly recommends that you run your SAS Software 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

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

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

Uninstall SAS Forecast Studio Client

Uninstall Files

In order for a new version of the SAS Forecast Studio client to be installed, the previous version must be removed. To uninstall the SAS Forecast Studio client, you can run one of the following uninstall files:

- UninstFCST.exe
- uninstall.jar

The uninstall files are located in the SAS Forecast Studio client Install directory:

```
c:\Program Files\SAS\SASForecastStudio\1.2\_uninstFCST\  
_UninstFCST.exe  
c:\Program Files\SAS\SASForecastStudio\1.2\_uninstFCST\  
_uninstall.jar
```

Add/Remove Programs

You can remove the SAS Forecast Studio client by using the **Add/Remove Programs** feature.

1. Navigate to the **Add/Remove Programs** by selecting **Start** → **Settings** → **Control Panel**.
2. Select **Add/Remove Programs**.
3. Select **SAS Forecast Studio**, and click **Change/Remove**.

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

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Chapter 9

Post-Installation Tasks

Most Current Documentation

For the most current installation and configuration information, see the following Web site and select SAS Forecast Studio as your product:

<http://support.sas.com/documentation/onlinedoc/index.html>

Install Current Hot Fixes

SAS 9.1.3 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). The required hot fixes can be downloaded from the following Web address:

http://ftp.sas.com/techsup/download/hotfix/op_home.html

CAUTION: You must install the hot fixes on the server tier before you start configurations on the middle tier.

CAUTION: If you are using Service Pack 3 for SAS 9.1.3, then the hot fixes for Service Pack 3 are required in order for SAS Forecast Server to function correctly.

SAS Forecast Studio Hot Fixes

You must install the current hot fixes for SAS Forecast Studio on the machine that is running the SAS Workspace Server. The required hot fixes can be downloaded from the following Web address:

http://ftp.sas.com/techsup/download/hotfix/op_home.html

CAUTION: The hot fixes for SAS Forecast Studio are required in order for SAS Forecast Studio to function fully.

All Operating Systems Administration Tasks

Pre-Assign Libraries in SAS Management Console

To use your SAS data sets with SAS Forecast Studio, you must enable SAS Forecast Studio 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 Studio to access your data, you must create the following:

Post-Installation Tasks

- 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 Studio 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 Studio input data set.

To enable SAS Forecast Studio 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) Select the **Library is Pre-Assigned** check box in the library's **Advanced Options** window. This window is accessible from the Library Options window of the New Library Wizard when you create a new data library.
 - (f) Ensure that the library is assigned to the correct SAS server(s). The selected library is assigned whenever one of the selected servers starts.
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 Studio 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 Studio, 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 Studio (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 above steps for all workspace servers that SAS Forecast Studio uses.

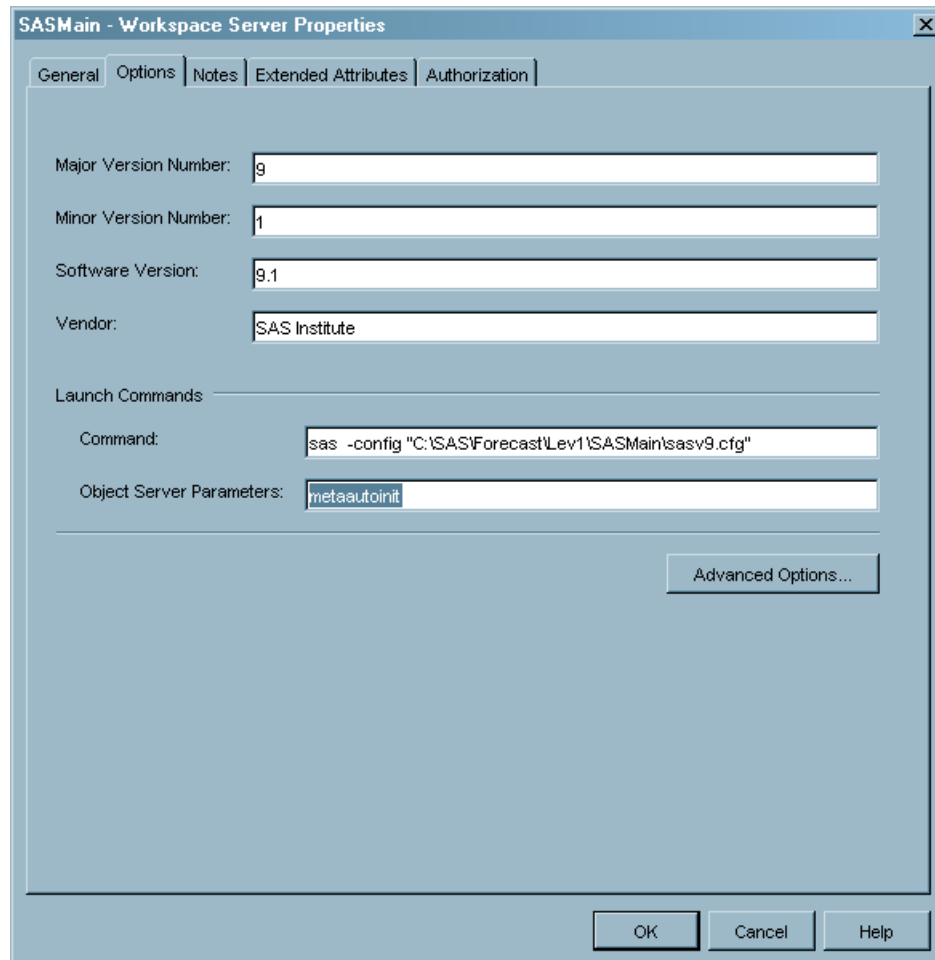


Figure 9.1. METAAUTOINIT Option in a Workspace Server Definition

- 4. Set the Metadata permissions on the libraries.
 - (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 Administrator user ID and grant all permissions to the administrator by checking the **Grant** boxes, as shown in [Figure 9.2](#).

Post-Installation Tasks

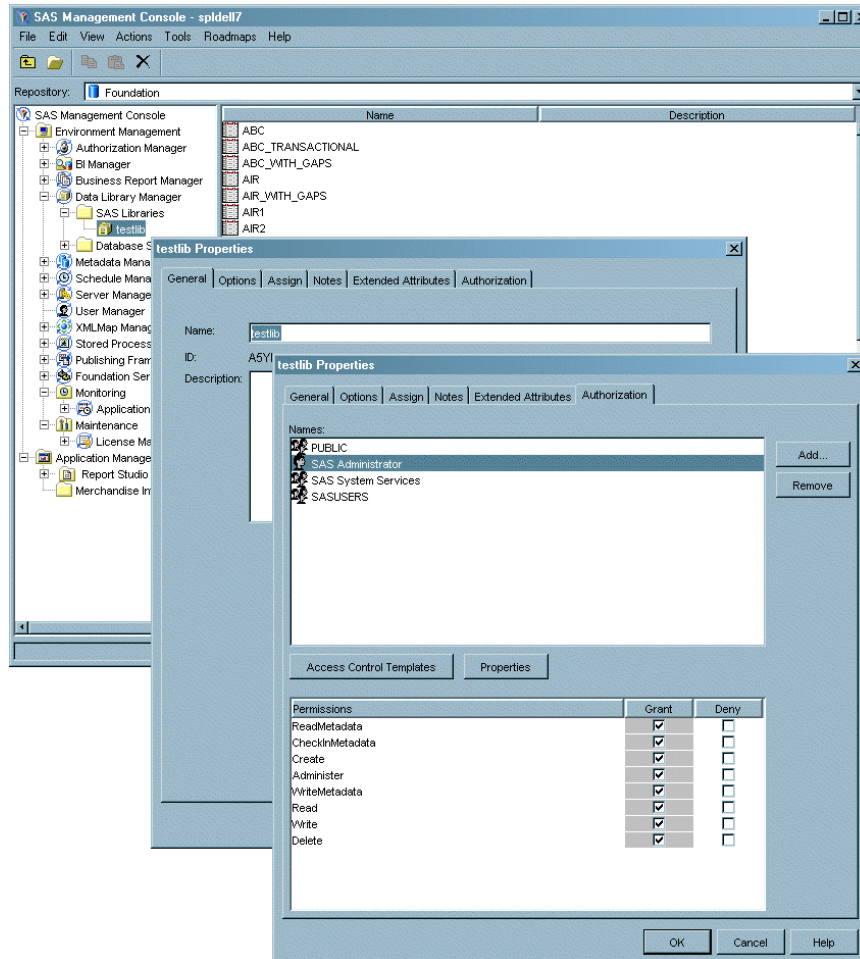


Figure 9.2. SAS Administrator Metadata Permissions

- (e) Repeat the same steps above for granting permissions to the SASUSERS group, as shown in [Figure 9.3](#).

SASUSERS is an implicit metadata group. To become a member of SASUSERS, you must be able to log on to the metadata server, which makes you part of the Public group, and have a registered metadata identity. All of the single headed icons in the User Manager plug-in become members of SASUSERS.

If SASUSERS is not listed under **Names**, then perform the following steps:

- i. Click **Add**.
- ii. Select SASUSERS from the list in the left column and click the single right arrow to add SASUSERS to the selection list in the right column.
- iii. Click **OK**.

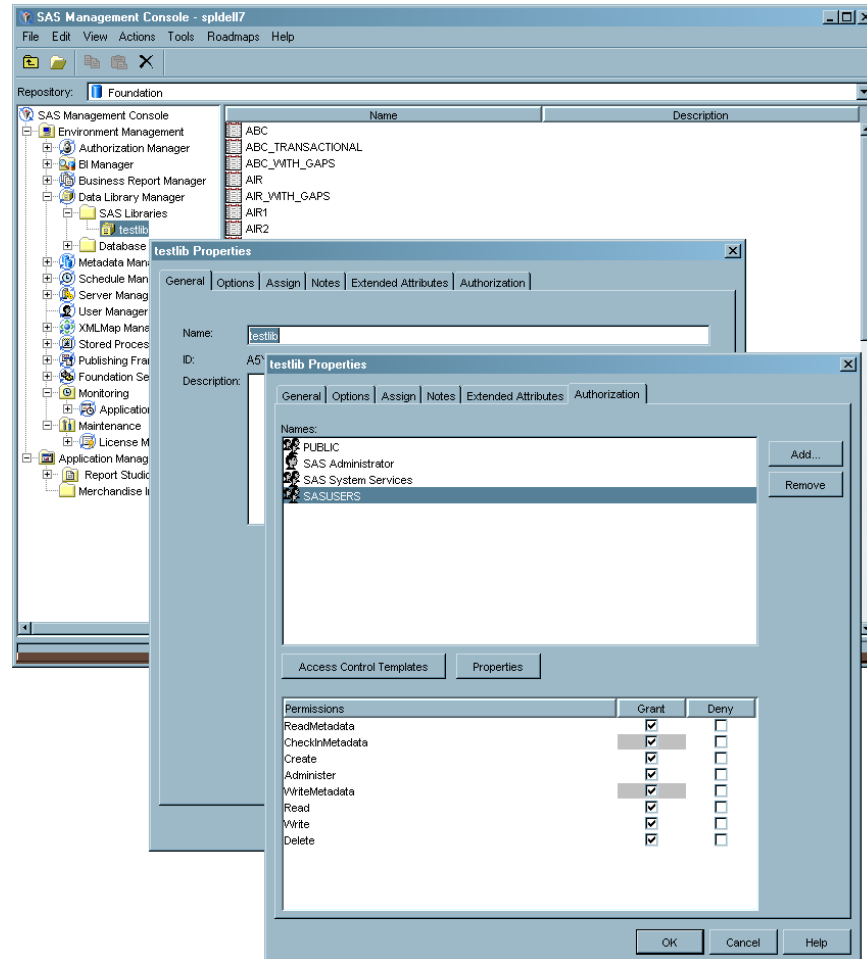


Figure 9.3. SASUSER Group Metadata Permissions

- Restart the Object Spawner.

Import the Default Set of SAS Forecast Studio Stored Processes

You can write SAS Stored Processes in order to extend the functionality of SAS Forecast Studio. 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 Studio.

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 ver-

Post-Installation Tasks

sion, then you can import the stored process from the solution CD that contains the SAS Forecast Studio stored processes.

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

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 Studio administration user as a pre-installation task, then you must create a SAS Forecast Studio administration user or grant administrative permissions to an existing user in the metadata.

Note: You can change the installation's home directory or grant Write permissions for the SAS Forecast Studio administrator to the installation home directory, by following the instructions found in the SAS Intelligence Platform documentation set at the following Web address:

<http://support.sas.com/onlinedoc/913/docMainpage.jsp>

Note: Do NOT use the SAS Administrator *sasadm* account.

The following example uses an existing user ID (*sasdemo*)

- (a) In SAS Management Console, expand BI Manager.
 - (b) Expand the **Forecast Studio** folder.
 - (c) Right-click Projects and select Properties.
 - (d) Select the Authorization tab and click Add.
 - (e) Move SAS Demo User to the right hand pane by selecting **SAS Demo User** in the left pane and click the single arrow icon between the two panes. Click OK.
 - (f) With **SAS Demo User** selected in the upper pane, click to select all available checkboxes under the Grant heading in the lower pane. Click OK
3. Create the metadata and complete file system directory structure for the SAS Forecast Studio stored process samples.
 - If the SAS Metadata Server and the SAS Workspace Server are in the same authentication domain, then perform the following steps:
 - (a) Start the SAS Analytics Platform.

Note: If you installed the SAS Metadata Server on a different machine than SAS Forecast Studio, then you must change the server information by reconfiguring the SAS Analytics Platform. For information about configuring the SAS Analytics Platform, refer to the

SAS Analytics Platform Administrator's Guide at the following Web address:

<http://support.sas.com/documentation/onlinedoc/>

- In the Windows operating system, perform the following steps:
 - i. Navigate a shortcut that is created to where the SAS Analytics Platform is installed:
Start→ Programs→ SAS→ SAS Analytics Platform→ Start AP Server
 - ii. If you are prompted for the user name and server location, then verify the following values:

User name: If you want the user ID 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.

- iii. Click **LogOn** to start the SAS Analytics Platform.
- In the UNIX operating system, perform the following steps:
 - i. Navigate to the installation directory of the SAS Analytics Platform
(e.g., .../SASAPCore/bin)
 - ii. 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.
 - iii. 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 an X display session.
- (b) Create the necessary metadata and complete file system directory structure for the stored processes.
 - i. The default location of the stored processes is the installation user's home directory. You can change the default location in one of two ways:
 - You can specify a different default location of the SAS Forecast Studio project directory when you run the SAS Forecast Studio setup file. This process should be executed on the physical machine that is running the SAS Analytics Platform. The location change updates the project location in SAS Metadata Server and creates a directory structure in your chosen directory.

Post-Installation Tasks

Windows:

- A. Open a Command window by selecting **Start** → **Run ...** and entering `cmd` in the **Open:** field. Press enter or click **OK**.
- B. Navigate to the following directory:
`...\SASAPCore\apps\ Forecasting\bin`
The default location is the following:
`C:\program Files\SAS\SASAPCore\apps\Forecasting\bin`
- C. Execute the `ForecastStudioSetup.bat` file with the following option:
`ForecastStudioSetup`
`"location=<new-directory-pathname>\ForecastStudio"`
Example:
`ForecastStudioSetup`
`"location=D:\myprojects\ForecastStudio"`

UNIX:

- A. Navigate to the `.../SASAPCore/apps/Forecasting/bin` directory. The default location is in your SAS program directory.
 - B. Execute the `ForecastStudioSetup.sh` script with the following option:
`ForecastStudioSetup`
`"location=<new-directory-pathname>/ForecastStudio"`
Example:
`ForecastStudioSetup`
`"location=/myprojects/ForecastStudio"`
- You can specify a different default location of the SAS Forecast Studio project directory by running the following code in a SAS session with the appropriate user ID, password, and path:

```
options metaserver="dl1569"
metaport=8561
metaprotocol=bridge
metauser="<sas-admin-user-name>"
metapass="<password>"
metarepository="Foundation";

data _null_;
rc=metadata._setattr("omsobj:Directory?
@Name='DefaultLocation'
and @Desc='Forecast Studio default
project location' ",
"DirectoryName",
"/<installation-user's-home-directory>/SAS/ForecastStudio");
put rc;
run;
```

- ii. Run the script that creates the metadata and complete file system directory.
 - In the UNIX operating system, on the machine that you installed the SAS Analytics Platform, run the script **ForecastStudioSetup.sh**, which executes the SAS Forecast Studio administrative setup without the need to install the SAS Forecast Studio client. The location of the setup script is in the following subdirectory of the installation directory:
`.../SASAPCore/apps/Forecasting/bin`
 - In the Windows operating system, you create the directory structure from a SAS Forecast Server Mid-Tier machine by running the script **ForecastStudioSetup.bat**, which executes the SAS Forecast Studio administrative setup without the installation of the SAS Forecast Studio client. The script is located in the following directory:
`!SASROOT\SASAPCore\apps\Forecasting\bin`
- (c) A logon dialog box appears. Log on as the SAS Forecast Studio administrator that you created in the above step to the server where you installed the SAS Analytics Platform (i.e., `localhost:5099`). The directory structure is created on the server that contains your workspace server.
- (d) Output similar to [Figure 9.5](#) appears. The output shown in [Figure 9.5](#) displays the default values from a Windows machine.

Post-Installation Tasks

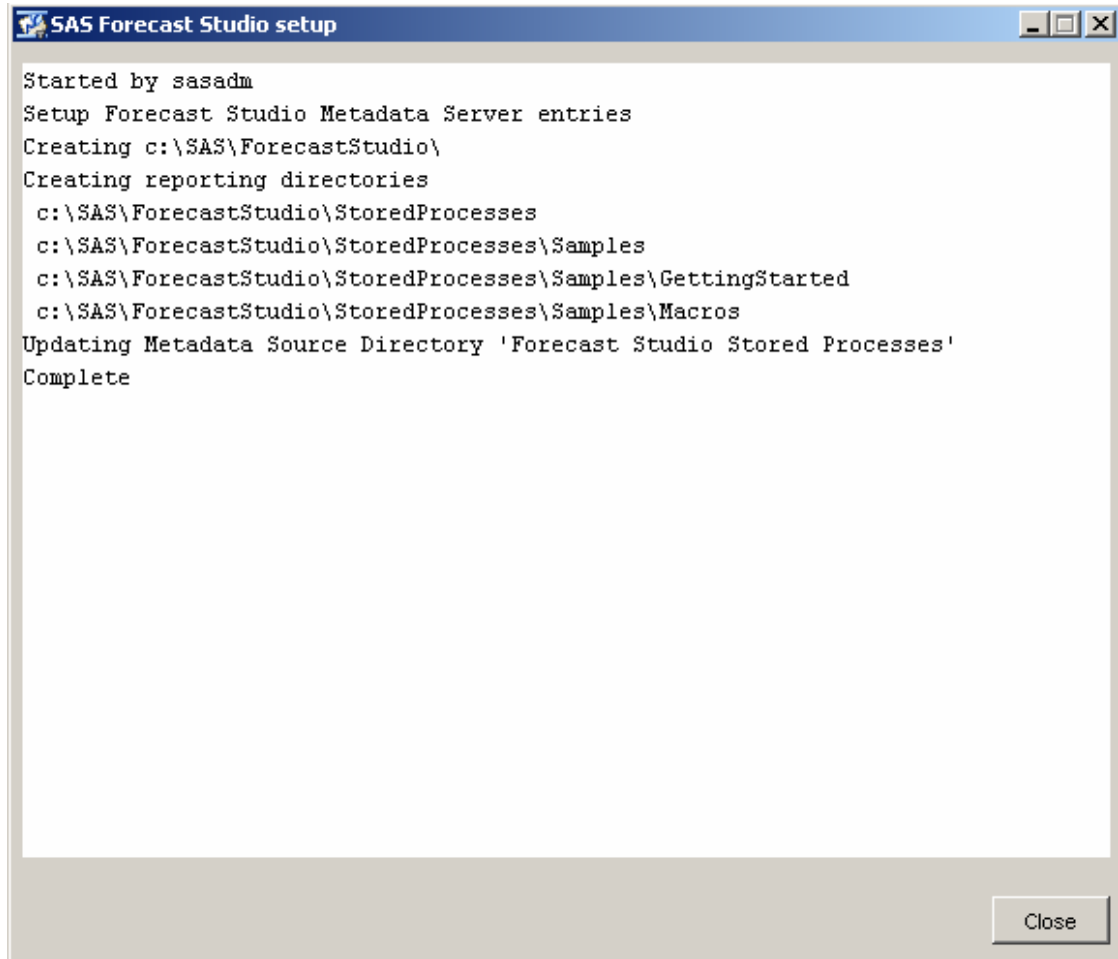


Figure 9.4. SAS Forecast Studio Directory Structure

- If the SAS Metadata Server and the SAS Workspace Server are in different authentication domains, then perform the following steps:
 - (a) Create the metadata and complete file system directory structure for the stored processes.
 - i. The default location of the stored processes is the installation user's home directory. You can change the default location in one of two ways:
 - You can specify a different default location of the SAS Forecast Studio project directory when you run the SAS Forecast Studio setup file. This process should be executed on the physical machine that is running the SAS Analytics Platform. The location change updates the project location in SAS Metadata Server and creates a directory structure in your chosen directory.

Windows:

- A. Open a Command window by selecting **Start** → **Run ...** and entering `cmd` in the **Open:** field. Press enter or click **OK**.
- B. Navigate to the following directory:
`... \SASAPCore\apps\ Forecasting\bin`
The default location is the following:
`C:\program Files\SAS\SASAPCore\apps\Forecasting\bin`
- C. Execute the `ForecastStudioSetup.bat` file with the following option:
`ForecastStudioSetup`
`"location=<new-directory-pathname>\ForecastStudio"`
Example:
`ForecastStudioSetup`
`"location=D:\myprojects\ForecastStudio"`

UNIX:

- A. Navigate to the `... /SASAPCore/apps/Forecasting/bin` directory. The default location is in your SAS program directory.
 - B. Execute the `ForecastStudioSetup.sh` script with the following option:
`ForecastStudioSetup`
`"location=<new-directory-pathname>/ForecastStudio"`
Example:
`ForecastStudioSetup`
`"location=/myprojects/ForecastStudio"`
- You can specify a different default location of the SAS Forecast Studio project directory by running the following code in a SAS session with the appropriate user ID, password, and path:

```
options metaserver="d11569"
metaport=8561
metaprotocol=bridge
metauser="<sas-admin-user-name>"
metapass="<password>"
metarepository="Foundation";

data _null_;
rc=metadata_setattr("omsobj:Directory?
@Name='DefaultLocation'
and @Desc='Forecast Studio default
project location' ",
"DirectoryName",
"/<installation-user's-home-directory>/SAS/ForecastStudio");
put rc=;
run;
```

Post-Installation Tasks

- ii. Run the script that creates the metadata and complete file system directory.
 - In the UNIX operating system, on the machine that you installed the SAS Analytics Platform, run the script **ForecastStudioSetup.sh**, which executes the SAS Forecast Studio administrative setup without the need to install the SAS Forecast Studio client. The location of the setup script is in the following subdirectory of the installation directory:
.../SASApCore/apps/Forecasting/bin
 - In the Windows operating system, you create the directory structure from a SAS Forecast Server Mid-Tier machine by running the script **ForecastStudioSetup.bat**, which executes the SAS Forecast Studio administrative setup without the need to install the SAS Forecast Studio client. The script is located in the following subdirectory of the installation directory:
!SASROOT\SASAPCore\apps\Forecasting\bin
- (b) A logon dialog box appears. Log on as the SAS Forecast Studio administrator that you created in the above step to the server where you installed the SAS Analytics Platform (i.e., **localhost:5099**). The directory structure is created on the server that contains your workspace server.
- (c) Output similar to [Figure 9.5](#) appears. The output shown in [Figure 9.5](#) displays the default values from a Windows machine.

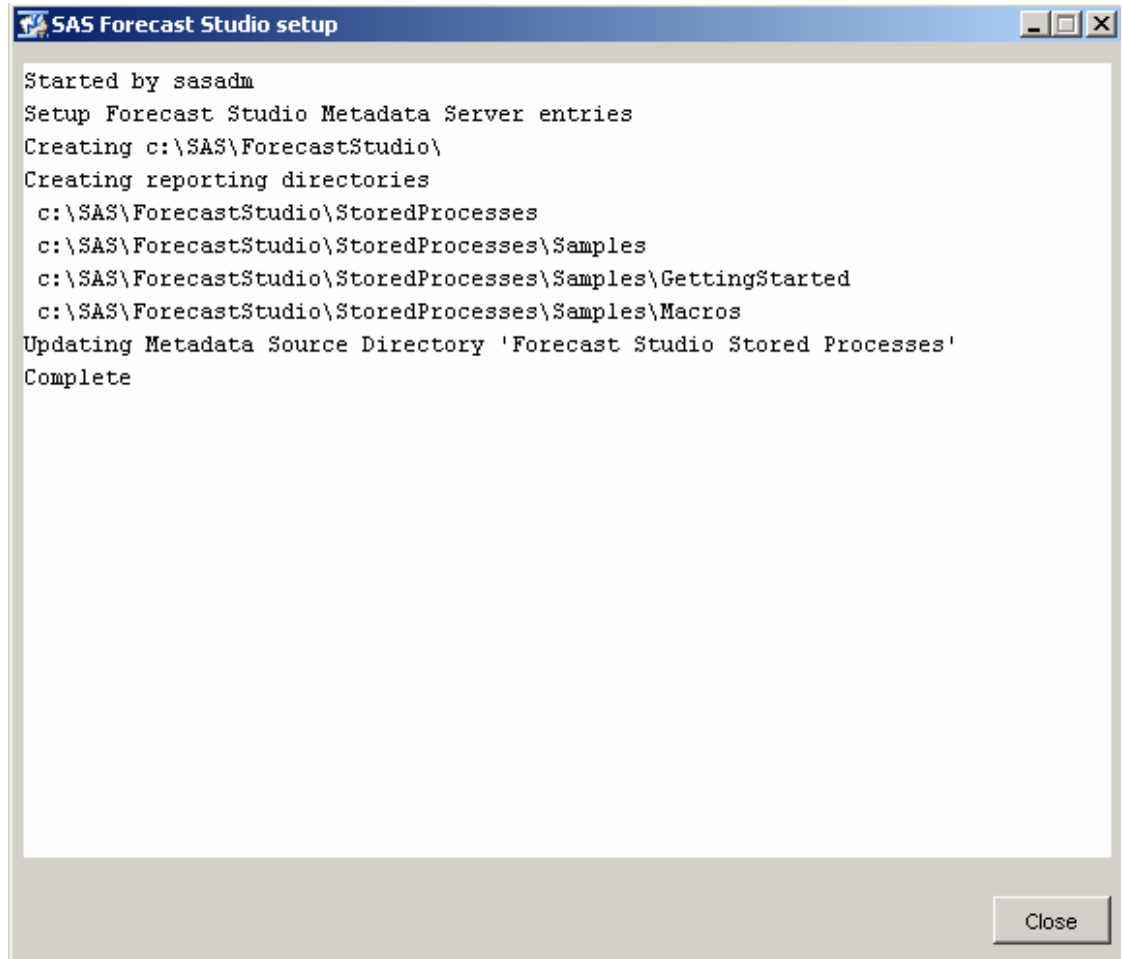


Figure 9.5. SAS Forecast Studio Directory Structure

4. Import the SAS Forecast Studio stored process samples.

Once the default directory structure for the SAS Forecast Studio 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 Studio 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.

- (a) Open SAS Management Console and connect to a metadata repository as the SAS Administrator (e.g., *sasadm*).
- (b) Expand the BI Manager as shown in [Figure 9.6](#).

Post-Installation Tasks

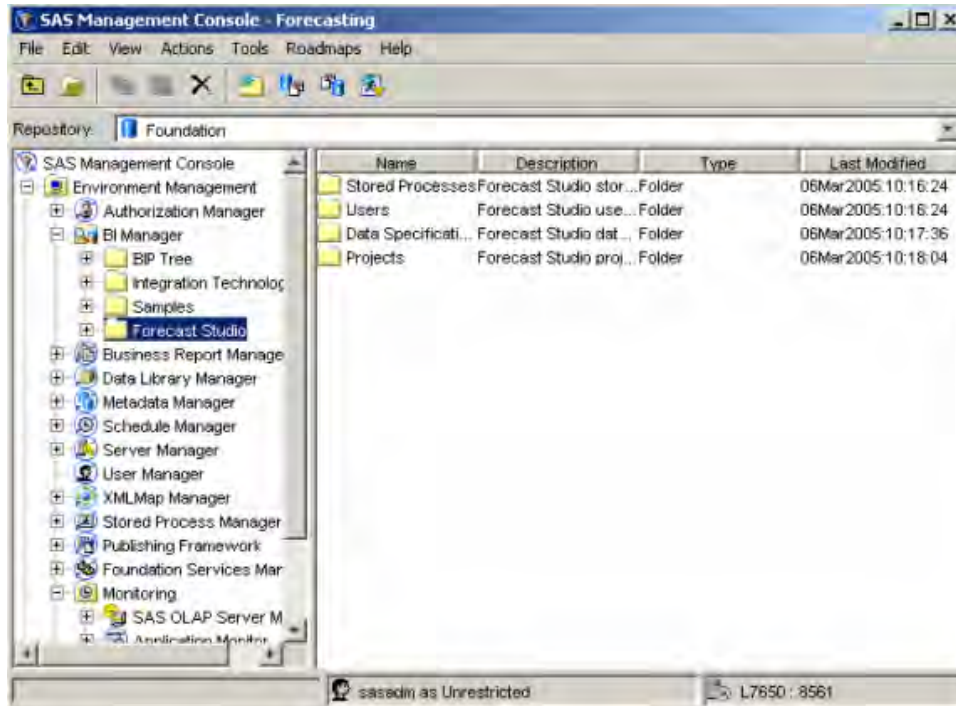


Figure 9.6. BI Manager

- (c) Right-click the **Forecast Studio** folder, and select **Import**.
- (d) Browse to the Forecast Server Mid-Tier installation directory to import the StoredProcesses.spk file:

```
... \SASAPCore\apps\Forecasting\samples\  
StoredProcesses.spk
```

The location is determined by retrieving the current default location for Forecast Studio projects. On Windows, the default location is `c:\SAS\ForecastStudio`. On UNIX, the default location is `<user.home>/ForecastStudio`. If you changed the default location by using the above SAS script, then specify the new location.

```
... \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.

- (e) Select **All Objects** as the Import Options and click **Next**.
- (f) Click **Next** again to select the application server and source code repository.
- (g) Select the appropriate server, and click **Next**. The window where you specify the application servers appears as shown in Figure 9.7.

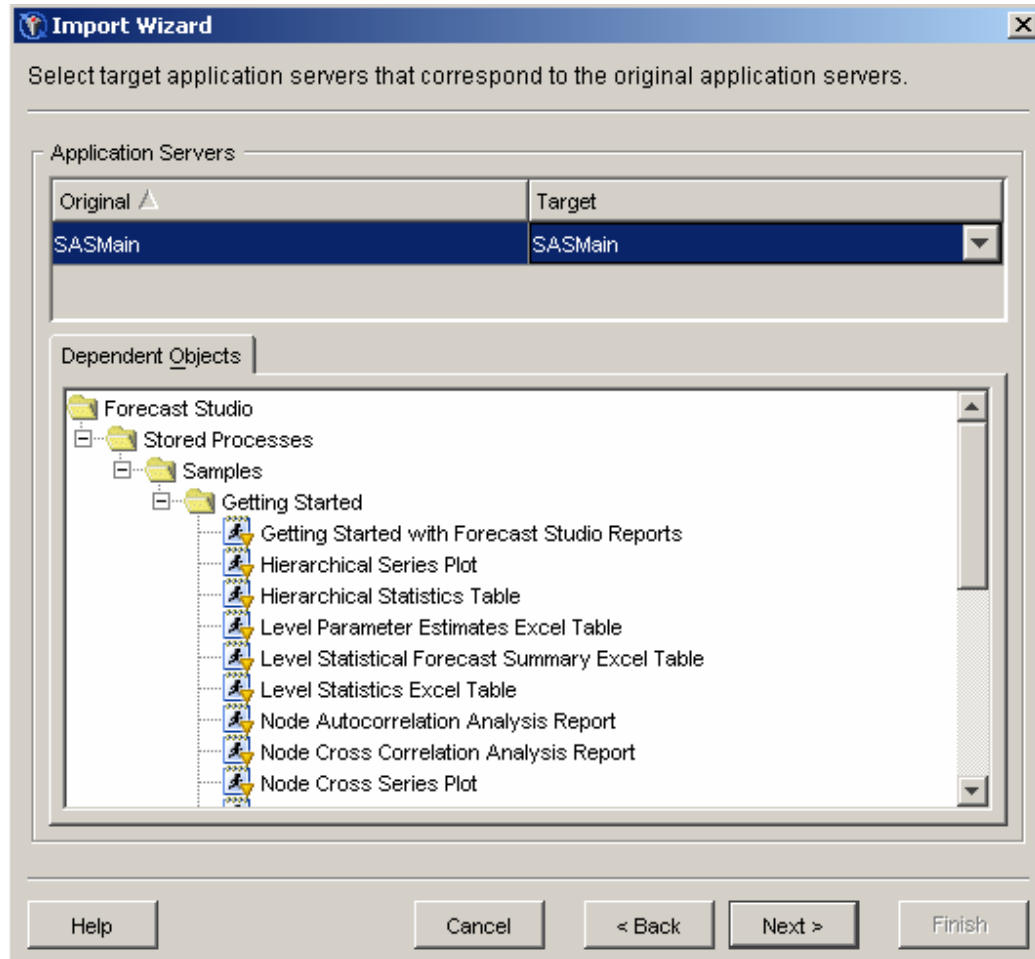


Figure 9.7. Import Wizard: Original and Target Application Servers

- (h) Select the original path of the source code repository, which is the physical location where the stored process source code is stored. When the stored process directory structure was created, a source code repository was created as well. Select this entry and specify the target path where you want the stored processes to be imported. On Windows, this location is the following:

... \SAS\ForecastStudio\StoredProcesses

Click **Next**.

Figure 9.8 shows the window where you specify the original path of the source code repository and the target path.

Post-Installation Tasks

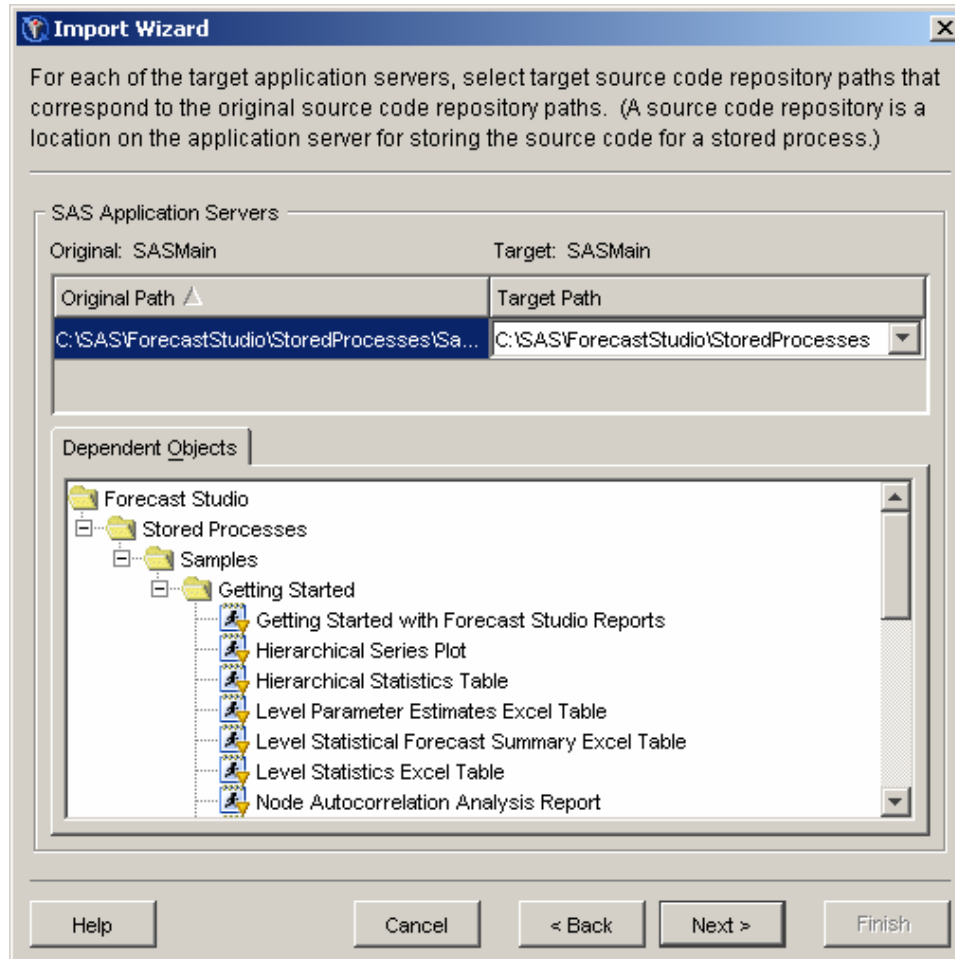


Figure 9.8. Import Wizard: Target Source Code Repository Paths

- (i) Click **Import** at the information step as shown in [Figure 9.9](#).

Note: You might need to re-authenticate to the metadata server by logging on again.

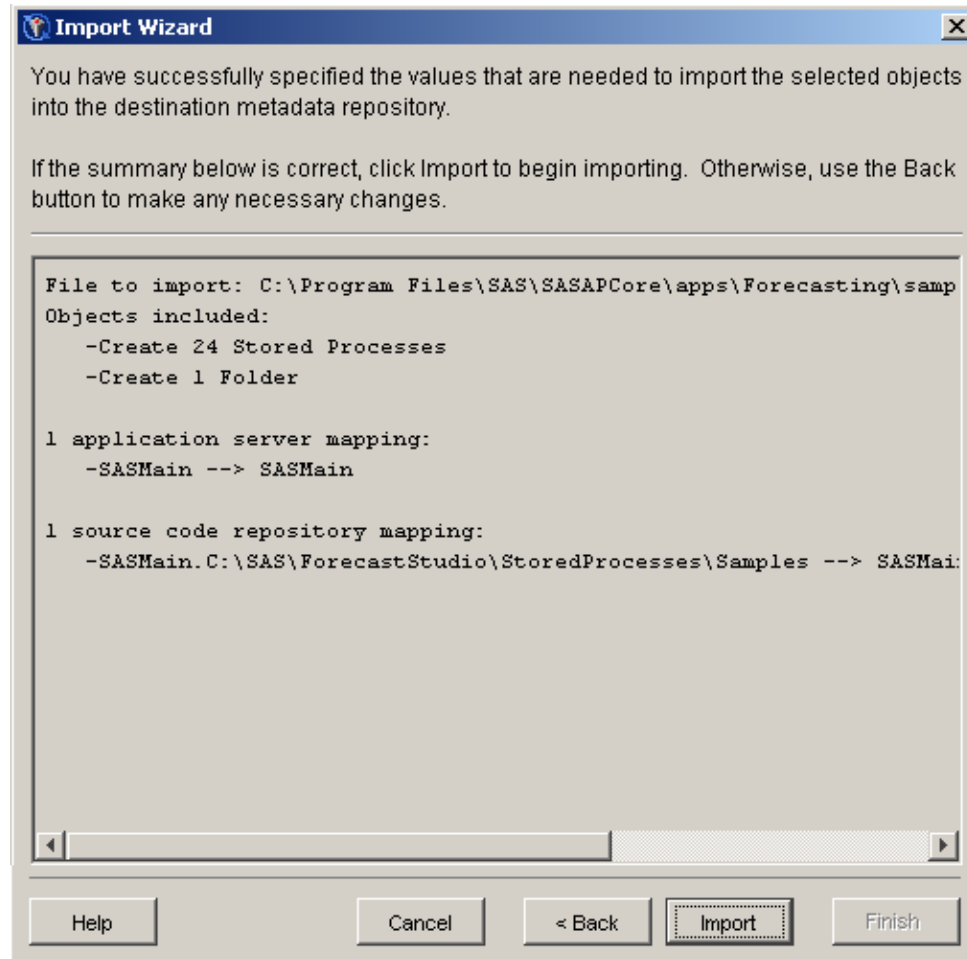


Figure 9.9. Import Wizard: Information Summary Window

- (j) As the BI Manager imports the sample stored processes from the SAS Package file, you see a progress dialog similar to [Figure 9.10](#).

Post-Installation Tasks

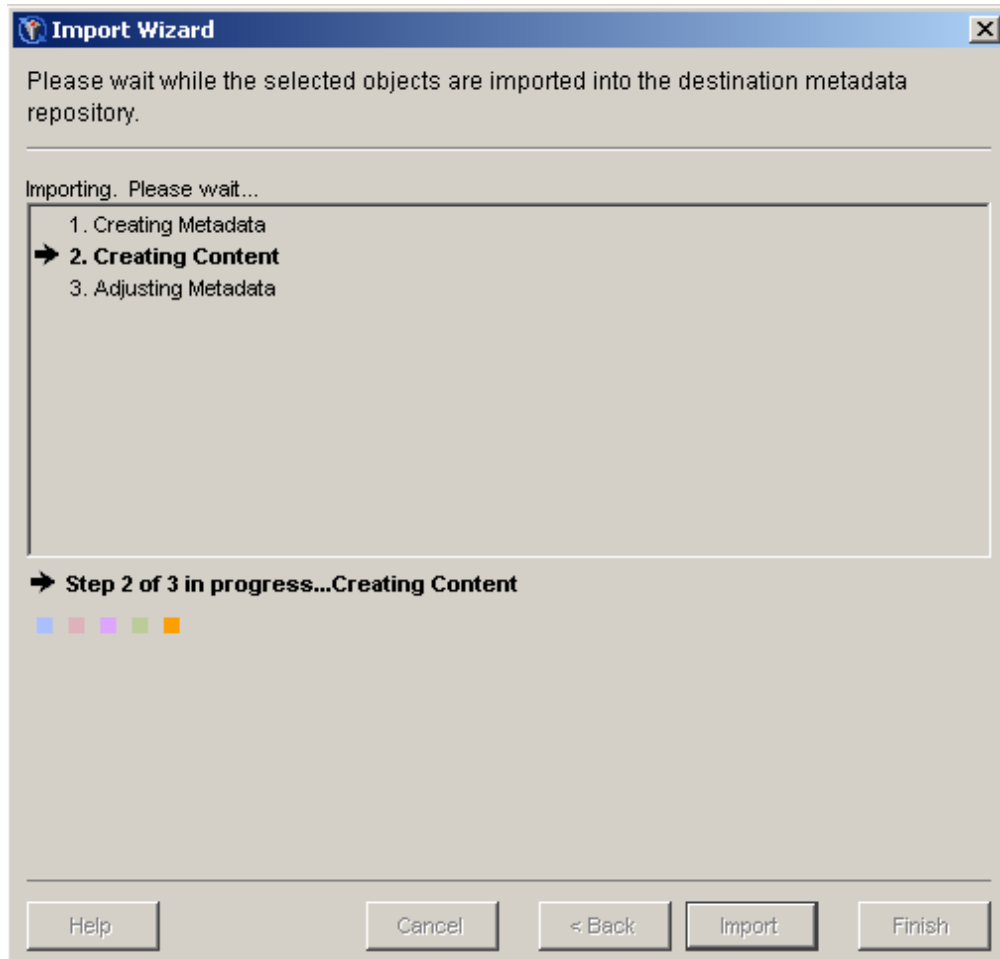


Figure 9.10. Import Wizard: Information Summary

- (k) When the import is done, you get a summary as shown in [Figure 9.11](#). If everything imported properly, then click **Finish**.

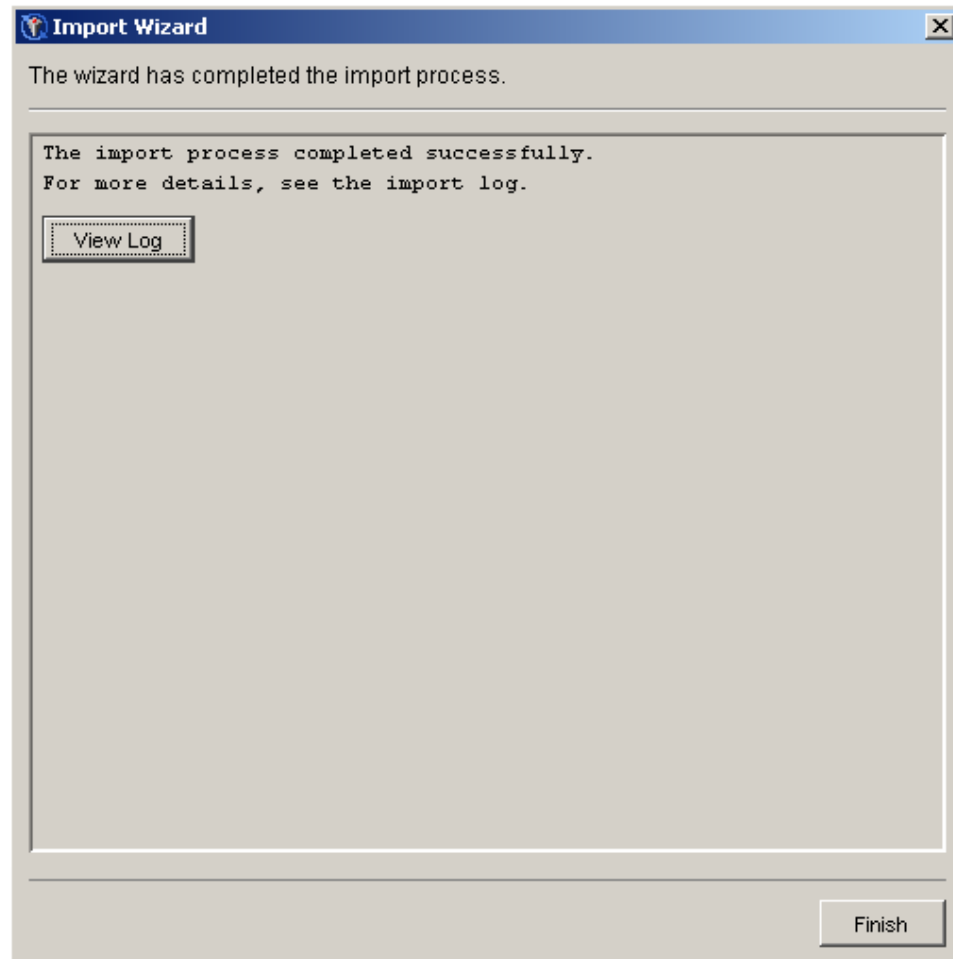


Figure 9.11. Import Wizard: Summary Window

5. Configure the stored process service. Once you import the SAS Forecast Studio stored processes, then you must configure the stored process service by using SAS Management Console.
 - (a) Open SAS Management Console and connect to a metadata repository as the SAS Administrator (e.g., *sasadm*).
 - (b) Expand the **Foundation Services Manager** folder.
 - (c) Expand the **Analytics Platform - Foundation Services** folder.
 - (d) Expand the **Core Services** folder. If there is a **Stored Process Service**, then you do not need to continue.
 - (e) Right-click on the **Core Services** folder, and select **New Service**.
If SAS Management Console wants to import some predefined service definitions, then let it.
 - (f) In the New Service wizard, select **service: Stored Process**. Click **Next**.
 - (g) Enter **Stored Process Service** as the name and a description if you like. Click **Next**.

Post-Installation Tasks

- (h) Click **Next** at the Service Interfaces panel.
 - (i) Click **Next** at the Service Configuration panel.
 - (j) Click **Next** at the Service Remote Clients panel.
Note: Enable remote clients should NOT be enabled.
 - (k) Click **Next** at the Required Services panel.
 - (l) Click **Finish** at the wizard summary panel.
6. 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 9.12](#).

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.

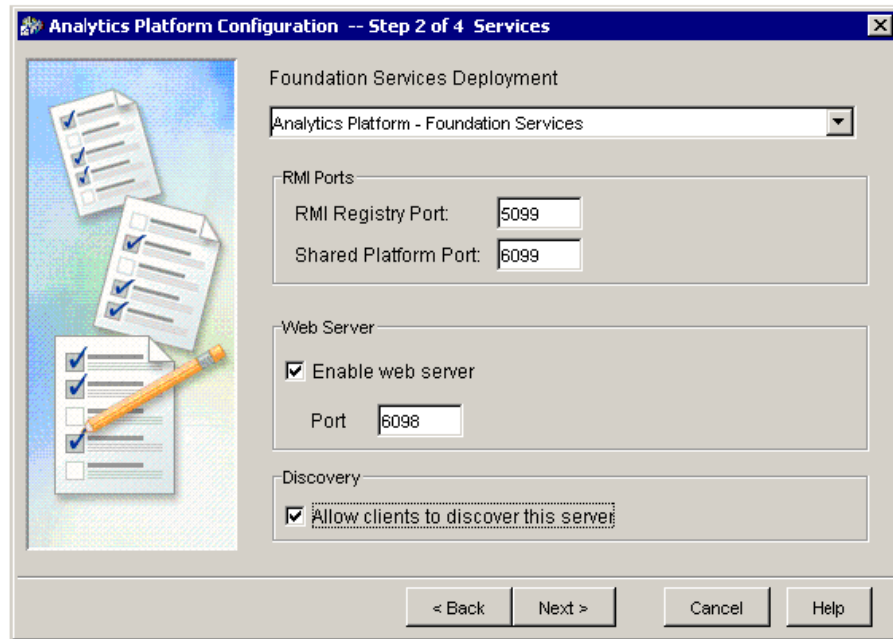


Figure 9.12. SAS Analytics Platform Configuration Wizard —Step 2 of 4

UNIX Administration Tasks

Define a User Group and Permissions to Access Metadata

Overview

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

For a more secure deployment, you can consult with your system administrator to create a SAS Forecast Studio user group, and ensure that the group contains all of the SAS Forecast Studio users. You must include any user who runs code in the batch mode as part of the group. Also, the group should be the primary group.

If you already have created a SAS Forecast Studio user group as a pre-installation task, then you can grant the same permissions to the user group. Grant Write permission on the SAS Forecast Studio directory on all machines that you installed SAS Forecast Studio. Verify that SAS Forecast Studio users have Read, Write, and Execute permissions on the `.../SAS/ForecastStudio/` 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

Post-Installation Tasks

Studio users. The following examples might require changes as per your server configurations.

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

1. Set the umask option in the following shell scripts only if the user is a member of the SAS Forecast Studio 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. Recommend a umask setting of 007.

The following command lines in bold text show the commands lines that you change on an UNIX operating system.

```
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 directory on your server where the ID command is stored. This information can be obtained by typing a **which id** command on your console. In this example, the operating system path is
CMD=/usr/bin/id
2. **GID=<solution-group-id>**
Replace the GID command line with your group ID. You can type **id** on your console in order to get the GID and UID information. In this example, the solution group ID for SAS Forecast Studio is GID=201.

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

- **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):

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

Windows Administration Tasks

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 Studio.

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 Studio. By default, the root 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.

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.

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:

1. Navigate to the `!SASROOT\SASAPcore\conf\` directory.
2. Edit the file `wrapper.conf`. 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`

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 9.13](#). You must use the exact name of the service in the next step.

Service Name	Path	Startup Type	Log On As	
SAS Lev1 MS - DI	SAS Lev1 ...	Automatic	Local System	
SAS Lev1 MS - EGServers	SAS Lev1 ...	Automatic	Local System	
SAS Lev1 MS - Forecast	SAS Lev1 ...	Started	Automatic	Local System

Figure 9.13. 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 step above, as shown in the example in [Figure 9.14](#).

```

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 9.14. Property Value for `wrapper.ntservice.dependency.1=` Entry

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 9.15](#), or by using the **`AnalyticsPlatformService start`** command, or by rebooting the machine.

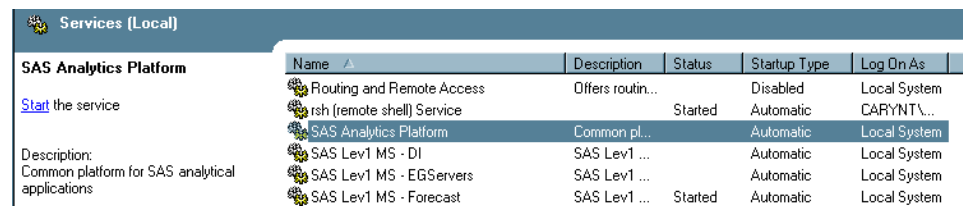


Figure 9.15. SAS Analytics Platform Starts as a Service

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. From the Windows services panel, stop the service.
2. Run the `UninstallAPL.exe` program that is located in the `!SASROOT\SASAPCore_uninstAPL` installation directory.

Chapter 10

Verify SAS Forecast Server Installation

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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 Workspace Server
- SAS Stored Process Server
- SAS Analytics Platform
- SAS Object Spawner

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 systems, you call these scripts directly to start servers and spawners.
- On Windows systems, 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 SAS Forecast Server Installation

Verify That the SAS Metadata Server Is Running

Windows Systems

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 as shown in [Figure 10.1](#).
3. Select **Stop** or **Restart**.

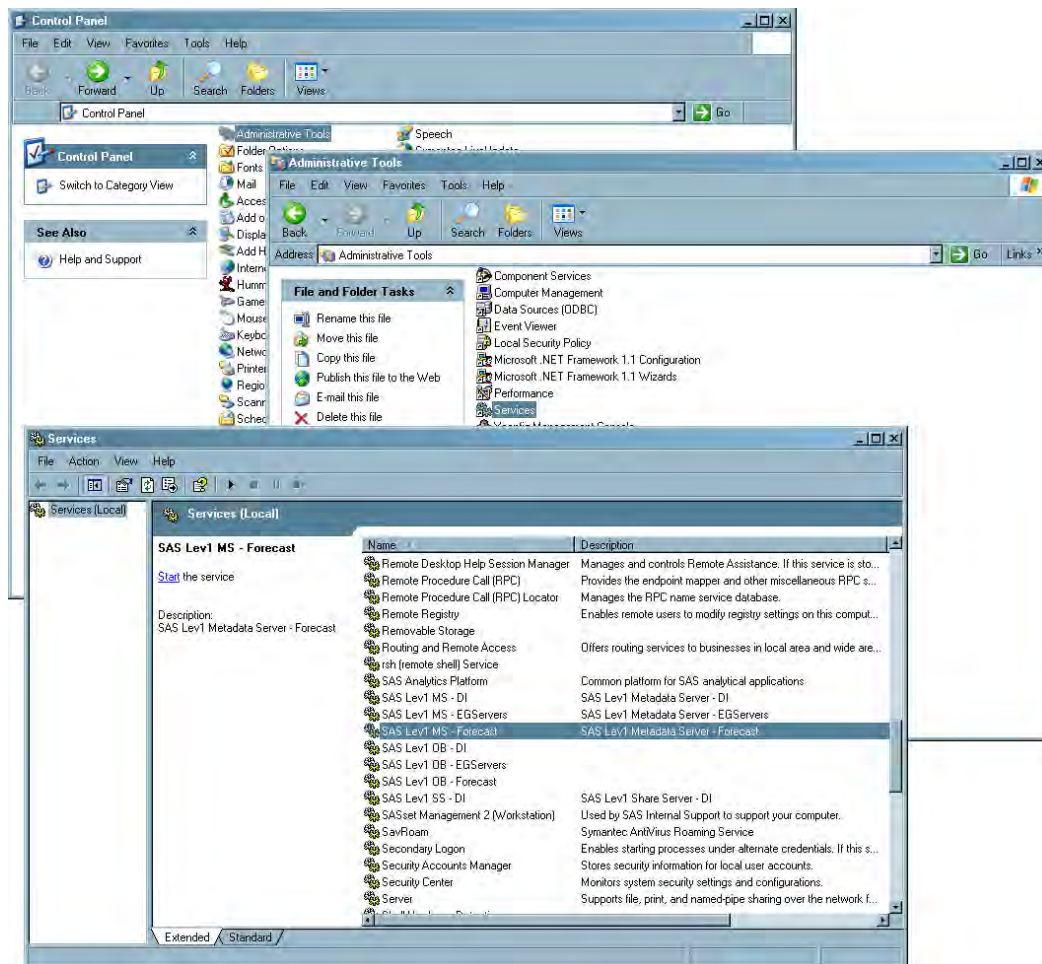


Figure 10.1. SAS Metadata Server Running

If your server is running on a Windows machine and you choose to start the servers by using scripts, then start the servers by performing the following steps:

1. Log on as a member of the Administrators group.

2. Use the **Start** menu to start the server by 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\server-type

UNIX Systems

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

1. Log on as a SAS user.
2. Navigate to the following path:
path-to-config-dir/Lev1/SASMain/server-type
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, refer to 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 10.2](#).
8. If prompted, enter a SAS Guest User ID (e.g., *sasguest*).

Verify SAS Forecast Server Installation

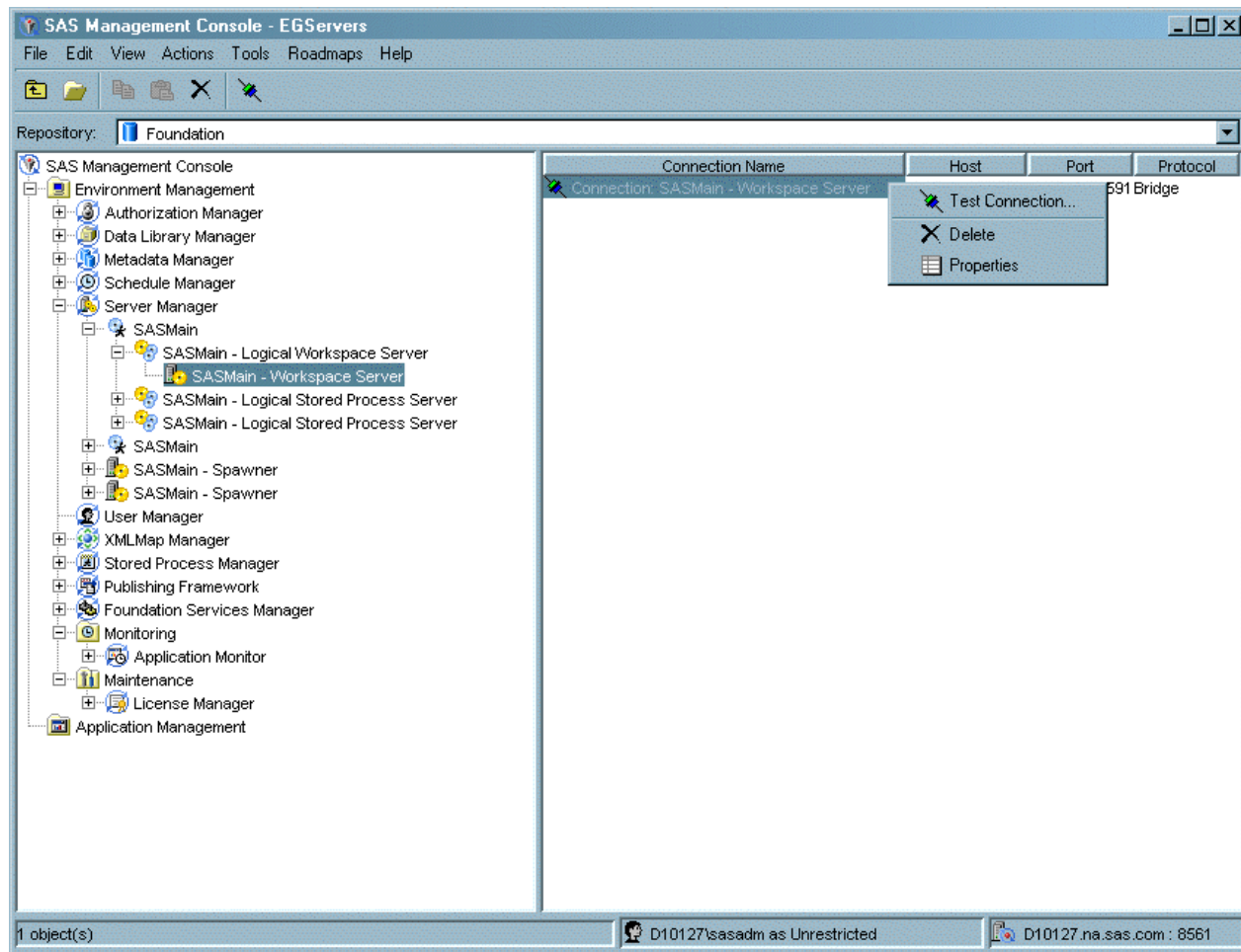


Figure 10.2. SAS Workspace Server: Test Connection

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 10.3.

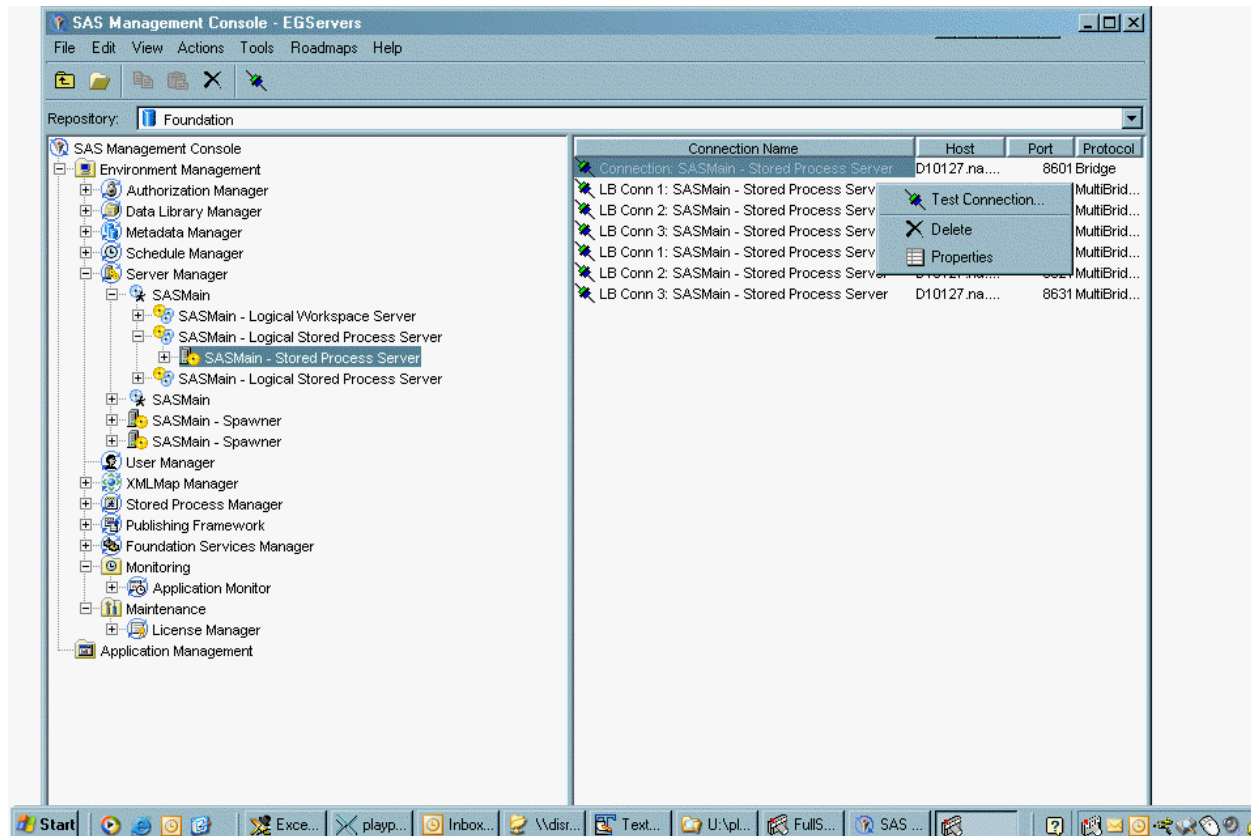


Figure 10.3. Stored Process Server: Test Connection

SAS Analytics Platform

Definition

The SAS Analytics Platform is a RMI middle-tier server that enables SAS Forecast Studio 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 Server Mid-Tier and SAS Forecast Studio client. By default, the SAS Analytics Platform is configured to run as an application. When you run the SAS Analytics Platform as an application, the user who starts the server must remain logged on to the server machine. When the user who started the SAS Analytics Platform logs off, the SAS Analytics Platform is shut down. However, when you configure the SAS Analytics Platform as a service, the

Verify SAS Forecast Server Installation

SAS Analytics Platform restarts when its machine reboots and runs even when users log off the machine. For information about configuring the SAS Analytics Platform to run as a service, see [Chapter 9, “Post-Installation Tasks.”](#)

Start the SAS Analytics Platform

To start the SAS Analytics Platform, navigate to the SAS Analytics Platform by selecting:

Start → Programs → SAS → SAS Analytics Platform → Start AP Server

Also, you can start the SAS Analytics Platform by running the start up script **apstart.exe**. You can find the start up script in the following location:

c:\Program Files\SAS\SASAPCore\bin

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 Systems

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 as shown in [Figure 10.4](#).
3. Select **Stop** or **Restart**.

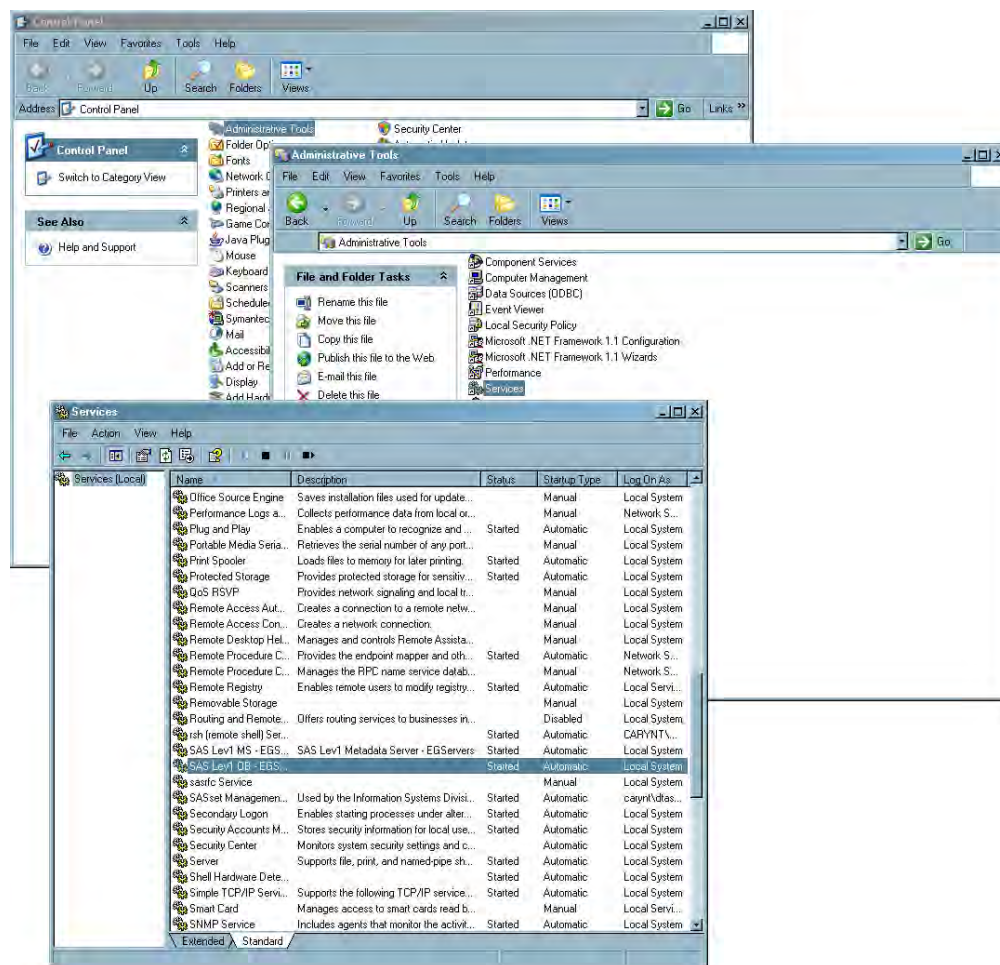


Figure 10.4. SAS Metadata Server Running

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 performing the following steps:

1. Log on as a member of the Administrators group.
2. Use the **Start** menu to start the server by selecting:
Start → **Program** → **SAS** → *configuration-directory* → **Start SAS Object Spawner**.

UNIX Systems

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

1. Log on as a SAS user (e.g., *sasquest*).
2. Change directories to *path-to-config-dir/Lev1/SASMain/server-type*.
3. Execute the script in the directory that starts the server.

Note: Each server is associated with a different task.

Start SAS Forecast Studio to Verify Installation

You can verify the successful installation of SAS Forecast Studio by starting the client on a Windows machine where you installed the client. You can start SAS Forecast Studio by performing the following steps:

1. Navigate to SAS Forecast Studio by selecting:
Start → Programs → SAS → SAS Forecast Studio → SAS Forecast Studio 1.2.
2. In the Log On dialog box, enter your user ID and password, and specify a SAS Forecast Server Mid-Tier location.
3. Click **Log On**.

For more information about different ways to start SAS Forecast Studio, see [Chapter 11, “Start the SAS Forecast Studio Client.”](#)

Chapter 11

Start the SAS Forecast Studio Client

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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 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

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

1. 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 name 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:

Start the SAS Forecast Studio Client

1. 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 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 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 SAS Forecast Studio by selecting:
Start → Programs → SAS → SAS Forecast Studio → SAS Forecast Studio 1.2.
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

Configure the Anonymous Logon Feature

Both the SAS Analytics Platform and SAS Forecast Studio 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. Navigate to the **AP Server Advanced Configuration** wizard by selecting: **Start** → **Program** → **SAS** → **SAS Analytics Platform** → **AP Server Advanced Configuration**.
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.

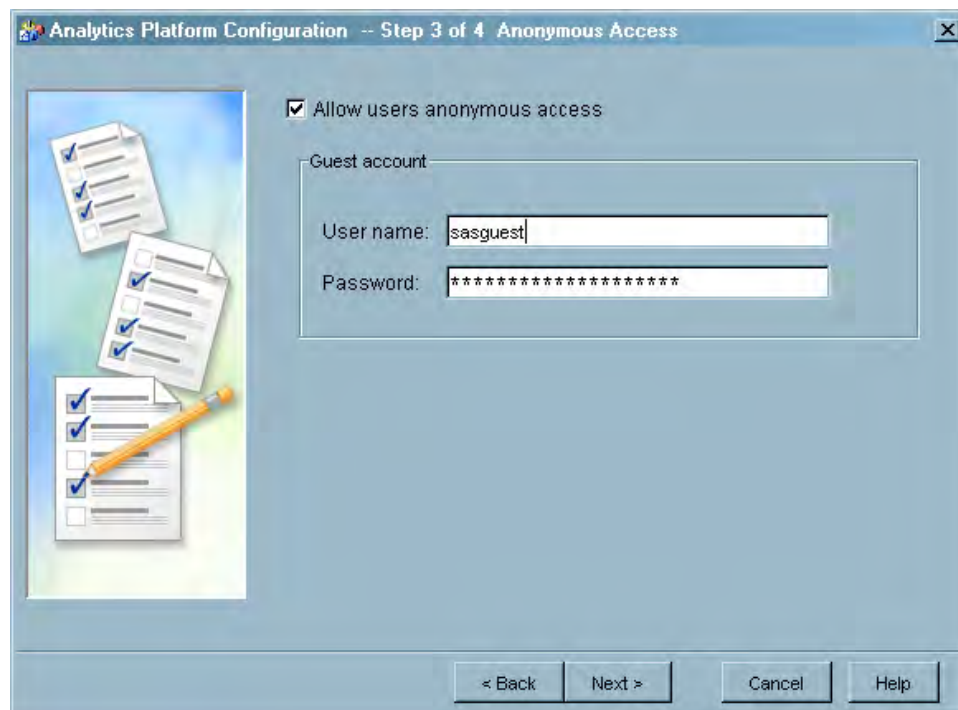


Figure 11.1. Anonymous Access Screen

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

Start SAS Forecast Studio Client with an Anonymous Logon

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

Start the SAS Forecast Studio Client

1. Navigate to SAS Forecast Studio by selecting:
Start → Programs → SAS → SAS Forecast Studio → SAS Forecast Studio 1.2.
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. [Figure 11.2](#) shows an example of an anonymous logon dialog box.



Figure 11.2. SAS Forecast Studio Logon Screen

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, or worry about the client application version not matching the server version. If you launch the application in this manner, then all of the required JAR files automatically download to your desktop. You might be prompted a few times for security purposes and asked if you want to create a desktop icon. If a new version of SAS Forecast Server is installed on the server, then the updated version automatically installs before the client application is invoked.

Note: You can use the SAS Forecast Studio client in a Windows environment only, and you must have the required JRE version installed on each of the client machines. For information about SAS Forecast Studio system requirements, see [Chapter 3, “System Requirements for SAS Forecast Studio.”](#)

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. By default, the Web server is started on port 6098. 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, refer to the Sun Web site at the following Web address:

`http://java.sun.com/products/javawebstart/`

Part 4 Administration

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Chapter 12

Additional Administration Tasks

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Chapter 12

Additional Administration Tasks

Enable Users to Access SAS Forecast Studio

Authentication versus Authorization

Before learning about authorizations within SAS Forecast Studio, 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 Studio. 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 Studio 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 Studio uses the metadata server for metadata authorization. Access permissions are defined and stored in the metadata repository. SAS Forecast Studio 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 Studio 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 Studio, 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:

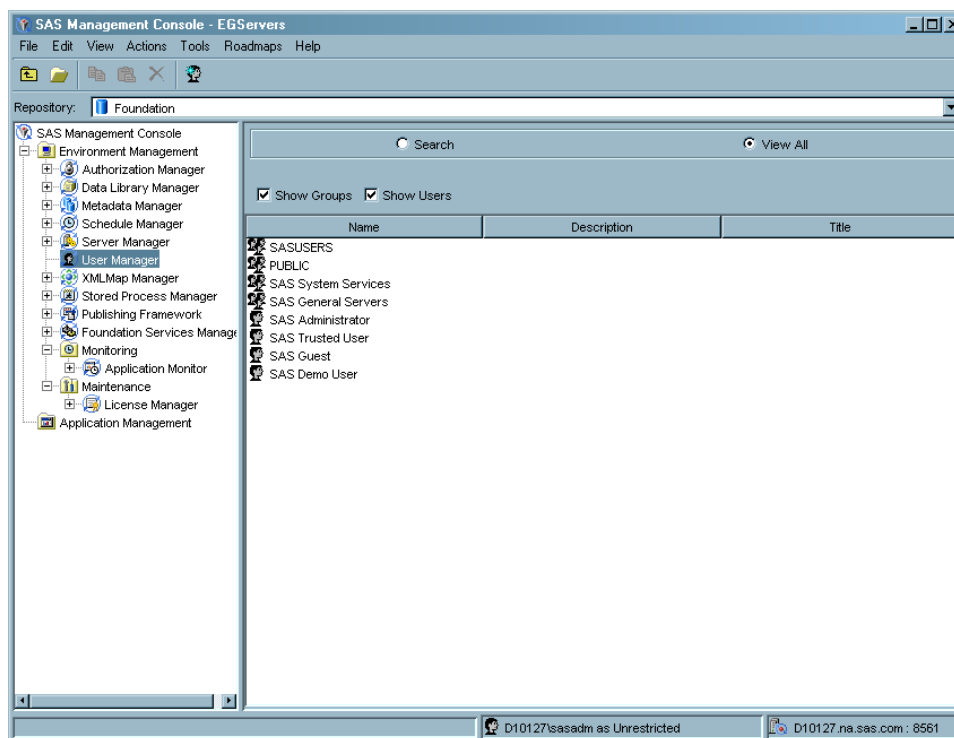


Figure 12.1. Initial Users and Groups for SAS Forecast Studio

Define Additional Users

If you want to log on to SAS Forecast Studio 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 Studio. 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.

New User Properties

General | Groups | Logins | Authorization

User

Name:

Job Title:

Description:

Email	Type	Address

New Edit Delete

OK Cancel Help

Figure 12.2. New User Definition for SAS Forecast Studio

For more information about how to define users and groups in SAS Management Console, refer to 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. A password is not generally required. [Figure 12.3](#) shows an example of associating an identity with the user ID *newuser*.

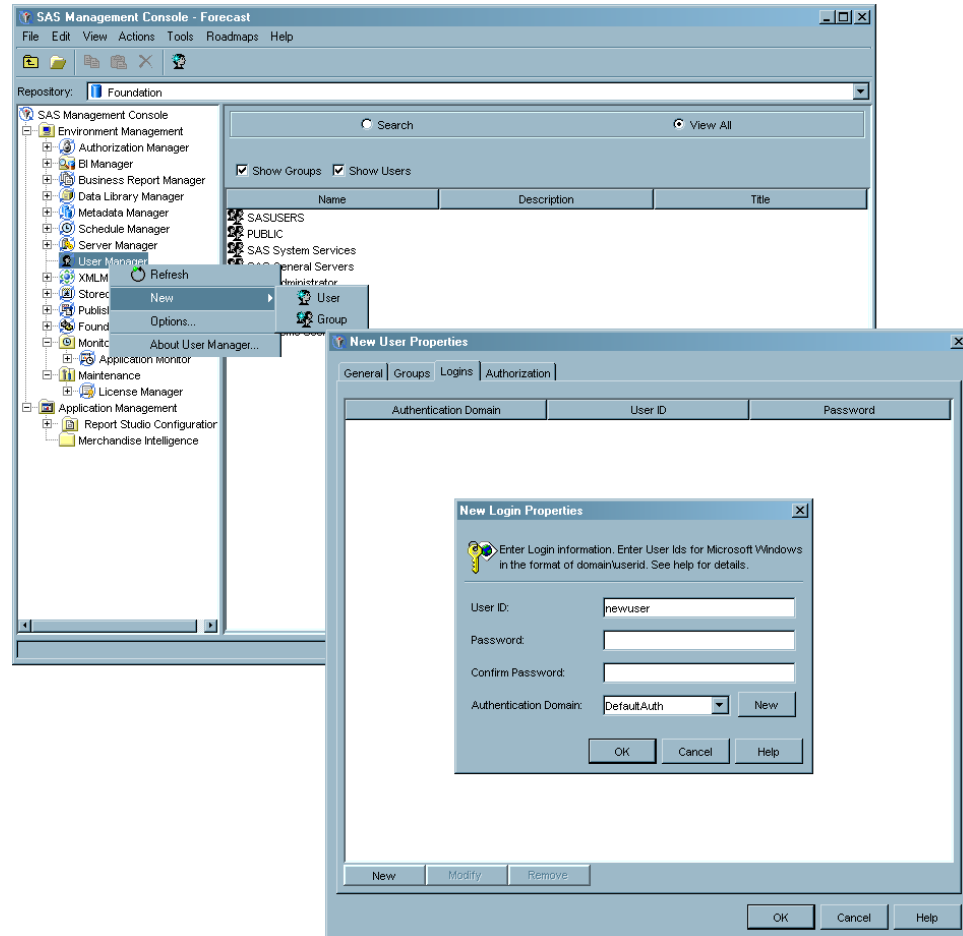


Figure 12.3. Associated Metadata Identity for a User ID

For more information about planning and defining new users and groups, refer to 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 Studio

What Permissions Can You Control?

To secure access to metadata objects that represent SAS Forecast Studio 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

Currently, you cannot secure SAS Forecast Studio projects or models. However, if you do not have permissions to access the SAS data set that a project uses, then you cannot access the project. Similarly, if you do not have permissions to read a variable that is used in a forecasting project, then you are denied permissions to the entire project.

View User Permissions

The following example illustrates how to set user permissions and how SAS Forecast Studio 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 Studio. 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.

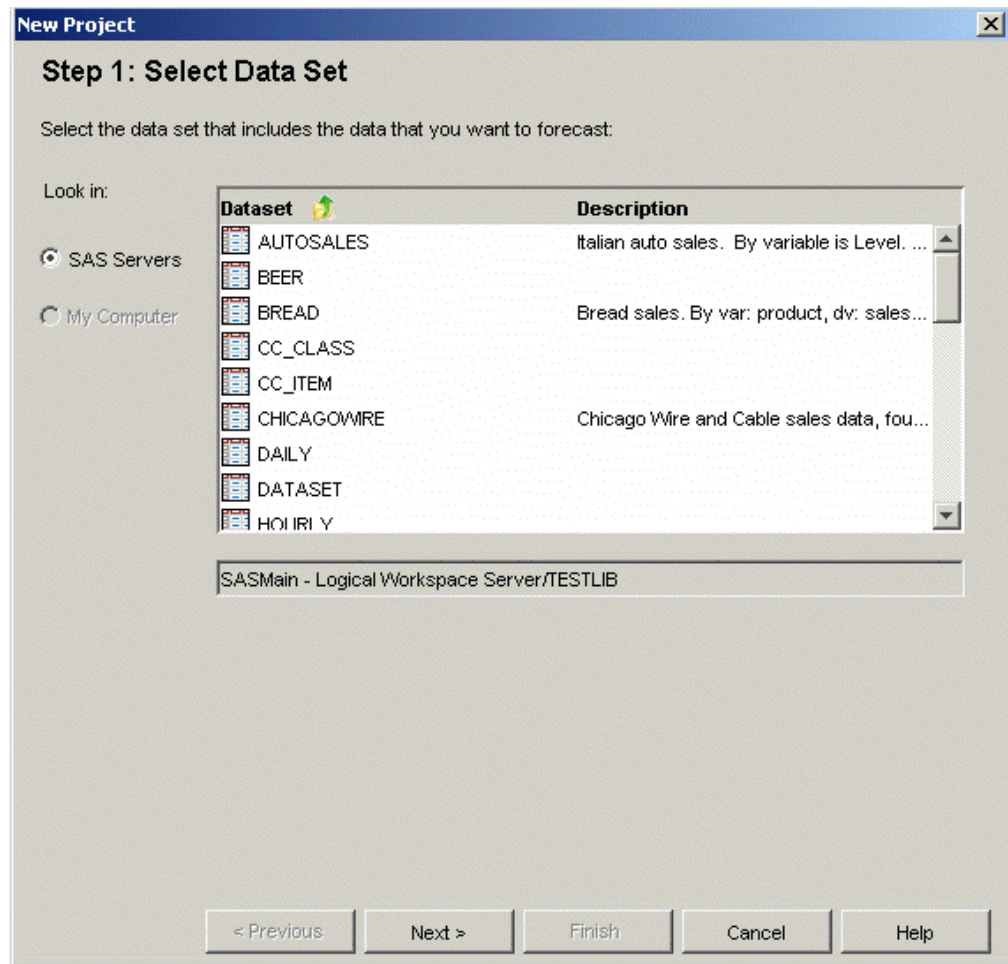


Figure 12.4. Available SAS Data Sets for *sasadm* User

Conversely, [Figure 12.5](#) shows that no SAS data sets are available to the *sasdemo* user for selection.

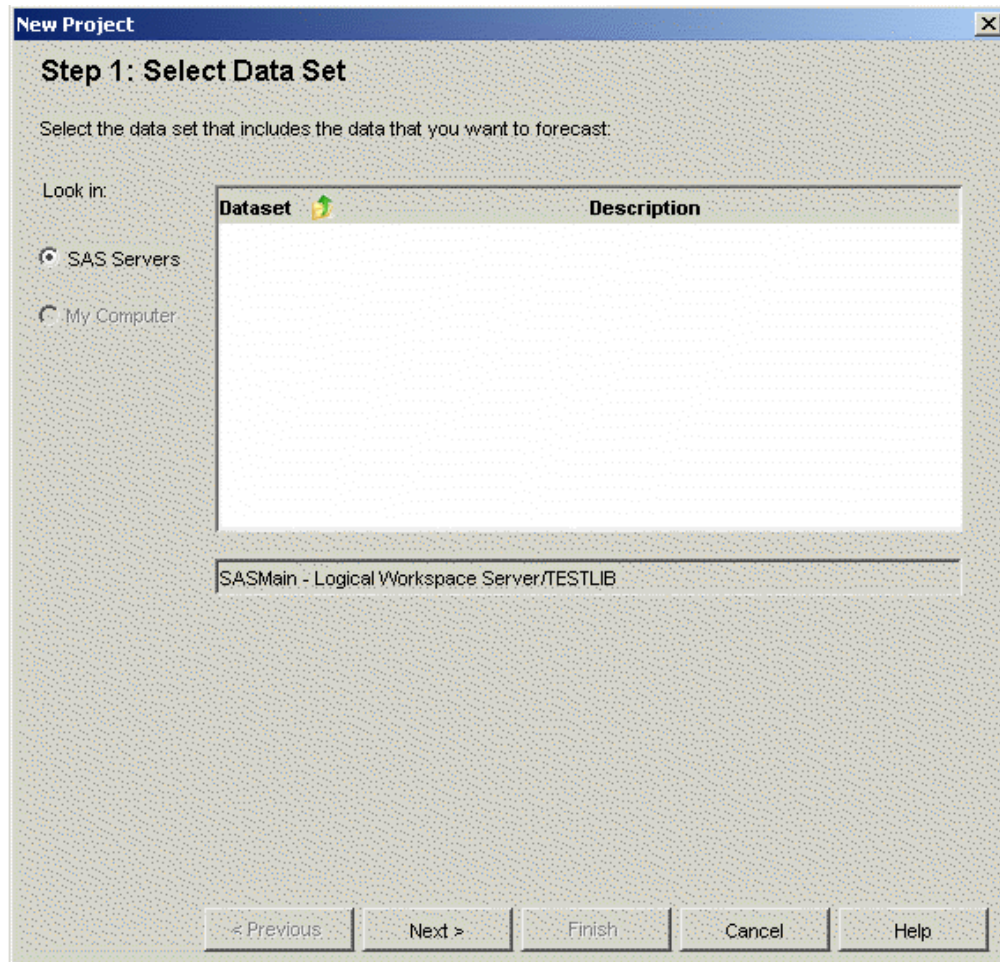


Figure 12.5. Available SAS Data Sets for *sasdemo* User

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 *sasadm*.
2. Expand the **Authorization Manager** node.
3. Select the **Access Control Templates** node as shown in [Figure 12.6](#).

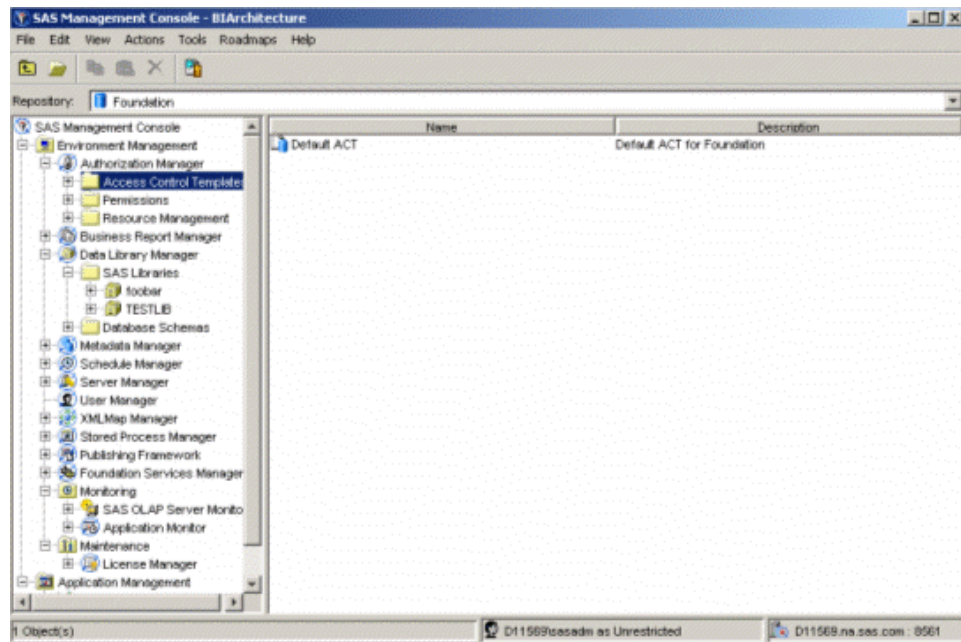


Figure 12.6. SAS Management Console Authorization Manager

4. Right-click **Default ACT**.
5. Select **Properties**, which allows you to modify the default template for the various SAS users.
6. Select the **Authorization** tab, which controls the permissions for the various users and groups as shown in [Figure 12.7](#).

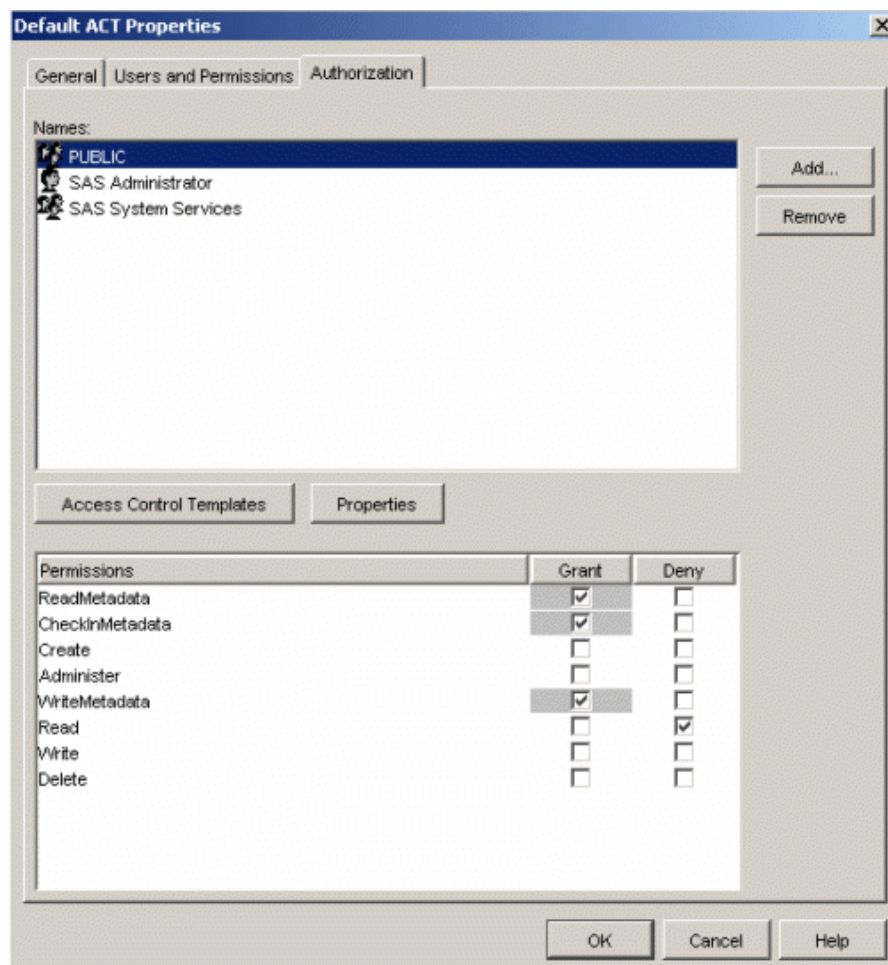


Figure 12.7. Default Act Properties

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, which is the group that *sasadm* is a member of, 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 Studio filters out any SAS data sets that the user is not authorized to read.

Grant User Permissions to Specific SAS Data Sets

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 *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](#).

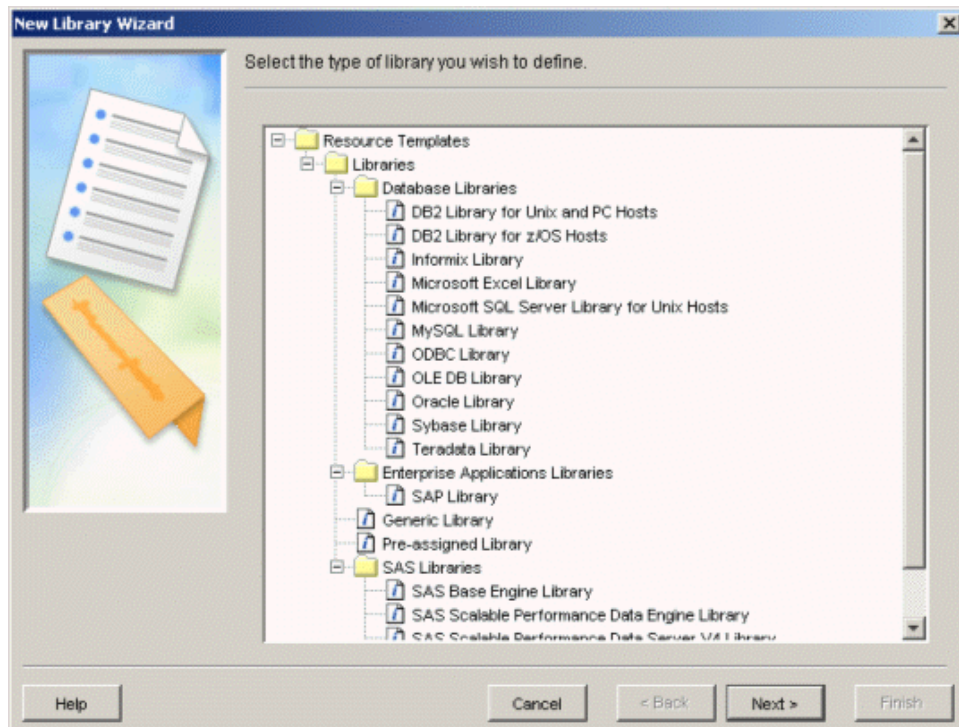


Figure 12.8. New Library Wizard

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. Select **SASMain** as the SAS server, and click **Next**.
9. Click **Finish** to return to SAS Management Console.

Note: SAS Forecast Studio 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. 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](#).

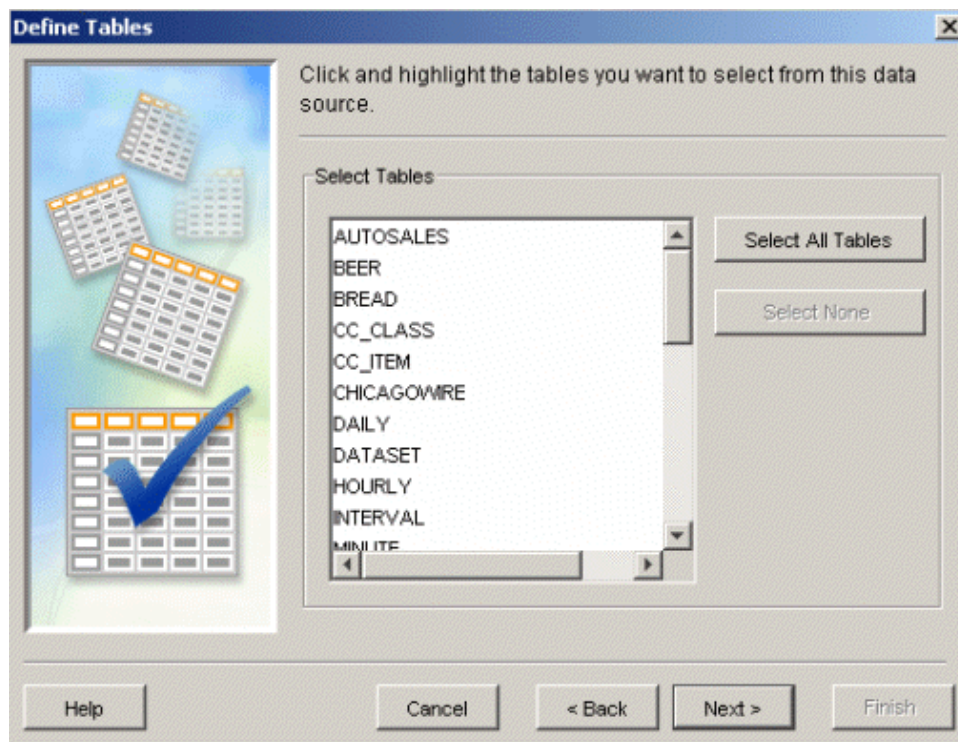


Figure 12.9. Define Tables

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](#).

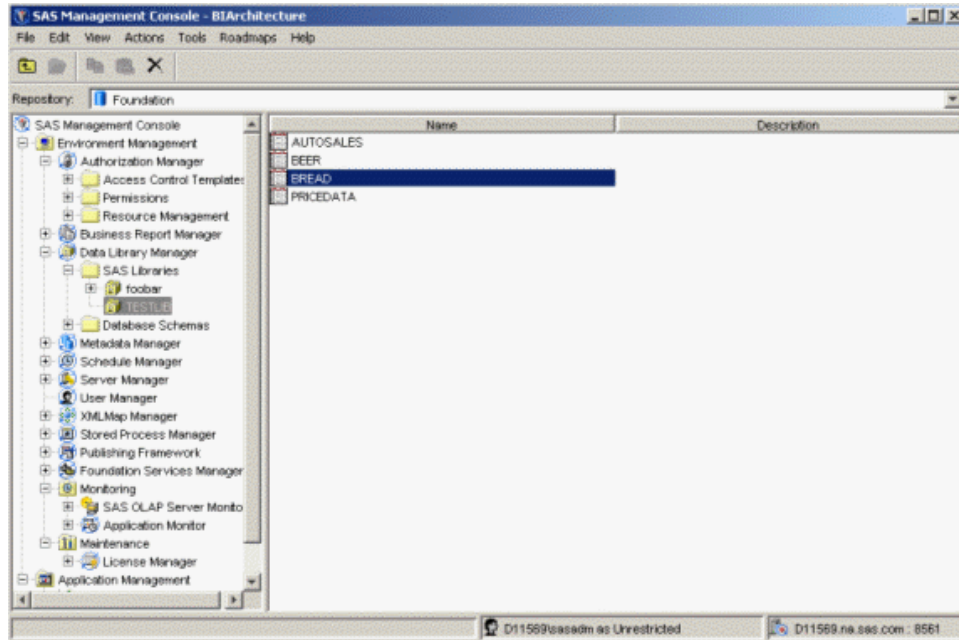


Figure 12.10. Selecting the **BREAD** Data Set

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](#).

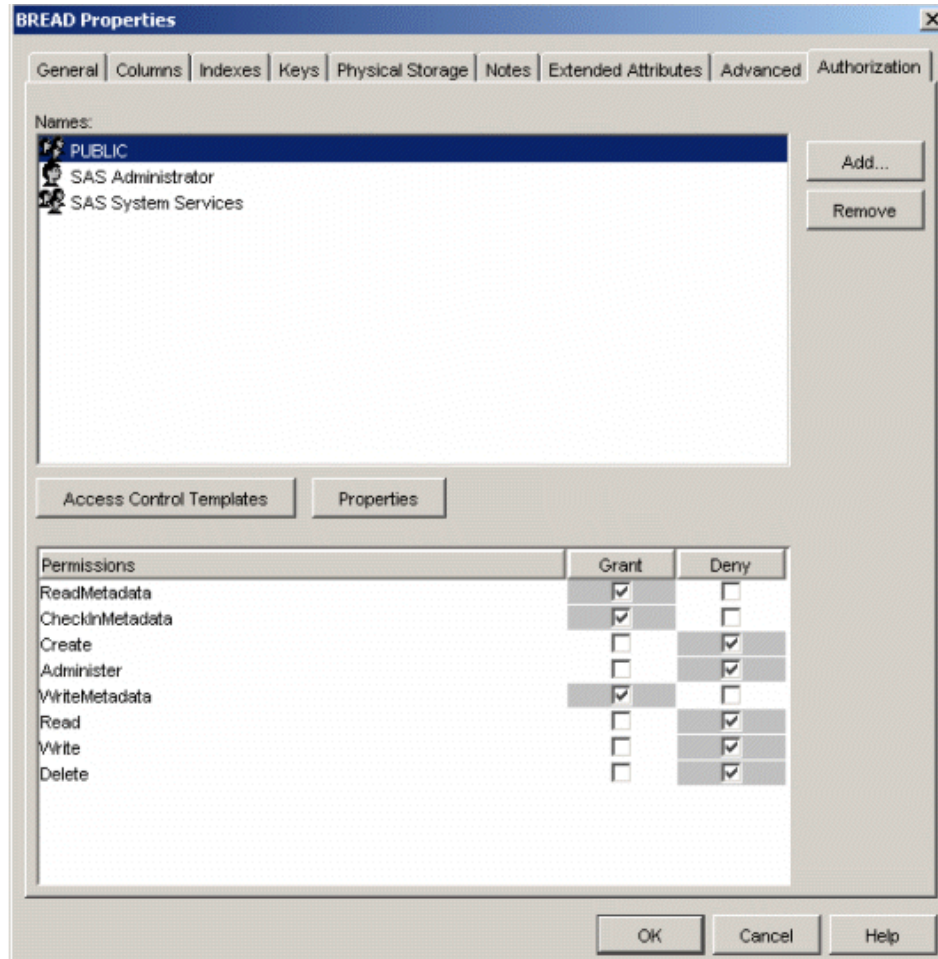


Figure 12.11. Setting Permissions for the **BREAD** Data Set

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](#).

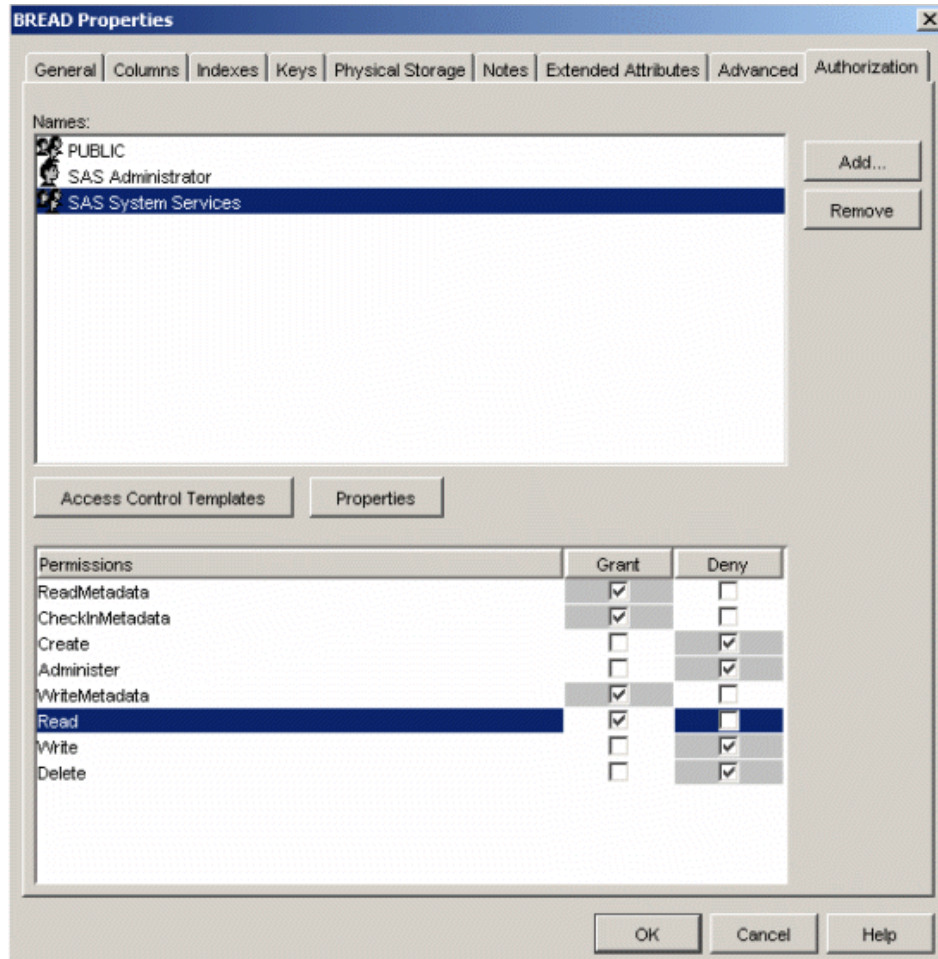


Figure 12.12. Setting Permissions for the PUBLIC Group

(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 a SAS Forecast Studio session, and log on as the *sasdemo* user.

Note: If you have an existing SAS Forecast Studio session 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](#).

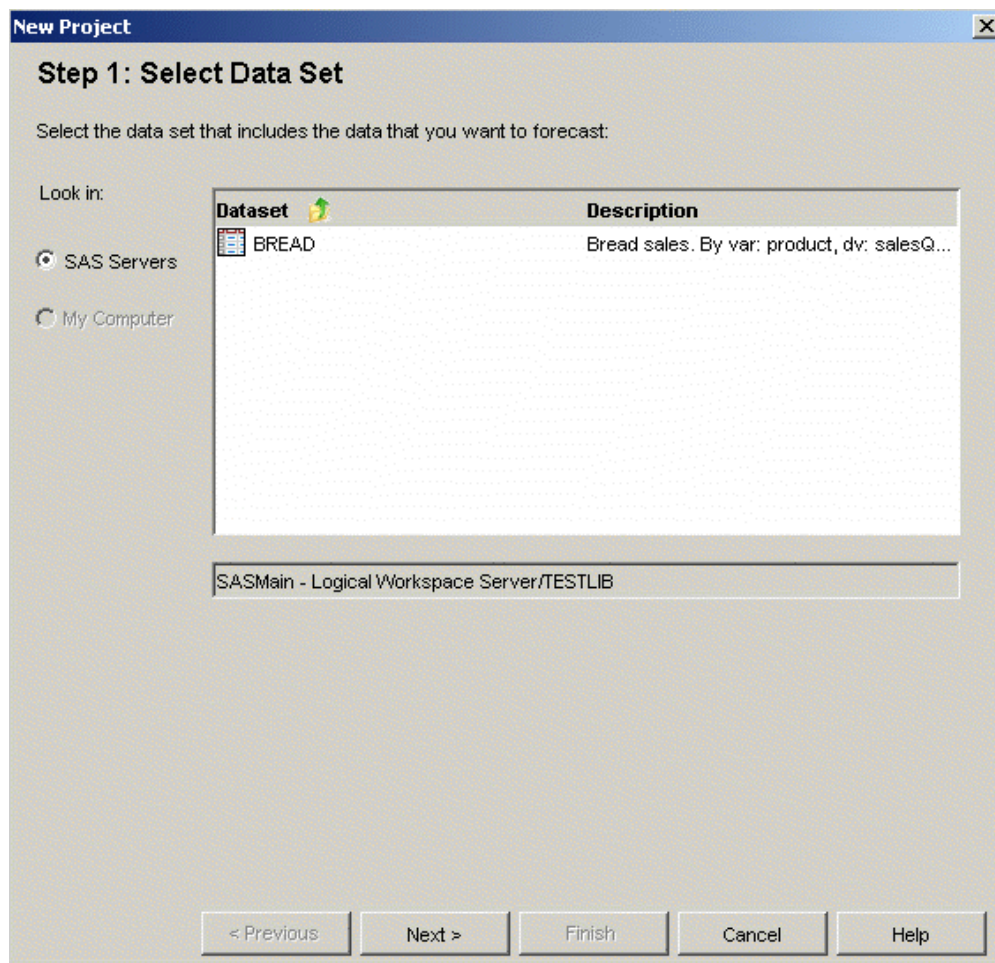


Figure 12.13. **BREAD** Data Set Available for Selection

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

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.

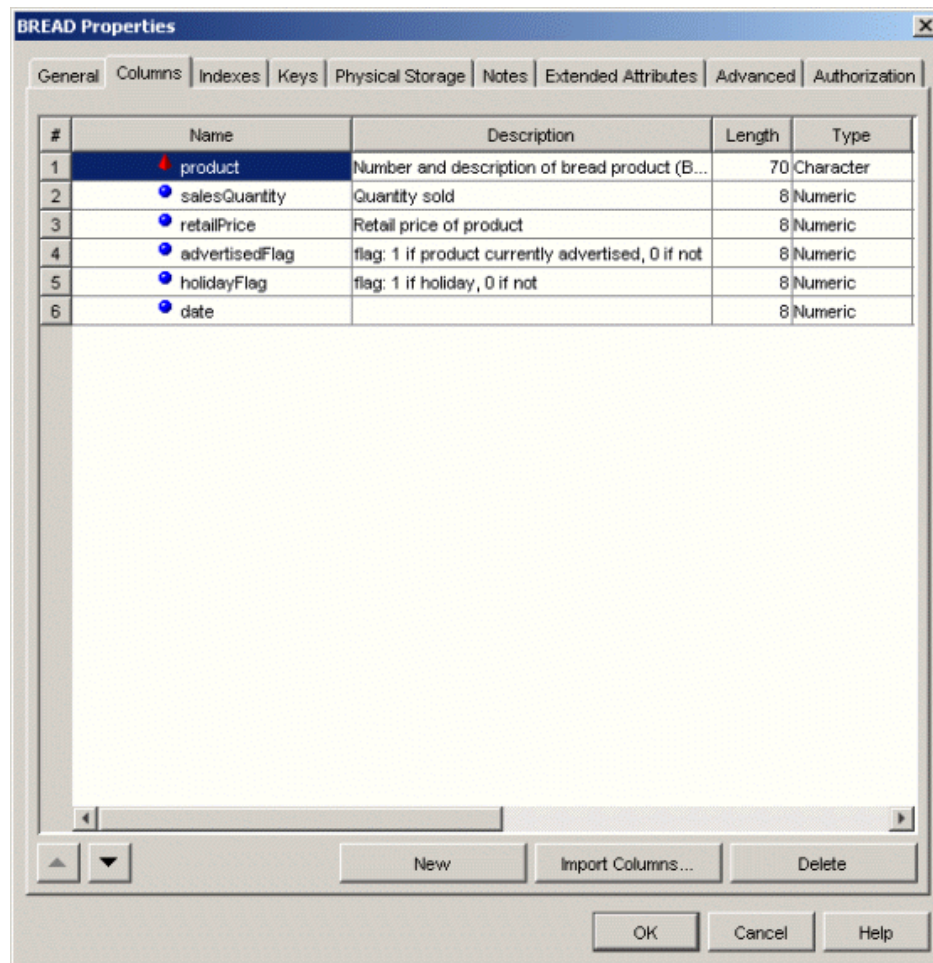


Figure 12.14. Setting Variable Permissions

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.

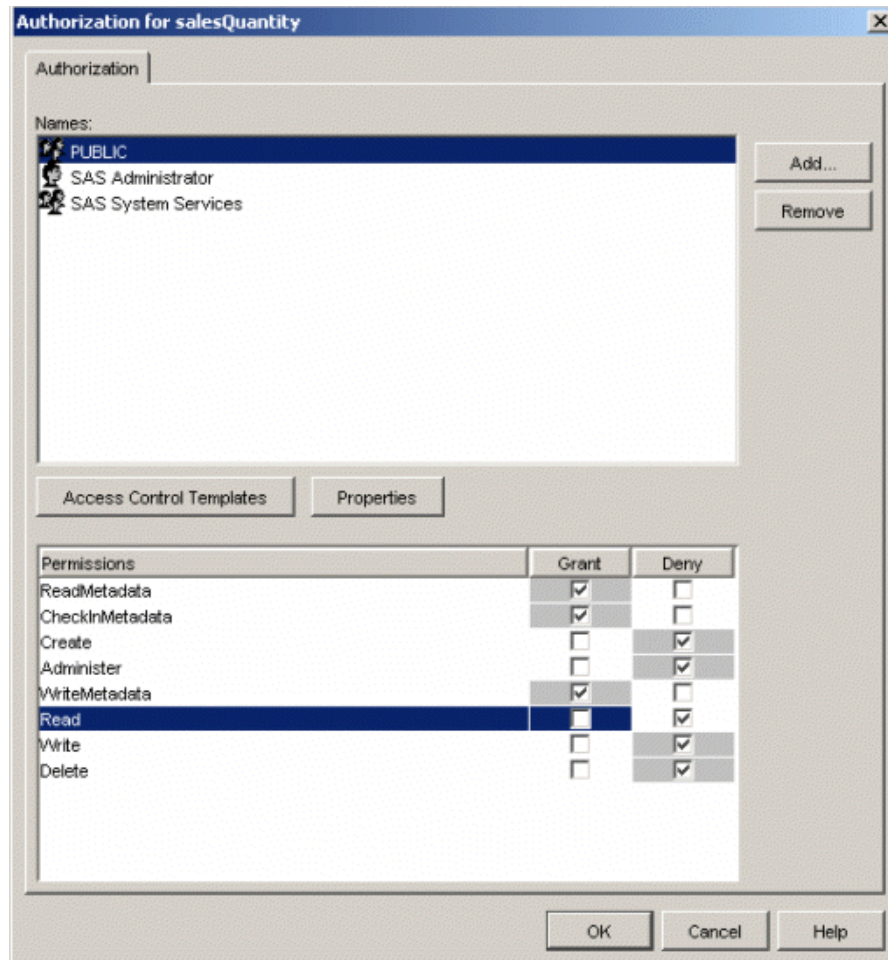


Figure 12.15. Restricted Variable Permissions

To verify that the *sasdemo* user does not have permissions to read the **retailPrice** variable, try to create a new project in SAS Forecast Studio 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.

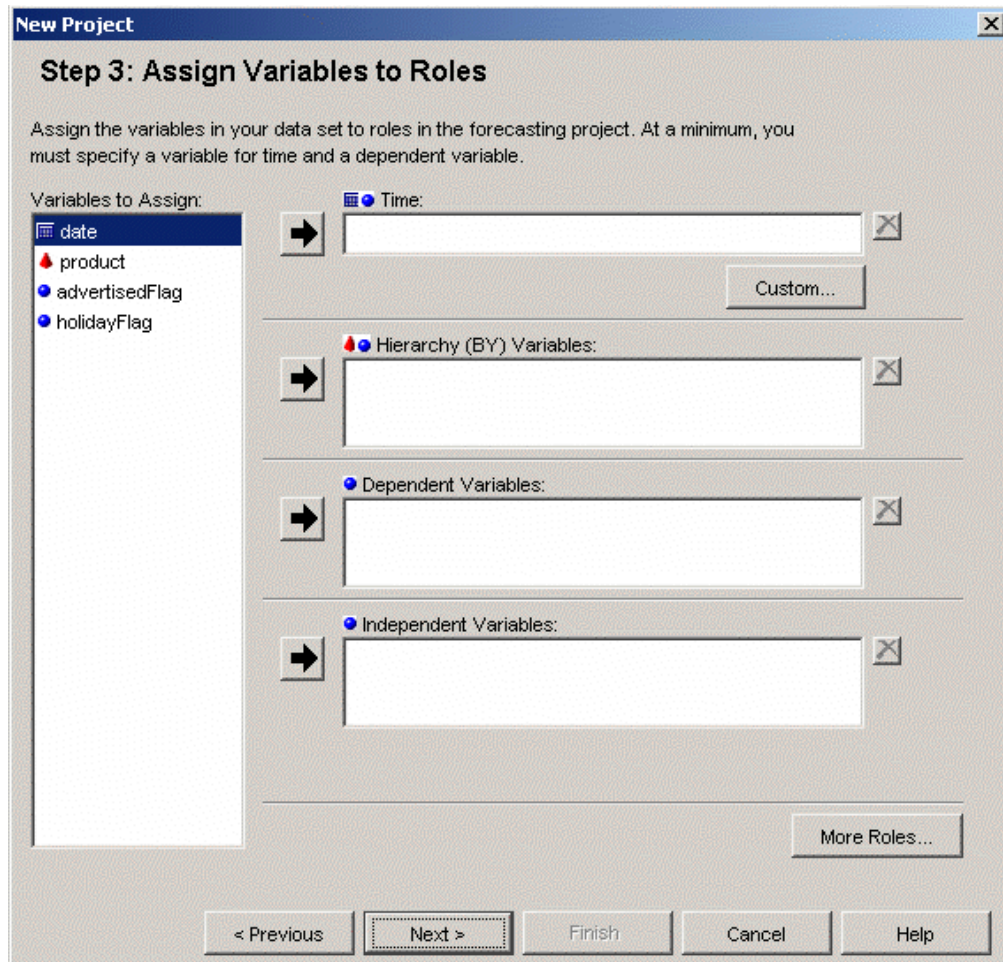


Figure 12.16. Available Variables Based on Permissions

Configure a SAS Forecast Studio 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, refer to the stored process section of the *SAS Integration Technologies: Developer's Guide*.

Configure SAS Forecast Studio Stored Processes

A SAS Forecast Studio 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 Studio 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 with that name.
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 above, and a description (optional).
 - (d) Click **OK**.
 - (e) Click **OK** again.
10. Select or enter the directory where you saved your SAS code above 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 Studio from the **Forecasting** → **Reports** menu option. If you have a project opened, then you can run the report.

Pre-defined Macro Variables for Use with Stored Processes

To assist you with creating stored processes, pre-defined macro variables are provided. 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 Studio can be grouped into two categories:

- project macro variables
- interactive macro variables

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.

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

Table 12.1 lists the macro variables and their descriptions. You can use these macro variables in any stored process which you create for a SAS Forecast Studio project.

Table 12.1. Pre-defined Macro Variables

Name	Description	Format
Macro Variables for Project Information		
HPF_PROJECT	The name of the project.	SAS name
HPF_PROJECT_LOCATION	System path to the project directory or folder.	System path
HPF_DESC	Description of the Forecast Studio Project.	SAS label
HPF_INCLUDE	Project include file. 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. By default, all libraries and catalogs are assigned with Read Only access (ACCESS=READONLY). For example, the following SAS code assigns project library names with Read Only access: %include "&HPF_INCLUDE"; For example, the following SAS code assigns project library names with Read and Write access: %let HPF_READ_ONLY = 0; %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

Table 12.1. Pre-defined Macro Variables (continued)

Name	Description	Format
Macro Variables for Project Variable Information		
HPF_NUM_BYVARS	Number of BY variables. If there are no BY variables, HPF_NUM_BYVARS is set to zero.	Nonnegative integer
HPF_BYVARS	List of BY variable names. The order of the BY variable names is the same as specified in the project. 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). 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. 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. There is always at least one dependent variable.	Positive integer
HPF_DEPVARs	List of all dependent variable names. 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). 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. 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. If there are no independent variables, HPF_NUM_INDEPVARs is set to zero.	Nonnegative integer

Table 12.1. Pre-defined Macro Variables (continued)

Name	Description	Format
HPF_INDEPVARs	List of all independent variable names. The order of the independent variable names is the same as specified in the project. 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). 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_INDEPVARs. 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. If there are no reporting variables, then HPF_NUM_REPORTVARs is set to zero.	Nonnegative integer
HPF_REPORTVARs	List of all reporting variable names. The order of the reporting variable names is the same order as specified in the project. 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
HPF_REPORTVAR&n	Report variable name listed in the n th position of the ordered list of report variables (HPF_REPORTVARs). 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. 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 SAS format name	Time ID format name	
HPF_SEASONALITY	Length of the seasonal cycle. A seasonality of 1 implies no seasonality.	Positive integer

Table 12.1. Pre-defined Macro Variables (continued)

Name	Description	Format
HPF_INTERVAL	Time interval name.	SAS time interval
HPF_DATASTART	Start date/date-time/time value of the project. 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. 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. Zero implies that the model fit is used for selection.	
HPF_SELECT_HOLDOUTPCT	Holdout sample percent size.	Positive integer
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. The levels of the hierarchy are numbered from 1 (the top of the hierarchy) to &HPF_NUM_LEVELS (the leaves of the hierarchy). If there is no hierarchy, then the number of levels is 1.	Positive integer

Table 12.1. Pre-defined Macro Variables (continued)

Name	Description	Format
HPF_LEVEL_DATAWHERE&n	<p>Input data WHERE clause for the n^{th} level, where n ranges from 1 to &HPF_NUM_LEVELS.</p> <p>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.</p> <p>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.</p> <p>Note: You must unquote this macro variable. For example, <code>%unquote (&&HPF_CURRENT_DATAWHERE&n);</code></p>	SAS WHERE clause
HPF_LEVEL_OUTWHERE&n	<p>Output data WHERE clause for the n^{th} level where n ranges from 1 to &HPF_NUM_LEVELS.</p> <p>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.</p> <p>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.</p> <p>Note: You must unquote this macro variable. For example, <code>%unquote (&&HPF_LEVEL_OUTWHERE&n);</code></p>	SAS WHERE clause
HPF_LEVEL_RECONCILE_DATASET&n	Reconciled forecast data set for the n^{th} level.	
HPF_LEVEL_RECONCILE_STATISTICS&n	Reconciled statistics data set for the n^{th} level.	

Table 12.1. Pre-defined Macro Variables (continued)

Name	Description	Format
HPF_LEVEL_BYVARS&n	List of BY variable names associated with the n^{th} level, where n ranges from 1 to &HPF_NUM_LEVELS. The variables names are separated by a single space. 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. 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
HPF_LEVEL_NSERIES&n	Number of series associated with the n^{th} level, where n ranges from 1 to &HPF_NUM_LEVELS. 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 Reconcile Information		
HPF_RECONCILE_LEVEL	Number of the reconciliation level. 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.	
Macro Variables for Interactive Current Level Information		
HPF_CURRENT_LEVEL	The level number associated with the current level. 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

Table 12.1. Pre-defined Macro Variables (continued)

Name	Description	Format
HPF_CURRENT_LEVEL_START	Start date/date-time/time value of the current level. 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. 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
HPF_CURRENT_DATAWHERE	Input data WHERE clause for the currently selected node. This WHERE clause can be used to subset the input data set to obtain information about the currently selected node of the hierarchy. Note: You must unquote this macro variable. For example, %unquote (&HPF_CURRENT_DATAWHERE);	SAS WHERE clause
HPF_CURRENT_OUTWHERE	Output data WHERE clause for the currently selected node. This WHERE clause can be used to subset the output data sets to obtain information about the currently selected node. Note: You must unquote this macro variable. For example, %unquote (&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. 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

Table 12.1. Pre-defined Macro Variables (continued)

Name	Description	Format
HPF_CURRENT_SERIESSTART	Start date/date-time/time value of the current node. 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. The ending time ID value of the series for the currently selected node of the hierarchy.	SAS date/ date-time/ time value
HPF_CURRENT_HORIZON	Horizon date/date-time/time value of the current node. 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 Metadata Repository Information		
HPF_METADATA_HOST	Metadata server host name.	
HPF_METADATA_PORT	Metadata server port number.	
HPF_METADATA_REPNAME	Metadata repository name.	
Macro Variables for Other Information		
HPF_READ_ONLY	Project access Read Only flag. By default, stored processes have Read Only access with respect to the project libraries. This macro variable changes this access to Write. For example, the following SAS code assigns project library names with Read Only access: %include "&HPF_INCLUDE"; For example, the following SAS code assigns project library names with Write access: %let HPF_READ_ONLY = 0; %include "&HPF_INCLUDE";	Boolean
HPF_DEFAULT_LOCATION	Default path to the system directory where the SAS Forecast Studio projects are currently stored.	System path name

Chapter 13

Troubleshooting SAS Forecast Studio

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Chapter 13

Troubleshooting SAS Forecast Studio

SASGUEST Cannot Log In from SAS Forecast Studio

Problem:

User manager profile identity is incorrect. *sasguest* user cannot log in 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://D8359.na.sas.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=xxx.na.sas.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 `xxx.na.sas.com`, then you need to change the deployment profile because the BI authentication cannot know that `xxx.na.sas.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://xxx.na.sas.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.

Incorrect Version of SAS for SAS Forecast Studio

Problem:

The version of SAS is not suitable for the version of SAS Forecast Studio being run. Code executes a syntax check on SAS High-Performance Forecasting software. If the syntax check fails, which means that the feature being checked is not present, then an exception is sent to the client. The client displays the error message, and SAS Forecast Studio then closes.

Error Message:

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

Solution:

If a user reports the incorrect version of SAS exception, then contact your SAS representative to inquire about updating your version of SAS.

Note: The client is installed in a 1.2 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 highlighted text shows the version number of the SAS Forecast Server Mid-Tier.

```
application.name=Forecasting
application.version=1.2
application.build.date=2004.08.10
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
```

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:

A warning that says “Errors were found in the report” is shown and no report is generated.

Solution:

If you added a new workspace server for SAS Forecast Studio, then the SAS Forecast Studio 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 Launch SAS Forecast Studio by Using Java Web Start

Problem:

After clicking **Launch for Forecasting** on the SAS Analytics Platform Web page, the SAS Forecast Studio client does not launch. Instead, an XML file shows 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.JNLPPProvider
- File sas.graph.nld.jar not found. 2005-08-30
15:17:43,796 [Thread-10]
```

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

Solution:

If an XML file displays 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 Studio Java Web Start to work.

For more information about SAS Forecast Studio system requirements, see [Chapter 3, “System Requirements for SAS Forecast Studio.”](#)

For more information about Java Web Start, see the following Web site:

<http://java.sun.com/products/javawebstart/>

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:ã 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 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`.

Cannot Log On to SAS Forecast Studio

Problem:

If you cannot log on to SAS Forecast Studio, 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 log on states:

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

Solution:

Because the

Part 5 Glossary

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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.

Your Turn

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