SAS® Forecast Analyst Workbench 5.2

User's Guide, Second Edition

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Using This Book

Audience

SAS Forecast Analyst Workbench is designed for the following users:

- Administrators who are responsible for setting up and maintaining the application environment

- Data analysts who are responsible for data management

- Business users (including planners, analysts, and advanced analysts) who are responsible for analyzing the forecasted data and for making decisions based on that data

This document focuses on explaining the tasks that you can perform by using the SAS Forecast Analyst Workbench user interface. As a user of SAS Forecast Analyst Workbench, you might be assigned to a specific role, which determines the tasks that you can perform.

Prerequisites

You must satisfy the following prerequisites to use SAS Forecast Analyst Workbench:

- a user ID and password for logging on to SAS Forecast Analyst Workbench

- a supported Web browser installed on your computer

- access to data sources or stored processes to obtain data

What's New

What's New in SAS Forecast Analyst Workbench 5.2

Overview

This chapter describes the new features and functionality that are added in the SAS Forecast Analyst Workbench 5.2 and in the second maintenance release of SAS Forecast Analyst Workbench 5.2.

SAS Forecast Analyst Workbench 5.2 has new features that affect the following areas:

- terminology
- product lifecycle management
- multi-tier causal analysis
- support for an additional calendar
- integration with SAS Visual Analytics
- enhancements in the collaboration planning process and forecasting

Second Maintenance Release of SAS Forecast Analyst Workbench 5.2

The second maintenance release of SAS Forecast Analyst Workbench 5.2 contains the following enhancements:

Enhancements in forecasting and in the collaboration planning process
   Multiple planners can create forecasts and plans concurrently. Similarly, multiple analysts can diagnose the forecasts concurrently.

Enhancement in new product forecasting
   You can assign a new product forecasting project to a forecast even if the new product is not a part of the forecast.

Enhancement to integration with SAS Forecast Studio
You can create a modeling project by selecting a time series on the **Table View** tab in the Model Management view.

Change in Terminology

The following terminology changes are in effect for SAS Forecast Analyst Workbench 5.2:

Changes in Terminology

Old Name	New Name	Description
Plan	Forecast	In previous releases, a *plan* was used to predict the demand for the product. In this release, the term for this type of plan is changed to *forecast*.
Consensus planning	Collaboration planning	The term *consensus planning process* is changed to *collaboration planning process*.
Consensus plan	Plan	The term *consensus plan* is changed to *plan*.
SAS Forecast Studio project	Modeling project	The term *SAS Forecast Studio project* is changed to *modeling project*.

Product Lifecycle Management

Planners can maintain the products and their predecessor and successors using product lifecycle management. Planners can also add phase-in dates, phase-out dates, and rephase-in dates for products. SAS Forecast Analyst Workbench also enables planners to scale up the demand of the successor products with respect to the predecessor products.

With product lifecycle management, planners can perform the following tasks:

- clone the demand of similar products

- analyze the demand changes ahead of actual occurrences in order to provide early visibility to all stakeholders

Multi-Tier Causal Analysis

With multi-tier causal analysis, planners and analysts can perform the following tasks:

- measure the impact of marketing mix on consumer demand at the retail level
- link retail demand to shipments from manufacturers to retailers
- perform scenario analysis to predict future demand and to help choose the optimal strategy for producing the highest volume and return on investment

Support for an Additional Calendar

Planners can add a custom calendar in addition to the Gregorian calendar that is used for forecasting. You can use this custom calendar for performing collaboration planning.

Using separate calendars for forecasting and collaboration enables planners to help analysts and stakeholders analyze future demand based on the new calendar.

Reports Using SAS Visual Analytics and SAS Web Report Studio

Planners can generate reports in order to analyze vital business information. SAS Forecast Analyst Workbench is tightly integrated with SAS Visual Analytics and SAS Web Report Studio for performing report-related tasks.

Enhancements in Forecasting and Collaboration Planning

Analysts can perform the following forecasting tasks:

- predict demand by using future values of independent variables
- apply time-series-specific events
- apply time-series-specific parameters
- retain custom models that are created in SAS Forecast Analyst Workbench or that are imported from SAS Forecast Studio

Planners can perform the following collaboration planning tasks:

- merge the data of multiple forecasts in order to create a plan

- configure additional dimensions and hierarchies for collaboration

- specify the type of data that you want to load into or extract from SAS Financial Management

These enhancements help planners to perform seamless collaboration planning and to achieve more accurate and more business-specific results.

Accessibility

For information about the accessibility of this product, see Accessibility Features of SAS Forecast Analyst Workbench 5.2 at support.sas.com.

Part 1

Introduction to SAS Forecast Analyst Workbench

1

Overview of SAS Forecast Analyst Workbench

What is SAS Forecast Analyst Workbench?

SAS Forecast Analyst Workbench is the demand planning module of the SAS Demand-Driven Planning and Optimization suite. SAS Forecast Analyst Workbench helps planners and analysts track, monitor, and predict the demand for products and services. Whether you are operating your business within a country or across countries, you will find that SAS Forecast Analyst Workbench is an incredibly easy and powerful tool to use. SAS Forecast Analyst Workbench helps organizations gain instant visibility and understanding of the demand for their products without needing to rely on personal judgments.

SAS Forecast Analyst Workbench is empowered with the capabilities of SAS solutions—analytics, data integration, and business intelligence. SAS Forecast Analyst Workbench enables your organization to perform the following tasks:

■ sense demand signals through the synchronization of internal and external data

■ shape demand by using advanced analytics

■ predict demand to create a more accurate, unconstrained demand forecast

Depending on the license that your organization has purchased, you can use the following modules of the SAS Forecast Analyst Workbench:

■ Collaboration (see Chapter 15, "Introduction to Collaboration," on page 119)

■ New Product Forecasting (see Chapter 12, "Introduction to New Product Forecasting," on page 95)

Benefits of Using SAS Forecast Analyst Workbench

Potential for Higher Profits

Organizations benefit from more effective downstream planning due to improved demand forecasting results that anticipate unconstrained demand more accurately. More effective downstream planning includes the following benefits:

- a reduction in customer stock orders and retailer shelving

- a significant reduction in customer back orders

- a reduction in the carrying costs for finished goods inventory

- consistently high levels of customer service, which results in high customer retention (due to having the right product at the right time)

Better Insights

Due to the systematic workflow of SAS Forecast Analyst Workbench, collaboration between stakeholders within the organizations improves. This improved collaboration leads to a better understanding of what drives profitability, which results in tighter budget control and more efficient allocation of marketing investment. This collaboration also results in a better understanding of products, customers, and market profitability.

Improved Relations

As all the internal stakeholders in the process begin to collaborate, they become more tightly aligned. This closeness enables quality collaboration among sales, marketing, finance, and operations planning. The building of quality relationships translates into stronger network integration, which helps minimize the pressures of market dynamics that surround your organization's brand and products.

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Accessing SAS Forecast Analyst Workbench

Roles and Capabilities

Different users have access to different functionality depending on their assigned roles. Each role is mapped to a set of predefined capabilities. A capability, also known as an application action, defines the operations that a user can perform.

SAS Forecast Analyst Workbench is shipped with three predefined roles: Planner, Forecast Analyst, and Process Administrator. Depending on the role that is assigned to you, you can view the hierarchy levels and their values.

Using SAS Management Console, an administrator can modify the roles and specify the capabilities that meet the guidelines for your organization. If you have questions about your assigned roles, contact your administrator.

Logging On To SAS Forecast Analyst Workbench

To display the SAS Forecast Analyst Workbench logon window, go to the URL that is supplied by your administrator or paste it in the address field of your web browser. For example, you might enter `http://server01.abc.com/SASForecastAnalystWorkbench/`.

To log on to SAS Forecast Analyst Workbench:

1 In the **User ID** field, type your user ID.

2 In the **Password** field, type the password.

Note: Your password is case sensitive. Your user ID might also be case sensitive, depending on the operating system that hosts the web application server. For assistance, contact your administrator.

3 Click **Log On** or press Enter.

The Forecast Plans workspace is displayed.

Logging Off From SAS Forecast Analyst Workbench

To log off from SAS Forecast Analyst Workbench, click **Log Off** on the application bar.

If you lose your connection to SAS Forecast Analyst Workbench (for example, your session times out), you must begin again at the point where you last saved your work.

If your connection to SAS Forecast Analyst Workbench remains inactive for a certain time, your session might time out. By default, if there is no activity for 30 minutes, the application prompts you to either continue the session or to log off from the application. If you do not select either of the options within a certain time (the default time is 10 seconds), the application automatically logs you off and displays the Session Timed Out page. Your administrator can change the inactivity period, countdown period, and availability of the **Log On** button on the Session Timed Out page.

3

Understanding the SAS Forecast Analyst Workbench User Interface

Overview of the SAS Forecast Analyst Workbench User Interface

User Interface Details

The SAS Forecast Analyst Workbench user interface contains workspaces, categories, and views that enable you to perform related tasks within the application. Each workspace contains categories, and each category also

contains views. A workspace is represented by a workspace button on the application bar.

The Menu Bar

The menu bar contains File menu and Help menu. Using the File menu, you can view your recent work, define preferences, and log off from SAS Forecast Analyst Workbench.

The Workspace Bar

Using the buttons that are present on the Workspace bar, you can switch between workspaces.

Toolbar

The toolbar contains that you can use to perform frequent tasks. The toolbar displays buttons that are specific to the workspace or the view that you are working on.

Category Pane

The Category pane contains categories that are available in the selected workspace. Click a category to switch between categories in the selected workspace.

Tile Pane

The Tile pane displays the objects that you have opened. You can work in multiple windows at a time. The Tiles pane enables you compare definitions of various objects such as tables and so on. For example, you can compare the predicted values of two forecasts in the Model Management view in separate windows. You can also use this feature to work on multiple objects together.

To open multiple windows:

1   From the list that is displayed in the respective workspace, select the object that you want to open.

2   On the toolbar, click the menu, and then select **Send to Tile Pane**.

3   Repeat steps 1 and 2 for the other objects.

4   In the Tile pane, hold down the Ctrl key and select the objects that you want to view. Each object opens in a separate window.

Status Bar

The Status bar displays the username of the person who has logged on to SAS Forecast Analyst Workbench.

Details and Properties Pane

The Details and Properties pane displays the details or properties of the object that is selected in the data table.

Workspaces in SAS Forecast Analyst Workbench

The SAS Forecast Analyst Workbench user interface contains the following workspaces:

- Forecast Plans

- New Products

- Administration

- Reports

When you log on to SAS Forecast Analyst Workbench, the Forecast Plans workspace appears by default.

Forecast Plans Workspace

Overview of the Forecast Plans Workspace

Use the Forecast Plans workspace to create and manage forecasts, modeling projects, and plans. You create a forecast to analyze a specific business challenge. The forecast encompasses the scope of your forecasting activity. You can also perform the following tasks in this workspace:

- create modeling projects that you can integrate with SAS Forecast Studio

- group forecasts and create a plan to perform collaboration

The Forecast Plans workspace is divided into the following categories:

- Forecasts

- Modeling

- Collaboration

To open the category, click the category in the category pane.

Forecasts Category

About the Forecasts Category

In the Forecasts category, you can create forecasts and work on them. You can perform a series of tasks on a forecast, including diagnosing a forecast, reconciling a forecast, and accepting a forecast. You can view, organize, and track all your forecasts in the Forecasts category.

This category is divided into views that you can use to perform a group of related tasks. For more information, see Chapter 4, "Forecasts and the Forecasts Category," on page 17.

Model Management View

In the Model Management view, you can view actual values and predict forecasted values by applying statistical models. You can view and compare the historical and predicted values of the forecast. You can also edit the properties of the forecast. In this view, you can perform a series of tasks, such as diagnosing a forecast, reconciling a forecast, accepting a forecast, editing parameters of a forecast, and creating modeling projects. You can use different panes, tables, graphs, and components of the view to perform these tasks. The Model Management view also contains a toolbar.

For more information, see Chapter 7, "Understanding the Model Management View," on page 47.

Modeling Category

In the Modeling category, you can view, track, and organize modeling projects. You can also update these projects with the data that you modified in SAS Forecast Studio. You can promote the modeling project so that the forecast is updated with the model-related information.

This category contains a Model Management view, in which you perform the tasks related to model management. (This Model Management view is not the same Model Management view that is in the Forecasts category.) For more information, see Chapter 10, "Understanding the Modeling Category," on page 83.

Collaboration Category

About the Collaboration Category

In this category, you create plans and work on them. You can perform a series of tasks on a plan, including configuring analysis variables, obtaining inputs for collaboration, and completing the collaboration planning. You can view, organize, and track all your plans in the Collaboration category.

The Explore Demand view is in the Collaboration category. In the Explore Demand view, you can analyze demand values. This category also contains the Collaboration Flow view, in which you perform the tasks related to collaboration.

Explore Demand View

In the Explore Demand view, you can explore and analyze the historical, current, future, and collaborated demand values. You can highlight the demand values that are not within the tolerance limit. You can also explore demand for the variables and dimensions in the hierarchies that interest you the most. The information that you obtain from this view helps you understand how the demand for your products is shaped.

For more information, see "Components of the Explore Demand View" on page 144.

Collaboration Flow View

Use the Collaboration Flow view to obtain inputs from all the stakeholders within your organization and achieve collaboration on the demand for the products. Using the workflow, you can create templates, share templates with

stakeholders, obtain inputs, and finally achieve consensus. You can easily collaborate with different stakeholders by using this view.

For more information, see "Understanding the Collaboration Flow View" on page 134.

Overview of the New Products Workspace

In the New Products workspace, you can forecast demand for a new product and promote the result to the forecast. This workspace contains the NPF Projects category, in which you create, view, track, and organize the new product forecast (NPF) projects.

For more information, see Chapter 13, "Understanding the New Products Workspace," on page 97.

Overview of the Administration Workspace

In the Administration workspace, you can administer the products that are associated with you. You can manage the product chains by specifying the product succession and substitution settings. This workspace enables you to specify these settings across dimensions of your choice.

For more information, see Chapter 20, "Managing the Life Cycle of Products," on page 157

Overview of the Reports Workspace

In the Reports workspace, you can launch SAS Visual Analytics or SAS Web Report Studio to create reports and view vital business information. Reports also help you present this business information to management in order to make decisions.

For more information about reports, see Chapter 21, "Working with Reports," on page 173.

Define Your Preferences

You can define the global preferences for all the SAS products that you are working on. You can also define preferences specifically for SAS Forecast Analyst Workbench.

To define preferences:

1 Select **File** ▸ **Preferences**. The Preferences window appears. The left pane is the category pane. The name of the right pane changes depending on the option that you select in the category pane.

2 In the category pane, click **Global Preferences**, and then define the global preferences.

The following table describes the fields in the **Global Preferences** pane.

Table 3.1   Fields in the Global Preferences Pane

Field	Description
User locale	Select a user locale from the list to specify the geographic region, language, and conventions. This setting might also apply to some SAS web applications that are not displayed with the Adobe Flash player.
Theme	Select a theme from the list. The theme specifies the collection of colors, graphics, fonts, and effects that appear in the application.
Invert application colors	Select this check box to invert all of the colors in the application window, including text and graphical elements. You can also temporarily invert or revert the colors for an individual application session by pressing Ctrl+~.

3 In the category pane, expand SAS Forecast Analyst Workbench, and click **General**.

4 Define the general preferences.

The following table describes the fields of the **General** pane.

Table 3.2   Fields in the General Pane

Field	Description
Open application using this workspace	Select a workspace that will appear as the default workspace when you log on to SAS Forecast Analyst Workbench.
Both icons and labels	Select this option to view both icons and labels on the user interface.
Icons only	Select this option to view only icons on the user interface.
Labels only	Select this option to view only labels on the user interface.

5 Click **OK**.

Time Zones and the User Interface

You can access the user interface of SAS Forecast Analyst Workbench by using a browser. SAS Forecast Analyst Workbench does not perform the time zone conversion automatically if the SAS Forecast Analyst Workbench server and

browser are located in different time zones. Therefore, the demand that you see for a date and time on the user interface is the demand for that particular server date and time. You must perform the time zone conversion manually to determine the exact demand in your time zone.

Where to Find Help

Help Menu

The **Help** menu is located on the application bar. Use the **Help** menu to access the following information about SAS Forecast Analyst Workbench:

- How-To topics: Use How-To topics to obtain information about important procedures quickly.

- User's Guide (PDF): Opens the *SAS Forecast Analyst Workbench 5.2: User's Guide* in a separate web browser.

- SAS On the Web: Includes links to the product support page, SAS customer support, SAS training page, and the SAS home page.

  The product support page at http://support.sas.com/documentation/onlinedoc/faw/index.html provides information about the documentation that is available for SAS Forecast Analyst Workbench. Use `FAWDOC` as the username and `UserDoc` as the password to access the product support page. You can access the product documentation along with other reference material (such as videos) on the product support page.

- About SAS Forecast Analyst Workbench: Displays copyright and other information about SAS Forecast Analyst Workbench.

Embedded User Assistance

The help components embedded in the SAS Forecast Analyst Workbench interface gives you just enough information to complete a task. You do not need to leave your current task and search for a particular topic in the *SAS Forecast Analyst Workbench 5.2: User's Guide*.

The SAS Forecast Analyst Workbench interface has the following embedded help components:

- Pop-up help: Displays detailed information about corresponding field or interface element. Click the help icon () to view the information.

- Tooltips: Displays short, descriptive information about icons in a pane. A tooltip appears when you move your mouse pointer over an icon in the interface.

- Instructional text: Displays information persistently in the interface near a field, group of fields, or a table (for example, data entry instructions and introductory text for fields and tables).

Part 2

Working with Forecasts

4

Forecasts and the Forecasts Category

About Forecasts

What Is a Forecast?

A forecast is the scope of the forecasting and planning activities. A forecast contains the following attributes:

- objective or type of the forecast that defines the purpose of your planning (for example, operational forecast)

- key performance indicator (KPI), which depends on the type of forecast that you choose (for example, demand)

- dimensions for which you want to forecast (for example, product or store location)

- hierarchy levels for each of the selected dimensions at which you might want to analyze the planning variable

- hierarchy values for each of the selected hierarchy levels

- information about the bill of material

- factors that impact or influence the planning variables, such as independent variables and events

The status of a forecast enables you to maintain a consistent and collaborative workflow within various departments of your organization. You can run a forecast in batch mode to periodically predict the values.

The Forecasts Category

Depending on your permissions, you can create forecasts and work on them. You can also view and work on the forecasts that other users created and shared with you. You can perform the following tasks in the Forecasts category:

- create a forecast
- edit a forecast
- delete a forecast
- copy a forecast
- refresh a forecast
- schedule a forecast in batch mode

Overview of the Forecasts Category

The Forecasts category consists of a table, a toolbar, views, and several panes. You can manage forecasts using these components. The table displays the following information:

- a list of forecasts
- name of each forecast
- run mode of each forecast (for example, ad hoc or batch mode)
- type of each forecast (for example, operational or financial)
- status of each forecast (for example, created or forecasted)
- key performance indicator (KPI) of each forecast
- periodicity of each forecast
- planning horizon
- number of series in each forecast
- description of each forecast
- if the forecast is scheduled to run in batch mode, the date on which the forecast was last run
- if the forecast is scheduled to run in batch mode, the date on which the forecast will run next
- date on which each forecast was created
- user name of the person who created each forecast
- latest date on which each forecast was modified
- user name of the person who last modified each forecast

Components of the Forecasts Category

About the Components

The Forecasts category contains the following components:

- toolbar
- **Properties** pane
- **Details** pane
- **Comments Manager** pane
- **Batch Run Details** pane

Toolbar

The toolbar contains buttons that you can use to perform frequent tasks. The following table describes the buttons of the Forecasts category.

Table 4.1   Buttons on the Forecasts Category Toolbar

Icon	Function
	Create a new forecast. For more information about creating a forecast, see "Creating a Forecast" on page 21.
	Modify the parameters of the selected forecast. For more information about editing a forecast, see "Edit a Forecast" on page 33.
	Recreate the forecast to include the time series that are related to product succession in the selected forecast. For more information about updating a forecast, see "Update a Forecast with Relationships" on page 37.
	Delete the selected forecast. You can delete a forecast that is not needed. For more information about deleting a forecast, see "Delete a Forecast" on page 34.
	Copy the information of the selected forecast and create a new forecast. For more information about copying a forecast, see "Copy a Forecast" on page 34.
	Refresh the selected forecast so that new data can be added to it. For more information about refreshing a forecast, see "Refresh a Forecast" on page 35.
	Diagnose the selected forecast. When you click this button, a confirmation message appears. Click **Yes**. For more information about diagnosing a forecast, see "Diagnose a Forecast" on page 58.

Properties Pane

The **Properties** pane displays the following information about the selected forecast:

- name of the selected forecast

- type of the selected forecast

- KPI of the selected forecast

- dimensions of the selected forecast

- date on which the forecast was created

- date on which the forecast was last modified

- status of the forecast and a description of any error that has occurred

- whether models are applied to the forecast

- whether the forecast is scheduled in batch mode

- root level of the forecast

- forecast leaf level of the forecast

Details Pane

The **Details** pane of the Forecasts category displays the following information:

- number of records that are present in each dimension (for example, the number of products selected in the PRODUCT dimension)

- number of independent variables that are included in the selected forecast

Comments Manager Pane

You can add comments to the selected forecast in the **Comments Manager** pane. Comments include information that is specific to a forecast or information that you might want to share and discuss with others.

If you have the required permission, you can perform the following tasks:

- create a new topic

  You can enter a subject and description for the new topic. You can select the priority of the topic and attach important files to the comment.

- reply to a topic

- search for a topic to comment on

Batch Run Details Pane

You can schedule a forecast to run periodically in the **Batch Run Details** pane. You can schedule a forecast to run daily, weekly, monthly, quarterly, or yearly. You can also edit the batch run settings that are specified. For more information, see "Schedule a Forecast to Run in Batch Mode" on page 36.

5

Managing Forecasts

Creating a Forecast

Overview of Creating a Forecast

The process of creating a forecast consists of five steps. You must have permission to create a forecast. In the Forecast Plans workspace, click . The New Forecast wizard appears. The wizard takes you through the following steps:

1 Define the objective of the forecast

2 Select hierarchy levels

3 Select hierarchical values

4 Reorganize the hierarchy

5 Specify other parameters

Define the Objective of the Forecast

A forecast consists of its name, its objective, and its dimensions. You define the objective for the forecast by specifying the key performance indicator (KPI). For example, you can define Demand as the KPI in order to use historical demand for predicting the future demand.

After you specify the objective of the forecast, select one or more dimensions for which you want to generate future values. For example, you can select **PRODUCT** to predict the demand for your products.

To define the objective of the forecast:

1 Enter a name for the forecast.

   Note: The forecast name must be unique and must be a valid SAS name. For more information about SAS naming conventions, see *SAS Language Reference: Concepts* at support.sas.com.

2 Enter a short description for the forecast.

3 In the **Type** list, select the forecast type. A forecast type defines the objective of your forecast.

   Note: The key performance indicators in the **KPI** list depend on the forecast type that you select.

4 In the **KPI** list, select the key performance indicator.

   Note: The dimensions that you see in the **Available items** section depend on the KPI that you select.

5 In the **Available items** section, select a dimension and click ➡. The selected dimension appears in the **Selected items** section.

   Note: The dimensions that you see in the **Available items** section depend on the options that you selected in the **Type** and **KPI** lists. The available dimensions also depend on your permissions.

6 Click **Next** to continue.

Select Hierarchy Levels

On the **Select Hierarchy Levels** page, choose the hierarchy levels that you want to include in the forecast. You must specify hierarchy levels for all dimensions that you have selected.

To select hierarchy levels:

1 In the **Dimension** list, select a dimension.

2 In the **Available items** section, select the hierarchy level and click ➡. The selected hierarchy level appears in the **Selected items** section.

   Note: You cannot select only the lowest-level leaf node. You must select the parent node of the lowest-level leaf node in the hierarchy.

3 Repeat steps 1 and 2 for all the dimensions.

4   Click **Next** to continue.

Select Hierarchical Values and Specify Attributes

Select Hierarchical Values

You must choose the hierarchical values for all the dimensions that you included in the forecast. You can also specify common attributes and product-specific attributes (also called product specifications) to further filter the data.

To select hierarchical values:

1   In the **Dimension** list, select a dimension.

2   In the **Available items** section, select the hierarchical value that you want. The hierarchical values are arranged in a tree structure. You can expand and collapse the hierarchy to select the values.

3   Click ➡. The selected hierarchical values appear in the **Selected items** section.

   Note: You must select valid hierarchy values.

4   Repeat steps 1 through 3 for all the dimensions.

5   (Optional) Click **Common attributes** to define the common attributes.

   For more information about defining common attributes, see "Specify Common Attributes" on page 23.

   Note: This link is available only if common attributes are defined for the selected hierarchical values.

6   (Optional) Click **Product-specific attributes** to define the attributes that are specific to a product.

   For more information about defining product-specific attributes, see "Specify Product-Specific Attributes" on page 24.

   Note: This link is available only if product-specific attributes are defined for the selected hierarchical values.

7   (Optional) Click **Select leaf nodes** to define the leaf nodes for the selected dimension.

   For more information, see "Select Leaf Nodes" on page 24.

   Note: This link is available only when the parent node of the lowest-level leaf node is selected and the forecast contains lowest leaf-level nodes.

8   Click **Next** to continue.

Specify Common Attributes

You can specify additional criteria that are common among all products in order to filter the data. For example, you can specify to forecast the demand for all products that are manufactured in the Seoul, South Korea plant and set the life cycle stage to **MATURE**.

When you specify attributes at different levels, SAS Forecast Analyst Workbench filters the data at the top-most level first. In other words, SAS

Forecast Analyst Workbench filters the data from the top level to the bottom level when the following conditions are true:

- the data is arranged in a hierarchy

- the attributes that are defined at the highest level are different from the attributes that are defined at lower levels in the hierarchy

For example, SAS Forecast Analyst Workbench filters all red shirts first and then filters by size when shirt color is defined at the highest level in the hierarchy.

To specify the common attributes:

1   On the **Select Hierarchical Values** page of the New Forecast wizard, select a hierarchical value in the **Selected items** section.

   Note: You must select a hierarchical value that is not at the forecast leaf level.

2   Click **Common attributes**. The Common Attributes window appears.

3   Specify the parameters and click **OK**.

The attributes are specified at the selected hierarchy level.

Specify Product-Specific Attributes

You can specify additional criteria that are specific to a product or to a group of products under one category. For example, you can specify to forecast the demand for all television units that are based on LED technology and that have a 59-inch screen.

To specify product-specific attributes:

1   On the **Select Hierarchical Values** page of the New Forecast wizard, select a hierarchical value in the **Available items** section.

   Note: You can set the attributes that are specific to products.

2   Click **Product-specific attributes**. The Specific Attributes window appears.

   Note: This link is not available when the selected hierarchy node does not contain product-specific attributes.

3   Define the parameters and click **OK**.

The specific attributes are defined for the selected products.

Select Leaf Nodes

You can select the leaf nodes in order to include them in your forecasting exercise. By default, all leaf nodes are selected.

To select the leaf nodes:

1   In the **Dimension** list on the **Select Hierarchical Values** page of the New Forecast wizard, select a dimension.

2   In the **Selected items** section, expand the hierarchy, and select the lower-level node.

3   Click the **Select Leaf nodes** link. The Select Node window appears.

4   Select the nodes that you want to include for forecasting, and click **OK**.

Reorganize the Hierarchy Levels

When you are reorganizing the hierarchy levels for the forecasting process, all the hierarchy levels and values that you selected on the **Select Hierarchy Levels** and **Select Hierarchical Values** pages are displayed. You can perform the following actions with respect to the hierarchy levels:

- reorganize the hierarchy levels

  You reorganize the hierarchy based on your purpose. For example, if you want to forecast the demand for all the products in a store, move the Product level to be immediately below the Store Location level.

- define the forecast-leaf-level node

  By defining the forecast-leaf-level node, you specify the level up to which the forecasting process must generate the forecasting values. For all levels below the forecast leaf level, SAS Forecast Analyst Workbench uses the disaggregation method to generate the forecasting values.

- define the reconciliation level

  By defining the reconciliation level, you specify the level at which the process of reconciliation must start. Based on the reconciliation level, SAS Forecast Analyst Workbench automatically selects one of the following reconciliation methods: bottom-up, middle-out, or top-down. If the reconciliation level that you selected is the same as that of forecast leaf level, SAS Forecast Analyst Workbench uses the bottom-up method for reconciliation. If you select the highest level, SAS Forecast Analyst Workbench uses the top-down method for reconciliation. For all other levels, SAS Forecast Analyst Workbench uses the middle-out method for reconciliation.

To reorganize the hierarchy levels:

1   In the Hierarchy Level column, select a level and click ⬇ or ⬆ .

  You cannot change the order of the hierarchy levels within a dimension. For example, for the Location dimension, you cannot move the States hierarchy level above the Regions hierarchy level. You can change the order of the hierarchy levels across dimensions.

2   In the Forecast Leaf Level column, click the lowest level up to which the forecasting process must run.

3   In the Reconciliation Level column, select the level at which the reconciliation method must start.

  Note: You cannot select a reconciliation level that is below the forecast leaf level that you selected.

4   In the **Periodicity** list, select the periodicity.

  The periodicity defines the forecasting interval, which is the frequency at which the data is forecasted.

5   In the **Number of periods of historical data** field, enter the number of periods of historical data that the forecasting process must include for generating forecast results.

6   In the **Number of periods in forecast horizon** field, enter the number of periods for which you want to generate forecast results.

7   In the **Minimum periods of historical data for act-like relationship** field, enter the least number of periods that the forecasting process should consider in order to generate statistical forecast results. If the number of periods for any times series is less than the specified value, the forecast from an act-like time series is used (if it is specified).

8   Click **Next** to continue, or click **Finish**.

If you click **Finish**, the status of the forecast becomes **Creating**. If the data is present in accordance with the parameters that you specified, the status of the forecast changes to **Created**.

Specify Other Parameters

Steps to Specify Other Parameters

On the **Specify Other Parameters** page, you can specify product chaining settings, events, and independent variables in order to generate forecast results.

To specify other parameters:

1   On the **Product Chaining** tab, specify bill of material information.

For more information about product chaining, see "Manage Product Chaining" on page 27.

Note: The **Product Chaining** tab is available only if you selected the Product dimension when you created the forecast.

2   On the **Events** tab, select the events that you want to apply to all time series that are included in the forecast, and select the method of events usage.

For more information about events, see "Manage Events" on page 27.

3   On the **Independent Variables** tab, select the independent variables and the method of aggregation.

You can also select the adjustment variables along with the independent variables. For more information about adjustment variables, see "Manage Adjustment Variables" on page 32.

For more information about independent variables, see "Manage Independent Variables" on page 32.

Note: Independent variables that are used as adjustment variables are not available.

> **TIP** If only one transactional data point is present for every time period, do not select the **STD** aggregation method.

4   Click **Finish**.

The forecast is created in the **Creating** state. After the forecast is completed, the status of the forecast changes to **Created**.

Manage Product Chaining

You define the bill of material settings on the **Product Chaining** tab.

You can explode the bill of material of the combined products while the forecasting results are being generated. When you explode the bill of material, the forecasting process generates the predicted values of child products separately. If you do not explode the bill of material, the forecasting process considers the combined products as a single product, and then generates the forecast result. The **Explore bill of materials** list is available when the forecast contains combined products.

Manage Events

You can specify special events that can affect the forecast. For example, during holidays, the demand for packaged food items is higher, which can affect the forecast for those products.

SAS Forecast Analyst Workbench enables you to apply the events to all time series in a forecast or to the selected time series that is included in the forecast. For example, a promotion that occurs on the 4th of July is applied to all customers in the United States, whereas a promotion that occurs on the date of the Sugarloaf Festival is applied only to customers that are in New Jersey.

For more information about applying events to the selected time series, see "Applying Events" on page 70.

The following table describes the buttons and fields on the **Events** tab.

Table 5.1   *Description of Buttons and Fields on the Events Tab*

Button or Field	Description
⬈	Click to import the events using a .csv file. When you click this button, a window appears. Navigate to the events .csv file on your computer or on the network, and import it.
⬀	Click to export the events in a .csv file. When you click this button, a window appears. Navigate to the location on your computer or on the network, and click **Save**.
Name	The name of the event.
Description	The description of the event.
Type	The type of the event.

Button or Field	Description
Event Usage	Select an option from the list to specify how events must be used when the model is generated. You can use one of the following options: ■ Select **Do not use** to exclude the event in the model. ■ Select **Force use** to include the event in the model, if feasible. By default, this option is selected. ■ Select **Try to use** to include the event in the model (if feasible) if the resulting model is stable and is an improvement over the simple model. ■ Select **Use if significant** to include the event in the model (if feasible) if the resulting model is stable, is an improvement over the simple model, and if the event is significant.
Event Class	The event class information.
Before Duration (In periods)	Specifies the applicability of the event to periods before the occurrence of the event. For example, suppose the event is BOXING, it occurs on December 26, the **Before Duration** value is 2, and the periodicity is weekly. In this case, the event is applicable beginning on December 13.
After Duration (In periods)	Specifies the applicability of the event to periods after the occurrence of the vent. For example, suppose the event is BOXING, it occurs on December 26, the **After Duration** value is 1, and the periodicity is weekly. In this case, the event is applicable until January 01.
Event Recurrence	The number of times that the event must recur.
Event Occurrence	The key name of the event, which indicates when it should occur. For example, if the key name is BOXING, the event occurs on December 26. If the key name is NEWYEAR, the event occurs on January 1.
Starting Date	The starting date of the event.
Ending Date	The end date of the event.

An event can be a simple event or a combined event. A combined event consists of two or more events. You must comply with the following guidelines in order to import events:

■ The name of the event must be unique.

■ The .csv file must contain columns in the following order: Name, Description, Type, Before Duration (In Periods), After Duration (In Periods), Event, Recurrence, Starting Date, Ending Date, Event Usage, Event Class, Event Occurrence, Date Interval, Date Time Interval, Start Observation, End Observation, Observation Interval, Value, Pulse, Slope Before, Slope After, Shift, T C Parameters, Rule, and Key Name. In the .csv file, either the Key Name column or the Starting Date column must contain values.

   Note: The Shift column can contain negative values.

■ The columns of the .csv file must contain specific numbers to represent event class, event type, event usage, event recurrence, and event occurrence. The

following table explains the values that are required for the event class column of the .csv file.

Table 5.2   *Required Values for the Event Class Column*

Event Class	Value
SIMPLE	1
COMBINATION	2

■   The following table explains the values that are required for the Event Type column of the .csv file.

Table 5.3   *Required Values for the Event Type Column*

Event Type	Value
POINT	1
LS	2
RAMP	3
TR	4
TEEMPRAMP	5
TC	6
LIN	7
LINEAR	8
QUAD	9
CUBIC	10
INV	11
INVERSE	12
LOG	13
LOGARITHMIC	14

■   The following table explains the values that are required for the Event Usage column of the .csv file.

Table 5.4   *Required Values for the Event Usage Column*

Event Usage	Value
Do not use	1
Try to use	2
Use if significant	3
Force use	4

■   The following table explains the values that are required for the Event Recurrence column of the .csv file.

Table 5.5   *Required Values for the Event Recurrence Column*

Event Recurrence	Value
DAY	1
WEEK	2
MONTH	3
QTR	4
YEAR	5

Note: If you enter a value in the keyname field in the .csv file, then you do not need to enter a value in the Event Recurrence column or in the Starting Date column in the .csv file.

■   The following table explains the values that are required for the Event Occurrence column of the .csv file.

Table 5.6   *Required Values for the Event Occurrence Column*

Event Occurrence	Value
BOXING	1
CANADA	2
CANADAOBSERVED	3
CHRISTMAS	4
COLUMBUS	5
EASTER	6
FATHERS	7

Event Occurrence	Value
HALLOWEEN	8
LABOR	9
MLK	10
MEMORIAL	11
MOTHERS	12
NEWYEAR	13
THANKSGIVING	14
THANKSGIVINGCANADA	15
USINDEPENDENCE	16
USPRESIDENTS	17
VALENTINES	18
VETERANS	19
VETERANSUSG	20
VETERANSUSPS	21
VICTORIA	22

- If the .csv file contains a simple event, the following columns of the .csv file must contain information: Name, Type, Before Duration (In Periods), After Duration (In Periods), Starting Date, Event Class, Value, Slope Before, Slope After, Shift, T C Parameters, and Rule.

- If the .csv file contains a combined event, the following columns of the .csv file must contain information: Name, Type, Event Usage, Rule, and Key Name.

- The .csv file must not be corrupt.

- The .csv file must not be empty or contain any empty lines.

- Events with the same name must not exist on the **Events** tab.

- The .csv file must not contain duplicate entries of events.

- The .csv file must be in UTF-8 encoding.

You can also create events in SAS Forecast Studio and import them into SAS Forecast Analyst Workbench. You can import the events into SAS Forecast Analyst Workbench by copying the event-related information to the following locations:

- from the eventrepository table in SAS Forecast Studio to the config.Create_event table in SAS Forecast Analyst Workbench

- from the eventrepository2 table in SAS Forecast Studio to the config.Event_required table in SAS Forecast Analyst Workbench

When you export the events, the .csv file contains columns in the following order: Name, Description, Type, Before Duration (In Periods), After Duration (In Periods), Event, Recurrence, Starting Date, Ending Date, Event Usage, Event Class, Event Occurrence, Date Interval, Date Time Interval, Start Observation, End Observation, Observation Interval, Value, Pulse, Slope Before, Slope After, Shift, T C Parameters, Rule, and Key Name.

For more information about events, see *SAS Forecast Server Procedures: User's Guide*.

Manage Independent Variables

Independent variables are the factors that influence demand. These factors can be internal or external and can include price, advertising, sales promotions, marketing events, economic factors, and so on. The forecasting process applies the appropriate model and generates the forecasting values based on the independent variables and the method of aggregation that you select.

You cannot specify the same variable as both an independent variable and an adjustment variable. For more information about adjustment variables, see "Manage Adjustment Variables" on page 32.

Manage Adjustment Variables

Systematic variations and deterministic components are included in time series data. You can specify an adjustment variable to identify the data that should be excluded before you perform a statistical analysis.

Using SAS Forecast Analyst Workbench, you can specify the adjustment variables in the following ways:

- before you generate the forecast

  After the time-stamped data has been accumulated and interpreted, you might need to adjust the time series before you generate the forecast. By adjusting the time series for any known systematic variations or deterministic components, you can more easily identify and model the underlying time series process.

  Examples of systematic adjustments are exchange rates, currency conversions, and trading days. Examples of deterministic adjustments are advanced bookings and reservations and contractual agreements.

- after you generate the forecast

  You might need to adjust the statistical forecast in order to return the forecasts to the metric used in the original data.

Generally, the adjustments that you make before you generate the forecast and those that you make afterwards are operations that are the inverse of each other.

To manage adjustment variables:

1 On the **Independent Variables** tab, click **Adjustments**. The Adjustments window appears.

2 Enter the appropriate information in each field. The following table describes each field.

Table 5.7 *Fields in the Adjustments Window*

Field	Description
Adjusting Variable	Displays the name of the adjustment variable. Select the adjustment variable to apply it. **Note:** The Adjustments window displays the variables that are not selected as independent variables.
Description	Enter the description for the selected adjustment variable.
Aggregation Method	Select the aggregation method for the selected adjustment variable.
Pre-operation	Select one of the following options from the list for pre-operation: **None**, **Add**, **Subtract**, **Multiply**, **Divide**, **Min**, or **Max**.
Post-operation	Select one of the following options from the list for post-operation: **None**, **Add**, **Subtract**, **Multiply**, **Divide**, **Min**, and **Max**.

3 Click **OK**.

Edit a Forecast

You can edit a forecast in order to modify your demand forecasting criteria. For example, you can include special events in the forecast.

If the forecast is in the **Ready to create** state, you can update all its details. If the forecast is in the **Created** or **Forecasted** state, you can update the following details of the forecast:

■ hierarchy values

■ product chaining information, if the Product dimension is selected

■ events information

■ independent variables information

Note: If you want to update all parameters of the forecast, you must create a new copy of the forecast and edit it. Fore more information about copying a forecast, see .

The following prerequisites apply:

■ You must have permission to edit a forecast. For more information, contact your system administrator.

■ The forecast status must be in one of the following states: **Draft**, **Ready to create**, **Created**, or **Forecasted**.

To edit a forecast:

1 In the Forecast Plans workspace, click **Forecasts**. The Forecasts category appears. Select a forecast, and click . A message appears that informs you that the edit functionality is limited.

2   Click **Yes**. The Edit Forecast window appears.

3   Edit the information and click **Finish**.

For more information about updating hierarchy values, see "Select Hierarchical Values and Specify Attributes" on page 23.

For more information about updating other parameters, see "Specify Other Parameters" on page 26.

The Model Management view displays the actual and predicted data for the latest hierarchical values that are selected in the forecast.

Delete a Forecast

The following prerequisites apply to delete a forecast:

- You must have permission to delete a forecast. For more information, contact your system administrator.

- The forecast must be in one of the following states: **Draft**, **Ready to create**, **Created**, **Error: In create**, **Forecasted**, **Error: In forecasting**, **Accepted**, **Warning: Forecasted with error**, or **Error: In delete**.

- The forecast must not be scheduled to run in batch mode.

To delete a forecast:

1   In the Forecasts category of the Forecast Plans workspace, select the forecast and click 🗑.

Note: Press and hold the Ctrl key to select multiple forecasts.

2   In the confirmation window, click **OK**.

After you delete a forecast, the forecast is removed, and all data (including the data that was created for a modeling project, if any) is deleted from the database.

Copy a Forecast

If you want to create a new forecast that is very similar to an existing forecast, you can copy the forecast and then make the required changes in the copy, instead of recreating the forecast from scratch. For example, if you want to add one more dimension to the forecast but you want to retain the rest of the forecast parameters, make a copy. When you copy a forecast, the metadata of the existing forecast is copied and a new forecast is created. The new forecast does not contain analytical base tables (ABT) for forecasting. You must specify the complete information in the forecast in order to create it and then diagnose the forecast.

The following prerequisites apply:

- You must have permission to copy a forecast. For more information, contact your system administrator.

- The forecast must be in one of the following states: **Draft**, **Ready to create**, **Created**, **Forecasted**, **Error: In forecasting**, **Accepted**, or **Warning: Forecasted with error**

- The forecast must not be scheduled to run in batch mode.

- You must have created the forecast that you want to copy.

To copy a forecast:

1   In the Forecasts category of the Forecast Plans workspace, select a forecast, and click ▉. The Copy Forecast window appears.

2   In the **Name** field, enter a name for the forecast and click **OK**. The application starts copying the metadata of the forecast, and a confirmation window appears.

3   Click **OK**. The application creates the forecast in the **Ready to create** state and displays it in the **Forecasts** list.

   Now you can edit the parameters of the forecast.

4   In the **Forecasts** list, select the forecast that you copied, and click ▉. The Edit Forecast window appears.

5   Update the information about the forecast.

   For more information about updating the objectives and dimensions of the forecast, see "Define the Objective of the Forecast" on page 22.

   For more information about updating the hierarchy levels of the forecast, see "Select Hierarchy Levels" on page 22.

   For more information about updating the hierarchical values of the forecast, see "Select Hierarchical Values and Specify Attributes" on page 23.

   For more information about reorganizing the hierarchy, see "Reorganize the Hierarchy Levels" on page 25.

   For more information about updating other parameters, see "Specify Other Parameters" on page 26.

6   Click **Finish**.

The forecast is created with new parameters. Now you can apply different models to the forecast in the Model Management view.

Refresh a Forecast

Refresh a forecast so that the new time series are added to the forecast and the new data for the existing time series is updated. When you refresh a forecast, the forecasting process uses the entire data set to generate forecast values.

The forecast must be in one of the following states: **Created**, **Forecasted**, **Error: In forecasting**, **Accepted**, or **Warning: Forecasted with error**.

To refresh a forecast:

1   In the Forecasts category of the Forecast Plans workspace, select a forecast, and click ▉.

2   In the confirmation window, click **Yes**.

The selected forecast is refreshed and the new data is loaded for the forecast according to the periodicity and forecast start date settings. After you refresh a forecast, its status might change. The following table explains the statuses of the forecast when you refresh it.

Table 5.8   Statuses of a Forecast Before and After Refreshing

Status before the refresh	Status after the refresh
Created	Created
Error: In create	Created (if the error is removed from the forecast)
Forecasted	Forecasted
Accepted	Forecasted
Warning: Forecasted with errors	Forecasted (if the error is removed from the predicted values)
Error: In forecasting	Forecasted (if the error is removed from the predicted values)

Schedule a Forecast to Run in Batch Mode

You can schedule a forecast to run periodically in batch mode. You can set the frequency of the run to meet your business requirements.

SAS Forecast Analyst Workbench does not perform the time zone conversion automatically if the SAS Forecast Analyst Workbench server and client are located in different time zones. You must manually perform the GMT time zone conversion before you enter the start and end dates.

The following prerequisites apply:

■   You must have permission to schedule a forecast in batch mode.

■   The forecast must not be in progress, in error, or in the **Created** state.

To schedule a forecast in batch mode:

1   In the Forecasts category of the Forecast Plans workspace, select a forecast.

2   In the **Batch Run Details** pane, click **Edit**.

3   Enter information in each field. The following table describes the fields.

Table 5.9   *Description of Fields in the Batch Run Details Pane*

Field	Description
Schedule to run in batch mode	Select **Yes** to schedule the forecast to run in batch mode.
Batch interval	Select the frequency at which the forecast should run. You can select one of the following options: daily, weekly, monthly, quarterly, or yearly.
	Note: This field is available only when you select **Yes** in the **Schedule to run in batch mode** list.
Start date	Select the date on which the forecast should begin to run periodically.
	Note: This field is available only when you select **Yes** in the **Schedule to run in batch mode** list.
End date	Select the date on which the forecast should stop running periodically. By default, the end date is displayed according to the periodicity that you selected. You can change the end date to meet your business requirements.
	Note: This field is available only when you select **Yes** in the **Schedule to run in batch mode** list.

4   Click **OK**.

Update a Forecast with Relationships

You can update a forecast in order to include the data for the latest relationships. You define these relationships while you work with the life cycle of the products. For more information about managing product life cycle, see Chapter 20, "Managing the Life Cycle of Products," on page 157.

To update the forecast with relationships:

1   In the Forecast Plans workspace, click **Forecasts**. The Forecasts category appears.

2   Select a forecast, and click .

SAS Forecast Analyst Workbench includes all time series that are related to product succession in the forecast. After the incremental data is added to the forecast, click in order to include the successor relationships in the forecast. For more information about scheduling a forecast to run in batch mode, see "Schedule a Forecast to Run in Batch Mode" on page 36.

When a successor relationship is defined before the initial forecast date and you refresh the forecast, SAS Forecast Analyst Workbench considers the history of the predecessor product and predicts the future values of the successor product.

When a successor relationship is going to be introduced after the initial forecast date, SAS Forecast Analyst Workbench does not consider the predecessor-

successor relationship. In this case, the successor and predecessor products are considered as separate products (if predecessor and successor are selected in the forecast). In order to consider the predecessor-successor relationship in the forecast, recreate the forecast so that the future values are considered after the history of the processor product is considered.

Statuses of a Forecast

The following table describes the statuses of a forecast.

Table 5.10 *Forecast Status and Description*

Status	Description
Draft	The forecast is being created, and the necessary information is being retrieved from the database.
Creating	SAS Forecast Analyst Workbench is in the process of creating the analytical base tables (ABTs) in order to create the forecast.
Created	The forecast is completely created and is ready for statistical models to be applied to it.
Forecasting	The forecasting process is generating the predicted values for the forecast.
Forecasted	The predicted values of the forecast have been generated.
Error: In create	An error occurred while the forecast was being created.
Error: In forecasting	An error occurred while the predicted values for the forecast were being generated.
Accepted	The statistical model has been applied to the forecast, and the predicted values are satisfactory. After the forecast is accepted, you can view and explore the historical values, predicted values, and consensus values in the Explore Demand view.
Scheduled	The forecast is scheduled to run periodically in batch mode.
Ready to create	The forecast has been copied. You can edit the forecast in order to create a new one.
Warning: Forecasted with errors	The predicted values of the forecast have been generated, but at least one time series is in error.
Deleting	SAS Forecast Analyst Workbench is deleting the forecast and its relevant information, such as its metadata, analytical base tables, and so on.
Error: In delete	An error occurred while the forecast was being deleted.
Accepting	The forecast is being accepted.

Status	Description
Refreshing data	SAS Forecast Analyst Workbench is refreshing the forecast.
Error: In update	An error occurred while the forecast data was being updated.
Error: In accept	An error occurred while the forecast was being accepted.
Obtaining NPF data	The data of a new product forecasting project data is being integrated with a forecast.
Error: In obtaining NPF data	An error occurred while the data of a new product forecasting project was being integrated with a forecast.

Part 3

Generating Predicted Values

6

Using the Model Management View to Generate Predicted Values

About Model Management

In the Model Management view in the Forecasts category, you can identify the most suitable statistical model and generate forecasts. You can also improve the quality of the predicted values by modifying the forecast-specific parameters.

You can perform the following tasks in the Model Management view:

- view demand for individual time series, based on the periodicity of the forecast (for example, daily, monthly, and so on)

- view the demand for all nodes in the hierarchy

- diagnose the forecast and compare actual values versus forecasted values in both tabular and graphical form

- view which independent variables and events are included in the forecast, and view their impact on the predicted values

- filter the time series by using different parameters (for example, forecast quality, forecast status, or life cycle stage of the product)

- improve the quality of the forecast by editing the parameters at different levels (such as at the forecast level or at the time series level) or by creating a modeling project

- reconcile the forecasted values

- accept the forecast so that the predicted values can be used in different processes

The Model Management view helps you predict the dependent variable for the portfolio of your products or services. You can also view the degree of accuracy and the confidence limits within which the forecasts occur.

Model Management Workflow

In the Model Management view, you can use the following workflow to choose the most suitable statistical model and to predict values:

1 Select the time series that are most important to you. The Model Management view displays the data for the selected time series.

   For more information about selecting the time series, see "Select Time Series" on page 57

2 View the time series and their actual values on either the **Hierarchy View** tab or the **Table View** tab. You can view the time series that are modified in the Administration workspace on the **Changed Time Series** tab.

   For more information about the **Hierarchy View** tab, see "Hierarchy View Tab" on page 48.

   For more information about the **Table View** tab, see "Table View Tab" on page 49.

   For more information about the **Changed Time Series** tab, see "Changed Time Series Tab" on page 50.

3 Diagnose the forecast so that the best suitable statistical model is applied and predicted values are generated. The status of the forecast changes from **Created** to **Forecasted**.

   For more information about diagnosing a forecast, see "Diagnose a Forecast" on page 58.

4 After the predicted values are obtained, consider the following factors when you examine them:

   ◼ the data that is available to you

   ◼ the purpose of your forecasting

   ◼ your organizational environment

   ◼ current market conditions

   ◼ the suite of products that you selected for generating the values

   ◼ the goals of your organization or department

   ◼ constraints

   Compare the predicted values that are generated for the historical period with the actual values. You can use the prediction error, the root mean square error (RMSE), and the mean absolute percent error (MAPE) to compare the predicted values. You can also use graphs to compare the actual values with the predicted values.

   For more information about RMSE and MAPE, see "Model Information Tab" on page 52.

   If the prediction error, RMSE, and MAPE are not satisfactory, you might consider improving the forecast. You can perform one of the following tasks:

■ edit parameters for the entire forecast, or for a single or multiple time series.

  For more information about editing parameters, see "About Editing Parameters" on page 59.

■ analyze the forecast in SAS Forecast Studio. You can generate different models, add events, and create scenarios in the SAS Forecast Studio, and then apply them.

  For more information about modeling projects, see Chapter 9, "Introduction to Modeling Projects," on page 79.

5 Rediagnose the forecast. When you rediagnose, SAS Forecast Analyst Workbench performs the following tasks:

   1 considers the edited parameters to build models

   2 selects the most suitable model

   3 calculates the predicted values for the selected time series or for the entire forecast

  For more information about rediagnosing the forecast, see "Rediagnose a Forecast" on page 72.

6 Repeat steps 3 through 5 until the prediction error, RMSE, MAPE, and forecasted values are satisfactory.

7 Reconcile the forecast to remove conflicts from the forecasted values if you have performed one of the following actions:

   ■ analyzed the node or time series in SAS Forecast Studio and then promoted the forecast in SAS Forecast Analyst Workbench

   ■ edited or rediagnosed some of the time series

   ■ evaluated and changed the default model of a time series

   ■ rerun the forecast process for the selected time series

  For more information about reconciling the forecast, see "Reconcile a Forecast" on page 73.

8 Rerun the forecast to evaluate the predicted values of the selected time series whose parameters are changed. You can also perform this task on the entire forecast.

  Fore more information about rerunning the forecast, see "Rerun the Forecast" on page 74.

9 After you are satisfied with the model that is applied to the forecast and the results, you can accept the forecast. The status of the forecast changes from **Forecasted** to **Accepted**.

  For more information about accepting the forecast, see "Accept a Forecast" on page 74.

10 Refresh the forecast. When you refresh a forecast that is in the **Created** status, SAS Forecast Analyst Workbench refreshes actual values and includes newly added time series with their actual data. When you refresh a forecast that is in the **Forecasted** or **Accepted** status, SAS Forecast Analyst Workbench includes all latest time series, generates the predicted values, and changes the forecast status to **Forecasted**.

Status of a Forecast and Tasks Permitted in the Model Management View

You can open a forecast in the Model Management view. The following table lists the tasks that you can perform in the Model Management view, depending on the status of the forecast.

Table 6.1 *Forecast Statuses and Permitted Tasks in the Model Management View*

State of the forecast	Tasks that you can perform in the Model Management view	Information that you can view in the Model Management view
Created	■ edit parameters for the forecast ■ diagnose the forecast ■ analyze the forecast in SAS Forecast Studio ■ set parameters for multiple time series	■ actual values for the entire period, in tabular and graphical form ■ time series in hierarchy or tabular form. When you are viewing the time series in tabular form, you can filter it.
Forecasted	■ edit parameters for the entire forecast or for the time series that you select ■ evaluate a single time series, compare the two models, and set one of them as the default model ■ analyze the entire forecast, a few nodes of the hierarchy, or the selected time series in SAS Forecast Studio ■ reconcile the forecast ■ rerun the forecast ■ rediagnose the forecast ■ accept the forecast ■ perform scenario analysis	■ actual values for the entire period, in tabular and graphical form ■ predicted values for the entire period ■ prediction error ■ upper control limit and lower control limit of the predicted values ■ model information such as name of the model that is applied to the forecast, the type and source of the model, and the MAPE and RMSE of the model
Accepted	■ edit parameters for the entire forecast or for the time series that you select ■ evaluate a single time series, compare the two models, and set one of them as the default model ■ analyze the entire forecast or the selected time series in SAS Forecast Studio ■ reconcile the forecast ■ rediagnose the forecast ■ rerun the forecast ■ perform scenario analysis	■ actual values for the entire period, in tabular and graphical form ■ predicted values for the entire period ■ prediction error ■ upper control limit and lower control limit of the predicted values ■ model information such as the name of the model that is applied to the forecast, the type and source of the model, and the MAPE and RMSE of the model

7

Understanding the Model Management View

Toolbar

The toolbar contains buttons that you can use to perform frequent tasks. The following table describes the buttons that are on the Model Management view toolbar.

Table 7.1 *Buttons on the Model Management View Toolbar*

Icon	Description
	Click this button and then select the appropriate option:
	■ **Edit parameters for forecast**: Select this option to edit the parameters for the entire forecast.
	For more information about editing parameters of the entire forecast, see "Edit Parameters for the Entire Forecast" on page 59
	■ **Edit parameters for time series**: Select this option to edit the parameters of the selected multiple forecast-leaf-level time series or to evaluate the selected single forecast-leaf-level time series. SAS Forecast Analyst Workbench uses the parameters that you defined to apply the model and predict the values.
	For more information about editing parameters of multiple forecast-leaf-level time series, see "Edit Parameters for Multiple Time Series" on page 60.
	Click this button to create a modeling project for the entire forecast, for the selected hierarchy node, or for the selected forecast-leaf-level time series. You can perform more analysis in SAS Forecast Studio, apply models, and promote the forecast.
	For more information about analyzing the forecast or a time series in SAS Forecast Studio, see "Create a Modeling Project" on page 71.
	Click this button to rerun the entire forecast or to rerun the forecast for the selected forecast-leaf-level time series. Rerunning the forecast applies newly assigned parameters to the time series. Forecasts might change to acceptable levels.
	For more information about running the forecast, see "Rerun the Forecast" on page 74.

Hierarchy View Tab

The **Hierarchy View** tab displays the time series in a tree view. You defined the time series when you created the forecast.

You can expand or collapse the nodes to view the time series hierarchy. On the **Hierarchy View** tab, the ▢ icon denotes the forecast leaf level and the ▣ icon denotes the combined products.

The **Hierarchy View** tab displays the time series that contain data. The time series that do not contain any data are not displayed.

The forecasting process applies the statistical models up to the forecast leaf level, and then generates the predicted values. All levels below the forecast leaf level are forecasted with the disaggregation method. You can select a time series on the **Hierarchy View** tab and work on it in the Model Management view.

Table View Tab

The **Table View** tab displays the hierarchical values that you selected while you were creating the forecast, in tabular form. You can select a time series on the **Table View** tab and work on it in the Model Management view.

The **Table View** tab displays the time series that contain data. The time series that do not contain any data are not displayed.

The **Table View** tab contains the following columns.

Table 7.2   *Columns on the Table View tab*

Column Name	Description
Parent Path	The path that starts from the parent and ends with the selected hierarchy value.
Name	The name of the hierarchical value.
BOM	Whether the bill of material is applicable for the selected time series. The column contains one of the following values: ■ **Yes** if you selected bill of material settings when you created the forecast. ■ **No** if you did not select the bill of material settings when you created the forecast. ■ **NA** if the bill of material settings are not applicable for the product. **Note:** This column displays a value only when you select a product at the forecast leaf level.
Forecast Status	One of the following forecast states for the hierarchical value: Normal, Failed to forecast, Forecasted with warnings, Disaggregated, and NPF-Forecasted.
MAPE	The mean absolute percentage error for the time series that are statistically forecasted.
RMSE	The root mean square error.
Prediction APE	The prediction absolute percent error for the selected time series if the forecast has run at least twice in batch mode.
Prediction MAPE	The prediction mean absolute percent error for the selected time series if the forecast has run at least twice in batch mode.

Filter the Time Series

On the **Table View** tab, you can filter the time series based on the following parameters:

- Forecast Quality

- Forecast Status

- Seasonality

- Intermittency

- Trend

- Events

- Independent variables

- Lifecycle Status

- RMSE

- MAPE

For example, select the **New products** option in the Lifecycle Status parameter to view data about new products only.

To filter a time series:

1   In the Model Management view, click the **Table View** tab. The **Table View** tab displays all the time series in tabular form.

2   Click ▼. SAS Forecast Analyst Workbench displays the parameters that you can filter on in the tree structure.

3   Expand the parameter that you want to filter on and select the appropriate option.

The **Table View** tab displays the time series that satisfy the selected filtering criteria.

You can also use the **Search** field to filter the time series.

Changed Time Series Tab

The **Changed Time Series** tab displays the time series of the products that will change within the horizon period. For example, if the forecast horizon is 12 weeks, the **Changed Time Series** tab displays all time series that will be changing within the next 12 weeks.

The reasons why a time series might be changing include the following:

- a successor product is added

- the time series is phased in or phased out

- an act-like relationship is defined

Select a time series on the **Changed Time Series** tab to view its demand data on the **Product Life Cycle** tab and in the Plot view in the Model Management view.

Note: The **Changed Time Series** tab is not available when you are working on modeling projects or when the forecast does not contain any time series that are going to change.

Plot View

The **Plot** view displays information in graphical form. Graphs help you compare information easily. If the forecast is in the **Created** state, the **Plot** view displays the actual values. If the forecast is in the **Forecasted** state, the **Plot** view displays the following values:

- predicted values

- actual values

- confidence limits

The **Plot** view displays the actual and forecasted data for the latest hierarchical values that are selected in the forecast. The graph in the **Plot** view displays a vertical line that indicates the start date of the planning horizon. The title bar of the **Plot** view displays the name of the time series whose values are shown in the graph.

You can use one of the following views to displays the demand values in the **Plot** view:

- The **Divided** view displays the demand values in tabular and graphical form.

- The **Graph** view displays the demand values only in graphical form.

- The **Table** view displays the demand values only in tabular form.

Summary Tab

The **Summary** tab displays the demand values. When the forecast is in the **Created** state, the **Summary** tab displays the actual values. When the forecast is in the **Forecasted** state, the **Summary** tab displays the following values:

- actual demand values for the historical period

- predicted demand values for the entire horizon

  The predicted demand value is the value that SAS Forecast Analyst Workbench generates after it applies the appropriate model by running the forecasting process. The predicted values are generated for the historical period and for the planning horizon. The value that is calculated for the historical period is called the historical prediction.

- prediction error

Prediction error shows you the number by which the predicted values are deviated from the actual values. The prediction error value is shown only for the historical period and not for the planning horizon.

■ forecast upper control limit (UCL)

The forecast upper control limit (UCL) is the upper limit of the predicted values for the planning horizon.

■ forecast lower control limit (LCL)

The forecast lower control limit (LCL) is the lower limit of the predicted values for the planning horizon.

■ values of the independent variables that have been applied to the model

SAS Forecast Analyst Workbench uses the future values of the independent variables if they are present. SAS Forecast Analyst Workbench generates the future values of the independent variables if they are not present and then calculates the predicted values.

■ impact of events if they are applied to the model

■ scenario values if the scenarios were created in SAS Forecast Studio and were promoted in SAS Forecast Analyst Workbench

The historical values are displayed in regular font, and the current and future values are displayed in bold.

Note: The **Summary** tab does not display the forecast upper control limit and lower control limit values for any new products that you have assigned to the forecast.

Model Information Tab

The **Model Information** tab displays the model that is applied to the selected time series. The **Model Information** tab is available only when the forecast is in the **Forecasted** or **Accepted** state. You can view the following information on the **Model Information** tab:

■ name of the model that is applied to each of the hierarchy levels up to the forecast leaf level that is selected on the **Hierarchy View** tab

■ type of the model (for example, ESM, ARIMA)

■ source where the model was created (for example, Default, Forecast Server, User Created)

If the model was created in SAS Forecast Analyst Workbench, the Source column displays `Default`. If the model was created in SAS Forecast Studio, the Source column displays `Forecast Server`. If you edit the parameters and change the model or evaluate the time series, the Source column displays `User Created`.

■ mean absolute percentage error (MAPE) of the selected time series

■ root mean square error (RMSE) of the selected time series

The **Model Information** tab displays a list of models when you evaluate a time series or import a model from the modeling project. You can select a model from the list, and then click **Set this model as forecast model**.

The **Model Summary** section of the **Model Information** tab displays information about the selected model.

- name of the selected model

- description of the selected model (for example, Linear Exponential Smoothing)

- type of the selected model (for example, ESM)

- source of the selected model (for example, Default)

- status of the forecast after the selected model has been applied (for example, Successful)

When the evaluated parameters of the time series and the selected model do not result in the most suitable model, SAS Forecast Analyst Workbench displays a warning message and applies another model.

SAS Forecast Analyst Workbench displays the complete formula of the model if you apply combined models.

Child Products Tab

The **Child Products** tab contains the demand values for the parent product and its child products, in tabular format.

The **Child Products** tab displays the following information:

- names of the members that constitute the product

  Various members constitute a product.

- relationship of the member to the product (for example, parent or child)

- number of members that constitute the product

- demand type (for example, actual demand or forecasted demand)

- demand values for the entire horizon

  If the forecast is in the **Created** state, the **Child Products** tab displays only actual demand values. If the forecast is in the **Forecasted** state, the **Child Products** tab displays the actual and forecasted demand values.

The **Child Products** tab is available only when the following criteria are met:

- On the **Hierarchy View** tab, you selected a product that contains child products.

- You selected **Yes** in the **Explode BOM** list when you created the forecast. For more information about child products, see .

Scenario Tab

On the **Scenario** tab, you can shape the demand by varying the future values of the factors that influence demand. You can vary the internal or external factors that impact the demand to perform scenario analysis.

For more information about performing scenario analysis, see

Product Life Cycle Tab

The **Product Life Cycle** tab displays the future demand data for the product that you selected on the **Changed Time Series** tab. The **Product Life Cycle** tab is not available when you are working on a modeling project.

The **Product Life Cycle** tab displays the demand values for the product from the horizon start date. The demand values are predicted based on the following information:

■ the demand values for the existing product are not shown for dates that are after the phase-out date

■ the demand values for the successor product are shown from the date on which it will be phased in or introduced

■ if an act-like relationship is defined, the demand values for the existing product are also calculated based on the demand of the act-like product

■ if a successor product has multiple predecessor products, the demand is calculated accordingly and is shown from the successor product's phase-in date.

Details Pane

The **Details** pane of the Model Management view displays the following information:

■ name of the forecast

■ type of the forecast (for example, financial)

■ planning horizon or the number of periods to forecast

■ periodicity

■ status of the forecast

■ date on which the forecast was created

■ name of the user who created the forecast

By using the **Edit parameters for the forecast** link, you can edit the parameters of the entire forecast. Fore more information about editing parameters, see "Editing Parameters" on page 59.

Time Series Details Section

The **Time Series Details** section of the Model Management view displays the following information:

- name of the time series that you selected on the **Hierarchy View** tab

- MAPE of the selected time series

- RMSE of the selected time series

- number of time series up to and including the selected node or time series

- number of historical data points

- forecast status of the time series and the reason for failure if the forecast has failed

   When the evaluated parameters of the time series and the selected model do not result in the most suitable model, SAS Forecast Analyst Workbench displays a warning message and applies another model.

By using the **Edit parameters for the time series** link, you can edit the parameters of the selected forecast-leaf-level time series. For more information about editing parameters, see "Editing Parameters" on page 59.

Working in the Model Management View

Select Time Series

If the forecast contains a greater number of time series than the value that is specified by the MODEL_MANAGEMENT_FETCH_DATA_LIMIT parameter, the Model Management view enables you to choose the time series that are most important to you. For example, if the forecast contains 1557 time series and MODEL_MANAGEMENT_FETCH_DATA_LIMIT is 1000, you can choose the 1000 most important time series.

For more information about the MODEL_MANAGEMENT_FETCH_DATA_LIMIT parameter, see *SAS Forecast Analyst Workbench: Administrator's Guide*.

To select the time series:

1 Double-click a forecast in the Forecasts category of the Forecast Plans workspace.

If the selected forecast contains a greater number of time series than the number that is specified in the MODEL_MANAGEMENT_FETCH_DATA_LIMIT parameter, a warning message appears.

2   Click **OK**. The Search Time Series wizard appears. The Search Time Series wizard displays the hierarchy levels that you selected in the forecast.

3   Select the hierarchy values for which you want to view the data in the Model Management view. Click **Next** to select the time series in each level.

You can view the number of time series that you have selected in the node at each step of the wizard.

4   Click **Finish**.

The Model Management view displays the data for the time series that you selected. All actions that you take in the Model Management view are performed on all the time series that are included in the forecast.

Diagnosing Forecasts

Overview of Diagnosing Forecasts

Diagnose a forecast in order to find the most suitable statistical model and generate the predicted values for future period. When you diagnose a forecast, the forecasting process analyzes the data and applies the appropriate model to all hierarchy levels up to the forecast leaf level.

For all levels below the forecast leaf level, the values are predicted by using the disaggregation method. The predictions in the upper levels are disaggregated to lower levels, based on their proportions in the historic demand. The forecasting process uses SAS Forecast Server. The process is used for levels up to and including the forecast leaf level. The demand that is obtained from the disaggregation method is called dependent demand. SAS Forecast Analyst Workbench does not display the upper and lower control limits for the dependent demand time series.

After SAS Forecast Analyst Workbench diagnoses the forecast, it displays the following information:

■   predicted demand values for the historical period

■   predicted demand values for the planning horizon (that is, for a future period)

■   prediction error

■   forecast upper control limit (UCL)

■   forecast lower control limit (LCL)

■   significant events that are applied in the model

■   significant independent variables that are applied in the model

Diagnose a Forecast

The following prerequisites apply for diagnosing forecasts:

- You must have permission to diagnose the forecast. For more information, contact your system administrator.

- The forecast must be in the **Created** state.

To diagnose a forecast, use one of the following methods:

- In the Forecast Plans workspace, select a forecast, and click ▨.

- Perform the following steps:

  1 In the Forecasts category of the Forecast Plans workspace, double-click a forecast.

  The Model Management view appears.

  2 Click **Diagnose**.

SAS Forecast Analyst Workbench starts generating the predicted values for the forecast and closes the Model Management view. The state of the forecast changes from **Created** to **Forecasting**. After the forecasting process is complete, the state of the forecast changes to **Forecasted**. You can view the model-related information on the **Model Information** tab. You can view the predicted values on the **Summary** tab and in the **Plot** view.

If you defined the succession settings, SAS Forecast Analyst Workbench uses the succession settings for these time series.

SAS Forecast Analyst Workbench does not calculate the predicted values for the time series that result in an error during forecasting. Therefore, even though the status of the forecast is **Forecasted**, some time series might not contain predicted values. You must select the individual time series in order to view their predicted values.

Editing Parameters

About Editing Parameters

You can edit parameters for the entire forecast, for multiple time series, or for a specific time series in order to improve the forecast. When you edit parameters for the time series, you can evaluate the predicted values and the model.

You can choose to apply the ARIMAX, ESM, or UCM model to the time series or to the forecast. You can also define the model selection and forecasting parameters, and specify the events settings. While editing the parameters, if you select multiple models, SAS Forecast Analyst Workbench applies the best fit model. After you edit parameters for the entire forecast or for multiple time series, you must rediagnose the forecast. When you edit the parameters for a single time series, you can evaluate it.

Edit Parameters for the Entire Forecast

To edit the parameters for the entire forecast:

1 In the Model Management view, click ▨, and then select **Edit parameters for forecast**. The Parameter Settings window appears.

2 Edit the parameters, and then click **OK**.

   Note: When you are editing parameters for the entire forecast, the **Events** tab of the Parameter Settings window is not available.

   For more information about editing the parameters, see "Editing Parameter Fields" on page 61.

After you edit the parameters for the entire forecast, you must diagnose or rediagnose the forecast to apply the parameters and calculate the new predicted values. If the forecast is in the **Created** state, you must diagnose the forecast after you edit the parameters. If the forecast is in the **Forecasted** or **Accepted** state, you must rediagnose the forecast after you edit the parameters.

For more information about diagnosing a forecast, see "Diagnose a Forecast" on page 58. For more information about rediagnosing the forecast, see "Rediagnose a Forecast" on page 72.

Edit Parameters for Multiple Time Series

You can select multiple time series and edit their parameters.The selected time series must contain sufficient historical data.

You cannot edit the parameters of a time series that you selected on the **Changed Time Series** tab of the Model Management view.

To edit parameters for multiple time series:

1 In the Model Management view, press and hold the Ctrl key and select multiple time series.

2 Click , and then select **Edit parameters for time series**. The Parameter Settings window appears.

3 Edit the parameters, and then click **OK**.

   Note: The mark next to a field indicates that the default value of the selected time series for that field is different than the value that is currently displayed. This mark appears when you select multiple time series that have different values.

After you have edited the parameters for the selected time series, you must rediagnose the forecast to recalculate the predicted values. For more information about rediagnosing the forecast, see "Rediagnose a Forecast" on page 72.

Evaluate a Time Series

You can evaluate a time series and check the forecasted values for that time series.

To evaluate a time series:

1 In the Model Management view, select a forecast-level time series.

2 Click , and then select **Edit parameters for time series**. The Edit Parameters window appears.

3 Edit the parameters, and then click **Evaluate**.

For more information about editing parameters fields, see "Editing Parameter Fields" on page 61.

SAS Forecast Analyst Workbench uses the edited parameters to build models and to predict the future values by using the most suitable model. The **Model Information** tab displays the model that was applied before the parameters were edited and another model with the new parameters. You can compare the values of the default model with the values of the evaluated model and select one model to be the default model. For more information about selecting a default model, see "Select a Default Model" on page 70.

Editing Parameter Fields

Defining ARIMAX Model Parameters

You can define the autoregressive integrated moving average with exogenous inputs (ARIMAX) model parameters.

The following table describes the fields of the **Use ARIMAX** option on the **Model Generation** tab.

Table 8.1 *Field Descriptions for the Use ARIMAX Option*

Field	Description
Use default ARIMAX	Select **Yes** to use the default ARIMAX model parameters.
Apply default ARIMAX parameters of SAS Forecast Studio	Select this check box to apply the ARIMAX model that is identical in SAS Forecast Studio and apply its parameters. **Note:** This check box is available only when you select **Yes** for **Use default ARIMAX**. **Note:** After you select this check box, only the **Identification order when inputs and events are specified** field is available.
Nonseasonal Options	
AR orders (p)	Select a range for the nonseasonal autoregressive (AR) orders. The valid range for nonseasonal AR orders is 0–13. The default value for the minimum AR order is 0, and the default value for the maximum AR order is 5.
MA orders (q)	Select a range for the nonseasonal moving average (MA) orders. The valid range for nonseasonal MA orders is 0–13. The default value for the minimum MA order is 0, and the default value for the maximum MA order is 5.
Seasonal Options	
AR Orders (P)	Select a range for the seasonal AR orders. The valid range for nonseasonal AR orders is 0–2. The default value for the minimum AR order is 0, and the default value for the maximum AR order is 2.

Field	Description
MA orders (Q)	Select a range for the seasonal MA orders. The valid range for nonseasonal MA orders is 0–2. The default value for the minimum MA order is 0, and the default value for the maximum AR order is 2.
Numerator	Select a range for the numerator orders of the transfer function of the ARIMAX model. The valid range for the numerator orders is 0–2. The default value for the minimum numerator is 0, and the default value for the maximum numerator is 2.
Denominator	Select a range for the denominator orders of the transfer function of the ARIMAX model from the list. The valid range for the denominator orders is 0–2. The default value for the minimum denominator is 0, and the default value for the maximum denominator is 2.
Criterion	Select the criterion for the tentative ARMA order selection. The list contains the following options: **SBC**: Schwarz Bayesian information criterion **Note:** This is the default criterion. **AIC**: Akaike information criterion
Significance level to decide AR and MA orders	Enter the significance level to use as a cutoff value for determining the AR and MA orders. The significance level must be in the range (0, 1).
Method for choosing tentative ARMA order	Select the method for choosing the tentative ARMA order. The list contains the following options: **CLS**: conditional least squares method. This is the default method. **ULS**: unconditional least squares method **ML**: maximum likelihood method
Identification orders when input and events are specified	Select the identification order to use when inputs and events are specified. The list contains the following options: **ARIMA**: Select this option to first find an ARIMA model for the error series and then choose significant inputs and events. **REG**: Select this option to first find a regression model first and then decide the AR and MA polynomial orders. **BOTH**: Select this option to fit models by using both methods to determine which is better. This is the default value.
Include constants	Select whether you want to include constants.
Outlier detection (ARIMA models only)	
Detect outliers	Select this check box to detect the outliers for ARIMA models, and then enter a value. You must enter a value that is equal to or greater than 1.

Field	Description
Significance level	Enter the significance level to use as a cutoff value for detecting the outliers for ARIMA models. The significance level must be within (0, 1).
Maximum percentage of series that can be an outlier	Enter the maximum percentage of series that can be outliers. The default value is 2%.

Defining UCM Parameters

You can define the unobserved component model (UCM) parameters.

The following table describes the fields of the **Use UCM** option on the **Model Generation** tab.

Table 8.2   Field Descriptions for the Use UCM Option

Field	Description
Use unobserved component model (UCM)	Select **Yes** to use the UCM parameters.
Components to be included in UCM	Select a component to test for inclusion in the UCM. The list contains the following options: ■ **all**: test which components, variances, or both are significant in the model. This is the default option. When the series contains seasonality information, the Irregular, Level, Slope, and Season components are included. Otherwise, the Irregular, Level, Slope, and Cycle components are included. ■ **Autoreg**: test whether an autoregressive component is significant in the model. ■ **Cycle**: test whether two Cycle components are significant in the model. The two Cycle components are included and the Level component is added. When the series contains seasonality information, the Cycle component is not tested. ■ **Deplag**: test whether a dependent lag component is significant in the model. Only the order 1 is included. ■ **Irregular**: test whether an irregular component is significant in the model. ■ **Level**: test whether a level component is significant in the model. ■ **Season**: test whether a season component is significant in the model. When the series contains seasonality information, the Season component is not tested. ■ **Slope**: test whether a slope component is significant in the model.
Significance level for model components	Enter the significance level to use as a cutoff value for deciding which components or variances are significant. The significance level must be within (0, 1)

Defining ESM Parameters

You can define the exponential smoothing model (ESM) parameters.

The following table describes the fields of the **Use ESM** option on the **Model Generation** tab.

Table 8.3   Field Descriptions for the Use ESM Option

Field	Description
Use exponential smoothing model (ESM)	Select **Yes** to use the ESM parameters.
ESM method	Select the ESM method from the list.
	◾ **Best**: Select this option to fit the best candidate smoothing model (SIMPLE, DOUBLE, LINEAR, DAMPTREND, SEASONAL, WINTERS, ADDWINTERS). This is the default option.
	◾ **Best nonseasonal**: Select this option to fit the best candidate nonseasonal smoothing model (SIMPLE, DOUBLE, LINEAR, DAMPTREND).
	◾ **Best seasonal**: Select this option to fit the best candidate seasonal smoothing model (SEASONAL, WINTERS, ADDWINTERS).

Defining Other Parameters

You can define the other parameters for a time series.

The following table describes the fields of the **Other Options** option on the **Model Generation** tab.

Table 8.4   Field Descriptions for the Other Options Option

Field	Description
Trend Diff	Specify the simple differencing for the dependent series. The list contains the following options:
	◾ **Auto**: Select this option to test for simple differencing. This is the default option.
	◾ **Nonnegative number**: Select this option to specify the simple differencing order.
	◾ **None**: Select this option to specify that simple differencing is not used.
Trend SDiff	Select an option from list to specify the seasonal differencing for the dependent series.
	◾ **Auto**: Select this option to test for seasonal differencing. This is the default option.
	◾ **Nonnegative number**: Select this option to specify the seasonal differencing order.
	◾ **None**: Select this option to specify that seasonal differencing is not used.

Field	Description
Diagnose independent variables separately	Select this check box, and then select an option from the list to diagnose the independent variables of the forecast separately.
	■ **Both**: Select this option to specify that the log transform and trend testing of the input variables are applied independently of the variable to be forecast. This is the default option.
	■ **Transform**: Select this option to specify that the log transform testing of the input variables is applied independently of the variable to be forecast.
	■ **Trend**: Select this option to specify that the trend testing of the input variables is applied independently of the variable to be forecast.
Do not diagnose	Select this check box in order to retain the model that is applied to the selected time series. Use this check box when the suitable model is applied to the selected time series, satisfactory predicted values are obtained, and you do not want SAS Forecast Analyst Workbench to diagnose the time series again.
	After you select this check box, SAS Forecast Analyst Workbench does not forecast the selected time series during the following tasks:
	■ rediagnosing the forecast or the time series
	■ refreshing the forecast in order to obtain the new time series if any
	■ reruning the forecast or time series
	SAS Forecast Analyst Workbench retains the models whether they are applied during forecasting in SAS Forecast Analyst Workbench or in SAS Forecast Studio.
	If you do not select the **Do not diagnose** check box for a time series, SAS Forecast Analyst Workbench complies with the nondestructive rediagnose process. During forecasting, SAS Forecast Analyst Workbench selects the best model based on the statistics of fit (that is, the MAPE and RMSE) values). SAS Forecast Analyst Workbench primarily retains the models that are generated in SAS Forecast Studio and custom models.

Defining Model Selection Parameters

You can define the model selection parameters for the selected time series or for the entire forecast.

The following table describes the fields on the **Model Selection** tab of the Parameters Settings window.

Table 8.5   *Field Descriptions for the Model Selection Tab*

Field	Description
Intermittency test	Enter a number that is greater than 1. This number is used to determine whether a time series is intermittent. If the average demand interval is greater than this number, then the series is assumed to be intermittent. The default value is 2.
Seasonality	Enter a number that is equal to or greater than 1 to specify the seasonality.

Field	Description
Perform seasonality test	Specify whether the seasonality test must be performed.
Seasonality test	Specify the seasonality test threshold. Time series with strong seasonality have small test probabilities. The value 0 always implies seasonality. The value 1 always implies no seasonality. The default value is 0.01.
Use holdout sample for model selection	Select this check box in order to use the holdout sample for selecting a model. The holdout sample is a subset of actual time series that end at the last nonmissing observation. If the holdout sample is not specified, the full range of the actual time series is used for model selection. The holdout option is used only to select the best forecasting model from a list of candidate models. After SAS Forecast Analyst Workbench selects the best model, the full range of the actual time series is used for subsequent model fitting and forecasting.
Holdout	Specify the size of the holdout sample to be used for model selection. **Note:** This field is available when you select the **Use holdout sample for model selection** check box.
Holdout percent	Specify the size of the holdout sample as a percentage of the length of the time series. **Note:** This field is available when you select the **Use holdout sample for model selection** check box.
Minimum observations for trend	Specify the number of observations that SAS Forecast Analyst Workbench must use to perform trend modeling. You must enter a value that is equal to or greater than 1.
Minimum observations for seasonality model	Specify the minimum number of observations that SAS Forecast Analyst Workbench must use to perform seasonality modeling. You must enter a value that is equal to or greater than 1.
Minimum observations for non-mean model	Specify the minimum number of observations that SAS Forecast Analyst Workbench must use to perform non-mean modeling. You must enter a value that is equal to or greater than 2.
Criterion	Select the method that SAS Forecast Analyst Workbench will use to select the best model. The list contains the following options: **RMSE** and **MAPE**.

Field	Description
Transform type	Specify the type of functional transformation. The list contains the following options:
	■ **Auto**: Select this option to automatically choose between None and Log, based on model selection criteria. This is the default option.
	■ **Boxcox**: Select this option to specify the Box-Cox transformation with a parameter value, where the value is between –5 and 5.
	■ **Log**: Select this option to specify logarithmic transformation.
	■ **Logistic**: Select this option to specify logistic transformation.
	■ **None**: Select this option if you do not want to apply any transformation.
	■ **Square root**: Select this option for square root transformation.
Boxcox	Enter the Box-Cox transformation value. The value must be between -5 and 5. The default value is 1.
	Note: This box is available only if you select the **Boxcox** option in the **Transform type** list.
Transform transopt	Specify the response series transformation option. The list contains the following options: **mean** and **median**.
Transform significance level	Specify the significance level to use as a cutoff value for deciding whether the series requires a log transformation. The significance level must be between 0 and 1. .
Start date	Click 📅, and then select a date to start the demand series.
End date	Click 📅, and then select a date to end the demand series.

Defining Forecast Parameters

You can define the alpha and lead parameters to define the forecast.

The **Forecast** tab of the Parameters Settings window contains the following fields.

Table 8.6   Field Descriptions for the Forecast Tab

Field	Description
Alpha	Enter the significance level to use in computing the confidence limits of the forecast. The alpha value must be between 0 and 1. The default value is 0.05, which produces 95% confidence intervals.
Lead	Enter the number of periods to forecast (forecast lead or horizon). The default value is 12. You must enter a value that is equal to or greater than 1.

Defining Combined Model Parameters

You can define the combined model parameters.

The **Combined Model** tab of the Parameters Settings window contains the following fields.

Table 8.7   Field Descriptions for the Combined Model Tab

Field	Description
Use combined diagnosed models	Select **Yes** to use the combined diagnosed models. In order to use the combined diagnosed models, you must have set at least two models to `Yes`. For example, you could set ARIMAX and UCM to `Yes` in order to use the **Use combined diagnosed models** option.
Method of combination	Select the method of combination from the list. ■ **AICC**: Akaike information Corrected criterion. Select this option to compute the combination weights based on corrected AIC weights. ■ **Average**: Select this option to compute the simple average of the forecasts that are selected for combination. This is the default option. ■ **ERLS**: Select this option to compute the combination weights based on a constrained least squares problem. This option minimizes the norm of the combined forecast residuals that are subject to the constraint that the weights sum to 1. ■ **LAD**: Select this option to compute the weights based on a least absolute deviations measure of fit for the combined forecast. ■ **NERLS**: Select this option to compute the combination weights based on a constrained least squares problem. This option minimizes the norm of the combined forecast residuals that are subject to the constraints that the weights sum to 1 and be nonnegative. ■ **NRLS**: Select this option to compute the combination weights based on a constrained least squares problem. This option minimizes the norm of the combined forecast residuals that are subject to the constraints that the weights be nonnegative. ■ **OLS**: Select this option to compute the combination weights that result from the ordinary least squares problem. This option minimizes the norm of the combined forecast residuals. ■ **RMSEWGT**: Select this option to compute the combination weights based on the RMSE statistic of fit for the forecast contributors. **Note:** This list is available only if you select **Yes** in the **Use combined diagnosed model** list.
Forecast encompassing test	Select this check box, then select the type of encompassing test and enter the encompassing test value. The list contains the following options: ■ **HLN**: Select this option to use the Harvey-Leybourne-Newbold (HLN) test to estimate pairwise encompassing between candidate forecasts. The default value is 0.05. The value can be in the range 0–1. ■ **OLS**: Select this option to use an OLS-based regression test to estimate pairwise encompassing between candidate forecasts. The default value is 0.05. The value can be in the range 0–1. **Note:** This list is available only if you select **Yes** in the **Use combined diagnosed model** list.

Field	Description
Rank criterion	Select a method from the list for computing ranking or order statistics.
	Note: This list is available only if you select **Yes** in the **Use combined diagnosed model** list.
Treatment of missing values	Specify how missing values in the forecast combination are treated. In a given time slice across the combination ensemble, one or more combination contributors can have a missing value. This setting determines the treatment of the missing values in the final combination for such time indices.
	The list contains the following options:
	■ **Missing**: Generate a missing combined forecast at each time index that has one or more missing contributors.
	Note: Select this option if you selected **OLS** or **NRLS** in the **Method of combination** list.
	■ **Rescale**: Rescale the combination weights for the nonmissing contributors at each time index to sum to 1. This option is the default.
	Note: This list is available only if you select **Yes** in the **Use combined diagnosed model** list.
Compute prediction error variance series	Select a method for computing the prediction error variance series. This series is used to compute the prediction standard error, which in turn is used to compute confidence bands on the combined forecast.
	The list contains the following options:
	■ **DIAG**: computes the prediction error variance by assuming that the forecast errors at time t are uncorrelated so that the simple diagonal form of summation of t is used. This is the default method for computing prediction error variance.
	■ **ESTCORR**: computes the prediction error variance by using estimates of correlation coefficient of i,j,t, the sample cross-correlation between $e_{i,t}$ and $e_{j,t}$ over the time span t = 1,....,T , where T denotes the last time index of the actual series y_t. This option implies that the error series $e_{i,t}$ and $e_{j,t}$ are assumed to be jointly stationary.
	Note: This list is available only if you selected **Yes** in the **Use combined diagnosed model** list.
Missing forecast values in the combination horizon	Select this check box and enter the threshold for the percentage of missing forecast values in the combination horizon. The threshold value is used to exclude a candidate forecast from consideration in the final combination. By default, no horizon missing percentage test is performed on candidate forecasts. The forecast horizon is the span of time during which multistep forecasts are generated.
	Note: This list is available only if you select **Yes** in the **Use combined diagnosed model** list.
Missing forecast values in the combination region	Select this check box and enter the threshold for the percentage of missing values in the combination estimation region. The threshold value is used to exclude a candidate forecast from consideration in the final combination. By default, no missing percentage test is performed on the candidate forecasts.
	Note: This list is available only if you select **Yes** in the **Use combined diagnosed model** list.

Applying Events

SAS Forecast Analyst Workbench enables you to apply events at the time-series level. You can select multiple time series and apply special events that have an impact on the demand. You can select the events from a list of events that are available, or you can import events from the .csv file. You cannot clear the events that you selected while you were creating the forecast. Those events are applied across the forecast and thus you cannot clear them at the time-series level. You must edit the forecast in order to clear the events that are not available in the Parameter Settings window.

Defining events at the time series level helps you apply the events that are specific to that time series with respect to other dimensions.

For example, in a global car manufacturing organization, a particular model of a car is sold in Europe but not in Asia. You can define the Europe-specific events on that time series instead of defining Europe-specific events at the forecast level.

For more information about events and the guidelines, see "Manage Events" on page 27.

Note: The **Events** tab in the Parameter Settings window is available when you are editing the parameters of the time series. This tab is not available when you are editing the parameters for the entire forecast.

Select a Default Model

When you edit the parameters of a time series, the **Model Information** tab displays two models. You can view the details of each model and select the most suitable model as the default model. After you select a default model, you must rediagnose the forecast.

The following prerequisites apply:

◼ The **Model Information** tab must contain multiple models.

◼ You must have permission to select a default model. For more information, contact your system administrator.

To select a default model:

1 On the **Model Information** tab of the Model Management view, select the most suitable model.

2 Click **Set this model as forecast model**.

The selected model is applied to the time series. Now, you must reconcile the forecast. For more information about reconciling the forecast, see "Reconcile a Forecast" on page 73.

Create a Modeling Project

You can create the modeling project to use the forecasting capabilities of SAS Forecast Studio and improve your forecast. You can create a modeling project in order to analyze the following items in SAS Forecast Studio:

- an entire forecast

- a selected hierarchy node

- an individual forecast-leaf-level time series

You cannot create a modeling project on a time series that is selected on the **Changed Time Series** tab of the Model Management view.

The following prerequisites apply:

- You must have permission to create the modeling project. For more information, contact your system administrator.

- The forecast must be in the **Forecasted** or **Accepted** state.

To create a modeling project:

1   Double-click a forecast in the Forecasts category of the Forecast Plans workspace.

    The Model Management view appears.

2   (Optional) On the **Hierarchy View** tab, select the hierarchy node or time series.

> **TIP** Press and hold the Ctrl key to select multiple hierarchy nodes and time series.

3   Click . The Analyze in SAS Forecast Studio window appears.

4   Select one of the following options:

- Select **Analyze all time series of the forecast** to analyze the entire forecast in SAS Forecast Studio.

    SAS Forecast Analyst Workbench considers all nodes up to and including the forecast leaf level. All nodes below the forecast leaf level are not considered when you create a modeling project.

- Select **Analyze on the selected hierarchy node** to base the analysis on the selected hierarchy node.

    SAS Forecast Analyst Workbench creates the modeling project with the selected hierarchy node and all nodes that are below the selected hierarchy node up to and including the forecast leaf level.

    Note: This option is not available if the forecast is in the **Created** state.

- Select **Analyze on individual time series** to base the analysis on the individual forecast-leaf-level time series of the forecast.

    Note: This option is not available if the forecast is in the **Created** state.

5 Enter the name for the modeling project.

   Note: This is a required field.

   The project name must be a valid SAS name. For more information about SAS naming conventions, see *SAS Language Reference: Concepts*.

6 Enter a description of the project.

7 Click **OK**.

The Modeling category displays the project that you created. By default, the project is created in the **Submitted** state.

For more information about modeling projects, see Chapter 9, "Introduction to Modeling Projects," on page 79.

Rediagnose a Forecast

You must rediagnose the forecast in order to recalculate the predicted values. You can rediagnose the forecast for various reasons. For example, you might want to generate new forecasted values after you edit the parameters for the entire forecast or for some time series. When you rediagnose the forecast, the forecast process considers factors such as the parameters that you edited and so on.

The following prerequisites apply:

■ You must have permission to rediagnose the forecast. For more information, contact your system administrator.

■ The forecast must be in one of the following states: **Forecasted**, **Accepted**, or **Error: In forecasting**.

To rediagnose a forecast, do one of the following:

■ In the Forecast Plans workspace, select a forecast, and click .

■ Perform the following steps:

   1 In the Forecasts category of the Forecast Plans workspace, double-click a forecast.

      The Model Management view appears.

   2 Click **Rediagnose**.

SAS Forecast Analyst Workbench starts rediagnosing the forecast. The Model Management view closes and the forecast status changes to **Forecasting**.

SAS Forecast Analyst Workbench uses the information that you modified to diagnose the most suitable model, and it uses the model to forecast the future values. If the **Do not diagnose** option is used for some time series, SAS Forecast Analyst Workbench retains the models for those time series and predicts the forecasted values.

After the predicted values are generated for the forecast, its status changes to **Forecasted**. If an error occurs during forecasting, the forecast status changes to **Error in forecasting**.

Reconcile a Forecast

You must reconcile the forecast to remove any conflicts if you have performed one of the following tasks:

■ analyzed the node or time series in SAS Forecast Studio and then promoted it in SAS Forecast Analyst Workbench

■ edited some of the time series

■ evaluated a time series and changed its default model

■ reran a time series

SAS Forecast Analyst Workbench uses one of the following reconciliation methods, which you defined when you created the forecast:

top-down
> aggregates the data from the lowest levels in the forecast and then uses these values to generate the forecasts at the highest level. SAS Forecast Analyst Workbench then uses this forecast and the disaggregation method that you specified to reconcile the forecasts for lower levels in the hierarchy.
>
> The top-down method enables you to remove excessive noise from the data at the lower levels of the hierarchy. However, you also might lose the pattern (such as the seasonality) in the forecast.

bottom-up
> uses the data at the lowest level of the hierarchy to generate the forecasts. These forecasts are then used to reconcile the forecasts for the higher levels in the hierarchy.
>
> The bottom-up method enables you to see any patterns (such as seasonality) in the data. However, because you are at the lowest level of the hierarchy, you can also have too much noise or randomness in the data. Also, these forecasts might fail because the data at the lowest level of the hierarchy is sporadic or too sparse.

middle-out
> aggregates the data from the lower levels and then uses these values to generate the forecasts for the middle level. SAS Forecast Analyst Workbench uses the forecasts at the middle level to reconcile the forecasts for both the higher and lower levels. Some hierarchies have more than one middle level, so you need to specify the level that you want to use.

For more information about reconciliation, see *SAS Forecast Server Procedures: User's Guide*.

The following prerequisites apply:

■ You must have permission to reconcile the forecast. For more information, contact your system administrator.

■ The forecast must be in one of the following states: **Forecasted**, **Accepted**, or **Error: In forecasting**.

■ The forecast must contain multiple hierarchy levels.

To reconcile a forecast:

1   Double-click a forecast in the Forecasts category of the Forecast Plans workspace.

The Model Management view appears.

2   Click **Reconcile**.

SAS Forecast Analyst Workbench starts reconciling the forecast and closes the Model Management view.

Accept a Forecast

You can accept a forecast when you are satisfied with the RMSE, MAPE, and predicted values. When you accept a forecast, its status changes from **Forecasted** to **Accepted**.

After you accept a forecast, you can perform tasks on it. For more information about tasks that you can perform on a forecast that is in the **Accepted** state, see Table 6.1 on page 46. After you perform any of these tasks, the state of the forecast changes from **Accepted** to **Forecasted**. You must review the forecast values and accept the forecast again in order to change its status to **Accepted**.

The following prerequisites apply:

■   You must have permission to accept the forecast. For more information, contact your system administrator.

■   The forecast must be in the **Forecasted** or **Warning: Forecasted with errors** state.

To accept a forecast:

1   Double-click a forecast in the Forecasts category of the Forecast Plans workspace.

The Model Management view appears.

2   Click **Accept**.

The Model Management view closes and the state of the forecast changes to **Accepted**. After you accept the forecast, you can run it in batch mode so that SAS Forecast Analyst Workbench calculates the predicted values for the newly added time series.

When you accept a forecast that contains scenario analysis performed on any of the time series, the predicted values of those time series are updated with the scenario values.

Rerun the Forecast

When you rerun the forecast, SAS Forecast Analyst Workbench recalculates the demand values. You can perform this task on the entire forecast or on the selected forecast-leaf-level time series.

The following prerequisites apply:

- You must have permission to rerun the forecast. For more information, contact your system administrator.

- The forecast must be in the **Forecasted** or **Accepted** state.

- You must select the top-level node on the **Hierarchy View** tab to rerun the entire forecast.

To rerun the forecast:

1 Double-click a forecast in the Forecasts category of the Forecast Plans workspace.

   The Model Management view appears.

2 Select one of the following options:

   - If you want to run the forecast on all time series of the forecast, select the top-level node on the **Hierarchy View** tab.

   - If you want to run the forecast for a specific time series, select a time series on the **Hierarchy View** tab.

   > **TIP** Press and hold the Ctrl key to select multiple time series.

3 Click ⛹. The Rerun Forecast Options window appears.

4 Enter the appropriate information in each field. The following table describes each field.

Table 8.8   *Fields in the Rerun Forecast Options Window*

Field	Description
Selection options	
All time series of the forecast	Select this option to rerun the forecast process on all time series of the forecast. When you select the top-level node on the **Hierarchy View** tab, this option is already selected.
Selected leaf level nodes	Select this option to rerun the forecast for the time series that you selected on the **Hierarchy View** tab. When you select the forecast-leaf-level nodes on the **Hierarchy View** tab, this option is already selected. This option is not available if you select the top-level node on the **Hierarchy View** tab.
Execution options	
Diagnose and then forecast	Select this option to perform the following tasks: - analyze the data - apply the most suitable model - estimate the model parameters - calculate forecast demand values

Field	Description
Select and forecast	Select this option to perform the following tasks: ▪ estimate the model parameters ▪ calculate forecast demand values SAS Forecast Analyst Workbench uses the same model but estimates the model parameters again and calculates the forecast demand values.
Only forecast	Select this option to produce the forecast demand values only. SAS Forecast Analyst Workbench uses the same model and the same modeling parameters to calculate the forecast demand values. **Note:** When you are recalculating the demand values for the forecast leaf level nodes or for the entire forecast, do not use this option.

5   Click **OK**.

Part 4

Integrating Modeling Projects with SAS Forecast Studio

9

Introduction to Modeling Projects

About Modeling Projects

You can use the forecasting capabilities of SAS Forecast Studio in order to improve your forecast. You can analyze the entire forecast, any node of the hierarchy, or the selected forecast-leaf-level time series in SAS Forecast Studio. You can perform the following tasks in SAS Forecast Studio:

- select models to fit to each time series

- specify the forecast model

- check the accuracy of the models

- compare models

- add a model to a time series

- create a new model based on the default model

- create a scenario and perform scenario analysis

- add override values

    The override values are promoted from SAS Forecast Studio to SAS Forecast Analyst Workbench if they are locked.

- create and add events

After you are satisfied with the results, you can import the results from the output data sets that are in the forecast projects directory into SAS Forecast Analyst Workbench. You can also import the models and events into SAS Forecast Analyst Workbench.

Workflow for the Modeling Category

In the Modeling category, you can use the following workflow to choose the most suitable statistical model:

1 Create a modeling project to analyze the entire forecast, the selected hierarchy node, or the selected time series in SAS Forecast Studio. SAS Forecast Analyst Workbench opens the Modeling category and displays a list of projects that are in different states.

For more information about creating a modeling project, see "Create a Modeling Project" on page 71.

2 Open the Model Management view of the Modeling category to explore the project. You can view the model information and demand values.

For more information about the Model Management view, see "Model Management View" on page 85.

3 If the forecast on which you based the modeling project was in the **Forecasted** state, observe and compare the actual values and predicted values in the Model Management view.

4 Click the **Open Forecast Studio** link in the Model Management view to open SAS Forecast Studio. SAS Forecast Studio appears with the project that you created. You can perform the model-related tasks in SAS Forecast Studio.

For more information about opening SAS Forecast Studio, see Chapter 11, "Managing Modeling Projects," on page 89.

5 In SAS Forecast Studio, view the project and perform tasks to improve the predicted demand values. For more information about tasks that you can perform in SAS Forecast Studio, see *SAS Forecast Studio: User's Guide*.

6 After you improve the predicted demand values, close SAS Forecast Studio.

7 If you have performed the model management-related tasks and updated the project, refresh the project in the Modeling category. After you refresh the selected project, SAS Forecast Analyst Workbench updates the Model Management view with the latest data.

For more information about refreshing the project, see "Refresh a Modeling Project" on page 90.

8 Promote the modeling project so that the latest model-related information and values are overwritten to the forecast.

For more information about promoting a project, see "Promote a Modeling Project" on page 91.

9 (Optional) Repeat steps 2 through 8 to improve the predicted demand values of the modeling project.

Status of Modeling Projects

Every project in the Modeling category has a specific status. The following table describes each status.

Table 9.1   *Status of Modeling Projects*

Status	Description
Submitted	The modeling project has been submitted for creation.
Created	The modeling project and all necessary input tables have been created. This status also indicates that the KPI data has been transferred to SAS Forecast Studio for forecasting and that predicted values have been generated.
Data refreshing in progress	SAS Forecast Analyst Workbench is updating the modeling project data.
Promoted	The modeling project has been promoted, and the data has been overwritten to the forecast.

Table 9.1   *Status of Modeling Projects*

10

Understanding the Modeling Category

Overview of the Modeling Category

The Modeling category consists of a table, toolbar, view, and different panes. The table in this view displays the following information:

- list of projects

- description of the projects

- status of each project

- name of the forecast that the modeling project is linked to

- name of the person who created the project

- date on which the project was created

- date on which the project was last modified

The Model Management view of the Modeling category enables you to view the demand values and to open SAS Forecast Studio.

Components of the Modeling Category

Toolbar

The toolbar contains the following buttons that you can use to perform frequent tasks.

Table 10.1 *Toolbar Buttons in the Modeling Category*

Icon	Description
	Click this button to promote the selected project and assign it to the forecast in the Forecasts category. For more information about promoting a modeling project, see "Promote a Modeling Project" on page 91.
	Click this button to refresh the selected project. When you refresh the selected modeling project, SAS Forecast Analyst Workbench updates the project with the changes that you performed in the SAS Forecast Studio. The status of the project changes to **Data refresh in progress**. After the data is updated completely, the status of the modeling project changes to **Created**. For more information about refreshing the project in the Modeling category, see "Refresh a Modeling Project" on page 90.
	Click this button to delete the selected project from the Modeling category. For more information about deleting a project, see "Delete a Modeling Project" on page 91.
	Click this button to open the selected project in SAS Forecast Studio.

Properties Pane

The **Properties** pane displays the following information about the selected project:

■ name of the forecast that the project is linked to

■ date on which the project was created

■ date on which the project was last modified

Comments Manager Pane

You can add comments to a project in the **Comments Manager** pane. Comments include information that is specific to a project or important information that you want to discuss with other users.

If you have the required permission, you can perform the following tasks in the **Comments Manager** pane:

■ create a new topic

You can enter a subject and description for the new topic. You can select the priority of the topic and attach a file.

■ reply to a topic

■ search for a topic to comment on

Model Management View

The Modeling category contains only one view, which is the Model Management view. This Model Management view is very similar to the Model Management view that is in the Forecasts category. For more information about that Model Management view, see Chapter 7, "Understanding the Model Management View," on page 47.

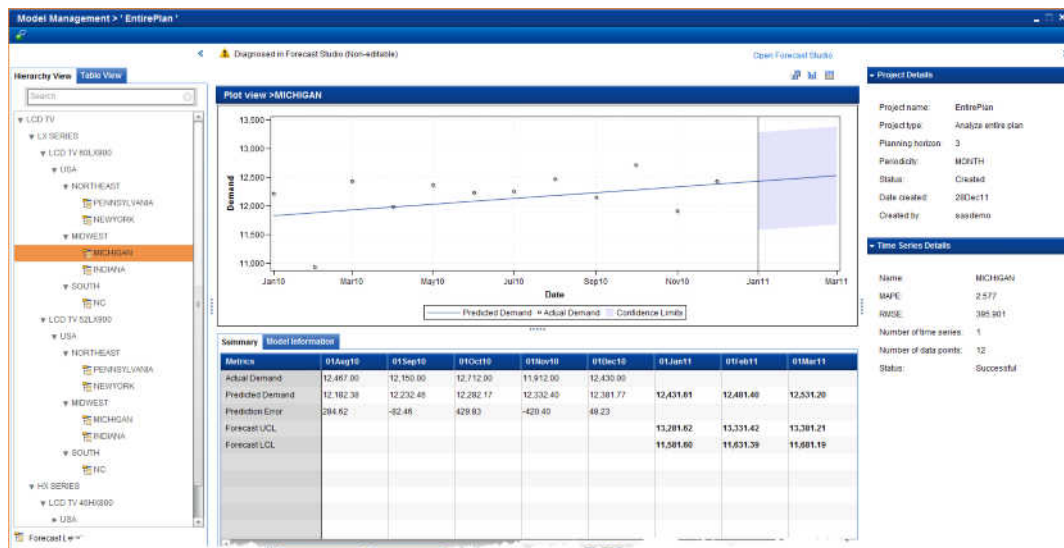However, in the Model Management view of the Modeling category, you can perform the following tasks:

■ open the project in SAS Forecast Studio to perform advanced model management tasks

■ promote the project to the linked forecast if you made changes to the project

■ compare the default model with the model that is generated by SAS Forecast Studio

By default, the modeling project displays the values for the model that is generated by SAS Forecast Analyst Workbench. Click the model that is generated by SAS Forecast Studio to compare those values.

You can double-click on a project in the Modeling category to open the Model Management view. Alternatively, click **Open** to open the selected project in the Model Management view.

When you create the modeling project for the entire forecast, the Model Management view displays all the hierarchy nodes on the **Hierarchy View** tab. The data for all the nodes is also displayed.

Figure 10.1 *Model Management View for an Entire Forecast*


When the modeling project for the forecast-leaf-level time series is created, the **Hierarchy View** tab of the Model Management view is not available. The forecast-leaf-level time series are displayed on the **Table View** tab.

Figure 10.2 Model Management View for a Time Series
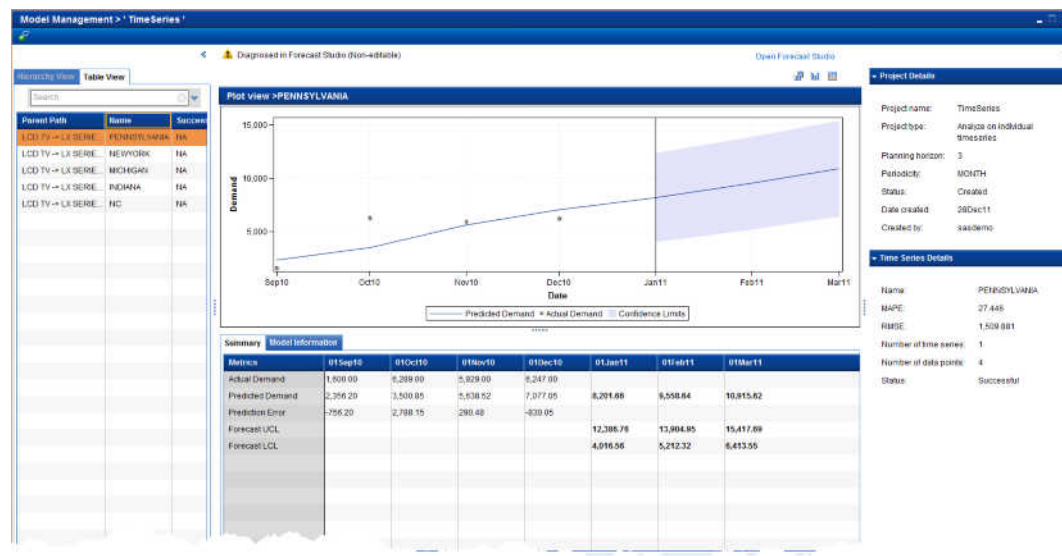
When the modeling project for the selected hierarchy nodes is created, the
Hierarchy View tab of the Model Management view displays those hierarchy
nodes in bold. The data for all nodes that are above the selected hierarchy
nodes is not displayed.

Figure 10.3 Model Management View for Hierarchy Nodes
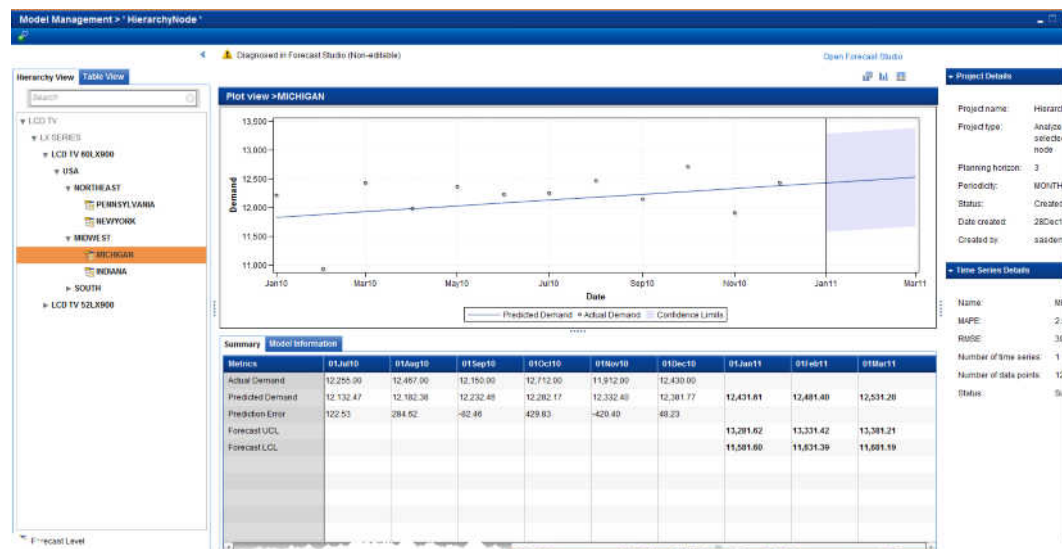
The graph in the **Plot** view displays a vertical line that indicates the start date of
the planning horizon. A mismatch in the start date of the planning horizon might
occur under the following conditions:

■ you are generating the predicted values using SAS Forecast Studio and SAS
Forecast Analyst Workbench

■ all time series for the input date contain missing values at the end of the
GL_FORECAST_DATE parameter

For more information about GL_FORECAST_DATE, see *SAS Forecast Analyst Workbench: Administrator's Guide*.

11

Managing Modeling Projects

Guidelines for Modeling Projects

When you are working on a project in SAS Forecast Studio, you must conform to the following guidelines:

- Do not change the hierarchy and variable settings.

- Do not change the periodicity of the forecast or of the time series.

- Do not change the horizon of the forecast or of the time series.

- Do not change the reconciliation hierarchy.

- If you change the model for a time series or add an override to the data when it is arranged hierarchically, reconcile the modeling project.

- Do not give an existing event name to a newly created event.

- Do not delete the modeling project from SAS Forecast Studio.

  If you delete a modeling project from SAS Forecast Studio and try to open the same modeling project in SAS Forecast Analyst Workbench, SAS Forecast Analyst Workbench gives an error.

When you override a time series, apply a lock to it in SAS Forecast Studio, and import the values into SAS Forecast Analyst Workbench, SAS Forecast Analyst Workbench retains those values. SAS Forecast Analyst Workbench does not change those values even after you rediagnose them.

When you import the results from the resulting data sets that are in the forecast projects directory into SAS Forecast Analyst Workbench, you can also import the models and events. You can change the parameters other than the periodicity and horizon. However, they are not imported into SAS Forecast Analyst Workbench.

You can create scenarios in SAS Forecast Studio. The Model Management view of the Modeling category displays the forecast studio scenario values when you perform the following steps:

1 Model a project for the entire forecast.

2 Create and run the scenarios in SAS Forecast Studio.

3 Set the scenario values as override, reconcile the hierarchy, and close SAS Forecast Studio.

4 Refresh the modeling project in the Modeling category.

Open SAS Forecast Studio

The modeling project is created in the Modeling category. You can use this category to perform the model management-related advanced tasks. You can also open a modeling project in SAS Forecast Studio and improve its predicted demand values.

The following prerequisites apply:

■ You must have permission to open SAS Forecast Studio. For more information, contact your system administrator.

■ In order to launch SAS Forecast Studio using the Java Web Start client, Java Runtime Environment (JRE) 1.7 or later needs to be installed on the client machine.

To open SAS Forecast Studio:

1 In the Modeling category, double-click a project. Alternatively, select a modeling project and click **Open**. The Model Management view appears.

2 In the Model Management view, click **Open Forecast Studio**.

SAS Forecast Studio opens and displays the project. For more information, see *SAS Forecast Studio: User's Guide*.

Note: When you create a scenario in a modeling project in SAS Forecast Studio, the model forecast values and the scenario forecast values might be different.

Refresh a Modeling Project

You must refresh the modeling project to import the changes that you made in SAS Forecast Studio to the Modeling category of SAS Forecast Analyst Workbench. You must have permission to refresh the modeling project. For more information, contact your system administrator.

To refresh a modeling project, in the Modeling category, select a project and click ↻.

SAS Forecast Analyst Workbench starts refreshing all data from SAS Forecast Studio. The status of the project changes to **Data refreshing in progress**. After the data is imported, the status of the project changes to **Created**.

Promote a Modeling Project

After you perform advanced tasks related to model management, you can promote the modeling project. When you promote the project, the data associated with the project is merged with the linked forecast in SAS Forecast Analyst Workbench. You must have permission to promote the modeling project. For more information, contact your system administrator.

Suppose you perform advanced model management tasks on a modeling project that contains a new product forecasting time series. Then, you promote the modeling project. In this case, SAS Forecast Analyst Workbench treats the new product forecasting time series as a regular time series, instead of using the demand that was generated in the New Products workspace.

To promote the modeling project:

1   In the Modeling category, select a project and click . The Promote window appears.

2   Choose the appropriate options.

> **Note:** You cannot clear the **Models** check box because the models that are created in SAS Forecast Studio are always promoted to the selected forecast.

3   Click **OK**.

SAS Forecast Analyst Workbench starts promoting the modeling project and changes the status to **Promoting**. After the data of the project is overwritten with the data of the forecast, the status of the project changes to **Promoted**.

After you promote the modeling project, you must reconcile it in the Model Management view of the Modeling category in order to update the predicted values. For more information about reconciliation, see "Reconcile a Forecast" on page 73.

Delete a Modeling Project

You must have permission to delete a modeling project. For more information about permissions, contact your system administrator.

To delete a modeling project:

1   In the Modeling category, select a project, and click .

2   In the confirmation window, click **Yes**.

The selected modeling project is deleted. All associated tables and data that were created for the project are also deleted.

Part 5

Forecasting a New Product

12

Introduction to New Product Forecasting

Overview of New Product Forecasting

The new product forecast uses a structured and judgmental analysis method that combines statistical analysis and judgmental analysis methods. This process helps you overcome the following challenges that are involved in forecasting the demand for a new product:

- lack of product history

- uncertain product life cycle

New product forecasting enables you to accomplish the following goals:

- leverage your business or domain knowledge by using a structured judgment technique

- combine business judgment with statistical techniques to calculate the history of surrogate products

- construct an appropriate model based on the history of surrogate products in order to generate forecasts of the new product that can be reviewed easily

Workflow for New Product Forecasting

SAS Forecast Analyst Workbench uses the following systematic workflow to forecast values for new products.

1 Create a new product forecast project. The project contains the new product and its parameters such as KPI, periodicity, number of clusters to be created, and so on.

For more information about creating a new product forecast project, see

2 Define the relationship of the new product to the dimensions, and select candidate products. A candidate product is a product whose historical demand data can be used to forecast the new product. You can also specify common attributes and attributes that are specific to the new product to filter the candidate products. SAS Forecast Analyst Workbench uses the historical demand data of the candidate products for the selected dimensions.

For more information about defining the relationship of the product to the dimensions and defining candidate products, see "Define Relationships and Candidate Products" on page 103.

3 Analyze the seasonality of the candidate products. Using your business judgment, remove outlier products whose demand pattern is not likely to be similar to the expected demand pattern of the new product. SAS Forecast Analyst Workbench creates clusters of the remaining candidate products that have a similar demand pattern. Each cluster contains the candidate products that can be used for modeling and forecasting the values of the new product.

For more information about selecting candidate products, see "Selecting Candidate Products" on page 105.

4 Select a cluster that contains the most suitable candidate products. The historical data of these candidate products is used to apply the statistical models.

For more information about selecting surrogate products, see "Select Surrogate Products" on page 107.

5 Apply models and generate the predicted demand for the new product.

For more information about selecting a model, see "Selecting a Model" on page 108.

6 (Optional) Using your judgment of various factors (such as market conditions, organizational environment, constraints, and so on), review and override the predicted demand. After you override the predicted demand, SAS Forecast Analyst Workbench marks the demand values as the final forecasted values.

For more information about reviewing the forecasted demand values, see "Reviewing the Forecast" on page 110.

7 Assign the project to a forecast. You can view the demand in the Explore Demand view and in the Model Management view.

For more information about assigning the New Product Forecasting project to a forecast, see "Assigning New Product Forecast Projects to a Forecast" on page 112.

13

Understanding the New Products Workspace

Overview of the New Products Workspace

The New Products workspace contains the NPF Projects category. The NPF Projects category contains the New Product Forecast Project view. Using the New Product Forecast Project view, you can forecast the demand for new products.

Components of the NPF Projects Category

This section gives detailed information about the toolbar and table that are in the NPF Projects category.

Toolbar

The toolbar contains the following buttons that you can use to perform frequent tasks.

Table 13.1   Description of Buttons in the NPF Projects Category

Icon	Description
	Click this button to create a new product forecast project. You can choose the new products from a list and specify the parameters for the project. For more information about creating a new product forecast project, see "Create a New Product Forecast Project" on page 102.

Icon	Description
	Click this button to assign the selected new product forecast project to a forecast. After you forecast the demand for the new product, you can assign the project to a forecast that has the product at the leaf level. For more information about assigning a new product forecast project to a forecast, see "Assigning New Product Forecast Projects to a Forecast" on page 112.
	Click this button to delete the selected new product forecast project.

New Product Forecast Projects

The NPF Projects category displays a table that lists all the new product forecast projects. You can view the following information about a new product forecast project:

- name of the new product

- key performance indicator (KPI) of the project

- status of the project

- periodicity or forecasting interval

Double-click a project to start working on it. When you double-click a project, the New Product Forecast Project view appears.

The following tasks are common to all views:

- sort the table rows

- modify the width of table columns

Overview of the New Product Forecast Project View

The New Product Forecast Project view is divided into two parts. The upper part of the view displays the steps of the new product forecasting process. After you complete each step, a appears at the bottom of the process step, which indicates that the step is complete. The bottom part of the view displays the options for the selected step and the result of the process.

You cannot proceed to the next step of the process unless you have completed the previous step. However, you can click a rectangle that contains to view and change the options for that step. You must complete all the previous steps in order to work on a subsequent step. These steps help you maintain a consistent and structured workflow for forecasting the values of the KPI for the new product.

Figure 13.1 *NPF Process Flow*
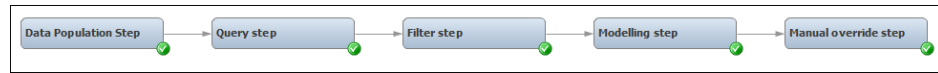
The title bar of the New Product Forecast Project view displays the name of the new product.

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Managing New Product Forecast Projects

About New Product Forecast Projects

The process of forecasting a new product consists of the following steps:

1   create a new product forecast project

2   define candidate products

3   select candidate products

    4   select surrogate products

    5   select a model

    6   review the forecast

After you complete these steps for a new product forecast project, you obtain the possible demand values for the new product. You can also assign the new product forecast project to a forecast, or delete a project that you no longer need.

Create a New Product Forecast Project

You must create a new product forecast project in order to forecast the demand for that new product. A new product forecast project consists of the new product and its parameters, such as key performance indicator (KPI), periodicity or forecasting interval, and so on. You must have permission to create a new product forecast project. For more information, contact your system administrator.

To create a new product forecast project:

1   In the New Products workspace, click the NPF Projects category, and then click ![icon]. The New Product Forecast Project view appears.

2   In the **Select Product** section, select a new product.

3   In the **Select Parameters** section, enter information in each field. The following table describes each field.

Table 14.1   Field Descriptions for the Select Parameters Section

Field	Description
KPI	Select the key performance indicator (KPI). The KPI is the variable that is to be forecasted for the new product. For example, select **Demand** to forecast the demand for the new product.
Periodicity	Select the periodicity. The periodicity defines the forecasting interval, which is the frequency at which the demand should be forecasted.
Number of cycles	Enter the number of cycles of the candidate products that you want to consider for generating the forecast results of the new product. A cycle is a period of time whose length is defined by your periodicity. The first cycle begins at the introduction of the candidate product. The next cycle begins on the date following the previous cycle. Cycle series data is useful for modeling and for comparing time series data with different introduction times. If cycles are defined, SAS Forecast Analyst Workbench uses them for forecasting. SAS Forecast Analyst Workbench considers the demand that is available for the specified number of cycles of the candidate products.
	For example, if you selected **Month** in the **Periodicity** list, and you entered 12 in the **Number of cycles** field, SAS Forecast Analyst Workbench considers the demand that was generated during the initial 12 months for the selected candidate products.

Field	Description
Number of clusters	Enter the number of clusters that SAS Forecast Analyst Workbench must create. Clustering helps you divide the candidate products into different groups. Each cluster contains the candidate products that have similar demand patterns.
Reduction method	Select the reduction method in order to reduce each candidate series to a uniform set of statistical properties that are not time-dependent. The list contains the following options:
	◼ **Decomposition**: Select this option to analyze seasonal patterns.You can use this option when at least two seasonal cycles of the time series data are available to you.
	◼ **Smoothing**: Select this option to obtain surrogate products that depend on level estimates and trend estimates of the candidate products.
Sales introduction date	Displays the sales introduction date of the new product. Click 📅 to change the date.
	Note: SAS Forecast Analyst Workbench does not convert the time zone automatically if the SAS Forecast Analyst Workbench server and client are located in different time zones. You must perform the GMT time zone conversion manually before you enter the sales introduction date.
Hierarchy path	Displays the path where the new product fits into the product hierarchy. This path helps you identify the new product easily in the Model Management and Explore Demand views.

4   Click **OK**.

Note: You cannot create multiple new product forecast projects for the same new product with the same KPI.

SAS Forecast Analyst Workbench closes the New Product Forecast Project view and creates the project with the status **Ready for NPF**. Now, you can start the process of forecasting the possible demand values for this new product.

Define Relationships and Candidate Products

In this step, you define the applicability of your product. You can define the relationship between the new product and the other dimensions that are defined for the selected KPI. Defining this relationship helps you focus your forecasting goal across dimensions. For example, if you are introducing the new product in a particular region of the USA, you would define the relationship of the new product to your Location dimension in this step.

You also define one or more products whose historical demand data can be used to forecast the new product. These products are called candidate products.

SAS Forecast Analyst Workbench uses the relationship of the new product with the dimensions to generate the demand history for the selected candidate products. For example, SAS Forecast Analyst Workbench calculates the

demand history that was generated for cell phone 1 and cell phone 2 in California if you select that dimension and those candidate products in this step. The historical demand data of these candidate products is used as a product history for generating the forecast of the new product.

You can also specify common attributes and product-specific attributes for the new product. SAS Forecast Analyst Workbench uses this attribute information to identify a set of candidate products with similar attributes.

> **TIP** In this step, you should identify a forecast to which you will promote this new product forecasting project after you obtain the demand for the new product.

To define relationships and candidate products:

1 In the New Products workspace, click the **NPF Projects** category, and double-click a project that is in the **Ready for NPF** state. The New Product Forecast Project view appears and contains two panes. The name of the right pane changes depending on the option that you select in the left pane.

2 Define the relationship of the new product with the dimensions.

   a In the left pane, click **Relationships**. The **Select domain relationships** pane displays all the dimensions on separate tabs.

   b Select values on each tab.

   For example, if you are introducing the new product in a particular region of the USA, define the relationship of the new product to the Location dimension in this step.

3 Define the candidate products whose historical data can be used to forecast the new product.

   a In the left pane, click **Candidate Products**. The right pane displays two sections: **Available items** and **Selected items**.

   b In the **Available items** section, select the candidate products. The candidate products are arranged in a tree structure. You can expand and collapse the hierarchy to select the candidate products.

   > **TIP** Press and hold the Ctrl key to select multiple candidate products.

   c Click ⬀. The hierarchy of the selected candidate products appears in the **Selected items** section.

   d (Optional) Click **Common attributes** to define common attributes.

   Note: This link is available only if common attributes are defined for the selected hierarchical values.

   e (Optional) Click **Product-specific attributes** to define product-specific attributes of the new product.

   By specifying product-specific attributes, you can filter the candidate products that are most suitable.

   Note: This link is available only if product-specific attributes are defined for the selected hierarchical values.

4   Click **OK**.

SAS Forecast Analyst Workbench starts generating the historical data for the defined candidate products for the selected dimensions. SAS Forecast Analyst Workbench uses this data to forecast the new product.

The state of the new product forecast project changes from **Ready for NPF** to **Data population completed**.

Selecting Candidate Products

About Selecting Candidate Products

What is Selecting Candidate Products?

This step helps you find a set of candidate products whose attributes are similar to a new product and that are useful in forecasting the unknown new product series. Because the new product series is not known, the known attributes of the new product can be used to find a set of candidate products with similar attributes. In this step, you can graphically view a set of the candidate series that is associated with the candidate products. You can also view each candidate product with its name. After you view the candidate products, use your judgment to remove one or more candidate products. Then you can graphically explore the revised set of candidate products to better understand the impact of your changes.

In this step, you can analyze the seasonality and life cycle of the candidate products by using the following plots: histogram, demand plot, demand percent plot, and time series plot.

Histogram

A histogram is a graphical representation of the distribution of data. A histogram consists of tabular frequencies, shown as adjacent rectangles, erected over discrete intervals (bins). The x-axis displays the total KPI for historical products over the number of cycles. If the KPI is demand, the x-axis displays the total demand for historical products over the number of cycles. The y-axis displays the percentage of candidates that fall within each interval of total demand.

Click **Refresh** to view the latest histogram after selecting the products.

KPI Plot

A KPI plot is helpful for removing outlier products from the list of candidate products. The name of the plot depends on the KPI that you select. For example, if you select **Demand**, SAS Forecast Analyst Workbench displays the name of the plot as Demand Plot.

The KPI plot displays the historical values of the selected candidate products in different cycles. The x-axis displays cycle index, and the y-axis displays the historical values of the candidate products. You can observe the historical values of the outlier product to remove it from the list of the candidate products.

KPI Percent Plot

The KPI percent plot displays the historical values of the selected candidate products as percentages. The name of the plot depends on the KPI that you select. For example, if you select **Sales**, SAS Forecast Analyst Workbench displays the name of the plot as Sale Percent Plot.

This plot helps you analyze the historical values of the candidate products against the cycle index. The x-axis displays cycle index, and the y-axis displays the historical values of the candidate products, as percentages.

Time Series Plot

The time series plot displays the historical demand for the candidate products against the date. Each line in this graph denotes the actual demand data of each candidate product in its original time period. Thus, the graph of each candidate product can start at a different date.

Because the demand for each candidate product is displayed against its actual time, the time series plot helps you understand the seasonal pattern of the candidate products. If the candidate products show seasonal fluctuations, you might decide to adjust their seasonality.

The plot shows the data for the selected candidate products in separate colors. When you select a candidate product in the left pane, the time series plot displays the demand for that product in red.

The time series plot enables you to view the data for particular time series and for particular durations. For example, you can view the data for products whose first seven time series are between January 2010 and December 2010.

Click **Reset graph** to reset the time series and duration.

You can select the candidate products and then filter their demand data. For example, you might want to view the demand data of only two candidate products out of four candidate products.
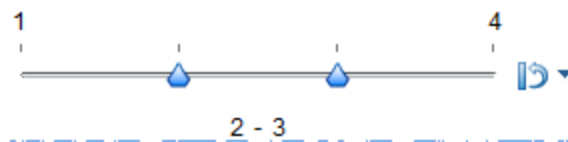
You can filter the data that you view by selecting a time range for which you want to view data. Select the start and end date for the time range. For example, you might want to view the demand data that was generated from March to November.

Note: If all time series contain the value 0 for a particular date, change NPF_MODE to ADD in the configuration table. For more information, contact your Administrator.

Select Candidate Products

You can select the candidate products that are useful in forecasting the demand for the new product. The new product forecast project must be in the **Data population completed** state.

To select the candidate products:

1   In the New Products workspace, click the NPF Projects category, and double-click a project. The New Product Forecast Project view appears. The left pane displays a list of candidate products in different colors. The right pane contains a histogram, demand plot, demand percent plot, and time series plot on separate tabs.

2   Clear the check box of the candidate product that is an outlier. You can now explore the historical demand data of the candidate products using the different plots.

    Note: Whenever you select or remove a candidate product, click **Refresh** to refresh the data on the plots.

3   (Optional) Select the **Adjust seasonality** check box to remove the seasonality patterns from the data for the candidate products.

    You can adjust the seasonality if the candidate products display regular seasonal fluctuations.

    Note: This check box is available only when the selected candidate products contain at least two periods of data.

4   (Optional) Click **Refresh** to refresh the histogram, demand plot, demand percent plot, and time series plot.

    Note: If you click **Refresh** after you adjust the seasonality, the histogram, demand plot, and demand percent plot display the de-seasonalized data. However, the time series plot does not display the de-seasonalized data.

5   Click **OK**.

SAS Forecast Analyst Workbench removes the outlier products from the set of the candidate products and forms the clusters based on the time series pattern of the candidate products. The state of the new product forecast project changes from **Data population completed** to **Clustered**.

Select Surrogate Products

This steps displays the clusters of candidate products that are formed after the following processes are completed:

■   analyzing the statistical pattern of the demand of the candidate products

■   filtering the outlier products from the list of candidate products

To create the clusters, SAS Forecast Analyst Workbench uses the reduction method that you selected when you created the new product forecast project. Each cluster contains the candidate products that have similar demand patterns.

This step helps you remove the outlier products from the set of the candidate products that was returned when you completed the previous step. If you correctly remove the outlier series, the set of surrogate series should be more similar to the new product series than the set of the candidate series was.

You can graphically explore the set of surrogate products by selecting particular clusters of surrogate products. You can also explore the number of surrogate products to ensure that sufficient surrogate products are present. After you

explore the set of surrogate series, you can apply judgment by removing one or more series from the set of surrogate products. After you apply judgment, you can graphically explore the revised set of surrogate products to better understand the impact of judgments.

The new product forecast project must be in the **Clustered** state for you to select surrogate products for it.

To select surrogate products:

1 In the New Products workspace, click the NPF Projects category and double-click a project. The New Product Forecast Project view appears.

2 In the **Select Cluster** list, select a cluster. The cluster graph and the cluster table display the historical demand data of the surrogate products in percentages, arranged against different cycles.

3 (Optional) Clear the check box next to a product to remove it from the cluster. The cluster graph refreshes and displays the updated data.

4 Repeat steps 2 and 3 to select the cluster that is most suitable to your needs.

5 Click **OK**.

SAS Forecast Analyst Workbench starts fitting the Naive and Neural models to the surrogate products of the selected cluster. You can also use a custom model. Detailed information about how to use a custom model is in *SAS Forecast Analyst Workbench: Administrator's Guide*.

After the models are fitted, SAS Forecast Analyst Workbench generates the predicted demand for the new product by using the demand of the surrogate products of the selected cluster. The state of the new product forecast project changes from **Clustered** to **Modeled**.

Selecting a Model

About Selecting a Model

SAS Forecast Analyst Workbench applies the Naive and Neural model to the surrogate products of the selected cluster. For each model, you can view the following information in graphical form:

- predicted demand of the new product

- actual demand of the surrogate products

- upper control limit and lower control limit of the predicted values

This step enables you to extract the statistical features from the set of surrogate products that was returned by the previous step. The set of surrogate products is similar to the new product series and is therefore useful in forecasting it.

After you select a model, it is fitted to the surrogate products and prediction errors are computed. You can graphically explore the set of surrogate products. You can also explore each surrogate product by using the following information:

- mean absolute percentage error (MAPE)

- root mean square error (RMSE)

- Akaike information criterion (AIC)

- adjusted R-square

After you explore the model results of each surrogate product, you can apply judgment by using one of the following methods:

- removing one or more surrogate products from the set of surrogate products

- changing the statistical model

For example, you might select or remove poorly fitting surrogate (outlier) series or choose other model specifications.

After you apply judgment, you can graphically explore the revised set of surrogate products and the new statistical model results to better understand the impact of judgments. For example, you might explore the result of excluding a particular surrogate product or of changing model specifications. If you are not satisfied with the results of this step, you can go back to the **Select Cluster** step.

Model Summary Tab

The **Model Summary** tab displays a histogram of the percentage of surrogate products that are within a particular range of the total demand.

The x-axis displays the range of total demand of surrogate products, and the y-axis displays percentage of the surrogate products. The **Model Summary** tab also displays the predicted demand value of the new product, the upper control limit, and the lower control limit of the predictions, in different colors.

Profile Series Model Tab

The **Profile Series Model** tab displays the following information:

- the profile series predictions of the new product

- the upper control limit and lower control limit of the new product

- the actual profile data for each of the surrogate products

The x-axis displays the cycles index, and the y-axis displays the percentage of demand. The **Profile Series Model** tab displays a graph of the percentages of the predicted demand value of the new product, the upper control limit, and the lower control limit of the predicted values, in different colors.

Cycle Series Model Tab

The **Cycle Series Model** tab displays the predicted demand for each candidate product in each cycle.

The x-axis displays the cycle index, and the y-axis displays the predicted demand. The **Cycle Series Model** tab also displays the predicted demand value of the new product, the upper control limit, and the lower control limit of the predicted values, in different colors.

Select a Model

You can select the model that is most suitable for the new product. The new product forecast project must be in the **Modeled** state.

To select a model:

1 In the New Products workspace, click the NPF Projects category, and double-click a project. The New Product Forecast Project view appears.

2 In the **Select model** list, select a model. The **Model Summary**, **Profile Series Model**, and **Cycle Series Model** tabs display the graphs of the predicted demand of the new product.

The information on the **Model Summary** tab represents the overall prediction, irrespective of the cycle ID. The information on the **Profile Series Model** tab represents the percentage of the predicted value of the new product for different cycles. The **Cycle Series Model** tab shows the actual prediction for each cycle. The upper control limit and lower control limit are also displayed in each graph.

3 (Optional) Clear the check box that is next to the product that is an outlier to remove it from the list of surrogate products.

Note: Whenever you select or remove any product from the list of the surrogate products, click **Refresh** to update the graphs.

4 Repeat steps 2 and 3 to select a model that is the most suitable to your needs.

5 Click **OK**.

SAS Forecast Analyst Workbench applies the selected model to the surrogate products and generates the predicted demand values for the new product. The state of the new product forecast project changes from **Modeled** to **Forecasted**.

If you specified to adjust for seasonality when you selected the candidate products, SAS Forecast Analyst Workbench readjusts the predicted demand of the new product for seasonality.

Reviewing the Forecast

About Reviewing the Forecast

You can review the predicted demand value of the new product and use your business judgment to override the value in order to make it the final forecast. This step predicts the new product series by using the predictions that are associated with the surrogate products. You can explore the forecast of the new product in the profile series and in a cycle series.

After you explore the forecasts, you might decide to override the statistical predictions. For example, you can override the forecasts for the profile series, the total quantity, or the cycle series. After you apply judgment, you can graphically explore statistical forecasts and judgmental overrides to better understand the impact of your changes. For example, you might explore the impact of overrides within the context of the statistical forecasts (predictions and confidence limits). If you are not satisfied with the results of this step, you can go back to the previous step and select a different model.

Demand Summary Table

The demand summary table contains the following columns:

■ Prediction

predicted demand is the sum of the KPI for the entire cycle series

■ Upper Control Limit (UCL)

upper control limit for the predicted demand

■ Lower Control Limit (LCL)

lower control limit for the predicted demand

■ Standard Error

standard error of prediction

■ Override

a text box where you can provide your judgment of demand

You can enter a value in the Override column of the table to override the total demand manually. When you override the total demand, SAS Forecast Analyst Workbench changes the predicted demand values of all cycles on the **Cycle Series** tab but retains the percentage of all cycles on the **Profile Series** tab.

Cycle Series Tab

The **Cycle Series** tab displays the predicted demand values of the new product for all cycles.

The x-axis displays the cycles index, and the y-axis displays the predicted demand values. The **Cycle Series** tab displays the upper control limit, lower control limit, predicted demand value, and final forecast values, in different colors.

The **Cycle Series** tab also displays the demand values in tabular format. You can enter a new demand value in the cell of any cycle to override it manually. When you override the demand value on the **Cycle Series** tab, SAS Forecast Analyst Workbench changes the total predicted demand in the Demand Summary table and the percentage of all cycles on the **Profile Series** tab.

Profile Series Tab

The **Profile Series** tab displays the predicted demand values of the new product, as a percentage, for all cycles.

The x-axis displays the cycle index, and the y-axis displays the predicted demand as a percentage. The **Profile Series** tab also displays the upper control limit, lower control limit, predicted demand value, and final forecast values, in the different colors.

The **Profile Series** tab also displays the demand values, as a percentage, in a tabular format. You can enter a new percentage value in the cell of any cycle to override its demand value manually. The predicted demand is shown up to four decimal points.

When you override the demand value on the **Profile Series** tab, SAS Forecast Analyst Workbench changes the predicted demand values of all cycles on the **Cycle Series** tab and the percentage of all cycles on the **Profile Series** tab. SAS Forecast Analyst Workbench retains the total predicted demand value.

Review the Forecast

You can review and override the predicted demand value of the new product to make it the final forecast. The new product forecast project must be in the **Forecasted** state.

To review the forecast:

1 In the New Products workspace, click the NPF Projects category and double-click a project. The New Product Forecast Project view appears.

2 On the **Cycle Series** tab and the **Profile Series** tab, review the predicted demand values.

3 To override the demand values, enter a new value on the **Cycle Series** tab, on the **Profile Series** tab, or in the demand summary table, and press Enter.

   Note: You cannot enter negative values.

4 (Optional) If you are not satisfied with the override values, click **Reset**. SAS Forecast Analyst Workbench resets the demand values to the original values.

5 (Optional) Repeat steps 2 through 4 to perform different scenarios.

6 After you are satisfied with the demand values, click **Close**.

SAS Forecast Analyst Workbench changes the predicted demand values for the final forecast values. The state of the new product forecast project changes to **NPF completed**. Now, you can assign this project to a forecast.

Assigning New Product Forecast Projects to a Forecast

Overview of Assigning New Product Forecast Projects to a Forecast

You can assign the new product forecast project to a forecast if the following conditions are true:

- the forecast and the new product forecast project contain the same KPI

- when you created the forecast, you selected PRODUCT at the forecast-leaf-level node on the **Reorganize Hierarchy** page

- if a node of another dimension that is beneath the PRODUCT is selected as the forecast-leaf-level node, then the leaf-level hierarchical values of the other dimensions that are selected in the forecast must be also be present in the new product forecast project

For example, suppose City, which is beneath PRODUCT, is selected as forecast-leaf-level node of the forecast. In such case, the Detroit and Tokyo that are a part of the forecast must also be present in the new product forecast project in order to assign the new product forecast project to that forecast.

You can assign the new product forecast project to multiple forecasts.

When you assign the new product forecast project to a forecast and a mismatch in the periodicity occurs, SAS Forecast Analyst Workbench automatically performs the conversion of the new product forecast project demand according to the forecast periodicity values. In other words, even if the forecast is at a more granular periodicity, new product forecasts can be accommodated in the forecast.

For example, if the periodicity of the new product forecast project is weekly but the forecast periodicity is monthly, SAS Forecast Analyst Workbench converts the weekly values of the new product forecast project to monthly values to fit them in the forecast.

When you assign the new product forecast project to a forecast, the Model Management view displays the forecasted values of the new product.

When you assign the new product forecast project to a forecast that already contains forecasted values for the new product, SAS Forecast Analyst Workbench does not override the forecast values that were generated by the new product forecasting process.

When you assign the new product forecast project to a forecast that contains forecasted values for the new product that were generated by SAS Forecast Studio, SAS Forecast Analyst Workbench overwrites those values with the values that were generated by the new product forecasting process.

When you assign a new product forecast project whose horizon end date is a later date than the horizon end date of the forecast, SAS Forecast Analyst Workbench extends the horizon end date for the forecast with the values from new product forecast project.

After the new product time series contains sufficient historical data, SAS Forecast Analyst Workbench no longer uses the forecast values that are generated by the new product forecasting process. When SAS Forecast Analyst Workbench contains sufficient historical data for the new product, SAS Forecast Analyst Workbench treats the new product as a regular product and generates the forecasts.

Assign a New Product Forecast Project to a Forecast

The following prerequisites apply:

■ You must have permission to assign a new product forecast project to a forecast. For more information, contact your system administrator.

■ The new product forecast project must be in either the **NPF completed** or **Forecasted** state.

■ The forecast must be in either the **Forecasted** or **Accepted** state.

To assign a new product forecast project to a forecast:

1   In the New Products workspace, click the NPF Projects category and select a project.

2   Click 📋. The Assign to Forecasts window displays a list of forecasts that have the same KPI.

   Note: The list of forecasts does not include forecasts to which you have already assigned this new product forecast project.

3   Select a forecast.

   > **TIP** Press and hold the Ctrl key to select multiple forecasts.

4   Click **OK**.

Note: After you assign the new product forecast project to a forecast, you should refresh that forecast immediately.

After you click **OK**, SAS Forecast Analyst Workbench starts integrating the data of the new product forecasting project with a forecast and changes the status of the forecast to **Obtaining NPF data**. After the data of a new product forecasting project is integrated completely with a forecast, the status of the forecast becomes **Forecasted**.

After you assign a new product forecasting project to a forecast, the status of the new product forecasting project remains the same. In other words, the status of the new product forecasting project remains either **Forecasted** or **NPF Completed** after you assign it to a forecast.

Delete a New Product Forecast Project

If you delete a new product forecast project that is assigned to a forecast, the forecast continues to use the forecast values that the new product forecasting process generated for the new product.

The following prerequisites apply:

■   You must have permission to delete a new product forecast project. For more information, contact you system administrator.

■   The new product forecast project must not be in the **Ready for NPF** state or in a state that is in progress.

To delete a new product forecast project:

1   In the New Products workspace, select a project and click 🗑.

   Note: You cannot delete multiple projects simultaneously.

2   In the confirmation window, click **Yes**.

The selected new product forecast project and its data are removed from SAS Forecast Analyst Workbench.

Statuses of a New Product Forecast Project

The following table describes that statuses that a new product forecast project can be in.

Table 14.2   *Statuses of New Product Forecasting Projects*

Status	Description
Ready for NPF	The new product forecast project has been created. You can double-click the project to open it and perform additional tasks.
Data population in progress	The new product forecast project is being created, and SAS Forecast Analyst Workbench is calculating the data.
Error in data population	An error occurred in calculating the data for the new product forecasting project.
Data population completed	The candidate products have been defined. The relationships between the new product and the dimensions of the forecast have also been defined.
Clustering in progress	SAS Forecast Analyst Workbench is creating clusters based on the settings that you defined when you created the new product forecasting project.
Clustered	The candidate products have been selected and clusters have been created.
Error in clustering	An error occurred when the clusters were created.
Modeling in progress	The surrogate products are being selected.
Modeled	The surrogate products have been selected.
Error in modeling	An error occurred when the surrogate products were selected.
Forecasting in progress	The statistical model is being applied to the surrogate products, and the predicted demand values are being generated.
Forecasted	The statistical model has been applied to the surrogate products, and predicted demand values have been generated.
Error in forecasting	An error occurred in applying the model and generating the predicted demand values.
NPF completed	The predicted values of the new product have been reviewed and finalized.

Status	Description
Deleting NPF project	The new product forecasting project is being deleted.
Error in deleting NPF project	An error occurred in deleting the new product forecasting project.

Part 6

Performing Collaboration

15

Introduction to Collaboration

What is Collaboration?

The collaboration process can include the following activities:

- the planner can publish the statistical baseline forecast for all products in the product hierarchy

- based on the statistical baseline forecast, stakeholders can add domain knowledge to improve the quality of an unconstrained demand forecast

- the planner and reviewers can examine the inputs that the stakeholders provide, resulting in the final unconstrained consensus demand forecast

The collaboration process is a structured workflow that consists of the following tasks:

1. create a plan

2. configure analysis variables

3. initiate the collaboration process

4. create templates to obtain inputs

5. publish the form sets to stakeholders

6. obtain inputs from various stakeholders within a specified time

7. review and mutually achieve a consensus on the inputs that were provided by the stakeholders

SAS Forecast Analyst Workbench integrates with SAS Financial Management to perform collaboration.

Collaboration Workflow

SAS Forecast Analyst Workbench uses the following systematic workflow for collaboration.

1 Create the plan. You can create the plan either from a single forecast or by merging multiple forecasts. Select the forecasts after you consider their KPIs and dimensions to create a plan that satisfies your business goal.

   For more information about creating a plan, see "Create a Plan" on page 123.

2 Open the Collaboration Flow view and configure the analysis variables. An analysis variable is a numeric variable that is used to calculate statistics.

   For more information about configuring analysis variables, see "Configure Analysis Variables" on page 135.

3 Initiate the collaboration process. When you initiate this process, plan-specific dimension hierarchy data and fact data are loaded into SAS Financial Management. You can open SAS Financial Management and check whether the cycles and models have been created for the specific plan. The state of the plan becomes **Process initiated**.

   For more information about initiating the collaboration process, see "Initiate the Collaboration " on page 136.

4 Open SAS Financial Management Studio and design form sets. Each form set contains a separate template that helps you obtain inputs from different stakeholders.

   For more information about creating templates, see "Create Form Sets and Form Templates" on page 137.

5 Click **Create Form Sets** in the Collaboration Flow view. Then, refresh the view in order to view a list of form sets that you created in SAS Financial Management.

6 Select a form set from the list of forms sets that you created, and publish it. After the form is published, notifications are sent to all the defined stakeholders.

   For more information about publishing templates, see "Publish Form Sets" on page 138.

7 After you obtain inputs from all stakeholders, review the inputs and mutually achieve a consensus to complete the collaboration. When you complete the process, the values are displayed in the Demand Explore view. The state of the plan becomes **Plan closed**.

   For more information about completing the collaboration process, see "Complete the Collaboration Process" on page 139.

8 (Optional) Initialize the collaboration to repeat steps 2 through 5. Initialize the collaboration process when you want to repeat it. You can repeat the collaboration process to reiterate it for the same period or for the next planning period. You repeat the collaboration process to improve the quality of the unconstrained demand forecast. You can continue this iterative collaboration process until you achieve a high level of confidence and trust in the unconstrained demand forecast.

   For more information about initializing the collaboration process, see "Initialize the Collaboration Process" on page 140.

When the collaboration license is not purchased, you can perform the following tasks in the Collaboration category of the Forecast Plans workspace:

- create a plan in order to merge multiple forecasts

  For more information, see "Create a Plan" on page 123.

- edit a plan in order to update the plan details

  For more information, see "Edit a Plan" on page 126.

- delete a plan that is no longer required

  For more information, see "Delete a Plan" on page 127.

- refresh a plan to obtain the latest data from the forecasts

  For more information, see "Refresh a Plan" on page 128.

- open a plan in the Explore Demand view to explore its demand

  For more information, see Chapter 18, "Exploring Demand," on page 143.

16

Managing Plans

Create a Plan

Create a plan that you can use to perform the collaboration. A plan contains the following information:

■ forecasts that you want to include

■ dimensions and the hierarchy for collaboration

■ settings of form sets for SAS Financial Management

■ future and past period settings

The following prerequisites apply:

■ You must have permission to create a plan. For more information, contact you administrator.

■ You must have permission to include the forecasts that you want to include in the plan.

■ The forecasts that you want to include in the plan must be in the **Forecasted** state or the **Accepted** state.

To create a plan:

1 In the Forecast Plans workspace, click the **Collaboration** category. The Collaboration category appears.

2 Click ![icon]. The **New Plan** page appears.

3 Enter information into the following fields on the **New Plan** page.

Table 16.1 *Fields on the New Plan Page*

Field	Description
Name	Enter a name for the plan.
	Note: This field is required. The plan name must be unique and must be a valid SAS name. For more information about SAS naming conventions, see *SAS Language Reference: Concepts*.
Description	Enter a short description for the plan.
Select reference forecast	Select a forecast that you want to use as a reference forecast for performing collaboration.
	Note: SAS Forecast Analyst Workbench displays forecasts that are in the **Forecasted** state and the **Accepted** state in the **Select reference forecast** list.
	Note: The **Select reference forecast** list displays forecasts that are created by you and forecasts that are shared with you by another user.
Forecasts to be included	
Available items	Select the forecasts and click ➡. The selected forecasts appear in the **Selected items** section.
	Note: SAS Forecast Analyst Workbench displays the forecasts that share the same dimensions as that of the forecast that is selected in the **Select reference forecast** list.
Selected items	Displays the forecasts that you selected. To remove a forecast, click ⬅.
	Click ⬇ or ⬆ to select the priority of the forecast.
	If the selected forecasts share the data for the same time series, then SAS Forecast Analyst Workbench selects the data according to the priority of the forecast that you selected. The data of the forecast that is in the higher position in the hierarchy is considered for the plan.
	For example, suppose you selected forecast A and forecast B. Forecast A had the horizon as January 2012 to June 2012. Forecast B had the horizon as July 2011 to March 2012. Now, forecasts A and B share the same forecast data for products X, Y, and Z for January through March 2012. In this case, SAS Forecast Analyst Workbench considers the data of forecast B since forecast B was selected in the higher position as that of forecast A in the **Selected items** list.
Hierarchy Settings	
Dimension	Select a dimension from the list to specify the hierarchy settings. SAS Forecast Analyst Workbench displays a list of all dimensions that were a part of the selected forecasts.

Field	Description
Dimension hierarchy	Select the hierarchy that suits your business requirement for the selected dimension. You can choose a different hierarchy than the hierarchy that was selected in the forecasts.
	For example, the forecasts contain category, sub-category, and product name in the hierarchy. However, to get a broad idea of demand and to perform collaboration, you can choose segment, class, and category.
	Note: If you are using the alternate hierarchy for collaboration, ensure that the lowest granularity of the alternate hierarchy is the same as that of the default hierarchy. For example, suppose the default hierarchy is PRODUCT and the alternate hierarchy is ITEM. In such a case, when you want to use the ITEM hierarchy for collaboration, ensure that the leaf-level node for the ITEM hierarchy is SKU, which is same as that of the PRODUCT hierarchy.
Aggregation level	Select an aggregation level that suits your business requirement for the selected dimension hierarchy. You can select an aggregation level up to which you want to perform collaboration. SAS Forecast Analyst Workbench aggregates the data on the selected aggregation level. You can view the data that is present for all levels above the aggregation level in the Explore Demand view. You cannot view the data for the hierarchies that are below the selected aggregation level hierarchy in the Explore Demand view.
Form Settings	
Keep forms always in open state	Select **Yes** to keep the form sets always in the **Open** state in SAS Financial Management.
	By keeping the form sets in the **Open** state, stakeholders can continue to provide inputs on the baseline forecasts even after the collaboration is ended. Planners can extract the inputs that stakeholders have provided. Planners and stakeholders can continue providing inputs until the plan is closed.
	If you choose not to keep the form sets in the **Open** state, stakeholders can provide inputs on the baseline forecasts only in a single cycle of the collaboration.
	Note: After the collaboration is completed and the plan status is **Plan closed**, you can use the values in the forms to perform analysis in SAS Visual Analytics. For more information, see *SAS Forecast Analyst Workbench: Administrator's Guide*.
Time Settings	
Define future and past periods	Select this check box to define the planning horizon and to see the historical demand. The periodicity of the future period and the past period depend on the aggregation level that you selected for the TIME dimension.
	Clear this check box to perform collaboration on all the data that is available for the selected forecasts.

Field	Description
Future periods you want to include	Enter the number of periods for which you want to perform collaboration. SAS Forecast Analyst Workbench considers the period that starts from the reference date that is specified on the GL_PLANNING_DATE parameter. For more information about the GL_PLANNING_DATE parameter, see *SAS Forecast Analyst Workbench: Administrator's Guide*. **Note:** This text box is available only when you select the **Define future and past periods** check box.
Past periods you want to include	Enter the number of periods that the collaboration process should consider. SAS Forecast Analyst Workbench considers past periods up to the reference date that is specified on the GL_PLANNING_DATE parameter. For more information about the GL_PLANNING_DATE parameter, see *SAS Forecast Analyst Workbench: Administrator's Guide*. **Note:** This text box is available only when you select the **Define future and past periods** check box.

4   Click **OK** to save the plan.

After the plan is created, you can start performing collaboration on it. For more information about performing collaboration, see Chapter 17, "Performing Collaboration," on page 133.

The plan shows actual and predicted values for all forecasts. When the predicted values change, the plan shows the latest predicted values for those time series. The predicted values change when you make changes in the time series (such as if you add a successor, or you add a phase-in or phase-out relationship). You can explore the demand values of all forecasts that are a part of the plan in the Explore Demand view.

Edit a Plan

You can edit the following information for a plan:

- forecasts that are included in the plan

- whether the forms should be kept in the **Open** state in SAS Financial Management

- past and future periods of data to be included in the plan

  You can edit the past and future periods when the status of the plan is **Created** and **Data unavailable**. You cannot edit the past and future periods for plans that are in other statuses.

The following prerequisites apply:

- You must have permission to edit a plan.

- The plan must be in one of the following statuses: **Created**, **Error: In create**, **Initialized**, **Plan closed**, or **Data unavailable**.

- The reference forecasts that are a part of the selected plan must be in the **Forecasted** or **Accepted** state.

■ You must have created the plan that you want to edit.

To edit a plan:

1 In the Collaboration category of the Forecast Plans workspace, select a plan, and click ![icon]. The **Edit Plan** pane appears.

2 Modify the required information.

   You can edit the forecasts, form settings, and time settings. For more information about these fields, see Table 16.1 on page 124.

3 Click **OK**.

While you are editing a plan, even if you remove one or more referenced forecasts, the content of the removed forecast is still available in the Explore Demand view.

When you edit a plan that is in either the **Created** state or the **Initialized** state (here, the **Initialized** state refers to the state that comes before initiating the first collaboration cycle on the plan), SAS Forecast Analyst Workbench displays the data for the latest time series.

When you edit a plan that is in either the **Plan closed** state or the **Initialized** state (here, the **Initialized** state refers to the state that follows the **Plan closed** state if you are working on that closed plan again), SAS Forecast Analyst Workbench displays the data of the existing time series and data for any new time series.

The following table describes the statuses of the plan after you edit it.

Table 16.2   Plan Status before and after Editing

Status before editing	Status after editing
Created	Created
Error: In create	■ Created, if the collaboration is yet to be performed on the plan ■ Initialized, if the collaboration has been performed on the plan
Data unavailable	Created, if the data is found
Initialized	Initialized
Plan closed	Initialized

Delete a Plan

To delete a plan, the following prerequisites apply:

■ You must have permission to delete a plan.

■ The plan must be in one of the following statuses: **Created**, **Error: In create**, **Plan closed**, or **Data unavailable**.

■ You must have created the plan that you want to delete.

To delete a plan:

1 In the Collaboration category of the Forecast Plans workspace, select the plan and click 🗑.

2 In the confirmation window, click **OK**.

After you delete a plan, the plan is removed, and all data (including any data that was created for SAS Financial Management) is deleted from the database.

Refresh a Plan

A plan initially contains one or more forecasts that are in the **Forecasted** state or the **Accepted** state. When the forecasts are refreshed or are included in a batch run, SAS Forecast Analyst Workbench considers any new data that has been added to the forecasts and generates the predicted values. If the forecast is a part of the plan, you can refresh a plan in order to obtain the latest data from the forecasts. By refreshing a plan, you ensure that you are working on the latest data.

When you refresh a plan, SAS Forecast Analyst Workbench shows the latest values for the existing time series and for any new time series.

The following prerequisites apply:

■ The plan must be in one of the following statuses: **Created**, **Data unavailable**, **Initialized**, **Plan closed**, or **Error: In refresh** state.

■ The forecasts that are a part of the plan must be in either the **Forecasted** state or the **Accepted** state.

■ You must have created the plan that you want to refresh.

To refresh a plan:

■ In the Collaboration category of the Forecast Plans workspace, select a plan, and click 🔄.

The following table describes the statuses of the plan after you refresh it.

Table 16.3   Plan Status Before and After Refreshing

Status Before Refreshing	Status After Refreshing
Created	Created
Data unavailable	■ Created, if the collaboration is not yet performed on the plan ■ Initialized, if the collaboration has been performed on the plan
Initialized	Initialized

Status Before Refreshing	Status After Refreshing
Plan closed	Initialized
Error: In refresh	- Created, if the collaboration is not yet performed on the plan - Initialized, if the collaboration has been performed on the plan

Statuses of a Plan

The following table describes the statuses of a plan.

Table 16.4   Plan Status and Description

Status	Description
Creating	SAS Forecast Analyst Workbench is in the process of creating the plan for collaboration, based on the information that you selected.
Created	The plan is created and is ready for performing collaboration.
Error: In create plan	An error occurred while the plan was being created or edited.
Initialized	The analysis variables are configured for the plan, and it is ready for collaboration process.
Process initiated	The collaboration process has been initiated on the plan. During the process, SAS Forecast Analyst Workbench starts loading data into SAS Financial Management.
Dimension data loaded	The data for the dimensions that are selected in the plan has been loaded into the solution data mart (SDM) of SAS Financial Management.
Cycle created	The cycle has been created for the plan in SAS Financial Management.
Model created	The models have been created for the plan in SAS Financial Management.
Fact data loaded	The fact data has been loaded for the plan to SAS Financial Management.
Phase created	A phase, which contains the form sets, has been created in SAS Financial Management.
Error: In loading dimension data	An error occurred in loading the dimension data for the plan.

Status	Description
Error: In create cycle	An error occurred while creating the cycle in SAS Financial Management.
Error: In create model	An error occurred in creating the model in SAS Financial Management. Ensure that the cycles have been created, and reset the plan to re-initiate the collaboration process.
Error: In loading fact data	An error occurred in loading the fact data in SAS Financial Management. Ensure that the cycle and model are created, and reset the plan to re-initiate the collaboration process.
Error: In create phase	An error occurred in creating the phase. A phase helps you group the form sets. Ensure that the form sets are created properly, and reset the plan to re-initiate the collaboration process.
Template unavailable	The form set has been created, but no data-entry template has been created for it yet.
Draft created	The form set has been created and a data-entry template has been created for it. The form set can be published at any time.
Publishing form set	SAS Forecast Analyst Workbench is publishing the form sets that you created in order to obtain inputs for collaboration.
Error: In publishing form set	An error occurred in publishing the form sets. Ensure that the form sets are created properly, and then publish the form sets again.
Open for inputs	The forms are open for providing inputs. Stakeholders can open the forms in Microsoft Excel or in the web-based Form Manager, and provide their inputs.
Consolidating inputs	The forms are open and stakeholders are in the process of providing their inputs.
Error: In import data	An error occurred in importing the data from SAS Financial Management to SAS Forecast Analyst Workbench.
Plan closed	The collaboration process is complete. You can now view the collaboration data in the Explore Demand view.
Data unavailable	The data is not available for the selected plan for the specified duration.
Seeding completed	The seeding for the analysis variables is complete.
Error: Seeding failed	An error occurred in seeding the analysis variables.
Deleting	SAS Forecast Analyst Workbench is deleting the plan and its relevant information from SAS Forecast Analyst Workbench and SAS Financial Management.

Status	Description
Error: In delete plan	An error occurred while the plan was being deleted. You can manually delete the form sets, cycles, models, and dimension hierarchies that were created for the plan in SAS Financial Management.
Refreshing data	SAS Forecast Analyst Workbench is refreshing the data for the selected plan for the selected period.
Error: In refreshing data	An error occurred in refreshing the plan data.

17

Performing Collaboration

Overview of Collaboration

In order to perform collaboration on a plan, you must have created the plan. When you create a plan, similar forecasts are merged. For example, forecasts that predict demand across the same geography for the same products but for different horizons can be merged. By merging the forecasts into a single plan, you do not have to perform the collaboration for individual forecasts. This helps you save time, and you get a broad view on which to perform the collaboration. For more information about how to create a plan, see "Create a Plan" on page 123.

After you create the plan, you perform the collaboration process in the Collaboration Flow view.

Understanding the Collaboration Flow View

Overview of the Collaboration Flow View

The Collaboration Flow view contains the following sections:

- **Workflow** section
- **Form Details** section
- **Details** pane

The title bar of the Collaboration Flow view shows the name of the plan that you are currently working on.

Open the Collaboration Flow View

To open the Collaboration Flow view:

- In the Collaboration category of the Forecast Plans workspace, select a plan, and click ![icon]. The Collaboration Flow view appears.

  Note: Depending on the license that your organization has purchased, you can perform collaboration planning by clicking the ![icon] button.

Workflow Section

The workflow section of the Collaboration Flow view displays the steps that need to be completed for the collaboration process. The steps of the process are indicated by rectangular boxes. You can click a box to work on that step. When a step is completed, ![icon] appears at the bottom of the process step. If a step is incomplete, ![icon] appears at the bottom of the process step. The process step also shows the status of that step.

Click ![icon] on the toolbar to initialize the collaboration process.

Form Details Section

The **Form Details** section contains a list of forms that are created for collaboration. The **Form Details** section displays the following details about each form:

- name of the form set
- name of the form
- status of the form (for example, ready or submitted)
- date by which the form needs to be submitted

Click ![icon] on the toolbar to refresh the **Form Details** section.

Details Pane

The **Details** pane displays the following information:

- name of the plan that is used for collaboration
- planning cycle
- date on which the collaboration process started
- status of the collaboration (for example, planning in progress, phased out)

Configure Analysis Variables

To start the collaboration process, you must configure the analysis variables. An analysis variable is a numeric variable that is used to calculate statistics. For example, you might want to use the actual demand values for analysis. You can use the default analysis variables to observe their values and provide inputs. By default, SAS Forecast Analyst Workbench provides the following analysis variables for you to use: Actual, Predicted, FM Override, and Final. In addition to the default analysis variables, you can also use custom variables (for example, scenario analysis and other seeded analysis variables) for analysis. For example, you might want to use a variable to analyze the productivity of employees. For more information about seeding and seeded analysis variables, see *SAS Forecast Analyst Workbench: Administrator's Guide*.

The following prerequisites apply:

- The ETL jobs must be executed before you configure the analysis variables. For more information about executing ETL jobs, contact your system administrator.
- You must have permission to configure the analysis variables.

To configure the analysis variables:

1 In the Collaboration category of the Forecast Plans workspace, select a plan and click . The Collaboration Flow view appears.

2 Click the **Configure Analysis Variables** process box. The Select Variables window appears.

3 Enter information in each field. The following table describes each field.

Table 17.1 *Fields in the Select Variables Window*

Field	Description
Variables	Select the analysis variables. You can select the following analysis variables: ■ **Actual**: Contains the historical data for the selected historical period. ■ **Predicted**: Contains the forecasted data for the selected future period. ■ **Final**: Contains the final data of collaboration. 　**Note:** Select the **Final** analysis variable so that reviewers or planners can provide collaboration values by using this analysis variable. ■ **FM Override**: Contains the overridden data. 　**Note:** Select the **FM Override** analysis variable so that stakeholders can provide their inputs by using this analysis variable. **Note:** SAS Forecast Analyst Workbench loads the values of all analysis variables that you selected to the default stakeholder in the form set. For the rest of the stakeholders, only override values are loaded in the form set.
Load Condition	The **Load Condition** field specifies the type of data that you want to load into SAS Financial Management. For example, select **Seeding Predicted** to load the data only for the seeded analysis variables.
Extract Condition	The **Extract Condition** field specifies the type of data that you want to extract from SAS Financial Management.

4   Click **OK**.

The selected analysis variables are used to perform the collaboration.

Initiate the Collaboration

When you initiate the collaboration process, plan-specific dimension data, hierarchy data, and fact data are loaded into SAS Financial Management. Phases, models, and cycles are also created in SAS Financial Management. You can open SAS Financial Management and check whether cycles and models have been created.

When you initiate the collaboration process for a plan, you must ensure that the following items are created in SAS Financial Management:

■ the cycle is created with the set of default dimensions and plan-specific dimensions.

■ the model is created with plan-specific hierarchies.

■ the period is created as per the plan-specific time period. The start period and the end period directly affect the visibility of plan data in templates.

Note: You cannot initiate collaboration on multiple plans simultaneously.

The following prerequisites apply:

■ SAS Financial Management must be installed.

■ You must have permission to initiate collaboration. For more information, contact your administrator.

■ You must have configured the analysis variables.

To initiate the collaboration:

1 In the Collaboration category of the Forecast Plans workspace, select a plan and click ⬛. The Collaboration Flow view appears.

2 Click the **Initiate Collaboration Planning** process box.

3 In the confirmation window, click **Yes**.

SAS Forecast Analyst Workbench starts loading the plan-specific dimension data, hierarchy data, and fact values to SAS Financial Management. The status field of the **Details** pane shows the following statuses:

1 Process initiated

2 Dimension hierarchy data loaded

3 Cycle created

4 Model created

5 Fact data loaded

6 Phase created

After the data is loaded in SAS Financial Management, the **Details** pane displays the **Template not present** status. You can now create the templates in order to obtain inputs.

Create Form Sets and Form Templates

After you initiate the collaboration process, you must create form sets in SAS Financial Management in order to obtain inputs from all relevant stakeholders. A form is a document that is used for data-entry purposes. A form set is a collection of forms that can be sent through a data-entry and approval process. You can also create a workflow that the forms must follow. For example, after a sales professional submits a form, it might go next to a sales manager for review and approval, then to the sales manager's manager, and on to successive reviewers.

When you create a form set, you select a target hierarchy. The forms are distributed to the members of the target hierarchy. The collaboration works best when you select the stakeholder dimension to create target hierarchy for SAS Forecast Analyst Workbench. You can select which members of the target hierarchy the forms should be distributed to. Every form set contains a deadline (a due date and time), which applies to each of its forms.

You perform the following tasks in SAS Financial Management:

■ create a form set

  The form set that you create can contain multiple forms. The number of forms equals the number of members that you selected in the target

hierarchy. The parameters that you define when you create the form set are used to prepare the template.

Note: When you are creating a form set in SAS Financial Management, ensure that the name of the form set is alphanumeric.

■ define a form template

You can create different templates for different members within your hierarchy. For example, you can create a form template for sales and marketing professionals to use for providing their input for collaboration. You can create another template for sales and marketing managers to use.

Note: When the GL_FM_FACT_LOAD_SOURCE_IND parameter is set to 1, SAS Financial Management makes some adjustments to the data while you are creating templates. Therefore, select SOURCE dimension in the template as a slicer or as a column. For more information about the GL_FM_FACT_LOAD_SOURCE_IND parameter, see *SAS Forecast Analyst Workbench: Administrator's Guide*.

■ edit the form set properties, as required

You can edit the properties of individual forms or multiple forms, as required. For example, you might want to assign additional reviewers to a financial form, or you might want to select different members for the target hierarchy.

You can use the following rules and guidelines to create form sets:

■ Select the **Stakeholder** dimension hierarchy to create the form sets.

■ Select the **FM Override** analysis variable so that stakeholders can provide their inputs by using this analysis variable.

■ Select the **Final** analysis variable so that reviewers or planners can provide collaboration values by using this analysis variable.

■ Ensure that the form is created for the current date and for the required duration in the model properties.

■ Ensure that you select only those dimensions that the stakeholders are authorized to work on.

To create form sets:

1 In the Collaboration category of the Forecast Plans workspace, select a plan and click ![icon]. The Collaboration Flow view appears.

2 Click the **Create Form Sets** process box.

3 In SAS Financial Management, create the form sets.

For more information about creating form sets and editing form-set properties, see *SAS Financial Management: User's Guide*.

4 In the Collaboration Flow view, click ![icon].

Publish Form Sets

After you create form sets and edit the properties of the form sets, you then publish the form set. When you create the forms, they are in the **Draft** state.

When you publish the forms, notifications are sent to the relevant stakeholders, and the state of the forms changes to **Ready**.

The following prerequisites apply:

■ You must have permission to publish the form sets. For more information, contact your system administrator.

■ You must have created the form sets.

■ Ensure that a template is created for the form set prior to publishing the form sets.

To publish the form set:

1 In the Collaboration category of the Forecast Plans workspace, select a plan and click . The Collaboration Flow view appears.

2 Select a form, and click the **Publish Forms** process box.

> **TIP** Press and hold Ctrl key to select multiple forms.

3 In the confirmation window, click **Yes**.

The selected forms are published and notifications are sent to the relevant stakeholders. The **Details** pane displays the **Planning in progress** status.

Providing Input for Collaboration

When you publish the forms, notifications are sent to all stakeholders that are associated with the published forms. The stakeholders can use the notifications to view the statistical baseline forecast that was created for all the products in the product hierarchy. The stakeholders can use the statistical baseline forecast as a foundation and can add domain knowledge to improve the quality of the unconstrained demand forecast.

When a stakeholder provides input and submits the form, the status of the form changes from **Ready** to **Submitted**. You can click the **Refresh form details** button to view the current status of all forms. After all the stakeholders provide their inputs, the status of the forms changes from **Ready** to **Submitted**, and a tick mark appears at the bottom of the process box.

Complete the Collaboration Process

After all stakeholders have provided the inputs for planning, the planner and reviewer can review these inputs. The planner and the reviewer can achieve a mutual agreement on the estimated demand values, and they can provide these values by using the analysis variable.

The following prerequisites apply:

■ You must have permission to complete the collaboration process. For more information, contact your system administrator.

■ You must have completed all previous steps.

To complete the collaboration process:

1   In the Collaboration category of the Forecast Plans workspace, select a plan, and click [icon]. The Collaboration Flow view appears.

2   Click the **Complete Collaboration Planning** process box. The **Details** pane displays the **Plan closed** status. The collaboration data that is generated in SAS Financial Management is loaded into SAS Forecast Analyst Workbench by using the analysis variables that you selected to extract the data.

If you did not choose to keep the forms in the Open state when you created the plan, all the forms that were submitted by different stakeholders are locked after the collaboration process is complete. Stakeholders cannot provide inputs or change their input when the form is locked.

If you have chosen to keep the forms in the Open state, stakeholders can continue to provide their inputs.

After the data is completely loaded into SAS Forecast Analyst Workbench, you can view and explore the actual, predicted, and final values in the Explore Demand view.

Initialize the Collaboration Process

You can initialize the collaboration process to repeat all the steps that are involved in collaboration. You can initialize the process to repeat the cycle for the same period or to run the cycle for the next planning period. You can initialize the collaboration process during any step of the process.

If you initialize the values at any time before the collaboration process is complete, all information except the analysis variables that you have configured is reset.

The following prerequisites apply:

■   You must have permission to initialize the collaboration process. For more information, contact your system administrator.

■   The plan must not be in the following statuses: **Creating**, **Created**, **Error: In create**, **Initialized**, **Deleting**, or **Error: In delete plan**.

To initialize the collaboration:

1   In the Collaboration category of the Forecast Plans workspace, select a plan and click [icon]. The Collaboration Flow view appears.

2   In the **Workflow** section of the Collaboration Flow view, click [icon].

   Note: Do not initialize the collaboration process if that process is already in progress. You can initialize the collaboration process when the initiate collaboration process step is not yet started or the initiate collaboration process step is finished.

The collaboration process is initialized. The only information that is retained are the analysis variables that you configured. Now, you can initiate the process again in order to obtain inputs from the stakeholders. If you initialize the collaboration process in order to obtain inputs for a new period, you must specify the new period in SAS Financial Management for the form sets.

Part 7

Analyzing Forecasts

18

Exploring Demand

Overview of the Explore Demand View

Use the Explore Demand view to perform the following tasks:

- drill down and explore historical demand, current demand, future demand, and collaborated demand values

- highlight the demand values that are not within the tolerance limit

You can drill down into the demand of the analysis variables in the dimensions and hierarchies that you are interested in. You can select any level of the hierarchy in order to view its demand values.

The information that you obtain from the Explore Demand view can help you get better insight into demand signals. It can also help you understand how the demand is shaped.

For example, suppose your organization manufactures cell phones. As a Territory Manager, you want to view the demand signals for cell phones in your territory. In this scenario, you select product, customer, and location dimensions to explore the demand. You can drill down and view how much demand a customer in your territory is generating for a particular model of cell phone.

The values for a time series in the Explore Demand view might be different from those in the Model Management view. The values are calculated using the analytical procedures in the Model Management view, but in the Explore Demand view, the values are calculated based on mathematical aggregation and disaggregation.

Components of the Explore Demand View

The Explore Demand view consists of the following components: the **Configuration Filter** pane, the **Demand Summary** table, the **Summary** tab, and the **Drill Path** tab.

Configuration Filter Pane

Overview of the Configuration Filter Pane

In the **Configuration Filter** pane, you define the display options, KPI, time, and dimensions. The options that you see in the **Configuration Filter** pane depend on the plan that you selected and the status of that plan.

Display Options Section

Perform the following tasks in the **Display Options** section:

- select the analysis variables for which you want to explore demand. For example, select **Actual** to explore the historical demand for your products.

- compare the demand values with another analysis variable. For example, compare the actual demand with the predicted demand.

- specify the tolerance limit in order to observe the variations in how the demand is shaped with respect to the compared variable. The demand values that are not within the tolerance limit are highlighted in red.

- select the dimensions for which you want to explore demand. For example, select the Product and Store Location dimensions to explore their demand.

  The dimensions that you do not select are used to filter the data and do not appear in the Demand Summary table. For example, if Product, Location, and Customer are the three available dimensions and you select only Product and Location, you can use the third dimension as a filter. You can also choose the order in which the demand should be displayed in the Demand Summary table.

KPI Section

Select the key performance indicator (KPI) for which you want to explore the demand. If you merged forecasts that have different KPIs, you can select the KPI of your choice to explore the demand.

For example, if two forecasts with Financial and Operational KPIs are merged to create a plan, you can select the Operational KPI to explore the demand for the plan.

Time Section

You define the period for which you want to explore demand in the **Time** section. For example, you can define a past period for which you want to view the actual demand.

The **Level** list in the **Time** section displays the hierarchy that you selected when you created the plan. You can select a periodicity in order to explore the demand in the **Level** list. For example, select **QTR** in the **Level** list to explore the demand for a quarterly period.

After you select the level, you must define the date range for which you want to explore the demand. Select the start and end date of the period for which you want to explore the demand.

Dimensions Section

The **Configuration Filter** pane lists all dimensions and their hierarchies that are selected in the **Display Options** area in separate sections. For example, if you selected Product, Location, and Customer dimensions in the **Displays Options** area, the **Configuration Filter** pane lists three separate components for each dimension.

You can select the appropriate level and then its value to explore the demand. For example, in the Location dimension, you could select the level Country and the value USA in order to explore the demand for USA.

Note: Press Ctrl and select multiple values for the dimension that you are using as a filter.

Demand Summary Table

The Demand Summary table displays the demand for the dimensions and time that you select.

You can drill down or filter the demand in the hierarchy by clicking different values for the dimensions. As you click different values, the Demand Summary table displays the respective demand values. You can explore the demand for a dimension value until a hyperlink is available for it.

The Demand Summary table displays the current value of the demand in bold and the demand values that are not within the selected tolerance limit in red.

Summary Tab

The **Summary** tab displays the demand values for the row that you selected in the Demand Summary table. The **Summary** tab is displayed and enables you to compare the demand values for all the analysis variables even though you are exploring the demand for only one analysis variable.

You can use the following views to view the demand values:

■ use the Table view to compare the analysis variable values side by side.

■ use the Graph view to select the analysis variables in order to display their demand values in graphical form. You can select a maximum of 12 analysis variables to compare.

■ use the Divided view to view the demand values in a combination of tabular form and graphical form.

Drill Path Tab

The **Drill Path** tab displays the navigation path of the demand exploration. The navigation path contains the nodes and its dimensions that you selected while you were exploring the demand. You can click any row to go back to any previous step of the **Drill Path** tab.

Explore Demand

You can drill down and explore demand for your analysis variables in any direction. When you are exploring the demand, the Explore Demand view displays the data for the hierarchies that you selected when you created the plan. The data for the hierarchies that are below the selected aggregation level hierarchy is not displayed in the Explore Demand view.

If the plan status is **Created** and you select the required analysis variables, the Explore Demand view shows the actual and predicted values of the forecasts. If the plan status is **Plan closed** and you select the required analysis variables, the Explore Demand view shows the actual, predicted, and collaborated values.

The Explore Demand view does not display the collaboration values for a newly added time period under the following conditions:

■ the forecast has been edited and some time series have been removed

■ the plan status was Plan Closed and it has been refreshed so that the updated values of the forecast appear in the plan

■ collaboration is being performed on the plan again

The Explore Demand view does not display the aggregate values of the start period and end period of the horizon and historical periods correctly when the periodicity of the forecasts and the periodicity of the plan are different. For example, the periodicity of the forecast is day and the periodicity of the plan is week.

SAS Forecast Analyst Workbench displays the latest data in the Explore Demand view when you edit the plan in the **Created** or **Initialized** state. However, when you edit the plan in any state other than **Created** or **Initialized**, the data of the removed time series is also shown in the Explore Demand view.

The following prerequisite applies:

■ The plan must not be in any in progress state or error state.

To explore demand:

1 In the Collaboration category of the Forecast Plans workspace, double-click a plan. The Explore Demand view appears.

2 In the **Display Options** section of the **Configuration Filter** pane, specify the following display parameters.

Table 18.1   *Fields in the Display Options Section*

Field	Description
Select analysis variable	Select an analysis variable for which you want to explore demand.
	The list of analysis variables depends on the status of the plan and the analysis variables that you selected to extract the data from. If you are exploring the demand for a plan that is in the **Created** state, only the **Actual** variable is available. If you are exploring the demand for a plan that is in the **Plan closed** state, the **Actual** and **Predicted** variables are available.
Allow conditional highlighting	If you select this check box, all the demand values that are not within the tolerance limit are highlighted in red. The demand value that is in bold indicates the demand for the current period.
	This check box is available only when the selected plan contains more than one analysis variable.
Compare with	Select the variable from the list with which you want to compare the demand. For example, if you selected **Actual** in the **Select analysis variable** list and **Predicted** in the **Compare with** list, then you can compare the actual demand values with the predicted demand values.
	This list is available only when you select the **Allow conditional highlighting** check box.
Tolerance limit	Enter the tolerance limit (as a percentage) in order to observe variations in your demand shaping with respect to the compared variable. The demand values that are not within the tolerance limit are highlighted in red.
	This box is available only when you select the **Allow conditional highlighting** check box.
Select dimensions	Select the dimensions for which you want to explore demand. The **Select dimensions** list displays all the dimensions that are present in the plan.

3   In the **KPI** section of the **Configuration Filter** pane, specify the following parameters:

   a   In the **Type** list, select the type of the key performance indicator.

   b   In the **KPI** list, select the key performance indicator.

      Note: The **KPI** list shows KPIs of all forecasts that are a part of the plan.

4   In the **Time** section of the **Configuration Filter** pane, specify the following display parameters.

Table 18.2   *Fields in the Time Section*

Field	Description
Level	Select the hierarchy level of the time dimension on which you want to explore the demand.
Range type	Displays the range type.

Field	Description
From	Displays the start date of the range. Click 📅 and select the start date of the range.
To	Displays the end date of the range. Click 📅 and select the end date of the range.

5   Specify the hierarchy levels and their values.

   Note: You can select multiple values of the selected level for a dimension if you have not selected the dimension in the **Select dimensions** list in the **Display Options** section.

6   Click **Apply**.

The demand for the analysis variables that you selected is displayed. You can click **Reset** to reset the options.

19

Performing Scenario Analysis

Introduction to Scenario Analysis

Using scenario analysis, you can shape demand by varying the future values of the factors that influence the demand. The factors that influence the demand can be internal or external and can include price, advertising, sales promotions, marketing events, economic factors, and other factors.

For example, you can use scenario analysis to determine what happens to the demand for gasoline when the price of gasoline increases by 5%.

Scenario analysis helps you complete the following tasks:

■ compare scenarios values to predicted demand values

■ export scenario values for future reference

■ ensure that you have correctly and thoroughly analyzed different scenarios

You can perform the following tasks while you are performing scenario analysis:

■ create a scenario

■ run a scenario

■ save a scenario

■ reset a scenario

■ delete a scenario

■ edit the values of the independent variables

Create a Scenario

You can create a scenario and analyze the impact on forecasted demand after you change the future values of independent variables. For example, you can increase the value of gasoline to check and compare the predicted and scenario values.

You must create the scenario when you are performing the scenario analysis for the first time for the selected time series. After you create the scenario and save it, you do not need to re-create it for analyzing different scenarios until the model of the time series changes. You edit the future values of independent variables for analyzing different scenarios.

The following prerequisites apply:

■ You must have permission to create a scenario. For more information, contact your administrator.

■ The forecast must be in the **Diagnosed** or **Accepted** state.

■ The model that is applied to the time series must contain at least one independent variable.

■ You must be creating the scenario for this time series for the first time. If you attempted to create a scenario for the selected time series but you did not save it, you can create it again.

To create scenario:

1 Double-click a forecast in the Forecasts category of the Forecast Plans workspace. The Model Management view appears.

2 (Optional) On the **Table View** tab of the Model Management view, filter the time series that have independent variables.

For more information about filtering the time series, see "Filter the Time Series" on page 50.

3 Select the time series for which you want to perform the scenario analysis, and click the **Scenario** tab. (You can select only one time series at a time.) The **Scenario** tab displays the list of independent variables that are used in the model for the selected time series, scenario demand, and predicted demand. The scenario demand is the same as that of the forecasted demand before you run the scenario for the first time. Note that if you have already saved the scenario, then the saved scenario demand values are displayed.

4 On the **Scenario** tab of the Model Management view, click ![icon]. The **Scenario** tab displays the values of the independent variables that are used to apply the model and to calculate the scenario demand.

Note: The ![icon] button is available only if you are creating the scenario for the selected time series for the first time or if you did not save the scenario.

Note: By default, the predicted demand and the scenario demand are same.

After you create the scenario, you can edit the future values of the independent variables and run the scenario. When you run the scenario analysis, the values of the scenario demand might change.

For more information about editing values of the independent or input variables, see "Editing the Values of Input Variables" on page 151.

For more information about running the scenario, see "Run a Scenario" on page 152.

Editing the Values of Input Variables

About Editing Input Variables

You can edit the future values of the input variables in the following ways:

- by entering the input value in the input table to specify a single value.

  For example, to run a scenario for the holiday season, you might want to increase the cost of transport charges for December.

- by using the input calculator. You can use this method when you want to specify all new values in the input table.

  For example, if you are running a scenario for a weather forecast report, you might want to decrease the value of rainfall by 8% for the entire year.

After you edit the future values of the independent variables, you must run the scenario in order to analyze the scenario demand.

Edit a Value in the Input Table

To edit the future value of an input variable in the input table:

1 In the input table, double-click a cell for the time period that you want to override.

2 Type the new value and press Enter.

Edit Values By Using the Input Calculator

To edit the values for multiple time periods:

1 While you are running the scenario analysis, select the independent variable whose values you want to change in the input table.

2 Click ▦. The Input Calculator window appears.

3 Enter the appropriate information for the following parameters.

Table 19.1 *Parameters in the Input Calculator Window*

Parameter	Description
Adjustment	Select this option, click + or –, and then enter the adjustment value, as a percentage.
	For example, click +, and then type `10`. The application adds 10% to all values in the time period for the selected independent variable.
Set to value	Select this option and enter the value that you want to assign.
Distribution method	Select the appropriate option to distribute the value that you entered in the **Set to value** field. You can select one of the following options:
	◾ **Assign value to each period**: Select this option to assign the value that you entered to each time period of the selected independent variable.
	◾ **Split evenly**: Select this option to split the value evenly across all time periods of the selected independent variable.
	◾ **Split proportional to current input value**: Select this option to split the value proportionately to the current value of all time periods.
	Note: The options in this list are available only when you select the **Set to value** option.

4   Click **OK**.

Run a Scenario

You must run the scenario in order to obtain the scenario demand and compare it with the predicted demand. You can run the scenario when you have edited the values of the independent variables for the selected time series. You can run the scenario when the status of the forecast is either **Accepted** or **Forecasted**.

To run a scenario:

◾ On the **Scenario** tab of the Model Management view, edit the values of the independent variables, and click 🏃.

By default, the predicted demand and the scenario demand are same. After you run the scenario analysis, the **Scenario** tab updates the scenario, so these values might change. You can change the values of independent variables to generate different scenarios. After you perform the scenario analysis, you can save the scenario for future reference. You can export the scenario values to a .csv file for future reference.

While scenario analysis is being executed, you can perform the following actions:

◾ change the time series

◾ view the generated scenario values in graphical form

■   export and save scenario values to a .csv file

Save a Scenario

Save the scenario values of the selected time series for future reference. You can save the latest values of the scenario only. When you save the scenario values, the predicted values of the forecast do not change.

You must have permission to save the scenario. For more information, contact your administrator.

To save the scenario:

1   On the **Scenario** tab of the Model Management view, run the scenario to perform scenario analysis.

  For more information about running a scenario, see .

2   After you ensure that you have analyzed all the scenarios, click ![save icon].

  Note: The ![save icon] button is available when you have previously run the scenario.

The latest values of the scenario are saved for future use.

Note: If a scenario already exists for a time series and the model for the time series has changed, then delete the scenario and recreate it to obtain the latest scenario values based on the new model.

Reset a Scenario

Reset the scenario to retain the original values of the independent variables. When you reset the scenario, SAS Forecast Analyst Workbench retains the values of the independent variables that were used when you saved the scenario.

You must have permission to reset the scenario. For more information, contact your administrator.

To reset the scenario:

■   On the **Scenario** tab of the Model Management view, click ![reset icon].

  Note: The ![reset icon] button is available when you have edited the values of the input parameters.

Delete a Scenario

Delete the scenario to start doing the scenario analysis from the beginning. When you delete a scenario, the values of independent variables are deleted.

You must have permission to delete the scenario.

To delete a scenario:

1   On the **Scenario** tab of the Model Management view, click 🗑.

2   In the confirmation window, click **Yes**.

View Graphs

Graphs can help you understand the information and analyze trends in a better way. When you are performing scenario analysis, you can view the scenario values in graphical form. In the graphs, you can also see a comparison of the predicated demand values and scenario demand values.

You must have permission to perform scenario analysis and view the graph.

To view the scenario values in graphical form, click 📊. The Scenario Demand Line Chart window displays the predicted demand and scenario demand in graphical form.

Export Scenario Values

When you perform a scenario analysis, the values that you change do not change the generated forecasts. You can export the generated scenario values to a .csv file You can export the values of all independent variables, predicted demand values, and scenario demand values.

You must have permission to perform scenario analysis and to export scenario values. For more information, contact your administrator.

To export the scenario values:

1   Click ↗. The Export Scenario Values window appears.

2   Navigate to the location where you want to save the file.

3   Enter a name for the file, and click **Save**.

The values of all independent variables, predicted demand values, and scenario demand values are exported to a .csv file.

Part 8

Administering SAS Forecast Analyst Workbench

20

Managing the Life Cycle of Products

Introduction to the Product Life Cycle

About the Product Life Cycle

SAS Forecast Analyst Workbench enables you to manage a suite of products, such as substitute and act-like products, and their life cycle information. You can perform the following tasks:

- specify a product's introductory date and its relationships

- specify a product's phase-out date and the relationships from which the product will be phased out

- specify a successor for the product and its details

SAS Forecast Analyst Workbench uses this information to forecast the demand for the products. Planners and forecast analysts can view the information about products in the Model Management view and in the Explore Demand view.

Product Life Cycle Workflow

SAS Forecast Analyst Workbench uses the following systematic workflow for managing the product life cycle.

1   Select a product that you want to manage. You can search for a product from the list of products that belong to you.

    For more information about searching a product, see "Search for Products" on page 158

2   Define a date on which to phase in or introduce the selected product. Also define relationships for the product. You can define multiple phase-in dates for the product. You can also define relationships for each phase-in date.

    For more information about phase-in dates and relationships, see "Defining Phase-in Dates and Relationships for a Product" on page 159.

3   Define a date on which to phase out the product. Also define relationships for the product. You can define multiple phase-out dates based on the relationships. You can also specify to phase out the product temporarily.

    For more information about defining a phase-out date for a product, see "Defining Phase-Out Dates and Relationships for a Product" on page 162.

4   Define a successor product for the selected phase-out date.

    For more information about defining successors, see "Managing Successor Products" on page 166.

Search for Products

By searching for products, you can view only the products that you are interested in. You can search for products by name or by specifying search criteria.

You must have permission to search the products.

To search for products:

1   In the Administration workspace, click **Products**. The Products category appears.

    The Products category appears by default since it is the only category in the Administration workspace.

2   In the Products category, click **Search**. The Search window appears.

3   Enter the search criteria.

    Enter the name of the product in the **Enter product name** field, or expand the dimensions and select the search criteria. For example, expand **Select Customers**, and then select the customers to which the products are assigned.

4   Click **Search**.

SAS Forecast Analyst Workbench displays the products that satisfy the search criteria. If the search result contains more than 1000 products, you must re-enter the search criteria to refine your search. If you do not refine the search criteria, SAS Forecast Analyst Workbench displays the first 1000 products.

Defining Phase-in Dates and Relationships for a Product

Defining Phase-in Dates

Add a Phase-in Date

You define the phase-in date or introduction date of the product with respect to other dimensions. For example, product A is introduced in Germany on September 01. You can define multiple phase-in dates for the product. For example, product A is introduced in Germany on September 01, but in Japan, it is introduced on September 15.

You must have permission to define the phase-in date.

To add a phase-in date:

1   In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

> **TIP** You can search the product from the list of available products. For information about how to search for a product, see "Search for Products" on page 158.

2   In the **Phase-in Details** section, click [icon]. The Select a Phase-in Date window appears.

3   Click [icon], and then select a phase-in date.

4   Click **Save**.

After you save a phase-in date, you define the relationships. For more information about defining a relationship to phase in a product, see Table 20.1 on page 161.

Edit a Phase-in Date

As your business requirements change, you might need to edit the phase-in date. You must have permission to edit a phase-in date.

To edit a phase-in date:

1   In the Product category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

> **TIP** You can search for a product. For information about how to search for a product, see "Search for Products" on page 158.

2 In the **Phase-in Details** section, select a phase-in date and click ⬕. The Select a Phase-in Date window appears.

3 Click 🗓 and select a different phase-in date.

   Note: If the phase-in date has an associated phase-out date, the phase-in date must be earlier than the defined phase-out date.

4 Click **Save**.

The phase-in date is edited.

Delete a Phase-in Date

You can delete a phase-in date and its associated relationships when it is not required. When you delete a phase-in date, the following details are also deleted:

■ phase-in relationships

■ phase-out dates and relationships that are associated with the phase-in date

■ any successors that are defined for the selected phase-in date

■ the phase-in date that is used as a successor's phase-in date for another product

You must have permission to delete a phase-in date.

To delete a phase-in date:

1 In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2 In the **Phase-in Details** section, select a phase-in date and click 🗑.

3 In the confirmation window, click **OK**.

The selected phase-in date and its associated phase-in relationships, phase-out dates and phase-out relationships, and successor products are deleted.

Defining Phase-in Relationships

Add a Phase-in Relationship

Along with the phase-in date, you can also specify relationships for the product or the applicability of the product. For example, Product A is not sold in all countries in the EMEA region. However, it is going to be sold in Canada. You use the dimensions and the product's phase-in date to define the relationships for the product. Every relationship is unique.

The following prerequisites apply:

■ You must have permission to add a phase-in relationship.

■ The relationship must belong to you.

To add a phase-in relationship:

1 In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2 In the **Phase-in Details** section, select a phase-in date and click **View / Edit**. The Define Phase-in Relationships window displays a list of all relationships that are already defined for the phase-in date. The relationships that are defined by using dimensions are in separate columns.

3 Click [icon]. The Add Phase-in Relationships window appears.

4 Enter information in each field. The following table describes the fields.

Table 20.1   Description of Fields in the Add Phase-in Relationships Window

Field	Description
Relationships	This section displays all relationships for this product. Select a dimension in the columns to add that relationship. Click [icon] in each column to select a value. For example, in the Customer column, click [icon] to select a customer.
	You do not need to select all dimensions in order to phase in a relationship. SAS Forecast Analyst Workbench saves all existing relationships for the selected dimensions, and the product is phased in accordingly. For example, suppose there are two dimensions, STORE LOCATION and CUSTOMER. If you select store location S1, then the customers C1, C2, and C3, which are already in a relationship with store location S1, are phased in with the product.
[icon]	Click this button to duplicate the selected relationship. Use this button when you want to add multiple relationships quickly. You can select multiple relationships.
	Note: You must change the value of at least one of the dimensions to make the relationship unique.
[icon] +	Click this button to add a relationship. When you click this button, a row is added in the Add Phase-in Relationships window in which you can select values for each dimension.
	Note: Every relationship must be unique.
[icon] ✕	Click this button to remove the selected relationship.
Act-Like Relationship	Define a relationship in order to use its demand for the selected relationship. SAS Forecast Analyst Workbench uses the demand of the relationship defined in the **Act-Like Relationship** section for the selected relationship.
	For example, suppose store X and store Y are in the same area in Detroit. You can use the demand for product A in store X as the demand for product A that will be introduced in store Y in May 2015.
	Note: The act-like relationship should be different from the phase-in relationship.

Field	Description
Scale Factor	Enter the scale factor for the act-like relationship. Use the scale factor to scale up or scale down the demand of the act-like relationship with respect to the phase-in relationship. The scale factor must be greater than 0 and less than 10.
	For example, suppose product A is already present in city X, and that product is to be introduced in city Y. City X is a metro city, and city Y is a Tier II city, so the demand for product A in city Y will be half as much as that in city X. In this case, you specify `0.5` as the scale factor in order to scale down the demand of product A by 50 %.

5   Click **Save**. The Add Phase-in Relationship window closes, and the relationship is displayed in the Define Phase-in Relationships window.

6   Click **Close** to close the Define Phase-in Relationships window.

Delete a Phase-in Relationship

Delete a relationship for which you do not want to phase in or introduce the product.

You must have permission to delete a relationship.

To delete a relationship:

1   In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2   In the **Phase-in Details** section, select a phase-in date and click **View / Edit**. The Define Phase-in Relationships window appears.

3   Select a relation, and click 🗑.

   Note: You cannot delete a relationship if it is used as a successor relationship for another product.

4   In the confirmation window, click **OK**.

Defining Phase-Out Dates and Relationships for a Product

Defining Phase-Out Dates

Add a Phase-Out Date

You can add a phase-out date for a product when you want to stop selling it. You might want to stop selling the product because the sale of the product is beginning to fall due to competition and changing consumer needs, the next version of the product is being launched, or for other reasons.

SAS Forecast Analyst Workbench enables you to add multiple phase-out dates when you want to stop selling a product gradually in different markets in which it was initially introduced. For example, suppose product A was introduced in Europe in June 2012. That product can be phased out from Scotland in February 2015 and from Austria in May 2015.

You can also temporarily phase-out a product by adding a temporary phase-out date. Use a temporary phase-out date to stop selling the product for a limited period and then re-introduce it later. For example, you might want to phase out the regular pack of chocolates for the upcoming Christmas season because the special pack of chocolates will be available during that time. After the phase-out date is elapsed, the product again becomes active.

You must have permission to select a phase-out date.

To define a phase-out date:

1   In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2   In the **Phase-in Details** section, select a phase-in date. The **Phase-out Details** section displays all the available phase-out dates for the selected phase-in date of the product.

3   Click . The Define Phase-out Date window appears.

4   In the Define Phase-out Date window, enter appropriate information. The following table describes the fields.

Table 20.2   Description of Fields in the Define Phase-Out Date Window

Field	Description
Phase-out Date	Click to specify a phase-out date.
	Note: The phase-out date must be later than the selected phase-in date.
Temporary Phase-out	Select this check box if you want to temporarily phase-out the selected product. In other words, select this check box if you want to stop selling the product for a limited period.
	For example, you might want to phase out the regular pack of chocolates for the upcoming Christmas season because the special pack of chocolates will be available during that time.
	Note: A product that is being temporarily phased out cannot have two successor products.
Rephase-in Date	Click to specify the date on which the selected product should be re-introduced after it was temporarily phased out. For example, after the Christmas season is over, you might want to sell the regular pack of chocolates again, instead of continuing to sell the special pack of chocolates.
	The phase-in date must be later than the selected phase-out date.
	Note: This field is available only when you select **Temporary Phase-out**. When you select **Temporary Phase-out**, this field is required.

5 Click **Save**.

After you save a phase-out date, you define the phase-out relationships. For more information about defining a relationship to phase out a product, see Table 20.4 on page 166.

Edit a Phase-Out Date

As your business requirements change, you might need to edit the phase-out date. You must have permission to edit a phase-out date.

To edit a phase-out date:

1 In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2 In the **Phase-in Details** section, select a phase-in date. The **Phase-out Details** section displays all phase-out dates that are defined for the selected phase-in date.

3 In the **Phase-out Details** section, select a phase-out date, and click ⬒. The Edit Phase-out Date window appears.

4 Edit the phase-out details.

Table 20.3   Description of Fields in the Define Phase-Out Date Window

Field	Description
Phase-out Date	Click ⬚ to specify a phase-out date.
	Note: The phase-out date must be later than the selected phase-in date.
Temporary Phase-out	Select this check box if you want to temporarily phase-out the selected product. In other words, select this check box if you want to stop selling the product for a limited period.
	For example, you might want to phase out the regular pack of chocolates for the upcoming Christmas season because the special pack of chocolates will be available during that time.
	Note: A product that is being temporarily phased out cannot have two successor products.
Rephase-in Date	Click ⬚ to specify the date on which the selected product should be re-introduced after it was temporarily phased out. For example, after the Christmas season is over, you might want to sell the regular pack of chocolates again, instead of continuing to sell the special pack of chocolates.
	The phase-in date must be later than the selected phase-out date.
	Note: This field is available only when you select **Temporary Phase-out**. When you select **Temporary Phase-out**, this field is required.

For more information about the fields in the Edit Phase-out Details window, see Table 20.2 on page 163.

5 Click **Save**.

Delete a Phase-Out Date

Delete a date if you no longer want to phase out the product on that particular date. After you delete a date, the following details that are associated with the selected phase-out date are also deleted:

- relationships that are defined for phasing out the product

- successor products that are associated with the phase-out date

- relationships that are defined for phasing in the successor product

- predecessor product selected for the successor product

You must have permission to delete a phase-out date.

To delete a phase-out date:

1   In the Product category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2   In the **Phase-in Details** section, select a phase-in date. The **Phase-out Details** section displays all the phase-out dates that are associated with the selected phase-in date.

3   Select a phase-out date and click 🗑.

4   In the confirmation window, click **OK**.

Defining Phase-Out Relationships

SAS Forecast Analyst Workbench displays a list of all relationships that you defined for the selected phase-in date. You can select one or more relationships in order to phase out the product.

For example, suppose Product A was introduced in EMEA, Canada, and Latin America in November 2012. You can phase out the product from only EMEA in February 2015. However, you can continue to sell the product in Canada and Latin America.

You use the dimensions and the product's phase-in date to define the relationships. Every relationship is unique.

The following prerequisite applies:

- You must have permission to phase out relationships.

To define phase-out relationships:

1   In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2   In the **Phase-in Details** section, select a phase-in date. The **Phase-out Details** section displays the list of all phase-out dates that are associated with the selected phase-in date.

3   Select a phase-out date, and click **View / Edit**. The Define Phase-out Relationships window appears.

4   Enter appropriate information. The following table describes the fields.

Table 20.4 *Description of Fields in the Define Phase-Out Relationships Window*

Field	Description
Eligible Relationships	Displays a list of all relationships that have been defined for the selected phase-in date. Choose a relationship and click **Select**. The selected relationship is moved from **Eligible Relationships** to **Existing Relationships**.
	By selecting a relationship, you specify that the product is phased out from the selected relationship on the specified date. For example, select California's store X in order for product A to be phased out on 15 November 2015.
	Note: Click **Select All** to phase out the product for multiple relationships.
	Note: Click **Deselect** when you do not want to phase out the product for the selected relationship. After you click **Deselect**, the 🚫 icon appears next to that relationship.
	Note: You can select only relationships that belong to you.
Existing Relationships	Displays a list of all relationships that would be phased out based on your selection. Choose a relationship and click **Remove**. The selected relationship is moved from **Existing Relationships** to **Eligible Relationships**.
	By removing a relationship, you specify that the product is not phased out from that relationship. When you remove a relationship, you cannot use it to phase in a successor product. If the relationship is already used to phase in a successor product, the relationship would be automatically removed from the successor.
	Note: Click **Remove All** to remove all phase-out relationships.
	Note: Click **Deselect** you want to phase out the product for the existing relationship. After you click **Deselect**, the 🚫 icon appears next to that relationship.
	Note: You can remove only relationships that belong to you.

5 Click **Close**.

Managing Successor Products

Select a Successor Product

By selecting a successor product, you specify the product that replaces the original product if the original product becomes unavailable. SAS Forecast Analyst Workbench considers the demand of the successor product with respect to the defined relationships and the phase-in date.

Note: A successor product cannot have two predecessor products that contain temporary phase-out dates.

The following prerequisites apply:

■ You must have permission to select a successor product.

■ The phase-out date must be defined.

To select a successor product:

1   In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2   In the **Phase-in Details** section, select a phase-in date. The **Phase-out Details** section displays the phase-out dates that are associated with the selected phase-in date.

3   In the **Phase-out Details** section, select a phase-out date. The **Successor Details** section displays the successor details that are associated with the selected phase-out date.

4   In the **Successor Details** section, click . The Select Successor Product window displays a list of all successors that are available for the selected product.

5   Enter the appropriate information in each field. The following table describes each field.

Table 20.5   *Fields in the Select Successor Product Window*

Field	Description
Product Name	Displays a list of all products that can act as a successor for the selected product. Click a product to use it as a successor.
	Note: A product cannot act as its own successor. For example, product A cannot be its own successor product.
Phase-in Date	Specify a date that can be used as the successor's phase-in date.
	The phase-in date of the successor product must be later than the phase-out date of the original product. For example, suppose the phase-out date for product A is 01 November 2014. The phase-in date of product B (which is a successor for product A) must be later than 01 November 2014.
	Note: The phase-in date of the successor product must immediately follow the phase-out date of the predecessor product. The rephase-in date of the predecessor product should immediately follow the phase-out date of the successor product.

6   Click **Save**.

After you select a successor product, you define the successor relationships. For more information about defining successor relationships, see step 4 of "Define Successor Relationships" on page 168.

The successor product is defined.

> **TIP** Define the phase-out date of the successor product as a date that is earlier than the rephase-in date of the predecessor product. For example, suppose product A is phasing out on May 31 and is being rephased in on September 01. Product B is the successor for product A. In this case, product B must be phased in after May 31 and be phased out before September 01. You can open the successor product and define a phase-out date for all relationships for which it is used as successor product.

In order to view the successor and predecessor products chaining information in the **Changed Time Series** tab of the Model Management view, ensure that the successor and predecessor products are a part of the forecast.

Define Successor Relationships

SAS Forecast Analyst Workbench displays a list of all relationships from which the product is phased out. Select one or more relationships to introduce the successor. At least one successor product must be defined in order to define successor relationships.

To define the successor relationships:

1   In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2   In the **Phase-in Details** section, select a phase-in date. The **Phase-out Details** section displays a list of all phase-out dates that are associated with the selected phase-in date.

3   In the **Phase-out Details** section, select a phase-out date. The **Successor Details** section displays a list of all successor products that are associated with the selected phase-out date.

   Note: The phase out date of the successor product must be a previous date of the rephase in date of the predecessor product.

4   In the **Successor Details** section, select a successor product, and click **View / Edit**. The Define Successor Details window displays a list of all eligible relationships and existing relationships that are defined for the successor product.

5   On the **Eligible Relationships** tab, choose a relationship and click **Select**.

   Note: The relationships that you see on the **Eligible Relationships** tab depend on the relationships that are defined for the selected phase-out date in the **Phase-out Details** section.

6   In the confirmation window, click **OK**. The selected relationship is moved from **Eligible Relationships** to **Existing Relationships**.

   TIP To remove a relationship, choose a relationship in the **Existing Relationships** tab and click **Remove**. Click **Remove All** to remove all the relationships.

7   (Optional) On the **Existing Relationships** tab, select a relationship and click **Scale Factor**. The Edit Scale Factor window appears.

   Note: After all successors are defined, SAS Forecast Analyst Workbench resets the scale factor equally among the existing successors. Thus, you must define the scale factor again in order to ensure that the demand is scaled appropriately.

8   (Optional) Enter the factor by which you want to scale up or scale down the demand of the relationship, and click **Save**.

SAS Forecast Analyst Workbench uses the demand of the successor product that you specify for the selected relationship in forecasting the demand for the selected product.

For example, if you enter 2, SAS Forecast Analyst Workbench scales up the demand of the successor product by 2 to predict the demand of product A in store X in Indiana.

9   Click **Close**.

Delete a Successor Product

Delete a successor product when it is not required.

To delete a successor product:

1   In the Products category of the Administration workspace, double-click a product. The Product Life Cycle view appears with three sections: **Phase-in Details**, **Phase-out Details**, and **Successor Details**.

2   In the **Phase-in Details** section, select a phase-in date. The **Phase-out Details** section displays a list of all phase-out dates that are associated with the selected phase-in date.

3   In the **Phase-out Details** section, select a phase-out date. The **Successor Details** section displays a list of all successor products that are associated with the selected phase-out date.

4   Select a phase-out date and click 🗑.

5   In the confirmation window, click **OK**.

Managing the Life Cycle for Multiple Products

SAS Forecast Analyst Workbench enables you to select multiple products and manage the phase-in date, phase-out date, and successor products for them simultaneously. You can also work with the relationships for the selected products.

To manage the life cycle for multiple products:

1   In the Products category of the Administration workspace, select multiple products by pressing and holding the Ctrl key, and click 🔍. The Product Life Cycle view displays a list of all selected products.

2   In the Product Life Cycle view, you can perform the following actions:

■   Add a phase-in date, and then define phase-in relationships.

1   Click 📩, and then select **Add phase-in Date**. The Select Phase-in Date window appears.

2   Select the phase-in date.

For more information, see .

3 Click ⟡, and then select **Modify phase-in relationships**. The Define Phase-in Relationships window appears.

4 Enter the appropriate information.

For more information, see .

◼ Add a phase-out date, and then define phase-out relationships.

1 Click ⟡, and then select **Add a phase-out Date**. The Define Phase-out Date window appears.

2 Enter the appropriate information.

For more information, see .

3 Click ⟡, and then select **Modify Phase-out Relationships**. The Define Phase-out Relationships window appears.

4 Enter the appropriate information.

For more information, see .

◼ Add a successor phase-in date, and then define successor relationships.

1 Click ⟡ and then select **Add Successor Phase-in Date**. The Select Successor Product window appears.

2 Enter the appropriate information.

For more information, see .

3 Click ⟡, and then select **Modify Successor Phase-in Relationships**. The Define Successor Details window appears.

4 Enter the appropriate information.

For more information, see .

Part 9

Generating Reports

21

Working with Reports

About Reports

Reports and analysis form the backbone of any business. With SAS Forecast Analyst Workbench, you can generate reports to analyze business information. SAS Forecast Analyst Workbench is tightly integrated with SAS Web Report Studio and SAS Visual Analytics for performing report-related tasks.

In the Reports workspace, you can perform the following tasks:

- view a report

- create a report

- search for a report

- refresh reports

Understanding the Reports Workspace

About the Reports Workspace

In the Reports workspace, you can create and view business reports.

The Reports workspace contains a toolbar, a table that lists all reports, and a **Properties** pane. The table in the Reports workspace displays the following information:

- name of the report

- description of the report

■ date on which the report was created

Toolbar

The toolbar contains the following buttons that you can use to perform frequent tasks.

Button	Description
⬕	Click this button, and then select an option for how you want to create a business report:
	When you select an option, the browser opens SAS Visual Analytics Designer or SAS Web Report Studio (based on the option that you select) in a separate tab.
	For more information about SAS Visual Analytics, see *SAS Visual Analytics: User's Guide*.
	For more information about SAS Web Report Studio, see *SAS Web Report Studio: User's Guide*.
↻	Click this button to refresh the reports that are available in the Reports workspace.

Properties Pane

The **Properties** pane in the Reports workspace contains the properties of the selected report.

You can view the following information for the selected report:

■ name and description of the report

■ name of the application in which the report was created (SAS Web Report Studio or SAS Visual Analytics)

■ location of the report

■ date on which the report was created

■ date on which the report was last modified

View a Report

You can view a report that was created in SAS Visual Analytics in SAS Visual Analytics Viewer. You can view a report that was created in SAS Web Report Studio in that application.

You can edit a report in SAS Visual Analytics if you have the required permission.

To view a report:

■ In the Reports workspace, double-click a report. Alternatively, select a report, and click **Open**.

Create a Report

You can create a report in order to understand and analyze business information. You must have permission to create a report.

To create a report:

1   In the Reports workspace, click , and then select one of the following options:

 ■ **Create Report in SAS Web Report Studio**

 ■ **Create Report in SAS Visual Analytics**

Depending on the option that you select, SAS Web Report Studio or SAS Visual Analytics Designer opens in a new tab in the browser.

2   Specify the report criteria and click **OK**.

For more information about SAS Web Report Studio, see *SAS Web Report Studio: User's Guide*.

For more information about SAS Visual Analytics, see *SAS Visual Analytics: User's Guide*.

Part 10

Appendix

Appendix 1

Performing Multi-Tier Causal Analysis

About Multi-Tier Causal Analysis

Multi-tier causal analysis links a series of quantitative methods together in order to measure the impact of sales and marketing strategies on consumer demand. Then, using the coefficients of the demand model, the analysis executes various what-if scenarios to shape and predict the demand. Finally, demand and supply are linked by using analytics rather than by using just judgment.

In other words, you can forecast the future values of an independent variable and use those values to predict the demand for your products.

Perform Multi-Tier Causal Analysis

When you perform multi-tier causal analysis, the following prerequisites apply:

■ You must identify the independent variable when you are deploying SAS Forecast Analyst Workbench.

■ The planner and the administrator must be familiar with the forecasts and plans.

■ The status of the plan must be either **Created**, **Initialized**, or **Plan closed**.

To perform multi-tier causal analysis:

1 If you are an administrator, complete the following steps:

a Open the table INDEP_VAR_TABLE that is in the CONFIG library. This table is available after you run the faw_0001_generate_config_datamart job. Then select the independent variable that you want to use.

b Run the faw_0002_populate_config_tables job in order to create the KPI_CONFIG table.

For more information, see *SAS Forecast Analyst Workbench: Administrator's Guide*.

c   In the KPI_CONFIG table, add the independent variable as a KPI and enter the other required information.

When you are using the INDEP_TABLE_NM table of a KPI as the KPI_TABLE_NM table for another KPI, you must use the same dimensions that are used by the earlier KPI.

For example, suppose KPI_1 is using PRICE_INDEP_VAR as the INDEP_TABLE_NM table and you are configuring the KPI_2 with PRICE_INDEP_VAR as the KPI_TABLE_NM table. In this case, you must use dim1, dim2, and dim3 as dimensions for KPI_2 that were used by KPI_1.

d   Run the remaining ETL jobs.

2   If you are a planner, complete the following steps:

a   Create a forecast for the independent variable that you added as a KPI.

For more information about creating a forecast, see "Creating a Forecast" on page 21.

You can use other independent variables as causal variables to forecast the values of the selected independent variable.

Note: The forecast must include all the dimensions of the KPI.

> **TIP** Select all the dimensions in the forecast in order to import the data from SAS Financial Management.

b   Run the forecast, predict the future values of the independent variables, and accept the forecast.

c   Create a plan in order to write back the predicted values of the independent variable. While you are creating the plan, select the forecast that you just created for performing multi-tier causal analysis.

For more information about creating a plan, see "Create a Plan" on page 123.

Note: The granularity of the data for the plan must be same as that of the forecast for all dimensions.

d   (Optional) Perform collaboration on the plan.

You can choose to perform collaboration planning on the plan in order to solicit the opinions of various stakeholders regarding the predicted values of the independent variable. After you have received the inputs from all stakeholders, complete the collaboration. The plan status becomes **Plan closed**.

3   If you are an administrator, complete the following steps:

a   Open the following job in the workspace of SAS Data Integration Studio:

```
/Products/SAS Forecast Analyst Workbench/5.2 Jobs/Wave08
(Utilities)/faw_0805_mtca_writeback
```

b Right-click in the empty area of the workspace, and click **Properties**. The **Properties** window appears.

c Click the **Precode and Postcode** tab, and specify the following parameters:

Table A1.1   *Parameter Description*

Parameter	Description
Plan name	Enter the name of the plan that you want to use for performing multi-tier causal analysis.
KPI	Enter the name of the key performance indicator that you used.
Analysis variable	Enter the name of the analysis variable that you used for collaboration
Cutoff date	Enter the date from which you want to use the values of the KPI. SAS Forecast Analyst Workbench loads the data that was collected after the date that you entered.

d Run the faw_0805_mtca_writeback job so that the future values of the independent variable can be used for predicting the demand of the products.

4 If you are a planner, complete the following tasks:

a Create the forecast with the regular KPIs (instead of using the independent variable as a KPI), and then use the predicted values of the independent variables.

b (Optional) Perform scenario analysis on the forecast to analyze various scenarios.

Recommended Reading

Here is the recommended reading list for this title:

- *SAS Forecast Server Procedures 13.2: User's Guide*

- *SAS Forecast Studio 13.2: User's Guide*

- *Demand-Driven Forecasting: A Structured Approach to Forecasting*

- *SAS Forecast Analyst Workbench 5.2: Administrator's Guide, Second Edition*

- *SAS Forecast Analyst Workbench 5.2: Data Reference Guide, Second Edition*

- *SAS Financial Management 5.5: User's Guide*

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