

Oracle® Retail Demand Forecasting Cloud Service

User Guide

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Oracle Retail Demand Forecasting Cloud Service User Guide, Release 15.0.

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- Do you need different information or graphics? If so, where, and in what format?
- Are the examples correct? Do you need more examples?

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Send your comments to us using the electronic mail address: retail-doc_us@oracle.com

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Preface

The Oracle Retail Demand Forecasting Cloud Service User Guide describes the application's user interface and how to navigate through it.

Audience

This document is intended for the users and administrators of Oracle Retail Demand Forecasting Cloud Service. This may include merchandisers, buyers, and business analysts.

Documentation Accessibility

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Related Documents

For more information, see the following documents in the Oracle Retail Demand Forecasting Cloud Service Release 15.0 documentation set:

- *Oracle Retail Demand Forecasting Cloud Service Administration Guide*
- *Oracle Retail Demand Forecasting Cloud Service Implementation Guide*
- *Oracle Retail Demand Forecasting Cloud Service Release Notes*
- *Oracle Retail Demand Forecasting Cloud Service User Guide*
- Oracle Retail Predictive Application Server documentation

Supplemental Documentation

The following document is available through My Oracle Support at the following URL:

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Improved Process for Oracle Retail Documentation Corrections

To more quickly address critical corrections to Oracle Retail documentation content, Oracle Retail documentation may be republished whenever a critical correction is needed. For critical corrections, the republication of an Oracle Retail document may at times not be attached to a numbered software release; instead, the Oracle Retail document will simply be replaced on the Oracle Technology Network Web site.

Oracle Retail documentation is available on the Oracle Technology Network at the following URL:

<http://www.oracle.com/technetwork/documentation/oracle-retail-100266.html>

An updated version of the applicable Oracle Retail document is indicated by Oracle part number, as well as print date (month and year). An updated version uses the same part number, with a higher-numbered suffix. For example, part number E123456-02 is an updated version of a document with part number E123456-01.

If a more recent version of a document is available, that version supersedes all previous versions.

Oracle Retail Documentation on the Oracle Technology Network

Oracle Retail product documentation is available on the following web site:

<http://www.oracle.com/technetwork/documentation/oracle-retail-100266.html>

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Introduction

Oracle Retail Demand Forecasting Cloud Service (RDF Cloud Service) is a statistical and promotional forecasting solution. It uses state-of-the-art modeling techniques to produce high quality forecasts with minimal human intervention. Forecasts produced by the RDF Cloud Service system enhance the retailer's supply-chain planning, allocation, and replenishment processes, enabling a profitable and customer-oriented approach to predicting and meeting product demand.

Today's progressive retail organizations know that store-level demand drives the supply chain. The ability to forecast consumer demand productively and accurately is vital to a retailer's success. The business requirements for consumer responsiveness mandate a forecasting system that more accurately forecasts at the point of sale, handles difficult demand patterns, forecasts promotions and other causal events, processes large numbers of forecasts, and minimizes the cost of human and computer resources.

Forecasting drives the business tasks of planning, replenishment, purchasing, and allocation. As forecasts become more accurate, businesses run more efficiently by buying the right inventory at the right time. This ultimately lowers inventory levels, improves safety stock requirements, improves customer service, and increases the company's profitability.

The competitive nature of business requires that retailers find ways to cut costs and improve profit margins. The accurate forecasting methodologies provided with RDF Cloud Service can provide tremendous benefits to businesses.

A connection from RDF Cloud Service to Oracle Retail's Planning and Optimization suite is built directly into the business process by way of the automatic approvals of forecasts, which may then be fed directly to any Planning and Optimization suite application. This process allows you to accept all or part of a generated sales forecast. Once that decision is made, the remaining business measures may be planned within an Planning and Optimization suite application such as Merchandise Financial Planning (MFP).

Forecasting Challenges and RDF Cloud Service Solutions

A number of challenges affect the ability of organizations to forecast product demand accurately. These challenges include selecting the best forecasting method to account for:

- Level
- Trending
- Seasonal demand

- Spiky demand
- Generating forecasts for items with limited demand histories
- Forecasting demand for new products and locations
- Incorporating the effects of promotions and other event-based challenges on demand
- Accommodating the need of operational systems to have sales predictions at more detailed levels than planning programs provide

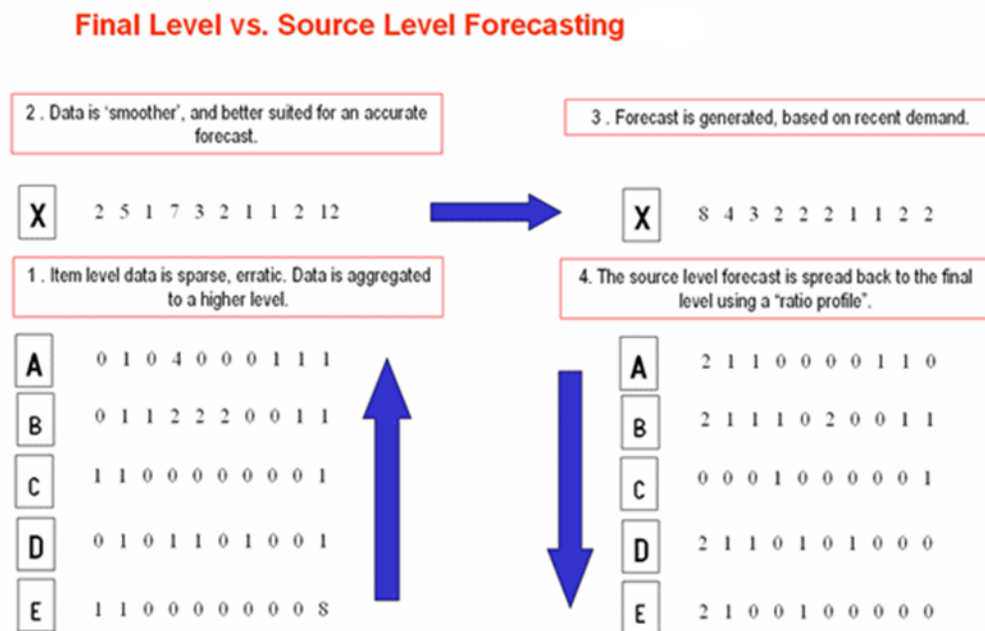
Selecting the Best Forecasting Method

One challenge to accurate forecasting is the selection of the best model to account for level, trending, seasonal, and spiky demand. Oracle Retail's AutoES (Automatic Exponential Smoothing) forecasting method eliminates this complexity.

The AutoES method evaluates multiple forecast models, such as Simple Exponential Smoothing, Holt Exponential Smoothing, Additive and Multiplicative Winters Exponential Smoothing, Croston's Intermittent Demand Model, and Seasonal Regression forecasting to determine the optimal forecast method to use for a given set of data. The accuracy of each forecast and the complexity of the forecast model are evaluated in order to determine the most accurate forecast method. You simply select the AutoES forecast generation method and the system finds the best model.

Overcoming Data Sparsity Through Source Level Forecasting

It is a common misconception in forecasting that forecasts must be directly generated at the lowest levels (final levels) of execution. Problems can arise when historic sales data for these items is too sparse and noisy to identify clear selling patterns. In such cases, generating a reliable forecast requires aggregating the sales data from a final level up to a higher level (source-level) in the hierarchy in which demand patterns can be seen, and then generate a forecast at this source-level. After a forecast is generated at the source-level, the resulting data can be allocated (spread) back down to the lower level, based on the lower level's (final level) relationship to the total. This relationship can then be determined through generating an additional forecast (interim forecast) at the final level. RDF Cloud Service can be set up to dynamically generate a profile based on the interim forecasts. Also, a non-dynamic profile can be generated and approved in Curve to be used as this profile. It is this profile that determines how the source-level forecast is spread down to the final level.

Figure 1–1 Final Level versus Source Level Forecasting

Some high-volume items may possess sufficient sales data for robust forecast calculations directly at the final forecast level. In these cases, forecast data generated at an aggregate level and then spread down to lower levels can be compared to the interim forecasts run directly at the final level. Comparing the two forecasts, each generated at a different hierarchy level, can be an invaluable forecast performance evaluation tool.

Your RDF Cloud Service system may include multiple final forecast levels. Forecast data must appear at a final level for the data to be approved and exported to another system for execution.

Forecasting Demand for New Products and Locations

RDF Cloud Service also forecasts demand for new products and locations for which no sales history exists. You can model a new product's demand behavior based on that of an existing similar product for which you do have a history. Forecasts can be generated for the new product based on the history and demand behavior of the existing one. Likewise, the sales histories of existing store locations can be used as the forecast foundation for new locations in the chain.

Managing Forecasting Results Through Automated Exception Reporting

The RDF Cloud Service end user may be responsible for managing the forecast results for thousands of items, at hundreds of stores, across many weeks at a time. The Oracle Retail Predictive Application Server (RPAS) provides users with an automated exception reporting process (called Alert Management) that indicates to you where a forecast value may lie above or below an established threshold, thereby reducing the level of interaction needed from you.

Alert management is a feature that provides user-defined and user-maintained exception reporting. Through the process of alert management, you define measures that are checked daily to see if any values fall outside of an acceptable range or do not

match a given value. When this happens, an alert is generated to let you know that a measure may need to be examined and possibly amended in a workbook.

The Alert Manager is a dialog box that is displayed automatically when you log on to the system. This dialog provides a list of all identified instances in which a given measure's values fall outside of the defined limits. You may pick an alert from this list and have the system automatically build a workbook containing that alert's measure. In the workbook, you can examine the actual measure values that triggered the alert and make decisions about what needs to be done next.

For more information on the Alert Manager, refer to the *Oracle Retail Predictive Application Server User Guide*.

Incorporating the Effects of Promotions and Other Event-Based Challenges on Demand

Promotions, non-regular holidays, and other causal events create another significant challenge to accurate forecasting. Promotions such as advertised sales and free gifts with purchase might have a significant impact on a product's sales history, as can fluctuating holidays such as Easter.

Using Promotional Forecasting (an optional, add-on module to RDF Cloud Service), promotional models of forecasting can be developed to take these and other factors into account when forecasts are generated. Promotional Forecasting attempts to identify the causes of deviations from the established seasonal profile, quantify these effects, and use the results to predict future sales when conditions in the selling environment is similar. This type of advanced forecasting identifies the behavioral relationship of the variable you want to forecast (sales) to both its own past and explanatory variables such as promotion and advertising.

Suppose that your company has a large promotional event during the Back To School season each year. The exact date of Back To School varies from year to year, as a result, the standard time-series forecasting model often has difficulty representing this effect in the seasonal profile. The Promotional Forecasting module allows you to identify the Back To School season in all years of your sales history, and then define the upcoming Back To School date. By doing so, you can causally forecast the Back To School-related demand pattern shift.

Managing and Forecasting for Floating Events

For some retailers, an RDF Cloud Service implementation with causal forecasting is necessary. Whenever price discount, marketing information (TV, flyer) or space information (front isle) need to be factored in the forecast, causal forecasting is the right tool.

However, in RDF Cloud Service implementations without the causal capability, some floating events still exist. For instance, an increase in sales leading to Easter will happen even if there is no promotion specifically associated with Easter (chocolate bunnies sell more during Easter even though they are not specifically promoted). And because it does not happen in the same time period every year, the Easter spike will appear 'randomly' any time in March or April. The spike is baked in the seasonality of each item/store, making its prediction, timing and magnitude, inaccurate at best.

RDF Cloud Service is able to handle such situations, not only thru its causal capabilities, but also for baseline forecasting.

To do that, a set of events has to be defined. This usually happens at configuration time. Then, a user has to flag the periods where an event was active in the past (history) and in the future (forecast horizon). Once the dates are set up, the effect of the

event is estimated based on past instances, and applied in the forecast horizon if the flag is active.

For the user interaction, that is the managing the periods when events were active, RDF Cloud Service provides the Floating Event Administration workbook. Its single worksheet lists events and you have the ability to flag periods when certain product/location combinations are active during an event.

53 Week Calendar

For the majority of retailers, the business is managed using a calendar (364 days organized into 13 week quarters) that periodically includes an extra 53rd week so that the year end stays in about the same time of the year. It is useful to have some control over how this 53rd week will be managed within the forecasting system's time dimension. Management of this issue causes customers the pain, time and cost of configuring their data every few years that this happens.

The problem described has two implications. The first case is when two years – each with 52 weeks – of historical sales are available, and the retailer needs to forecast for the following year, which has 53 weeks. The second case is when one of the years of historical sales has 52 weeks, and the other has 53 weeks.

The correction for the extra week happens as part of generate, in particular when the baseline is written out. This is necessary, such that all additional effects (promo, price change, demand transference) are layered on top of the baseline.

The information RDF Cloud Service needs to handle a 53rd week is the name of the measure that indicates which week is the extra week. The measure is loaded or populated through user input, and it is stored in the Forecast Administration parameter called **Extra Week Indicator Data Source**. On the same view (Advanced Final and Source Level Parameters) there is also the measure **Extra Week Interpret Method** that indicates how to calculate the forecast value for a week that was flagged as 53rd or extra week.

Forecasting Returns

RDF Cloud Service has the ability to calculate returns based on the unconstrained demand that it generates. The approach is based on the following assumptions:

- All returned items are re-sellable; in other words there is no damage or decomposition.
- Each week, the return is solely based on a previous week's sale, instead of weighting several weeks.

You need to enable the returns forecast generation, as well as input two parameters:

- The percentage of the merchandise that was returned
- The number of periods, t , from when the merchandise was sold until it was returned.

Given this information, the formula for the returns at time period t , is:

$$\text{Returns}(t) = \text{Forecast}(t - t) * \text{percentage}$$

In [Figure 1-2](#), the time shift is specified as 1 and the return rate is 5%. Given the forecast (Fcst), the returns are calculated as:

$$\text{Returns}(t) = \text{Forecast}(t-1) * 5\%$$

Note: The returns for the first week of forecast are based on the latest week of historical sales (HS), since no previous forecast value is available.

Figure 1–2 Calculating Returns

Logic	HS 107	HS 108	Forecast Start	Week 1	Week 2	Week 3	Week 4	Week 5
Fcst/Sls	50	50		50	80	80	100	60
Return = Fcst _{shifted time} * percentage	NA	NA		2.5	2.5	4	4	5

The parameters are set in the [Forecast Administration Workbook](#) and the [Forecast Maintenance Workbook](#). The returns forecast can be viewed in the [Forecast Approval Workbook](#).

Oracle Retail Demand Forecasting Cloud Service Architecture

This section includes these topics:

- [The Oracle Retail Predictive Application Server and RDF Cloud Service](#)
- [Global Domain Versus Simple Domain Environment](#)

The Oracle Retail Predictive Application Server and RDF Cloud Service

The RDF Cloud Service application is a member of the Planning and Optimization suite, including other solutions such as Merchandise Financial Planning, Item Planning, Category Management, and Advance Inventory Planning. The Planning and Optimization suite applications share a common platform called the Oracle Retail Predictive Application Server (RPAS). RDF Cloud Service leverages the versatility, power, and speed of the RPAS engine and user-interface.

These features characterize RPAS:

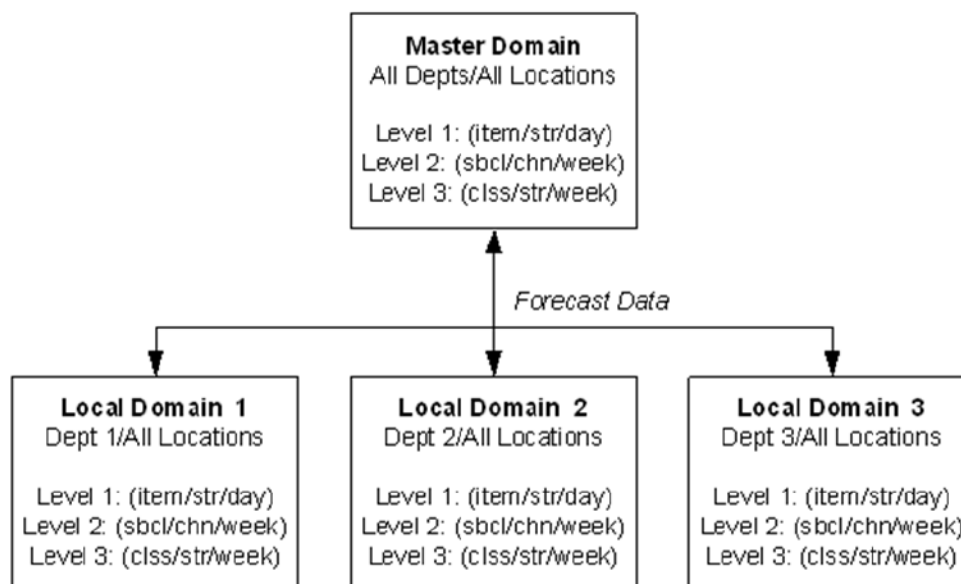
- Multidimensional databases and database components (dimensions, positions, hierarchies)
- Product, location, and calendar hierarchies
- Aggregation and spreading of sales data
- Client-server architecture and master database
- Workbooks and views for displaying and manipulating forecast data
- Wizards for creating and formatting workbooks and views
- Menus, quick menus, and toolbars for working with sales and forecast data
- An automated alert system that provides user-defined and user-maintained exception reporting
- Charting and graphing capabilities

More details about the use of these features can be found in the *Oracle Retail Predictive Application Server User Guide* and online help provided within your RDF Cloud Service solution.

Global Domain Versus Simple Domain Environment

A simple domain environment supports isolated partitions of data. This type of environment does not allow for data to be aggregated across partitions into a single view. Whereas a global domain environment allows for data partitions to exist, however, certain data may be edited and viewed across partitions. Within this structure we refer to data within a partition as the Local domain (or sub-domain) and the view to data across multiple local domains as the Master domain. [Figure 1–3](#) represents a global domain environment:

Figure 1–3 Global Domain versus Simple Domain Environment



Within this structure, batch forecast results across all domains may be viewed within the master domain. This is achieved by passing measures with the same forecast birth date (date/time stamp) to each Local Domain when the batch forecast is generated. It is important to note that this cannot be achieved through the use of the [Run Batch Forecast Workbook](#) wizard. The *Oracle Retail Demand Forecasting Cloud Service Implementation Guide* provides more information on execution of batch forecast processes to support a global domain environment.

The RDF Cloud Service solution in a global domain environment also supports centralized administration and maintenance of forecast parameters in the Master domain. Additional details on the availability and limitations of all of the workbooks in the Master domain environment are provided in the following sections.

Oracle Retail Demand Forecasting Cloud Service Workbook Groups

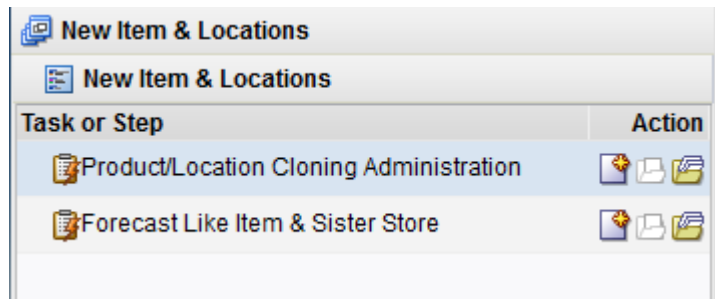
In addition to the standard RPAS Administration and Analysis workbook groups, there are several workbook groups that are associated with the RDF Cloud Service solution which may include: Forecast, Promote, Curve, or any Planning and

Optimization suite application (available modules are based upon licensing agreement).

New Items & Locations

The New Items & Locations module consists of the workbooks and algorithms required to clone or copy history and model a new product's demand after an existing product.

Figure 1–4 New Item & Location Taskflow Pane






























For workbooks and views for this module, refer to [Chapter 4, "New Item & Locations Task"](#)

Historical Demand Preparation

The Historical Demand Preparation module consists of the workbooks used to correct historical data prior to forecast generation when history does not represent general demand patterns. It is meant to automatically make adjustments to the raw POS (Point Of Sales) data so the next demand forecasts do not replicate undesired patterns.

Figure 1–5 Historical Demand Preparation Taskflow Pane

Historical Demand Preparation	
Historical Demand Preparation	
Task or Step	Action
Preprocess Administration	  
Preprocess Admin	  
Out of Stock & Outlier Thresholds	  
Preprocess Parameters	  
Preprocess Review and What-If	  
Preprocess Admin	  
Out of Stock & Outlier Thresholds	  
Preprocess Parameters	  
What-If	  

For workbooks and views for this module, refer to [Chapter 5, "Preprocessing Administration Task"](#) and [Chapter 6, "Source Measure Maintenance Task"](#).

Forecasting Core Process

The Forecasting Core Process module refers to the primary RDF Cloud Service functionality and consists of the workbooks, measures, and forecasting algorithms that are needed to perform time-series forecasting.

Forecasting Core Process includes Curve workbooks and batch algorithms that are necessary for the creation, approval, and application of profiles that may be used to spread source-level forecasts down to final levels as well to generate profiles, which may be used in any RPAS solution. The types of profiles typically used to support forecasting are: store Contribution, Product, and Daily profiles. These profiles may also be used to support Profile-Based Forecasting, however; Curve may be used to generate profiles that are used by other Planning and Optimization suite applications for reasons other than forecasting. Profiles Types include Daily Seasonal, Lifecycle, Size, Hourly, and User-Defined profiles.

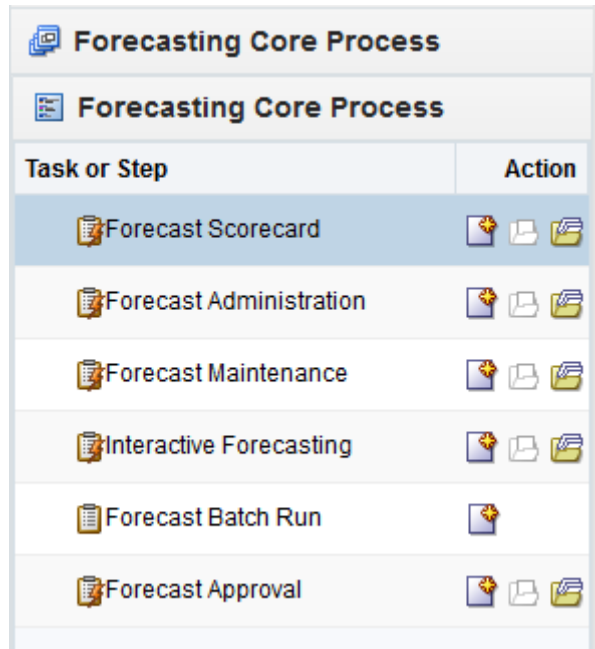
The Forecasting Core Process module also includes the batch forecasting routine and all of its component algorithms.























For more information on the Forecasting Core Process workbooks and views, refer to these chapters:

- [Chapter 7, "Forecast Scorecard Task"](#)

- [Chapter 8, "Forecast Administration Task"](#)
- [Chapter 9, "Forecast Maintenance Task"](#)
- [Chapter 10, "Run Batch Forecast Task"](#)
- [Chapter 11, "Forecast Approval Task"](#)

Figure 1–6 Forecasting Core Process Taskflow Pane


















Task or Step	Action
 Forecast Scorecard	  
 Forecast Administration	  
 Forecast Maintenance	  
 Interactive Forecasting	  
 Forecast Batch Run	
 Forecast Approval	  

Event Planning

The Event Planning module consists of the workbooks and algorithms required to perform promotional forecasting, which uses both past sales data and promotional information (for example, advertisements, holidays) to forecast future demand.

Figure 1–7 Event Planning Taskflow Pane

















Event Planning	
Event Planning	
Task or Step	Action
Promo Planner	  
Promotion Management	  
Promo Effect Maintenance	  
Promo Effectiveness/Results	  
▶ Floating Events Admin	  

For workbooks and views for this module, refer to [Chapter 12, "Promote \(Promotional Forecasting\) Task"](#).

Forecasting Support Process

The Forecasting Support Process module consists of the workbooks that allow you to manage the thresholds used in the batch and workbook alerts included in RDF Cloud Service, as well as to manually delete a forecast.

Figure 1–8 Forecasting Support Process Taskflow Pane

Forecasting Support Process	
Forecasting Support Process	
Task or Step	Action
▲ Alert Thresholds	  
Forecast Alert Params	  
Grouping Management	  
Forecast Delete	
▶ Extra Week Administration	  
▶ Short Life Cycle Maintenance	  

For workbooks and views for this module, refer to these chapters:

- [Chapter 13, "Alert Thresholds Task"](#)
- [Chapter 14, "Grouping Management Task"](#)
- [Chapter 15, "Forecast Delete Task"](#)

- [Chapter 16, "Extra Week Administration Task"](#)

RDF Cloud Service Solution and Business Process Overview

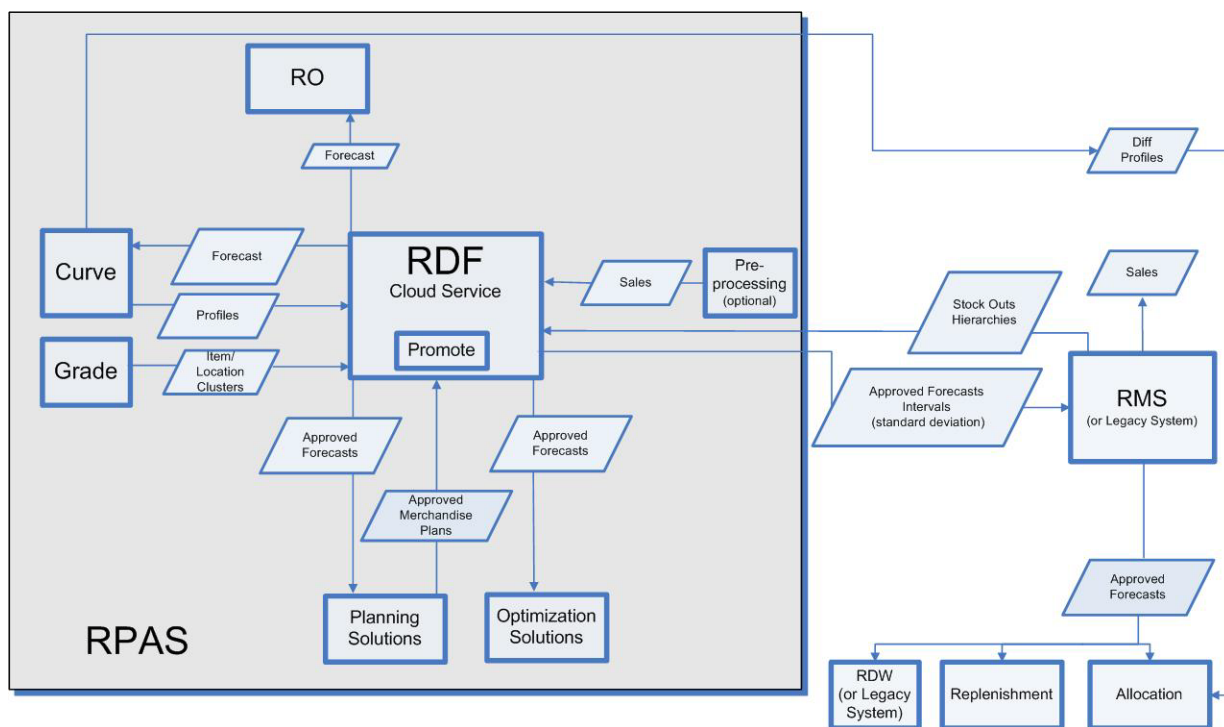
Oracle Retail has designed a forecasting solution separate from replenishment, allocation or planning. In order to provide a single version of the truth, it is crucial to free up your time and supply the tools to focus on the analysis of forecast exceptions, historical data, and different modeling techniques. This empowers you to make better decisions, thus improving overall accuracy and confidence in the forecast downstream.

RDF Cloud Service and the Oracle Retail Enterprise

Within the Oracle Retail Enterprise, Oracle Retail Merchandising System (RMS) supplies RDF Cloud Service with Point-of-Sale (POS) and hierarchy data that is used to create a forecast. Once the forecast is approved, it is exported to RMS in order to calculate a recommended order quantity. Forecasts can also be utilized (no export process required) in any RPAS solution to support merchandise, financial, collaborative, and price planning processes.

[Figure 1-9](#) illustrates an overview of RDF Cloud Service and the Oracle Retail Enterprise.

Figure 1-9 RDF Cloud Service and the Oracle Retail Enterprise



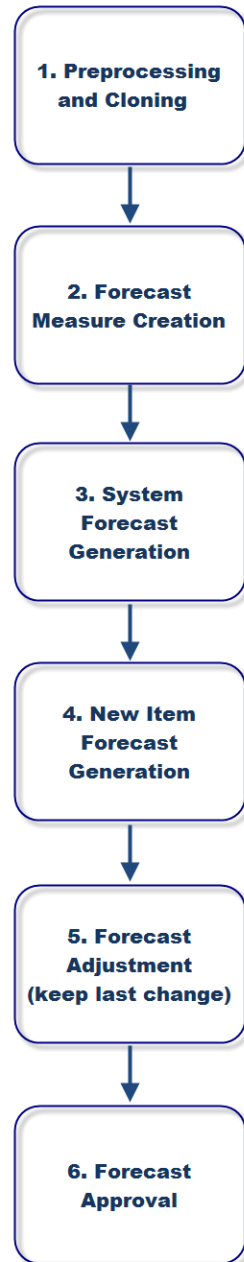
RDF Cloud Service Primary Workflow

There are a number of core super-user/end-user forecasting steps in the RDF Cloud Service workflow that are essential for producing accurate forecasts for the millions of item and location combinations that exist in a domain.

RDF Cloud Service Batch Flow Process

The RDF Cloud Service batch flow process follows six phases as shown in [Figure 1–10](#).

Figure 1–10 *Batch Flow Process in RDF Cloud Service*



Navigation

This chapter provides a brief description of how to get started using RDF Cloud Service on the RPAS Fusion Client. It includes the following sections:

- [Before you Begin](#)
- [Logging into RDF Cloud Service](#)
- [Taskflow Pane](#)
- [Opening a Workbook](#)
- [Deleting a Workbook](#)
- [Permissible File Names](#)
- [Renaming a Workbook](#)
- [Understanding the Workbook Wizard Window](#)
- [Accessing Online Help](#)
- [Logging Out of RDF Cloud Service](#)

Before you Begin

Note: Before you log on to the RPAS Fusion Client, ensure that your system meets the recommended configuration. For more information, refer to the *Oracle Retail Predictive Application Server Installation Guide*.

Once you check the configuration, obtain the following information:

- Uniform Resource Locator, URL – Enter the URL or the Web address of the application in the Web browser to access the application. For example:
`http://<fullyqualifieddomainname>:<port>/aip`
- User name, Password, and Profile Name – Based on the tasks you want to perform, obtain a user account (that includes user name and password) to log on to the application.

Logging into RDF Cloud Service

To log on to the RPAS Fusion Client, follow these steps:

1. Start a supported browser such as IE, Firefox, or Chrome.

2. In the **Address** bar, enter the RPAS Fusion Client URL and press **Enter**. The RPAS Fusion Client Login page opens, as shown in [Figure 2-1](#).

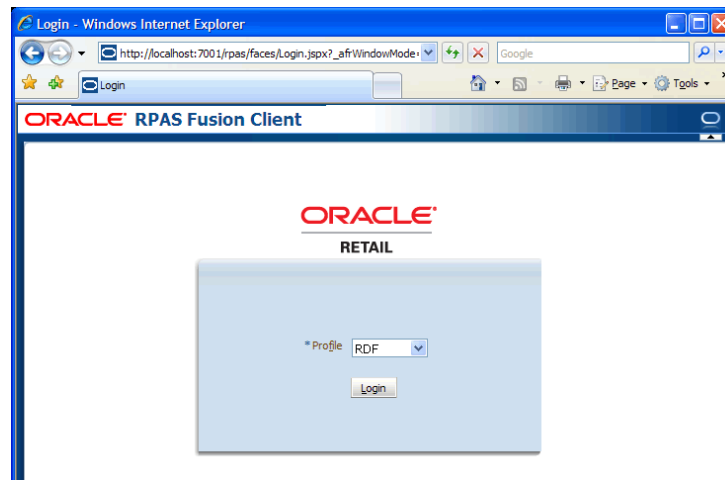
Figure 2-1 RPAS Fusion Client Login Page



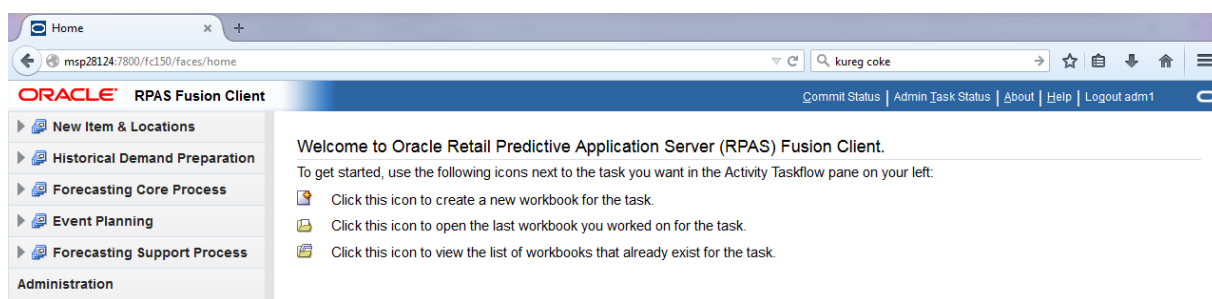
3. On the **Login** page, enter your Username and Password, and select your domain from the **Profile** drop-down list.

Note: If you have accessed the RPAS Fusion Client through a single sign-on environment such as the Oracle Retail Workspace portal, then only the profile field appears on the RPAS Fusion Client login page. Select your domain from the drop-down list, as shown in [Figure 2-2](#).

Figure 2-2 RPAS Fusion Client Login Page, Accessed Through SSO



4. Click **Login**. The window refreshes and the homepage of the RPAS Fusion Client is shown.

Figure 2–3 RPAS Fusion Client Home Page

Taskflow Pane

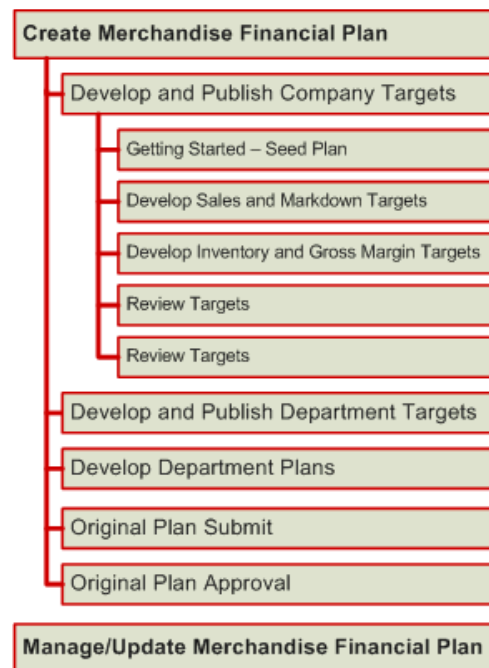
The taskflow pane opens on the left of your window and enables you to easily navigate through the activities in the application. It provides a pre-configured business workflow organized into expandable and collapsible activities, tasks, and steps.

Note: The taskflow pane also opens when you log on to the application.

Each activity consists of more than one task, and each task may consist of one or more steps. In the RPAS Fusion Client, each solution (spanning across multiple workbooks) is represented as a set of activities, tasks, and steps.

Note: The taskflow is configured for your domain during implementation. For more information on this configuration, refer to the *Oracle Retail Predictive Application Server Configuration Tools User Guide*.

Figure 2–4 shows an example of an RPAS solution configured with activities, tasks, and steps:

Figure 2–4 Illustration of Activity, Task, and Step for RPAS Fusion Client Applications

In the RPAS Fusion Client, the workflow shown in [Figure 2–5](#) opens in the following manner:

Figure 2–5 Taskflow Pane

When you are working with a specific step, a left arrow icon appears in the taskflow pane, indicating the current step and your position in the workflow.

The Create New Workbook, Open Latest Workbook, and Show List of Workbooks icons that appear next to each task or step enable you to create new workbooks or open existing workbooks. You can find more information on creating new workbooks and opening existing workbooks in the section [Opening a Workbook](#).

[Figure 2–6](#) illustrates the icons that appear in an RPAS taskflow.

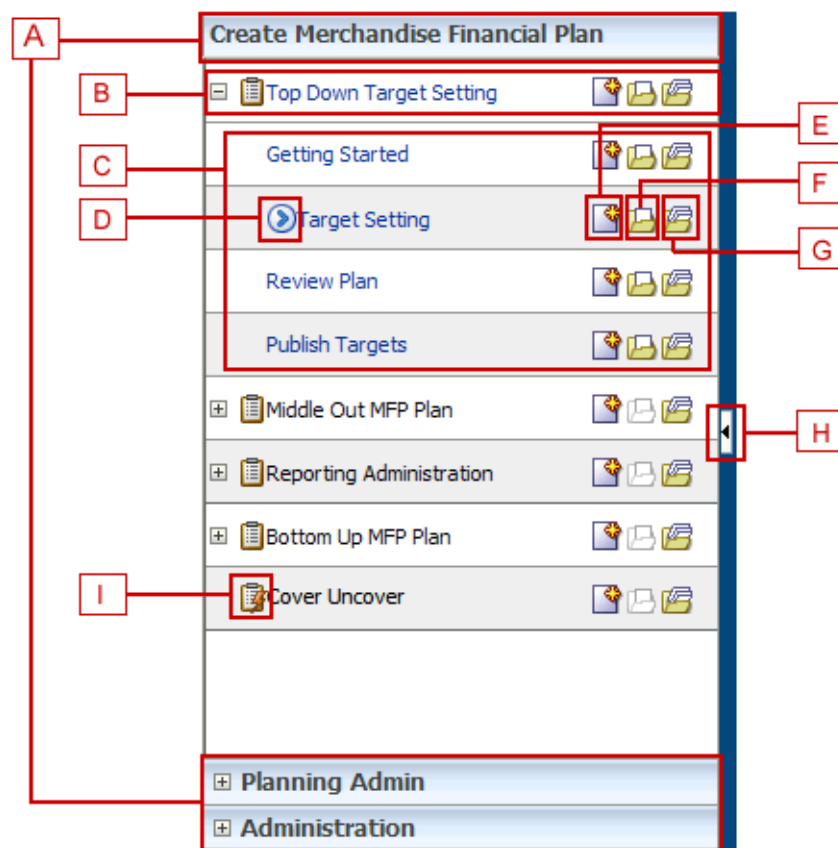
Figure 2–6 Icons in the Taskflow Pane

Table 2–1 describes the icons that appear with all the entries in the taskflow.

Table 2–1 Description of Icons in the Taskflow Pane

Legend	Icon Name	Description
A	Activities	These tabs represent the predefined activities of the application.
B	Tasks	These are individual tasks within an activity. Tasks that have a workbook associated with them display a clipboard icon.
C	Steps	One or more steps make up each task.
D	Current Position Icon	Indicates the current step and your position in the workflow.
E	Create a New Workbook	Click this icon to create a new workbook. The new workbook wizard associated with the relevant task opens.
F	Open the Latest Workbook	Click this icon to view the latest workbook (associated with the relevant task/step) you worked on.

Table 2–1 (Cont.) Description of Icons in the Taskflow Pane

Legend	Icon Name	Description
G	Show List of Workbooks	Click this icon to view a list of all workbooks (associated with the relevant task/step) accessible to you. The Open Workbook window opens with a list of accessible workbooks. If you do not own any workbooks, a message appears allowing you to view all workbooks. In case there are no workbooks associated with the task/step, created by you or by someone else, a message appears that allows you to create a new workbook.
H	Collapse/Restore Icon	Click this icon to collapse or restore the taskflow pane. This allows you to view more content in the Contents area.
I	Dynamic Task	A dynamic task is a task that has been defined in the taskflow file but does not have a workbook associated with it. Dynamic tasks display a clipboard with a lightning bolt icon.

Access Based Visibility

The activity and tasks that appear in the taskflow pane are access-based. Depending upon the security settings, you may not have access to some tasks or activities. Access to a task is defined by whether you have access to the workbook that the task is assigned to.

The access to the workbook is maintained in the Security Administration step. Refer to the *Oracle Retail Predictive Application Server Administration Guide for the Fusion Client* for more information about the Administration activity. If you do not have access to a workbook, then you are not able to build the workbooks for the associated tasks and steps.

Hiding specific tasks or activities based on user access is configurable. In the configuration, a task can be set to either hidden or disabled. If it is hidden and you do not have access to it, then the task is not displayed. If it is disabled and you do not have access, then the task is displayed but the links to access the workbooks are disabled. For more information, refer to the *Oracle Retail Predictive Application Server Configuration Tools User Guide*.

Switching Between Multiple Tasks

When working within multiple steps or tasks, all changes you make in a specific step are maintained when you move to a step in the same task or a different task associated with the same workbook. In this case, you do not need to save your work when you switch between tasks within the same workbook.

If you switch to a task that is associated with a different workbook, you are prompted to save or discard the changes before opening or building a new workbook. To save your changes, use the Save As dialog box.

Opening a Workbook

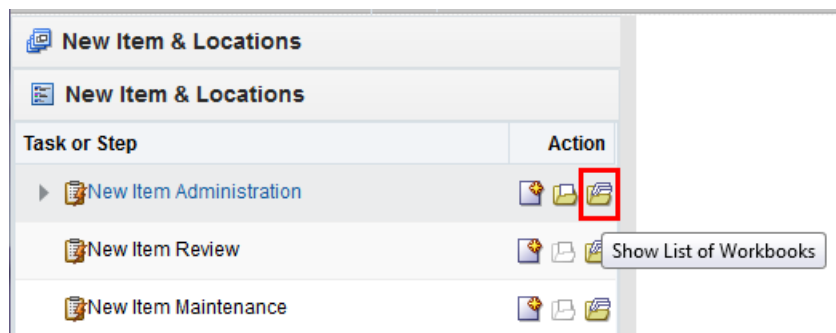
After you log on to the application, a taskflow pane opens that enables you to navigate through the activities and tasks associated with your user account.

Note: This procedure outlines the basic steps for creating a new workbook. For detailed information about building specific RDF Cloud Service workbooks, refer to the specific chapter for that workbook in this guide.

To open a workbook:

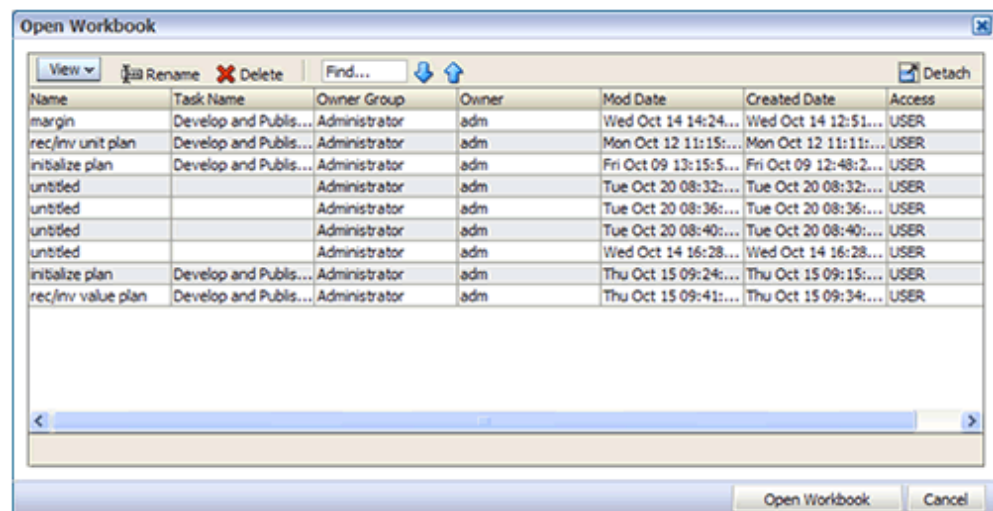
1. On the taskflow pane, click the **Show List of Workbooks** icon next to the task or step you want. For more information on the taskflow pane, refer to the section [Taskflow Pane](#).

Figure 2–7 Show List of Workbooks Icon



The **Open Workbook** window opens.

Figure 2–8 Open Workbook Window



2. Select the workbook you want and click **Open Workbook**.

Deleting a Workbook

From the list of workbooks, you can delete any workbook you have write access to.

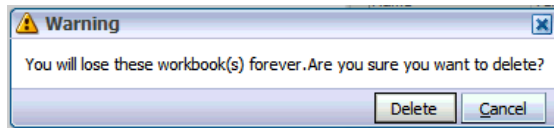
To delete a workbook:

1. On the Open Workbook window, select the workbook you want.

To delete more than one workbook, hold down the **Ctrl** key and select the workbooks you want to delete. Or, you can hold down **Shift** and select a group of workbooks.

2. Click **Delete**. A warning message appears.

Figure 2–9 Delete Warning Message



3. Review the warning message and then click **Delete** to delete the workbooks or click **Cancel** to cancel this operation.

Permissible File Names

When saving a workbook (or saving a copy using the **Save As** command), there are restrictions on the length of the file name and the characters that can be used,

- The file name can be a maximum of 32 characters.
- The filename can contain the following standard characters:
 - a - z
 - A - Z
 - 0 - 9
- The filename can contain the following special characters:
 - .
 - |
 - _
 - -
 - /
 - \$
 - &
 - spaces

Any file name not meeting these conditions results in an error message.

Renaming a Workbook

The new workbook wizard also enables you to rename existing workbooks without affecting the data within the workbook or the other workbook information such as the created date, modified date, formatting information, and so on.

There are a few key points to know about renaming workbooks:

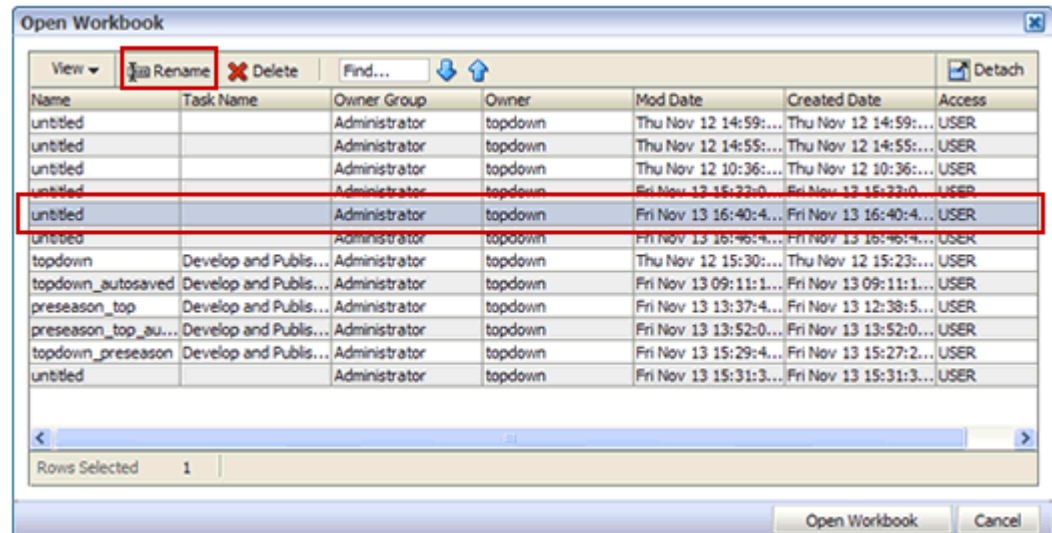
- You can only rename workbooks that you have write access to.
- Workbook names can be no more than 32 characters.
- Workbook names cannot contain double or single quotation marks.

- Workbooks cannot be named *Untitled*. This name is reserved.

To rename a workbook in the new workbook wizard, perform the following steps:

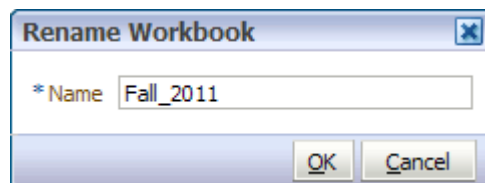
1. Select the workbook you want to rename from the list. When selected, it becomes shaded, as shown in [Figure 2–10](#).
2. Click **Rename**.

Figure 2–10 Renaming a Workbook



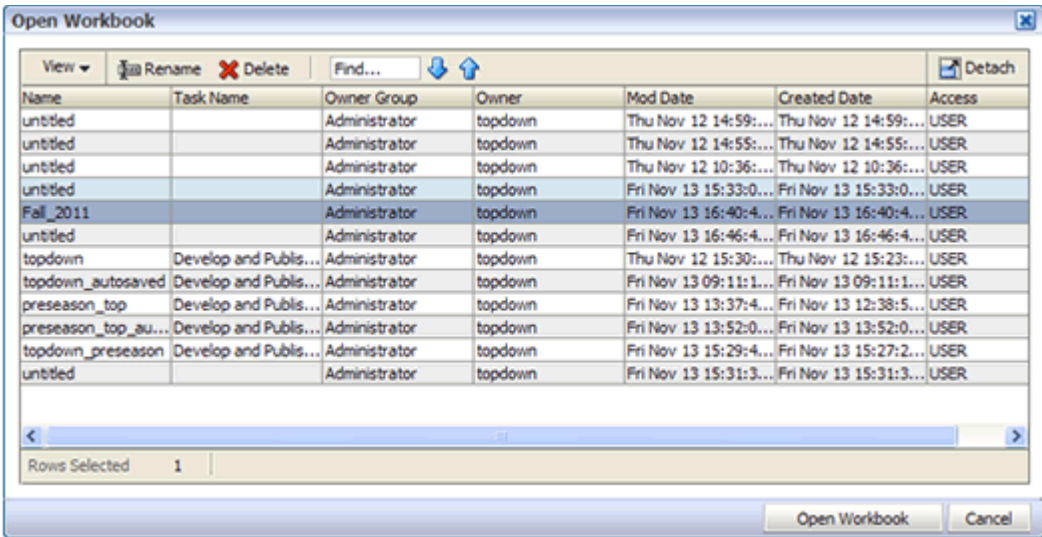
3. The Rename Workbook dialog box appears. Enter the new name of the workbook and click **OK**.

Figure 2–11 Rename Workbook Dialog Box



4. The renamed workbook appears in the workbook list.

Figure 2–12 Renamed Workbook



You can also rename a workbook from the File menu.

Understanding the Workbook Wizard Window

Figure 2–13 highlights the various components of the workbook wizard window.

Figure 2–13 Workbook Wizard

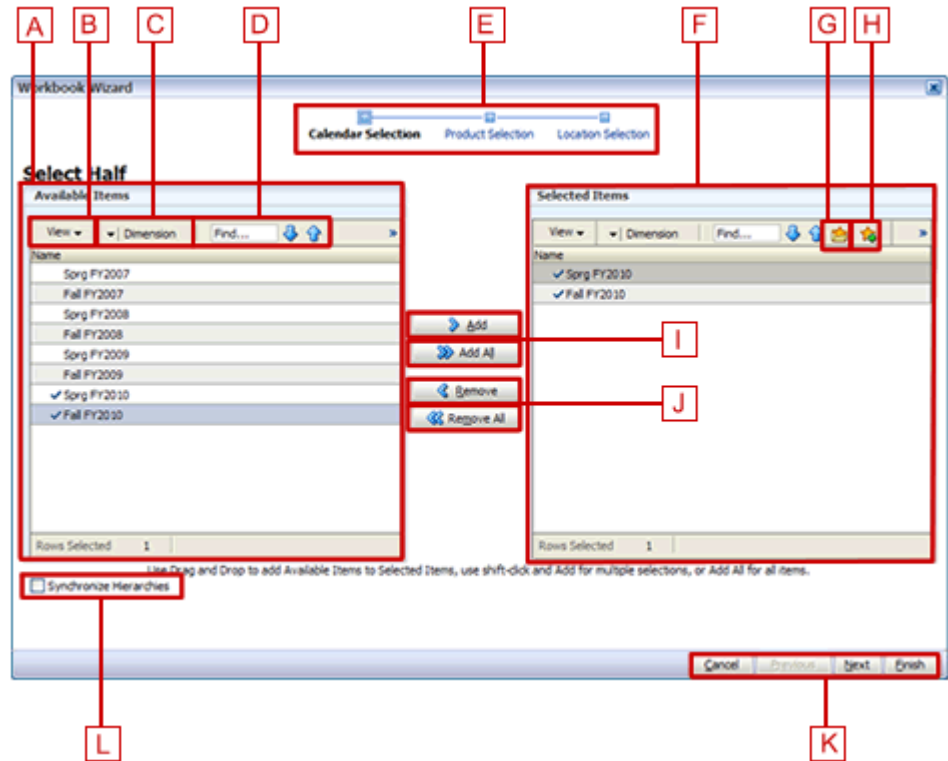


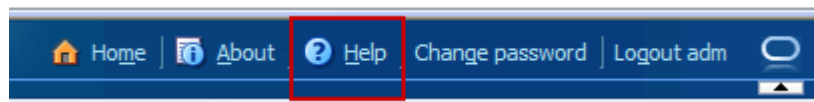
Table 2–2 describes the components of the workbook wizard window.

Table 2–2 Workbook Wizard Window User Interface Components

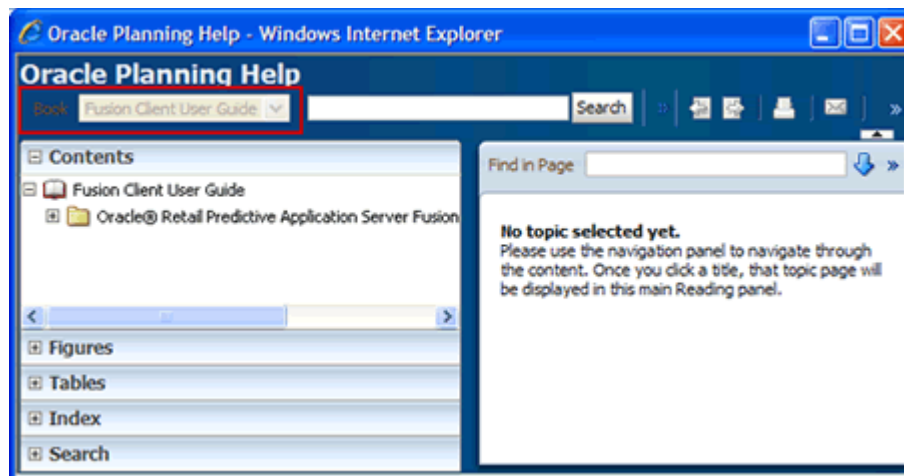
Legend	Window Area Name	Position	Description
A	Available Items area	Center Left	Displays the positions that are available for you to select.
B	View menu	Center Left, within the Available Items area	Provides options for viewing the available positions. You can adjust the column setting, detach the list to view it in a larger window, expand or collapse the positions, or scroll to the beginning or end of the list.
C	Dimension menu	Center Left, within the Available Items area	Opens the Dimension options window where you can select the levels of the dimension you want to view in the Available Items list. You can also select the attributes that you would like to see and sort by in the list.
D	Find field, Previous and Next arrows	Center Left, within the Available Items area	Enables you to identify the positions with the keywords you entered in the Find field. Use the Previous and Next arrows to navigate between the workbooks matching the search pattern. The search is not case-sensitive.
E	Wizard Taskflow	Top Center	Displays the steps in the wizard process and shows you where you are within that process. The wizard taskflow is configured in the RPAS Configuration Tools. For more information, refer to the <i>Oracle Retail Predictive Application Server Configuration Tools User Guide</i> .
F	Selected Items area	Center Right	Displays the positions you selected. It also includes a toolbar that enables you to perform various functions.
G	Load Favorite icon	Center Right, within the Selected Items area	Enables you to select a previously saved group of positions to load into the workbook.
H	Save Favorite icon	Center Right, within the Selected Items area	Enables you to save the positions you have selected as group. The next time you build a new workbook, you can select and load that group rather than choosing the same positions individually again.
I	Add and Add All icons	Center	Enables you to add positions that are selected in the Available Items area. To add all positions in the Available Items area, click the Add All icon.
J	Remove and Remove All icons	Center	Enables you to remove positions in the Selected Items area. To remove all positions in the Selected Items area, click the Remove All icon.
K	Wizard Navigation icon	Bottom Right	Enables you to navigate from one wizard page to another. Once you have made the selections for the workbook and clicked Finish , the workbook builds with the selected positions.
L	Synchronize Hierarchies check box	Bottom Left	When selected, the shown levels within the Selected Items area match the ones in the Available Items area. This is selected by default.

Accessing Online Help

To access online help, click **Help** in the global header.

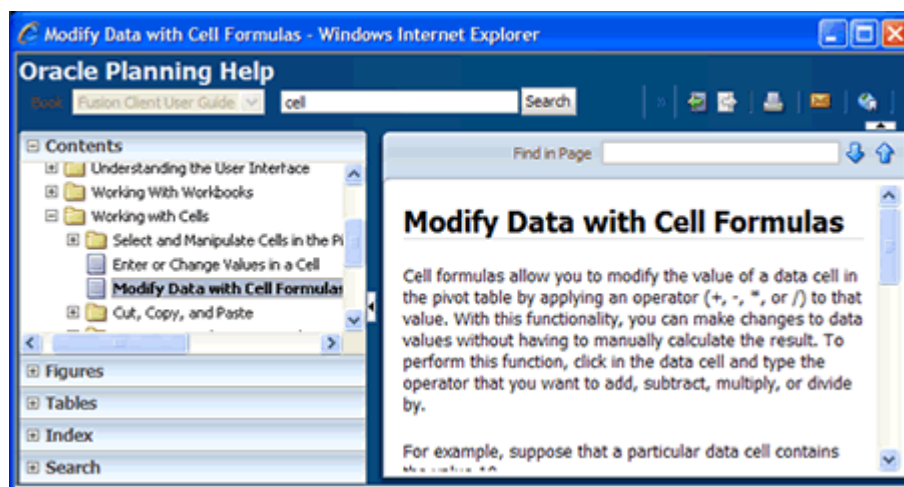
Figure 2–14 Online Help Link

The online help opens in a new browser window. If more than one help set is available, you can choose which one to view by selecting it from the Book drop-down field. If there is only one help set, the field is shaded.

Figure 2–15 Online Help Window, Book Field

Contents

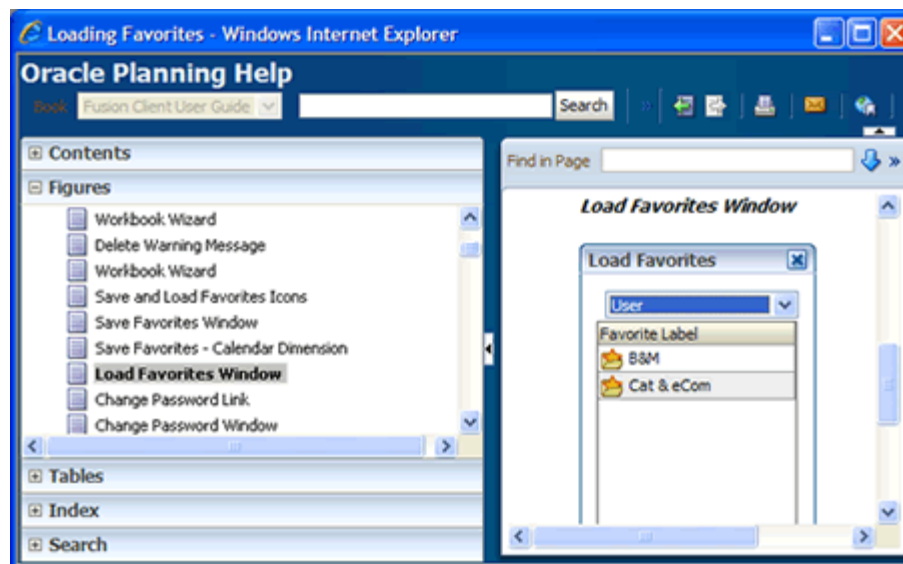
The contents of the online help set are shown in the Contents section of the navigation bar on the left. Click the **Expand** icon next to the folders to drill down to the help topics. Click the page that you want to view. It appears in the content area.

Figure 2–16 Help Topic within Online Help

Figures and Tables

To view a list of figures or tables, click the **Figures** or **Tables** bar.

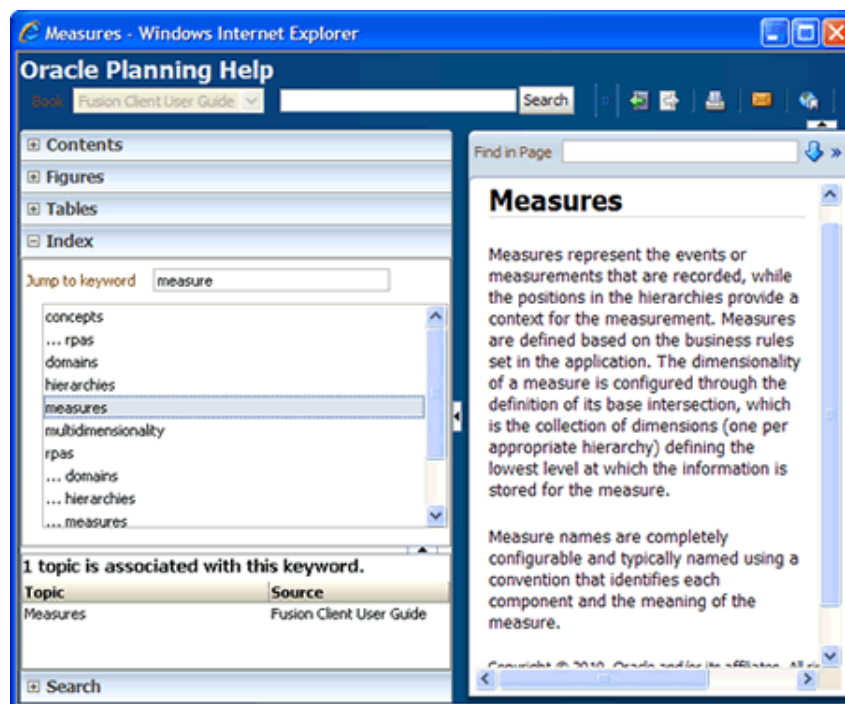
Figure 2–17 Online Help: Figure List



Index

In the Index, you can enter keywords to find topics that contain this keyword. Click the topic name to see the page.

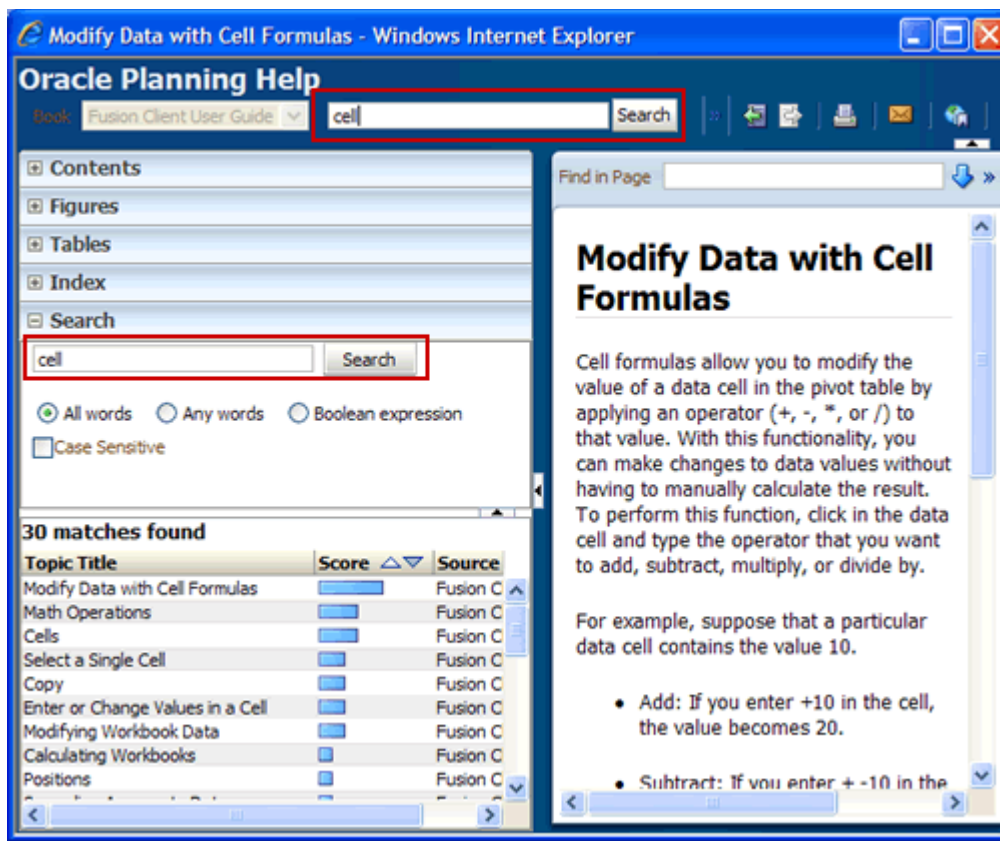
Figure 2–18 Online Help: Index



Search

Use the Search field at the top of the online help window or the Search section within the navigation bar to search for words or phrases.

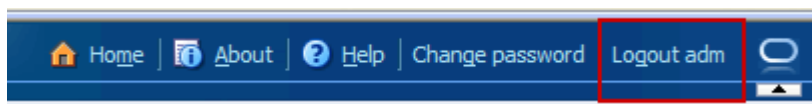
Figure 2–19 Online Help: Search



Logging Out of RDF Cloud Service

To log out of the application, click **Logout** in the global header.

Figure 2–20 Logout Link



Note: You may be prompted to save and commit the workbook data before logging out of the application.

Oracle Retail Demand Forecasting Cloud Service Methods

This chapter discusses the forecasting methods used in Oracle Retail Demand Forecasting Cloud Service in detail including:

- [Forecasting Techniques Used in RDF Cloud Service](#)
- [Forecasting Methods Available in RDF Cloud Service](#)
- [Time Series \(Statistical\) Forecasting Methods](#)
- [Profile-Based Forecasting](#)
- [Bayesian Forecasting](#)
- [LoadPlan Forecasting Method](#)
- [Copy Forecasting Method](#)
- [Causal \(Promotional\) Forecasting Method](#)
- [Causal Forecasting with Baselines](#)

Forecasting Techniques Used in RDF Cloud Service

RDF Cloud Service uses a variety of predictive techniques to generate forecasts of demand. The technical methods used are driven by the goal to provide the most accurate forecasts possible in an automatic and efficient manner. These methods have been analyzed, optimized, and refined over years of research on retail-specific data.

The primary techniques RDF Cloud Service uses include:

- [Exponential Smoothing](#)
- [Regression Analysis](#)
- [Bayesian Analysis](#)
- [Prediction Intervals](#)
- [Automatic Method Selection](#)
- [Source Level Forecasting](#)
- [Promotional Forecasting](#)

Exponential Smoothing

Exponential smoothing models fit basic features of the demand pattern such as level, trend, and seasonality, and project these into the future. These models provide

computational benefits and have been chosen for their ability to handle different types of time series, including short and/or noisy series that are characteristic of retail sales. They are smoothing models because they use weighted averages on historic data. They are exponential smoothing models because the weighting uses decays at an exponential rate. That is, more recent data is weighted more heavily than the past.

Regression Analysis

Regression analysis is another standard technique used in prediction. Regression uses a least-squares estimator to fit a model of predictor variables to another set of target variables. Seasonal Regression is an Oracle Retail specific extension of this procedure for use in seasonal models with between one and two years of history. Causal Forecasting uses stepwise regression to determine which causal variables are significant.

Bayesian Analysis

Bayesian analysis considers *a priori* information as a starting point in development of a prediction. Bayesian forecasting, as developed by Oracle Retail, uses a sales plan as the starting point that is adjusted based on observed data. This method fills a gap in standard time series forecasting when new, short lifecycle or products with significant lifecycles are being forecast.

Prediction Intervals

Predictions from these various models gives the estimated mean outcome. By using standard statistical distributional assumptions, RDF Cloud Service develops measures of uncertainty associated with forecast point estimates from these models. While this is of key concern for various optimization solutions of the forecast, the technical details are beyond the scope of this document. For further details on prediction interval calculations, refer to *Char&Yatfield, International Journal of Forecasting, March 1992*.

Automatic Method Selection

Providing multiple forecasting methods is only valuable if the appropriate model can be selected in an accurate and efficient manner. In order to make this feasible in a retail environment, Oracle Retail has developed a number of different meta-methods that can automatically select the best method among a number of competing models. Automatic Exponential Smoothing (AutoES) is an example of one such method that clients can select. The final selection between the competing models is made according to a performance criterion that involves a trade-off between the model's fit over the historic data and its complexity. A description of the competing models used within AutoES is described in "[Exponential Smoothing \(ES\) Forecasting Methods](#)" on page 3-12. In academia, this discipline is known as Information Theory and is used in the combination and selection of various competing models.

Source Level Forecasting

Sometimes it is difficult to capture seasonality, trend, or causal effects on the final-level (item/store) due to scarcity of the data. Also, time series are often too noisy at that level. To overcome these issues, RDF Cloud Service utilizes source-level forecasting. In source-level forecasting, data is aggregated first to a higher level across the product or location hierarchy (or both). Then the forecast is generated and proportionally spread down to the final-level. We have experimentally proven that source-level forecasting technique often improves the accuracy on the final-level.

Promotional Forecasting

In some instances, especially in retail, pure time series techniques are inadequate for forecasting demand. Instead of using only historic demand patterns to forecast future demand, additional causal or promotional factors are used to better explain past performance. With the help of a promotional calendar, an indication of when promotions is run in the future, these promotional forecasting techniques can better predict demand in the future.

Forecasting Methods Available in RDF Cloud Service

A forecasting system's main goal is to produce accurate predictions of future demand. The RDF Cloud Service solution utilizes the most advanced forecasting algorithms to address many different data requirements across all retail verticals. Furthermore, the system can be configured to automatically select the best algorithm and forecasting level to yield the most accurate results.

Following is a summary of the various forecasting methods employed in RDF Cloud Service. Some of these methods may not be visible in your solution based on configuration options set in the RPAS Configuration Tools.

More detailed information on these forecasting algorithms is provided in the following sections:

- [Time Series \(Statistical\) Forecasting Methods](#)
- [Profile-Based Forecasting](#)
- [Bayesian Forecasting](#)
- [LoadPlan Forecasting Method](#)
- [Copy Forecasting Method](#)
- [Causal \(Promotional\) Forecasting Method](#)
- [Causal Forecasting with Baselines](#)

RDF Cloud Service Forecasting Methods

Average

RDF Cloud Service uses a simple average model to generate forecasts.

Moving Average

RDF Cloud Service uses a simple moving average model to generate forecasts. You can specify a Moving Average Window length.

IntermittentES

RDF Cloud Service fits the data to the Croston's model of exponential smoothing. This method should be used when the input series contains a large number of zero data points (that is, intermittent demand data). The original time series is split into a Magnitude and Frequency series, and then the SimpleES model is applied to determine level of both series. The ratio of the magnitude estimate over the frequency estimate is the forecast level reported for the original series.

TrendES

RDF Cloud Service fits the data to the Holt model of exponential smoothing. The Holt model is useful when data exhibits a definite trend. This method separates base

demand from trend and then provides forecast point estimates by combining an estimated trend and the smoothed level at the end of the series. For instance, where the forecast engine cannot produce a forecast using the TrendES method, the Simple/IntermittentES method is used to evaluate the time series.

Causal

Causal is used for promotional forecasting and can only be selected if Promote is implemented. Causal uses a Stepwise Regression sub-routine to determine the promotional variables that are relevant to the time series and their lift effect on the series. AutoES and source-level forecasting are used to generate future baseline forecasts. By combining the future baseline forecast and each promotion's effect on sales (lift), a final promotional forecast is computed. For instances where the forecasting engine cannot produce a forecast using the Causal method, the system evaluates the time series using the SeasonalES method.

To forecast short lifecycle, promotional items, Causal deprices, depromotes, and smoothes the forecasting data source to generate the short-lifecycle forecast causal baseline. The promotion effects are calculated using the same Stepwise Regression code as Causal. However, the promo lifts are first filtered from the sales and applied on top of the item's rate of sale. The resulting measure is regressed against the promotional variables to determine the promotion effects. Finally, the promotion effects are applied on top of the short lifecycle baseline to generate the final forecast.

No Forecast

No forecast is generated for the product/location combination.

Bayesian

Useful for short lifecycle forecasting and for new products with little or no historic sales data, the Bayesian method requires a product's known sales plan (created externally to RDF Cloud Service) and considers a plan's shape (the selling profile or lifecycle) and scale (magnitude of sales based on Actuals). The initial forecast is equal to the sales plan, but as sales information comes in, the model generates a forecast by merging the sales plan with the sales data. The forecast is adjusted so that the sales magnitude is a weighted average between the original plan's scale and the scale reflected by known history. A Data Plan must be specified when using the Bayesian method. For instances where the Data Plan equals zero (0), the system evaluates the time series using the SeasonalES method.

Profile-based

RDF Cloud Service generates a forecast based on a seasonal profile that can be created in RPAS or legacy system. Profiles can also be copied from another profile and adjusted. Using historic data and the profile, the data is de-seasonalized and then fed to the SimpleES method. The Simple forecast is then re-seasonalized using the profiles. A Seasonal Profile must be specified when using the Profile-Based method. For instances where the Seasonal Profile equals zero, the system evaluates the time series using the SeasonalES method.

Components

The Components forecast method multiplies pre-calculated baseline, promotional lifts, and regular price lifts to generate the forecast. These components are specified in Forecast Administration task, Advanced Settings activity, Final Level Parameters view. The following table lists the components and their referenced measures.

This method should only be assigned to final forecasting levels.

Component	Measure
Baseline	Components - Baseline
Regular Price Lifts	Components - Regular Price Lifts
Promotional Lifts	Components - Promotional Lifts
Interval	Components - Baseline Interval

Intervals are not generated and need to be provided. This method is useful when the forecast components are available since the forecast can be quickly generated.

Automatic Exponential Smoothing (AutoES)

RDF Cloud Service fits the sales data to a variety of exponential smoothing models of forecasting, and the best model is chosen for the final forecast. The candidate methods considered by AutoES are:

- [SimpleES](#)
- [Croston's Method](#)
- [Simple/IntermittentES](#)
- [HoltES](#)
- [Multiplicative Seasonal](#)
- [Additive Seasonal](#)
- [SeasonalES](#)
- [Seasonal Regression](#)

The final selection between the models is made according to a performance criterion (Bayesian Information Criterion) that involves a trade-off between the model's fit over the historic data and its complexity.

SimpleES

RDF Cloud Service uses a simple exponential smoothing model to generate forecasts. SimpleES ignores seasonality and trend features in the demand data and is the simplest model of the exponential smoothing family. This method can be used when less than one year of historic demand data is available. For more information, see [Simple Exponential Smoothing](#).

Croston's Method

Croston's Method is used when the input series contains a large number of zero data points (that is, intermittent demand data). For more information, see [Croston's Method](#).

Simple/IntermittentES

Simple/IntermittentES is a combination of the SimpleES and IntermittentES methods. This method applies the SimpleES model unless a large number of zero data points are present, in which case the Croston's model is applied. For more information, see [Simple/Intermittent Exponential Smoothing](#).

HoltES

Holt exponential smoothing treats data as linearly trended but non-seasonal. The Holt model provides forecast point estimates by combining an estimated trend (for the

forecast horizon - h) and the smoothed level at the end of the series. RDF Cloud Service uses a damped Holt model that decays the trend component so that it disappears over the first few weeks. This improves forecasts created using Holt over longer forecast horizons. For more information, see [Holt Exponential Smoothing](#).

Multiplicative Seasonal

Also referred to as Multiplicative Winters Model, this model extracts seasonal indices that are assumed to have multiplicative effects on the un-seasonalized series. For more information, see [Multiplicative Winters Exponential Smoothing](#) which includes Oracle Winters.

Additive Seasonal

Also referred to as Additive Winters Model, this model is similar to the Multiplicative Winters model, but is used when zeros are present in the data. This model adjusts the un-seasonalized values by adding the seasonal index (for the forecast horizon). For more information, see [Additive Winters Exponential Smoothing](#).

SeasonalES

This method, a combination of several Seasonal methods, is generally used for known seasonal items or forecasting for long horizons. This method applies the Multiplicative Seasonal model unless too many zeros are present in the data, in which case the Additive Winters model of exponential smoothing is used. If less than two years of data is available, a Seasonal Regression model is used. If there is too little data to create a seasonal forecast (in general, less than 52 weeks), the system selects from the SimpleES, TrendES, and IntermittentES methods. For more information, see [Seasonal Exponential Smoothing \(SeasonalES\)](#).

Seasonal Regression

Seasonal Regression cannot be selected as a forecasting method, but is a candidate model that is used only when the SeasonalES method is selected. This model requires a minimum of 52 weeks of history to determine seasonality. Simple Linear Regression is used to estimate the future values of the series based on a past series.

The independent variable is the series history one-year or one cycle length prior to the desired forecast period, and the dependent variable is the forecast. This model assumes that the future is a linear combination of itself one period before plus a scalar constant. For more information, see [Seasonal Regression](#).

Time Series (Statistical) Forecasting Methods

This section describes those techniques within RDF Cloud Service that generate forecasts directly from only a single time series. Generally the time series provided is past sales history for a given item/store that is used to predict what future demand might be. In actual practice these algorithms have been and can be used to forecast a myriad of different data streams at any product/location level (shipment data at item/warehouse, financial data at dept./chain, and so on).

The following topics present fundamentals of the RDF Cloud Service statistical forecasting processes. Included is a discussion of the importance of confidence intervals and confidence limits, the time series methods used to generate forecasts, and how the best forecasting method is selected from a list of candidate models.

A wide variety of statistical forecasting techniques are available, ranging from very simple to very sophisticated. All of these methods attempt to best capture the statistical probability distribution previously discussed, and they do this by fitting

quantitative models to statistical patterns from historical data. Put simply, the better the history of the variable being forecast, the stronger these statistical patterns are. Increased forecast accuracy depends on the strength of these patterns in relation to background irregularities.

RDF Cloud Service is able to use several time series methods to produce forecasts. Time series methods extrapolate features from the past (in this case, past sales data) to the future.

The time series methods that RDF Cloud Service offers include:

- [Average](#) (Simple Moving Average)
- [Bayesian Information Criterion \(BIC\)](#)
- [Exponential Smoothing \(ES\) Forecasting Methods](#) - Automatic Exponential Smoothing (AutoES)
 - [Simple Exponential Smoothing](#)
 - [Croston's Method](#)
 - [Simple/Intermittent Exponential Smoothing](#)
 - [Holt Exponential Smoothing](#)
 - [Multiplicative Winters Exponential Smoothing](#)
 - [Oracle Winters](#)
 - [Additive Winters Exponential Smoothing](#)
 - [Seasonal Exponential Smoothing \(SeasonalES\)](#)
 - [Seasonal Regression](#)

Why Use Statistical Forecasting?

The purpose of statistical forecasting is to make the process of predicting future events both objective and quantitative. Statistical forecasting utilizes information from the past (such as sales data) to predict what will happen in the future. Forecast accuracy depends on the degree to which a mathematical model can detect and extract statistical patterns from historic data. The most common statistical methodologies used are univariate. This means that they are based solely on the history of one variable, such as sales. Each forecast observation reflects a future value of the sole input variable. Statistical forecasting processes are relatively easy to implement, and the better the historical data, the better the resulting forecasts.

Businesses benefit greatly from the use of systematic statistical forecasting techniques that aim to accurately predict product demand, enabling these businesses to maintain sufficient product inventory levels. When inventory levels are optimized, lost sales due to product stock-outs are greatly reduced, as are the costs incurred by overstocking.

Average

A simple moving average forecast involves taking the average of the past n time periods and using that average as the forecast for all future time periods (where n is the length of fitting period). Simple moving average forecasts are frequently used in the system because they:

- Make few assumptions about the historical time series.
- Can be generated with little historical data.

- Are very fast to generate.

Typically, moving average forecasts are generated at the final forecast level (for example, item/store) and their results used to spread more sophisticated higher-level forecasts (for example, those generated with exponential smoothing).

A Simple Moving Average model assumes that historical data is too short or noisy to consider seasonal effects or local trend and is based on the level of the series. Since this model does not use a smoothing parameter to place added weight on more recent historic values, a Simple Moving Average model is not actually in the exponential smoothing family. However, it is an adequate model to use when low-level (final forecast) ratios are needed for RDF Cloud Service's spreading of high-level (aggregate) forecasts. That is, when aggregate forecasts can be calculated for long and less noisy aggregate time series, Simple Moving Average models provide an adequate (and computationally quick) forecast to determine the ratios needed for RDF Cloud Service spreading. User input in overriding the automatic training horizon further enhances the simple robustness of this model for base-level data.

Bayesian Information Criterion (BIC)

Within AutoES, the model that minimizes the Bayesian Information Criterion (BIC) is selected as the final model. The BIC criterion attempts to balance model complexity with goodness-of-fit over the historical data period (between history start date and forecast start date). The BIC criterion rewards a model for goodness-of-fit and penalizes a model for its complexity. The complexity penalty is necessary to avoid over fitting.

There are various equivalent versions of the Bayesian Information Criterion, but RDF Cloud Service minimizes the following:

$$BIC = s \cdot n^{k/2n}$$

where n is the number of periods in the available data history, k is the number of parameters to be estimated in the model (a measure of model complexity), and s is the root mean squared error computed with one-step-ahead forecast errors resulting from the fitted model (a measure of goodness-of-fit). Note that since each member of the model candidate list is actually a family of models, an optimization routine to select optimal smoothing parameters is required to minimize s for each model form (that is, to select the best model).

Within RDF Cloud Service, a few modifications to the standard selection criteria have been made. These include reducing the number of parameters the Winter's model is penalized by discounting seasonal indices that have little impact on the forecast (multiplicative indices close to one (1), additive indices close to zero (0)). These changes tend to favor the seasonal models to a slightly higher degree that improves the forecasts on retail data, especially for longer forecast horizons.

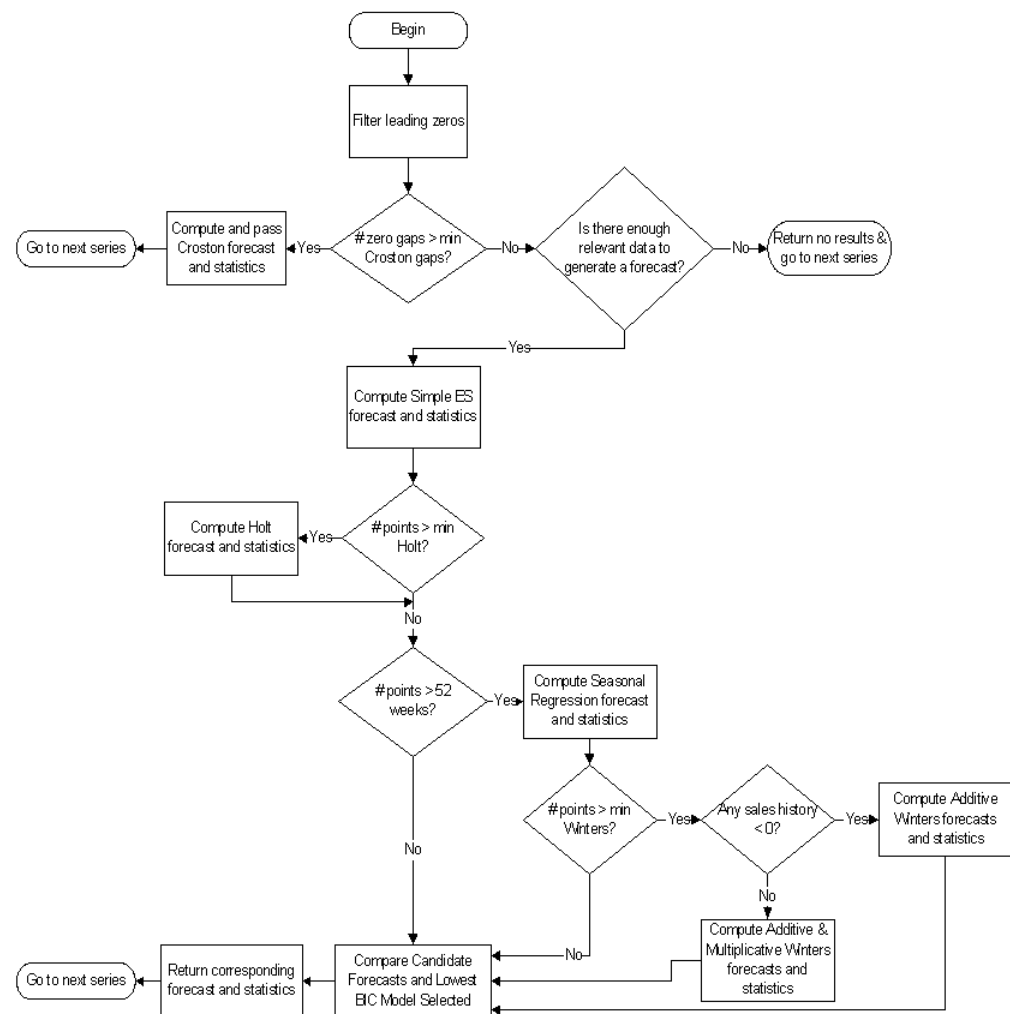
AutoES Flowchart

The following procedure outlines the processing routine steps that the system runs through to evaluate each time series set to forecast using the AutoES method. Refer to [Figure 3–1, "AutoES Flowchart"](#).

1. Filter all leading zeros in the input data that is within the training window.
2. Does the time series contain the minimum data points to qualify to forecast using the Croston's method? If yes, generate the forecast and statistics using the

Croston's method and move on to the next time series. If no, move on to Step 3.

3. Does the time series contain enough relevant data to generate a forecast? If yes, generate a forecast and statistics using the SimpleES method and move on to Step 4. If no, do not forecast and go to the next time series.
4. Does the time series contain the minimum data points to qualify to forecast using the Holt method? If yes, generate a forecast and statistics using the Holt method and move on to Step 5. If no, move on to Step 9.
5. Does the time series contain more than 52 weeks of input data? If yes, generate a forecast and statistics using the Seasonal Regression method and move on to Step 6. If no, move on to Step 9.
6. Does the time series contain the minimum data points to qualify to forecast using Winters methods? If yes, move on to Step 7. If no, move on to Step 9.
7. Does the time series contain any data point with sales equal qualify to forecast using Additive Winters method? If yes, generate the forecast and statistics using the Additive Winters method and move on to Step 9. If no, move on to Step 8.
8. Does the time series qualify to forecast using the Multiplicative Winters method? If yes, generate the forecast and statistics using both the Additive Winters and Multiplicative Winters methods and move on to Step 9.
9. Compare all candidate forecasts using BIC Criterion.
10. Return the corresponding forecast and statistics for the system-selected forecast method and move on to the next time series.

Figure 3–1 AutoES Flowchart

Automatic Forecast Level Selection (AutoSource)

This section describes how the automatic forecast level selection (AutoSource) could help improve the accuracy of your forecasts.

In the system, one of the key elements to producing accurate forecasts is using the system's ability to aggregate and spread sales data and forecasts across the product and location hierarchies. Low selling or relatively new products can use aggregated data from similar products/locations at a higher level in the hierarchy, generate forecasts using this data, and then spread these higher level forecasts back down to provide more accurate forecasts. The difficulty comes in deciding which products/locations will benefit from this technique and from what level in the hierarchy these source-level forecasts should be spread.

The Automatic Forecast Level Selection feature of the system automates the selection of best aggregation level (forecast source-level) for each product/location combination. While providing invaluable information regarding the best aggregate level for source forecasts, the Automatic Forecast Level Selection process may be very CPU intensive. To solve this problem, the task of selecting best aggregation levels for product/location combinations is decomposed and processed piecemeal during times when the computer would normally be idle.

Identifying the best aggregation levels for sets of products and locations can be divided into a number of sub-problems:

- Forecasting
- Determining the best source-level forecast
- Status and scheduling

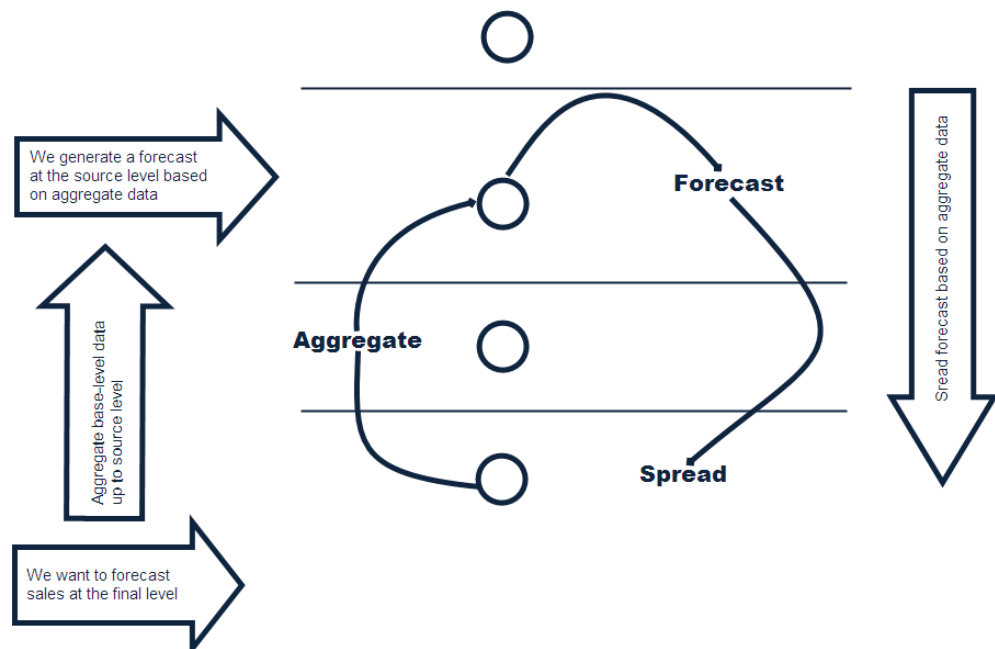
The Forecast Level Selection Process

The automatic source generation level selection subsystem selects the best source generation level for each product/location in a given final forecast level. In order to determine the best level, a final forecast is generated for each product/location using each candidate source generation level. As illustrated in [Figure 3–2](#), a final forecast is generated by:

1. Aggregating up from the base level to the source-level
2. Generating a source-level forecast
3. Spreading the source-level forecast down to the final-level

For example, assume base-level sales data is at the item/store level, the final forecast level is at the item/store level, and the candidate source generation level is at the style/store level. In this case, base-level sales data is aggregated from the item/store level up to the style/store level. A style/store forecast is generated, and the forecast data is spread back down to the item/store level. This forecast represents the final forecast.

Figure 3–2 Forecast Level Selection Process



Determining the Best Source Level Forecast

The selection of the best level is based on a train-test approach. In this process, historical data is used to generate a forecast for a test period for which actual sales data already exists. The forecast, generated over the train period, can be compared to

the actual sales figures in the test period to calculate the Percent Absolute Error (PAE) between the two.

A final-level forecast is generated for each product/location combination using each potential source generation level. Each time a source-level forecast is generated, a PAE is calculated for that level. If that PAE is better than the current best PAE (corresponding to the current best source generation level), the source generation level that generated that better PAE becomes the new best level.

Status and Scheduling

Identifying the best aggregation level for a given set of products and locations may take a significant amount of time (that is, an amount of time that is greater than the duration of the computer's shortest idle period). This task, however, can be partitioned meaning that the problem of selecting the best aggregation levels can be decomposed into smaller sub-problems to be solved piecemeal during times when the computer would normally be idle.

For each product/location combination at the final forecast level, the problem consists of:

- Generating forecasts at each unique aggregation level
- Using the train-test approach to evaluate the percent absolute error statistics for each

One or more of these subtasks is performed during each period that the computer is idle. The best aggregation status keeps track of which sub-problems have been performed and which sub-problems remain. In this way, when the best aggregation procedure is run, the procedure knows what the next sub-problem is.

Best aggregation level procedures are run during idle computer periods. The scheduling of the Automatic Forecast Level Selection process (AutoSource) must be integrated with the schedules of other machine processes. In general, you should select a schedule so that source generation-level selection does not conflict with other activities. The following is an example of a typical schedule for the Automatic Forecast Level Selection process: Monday through Thursday, the selection process starts at midnight and runs for eight hours. On Friday and Saturday, the process is allowed to run for 20 hours. Sunday is reserved for generating forecasts.

Using the System-Selected Forecast Level

You have the option of accepting the system-generated source-level selection or manually selecting a different source-level to be used. The value for the source forecast level can be manipulated in the Final Level view of the Forecast Maintenance workbook. For each product/location combination, the best source forecast level identified by RDF Cloud Service appears in the Optimal source-level measure on this view. You can enable the use of this level by placing a check mark in the Pick Optimal Level measure for that product/location. The absence of a check mark in this measure causes the system to default to the Default Source level or the Source Level Override value if this has been set by you.

Exponential Smoothing (ES) Forecasting Methods

The primary process by which RDF Cloud Service automatically fits an exponential smoothing model to a time series is called Automatic Exponential Smoothing (AutoES). When AutoES forecasting is chosen in RDF Cloud Service, a collection of candidate models is initially considered. The models in the candidate list include:

- [Simple Exponential Smoothing](#)

- Croston's Method
- Simple/Intermittent Exponential Smoothing
- Holt Exponential Smoothing
- Multiplicative Winters Exponential Smoothing
 - Oracle Winters
- Additive Winters Exponential Smoothing
- Seasonal Exponential Smoothing (SeasonalES)
- Seasonal Regression

These models include level information, level and trend information, and level, trend and seasonality information, respectively. The optimal smoothing parameters for each model form are determined automatically (that is, greater smoothing is applied to noisier data). The final selection between the resulting models is made according to a performance criterion that involves a trade-off between the model's fit over the historic data and its complexity.

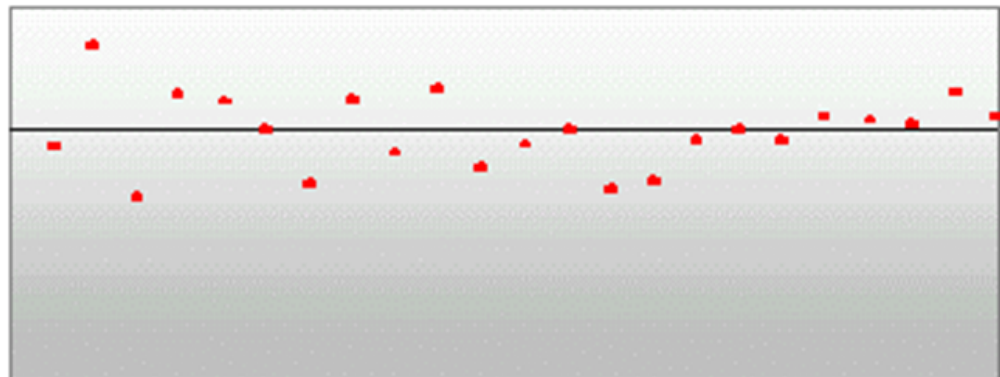
The amount of available historic information can affect the complexity of the model that can be fit. For example, fitting a seasonal model would not be appropriate without a complete year of historic data. In fact, one prefers to see each season occur multiple times. For a particular series, even if the amount of available history allows one to fit a complex model (that is, one with seasonal components), the resulting model is not necessarily superior to a simpler model. If a simpler model (for example, a model with only a level component or level and trend components) fits as well as a seasonal model, the AutoES forecasting process finds the simpler model to be preferable. In such a case, the simpler model captures the basic features supported by the data without over fitting and therefore generally projects better forecasts.

Simple Exponential Smoothing

Simple Exponential Smoothing does not consider seasonality or trend features in the demand data (if they exist). It is the simplest model of the exponential smoothing family, yet still adequate for many types of RDF Cloud Service demand data. Forecasts for short horizons can be estimated with Simple Exponential Smoothing when less than a year of historic demand data is available and acts-like associations are not assigned in RDF Cloud Service.

Figure 3–3 is an example of a forecast in which data seems to be un-trended and un-seasonal; note the flat appearance of the forecast.

Figure 3–3 Simple Exponential Smoothing



Croston's Method

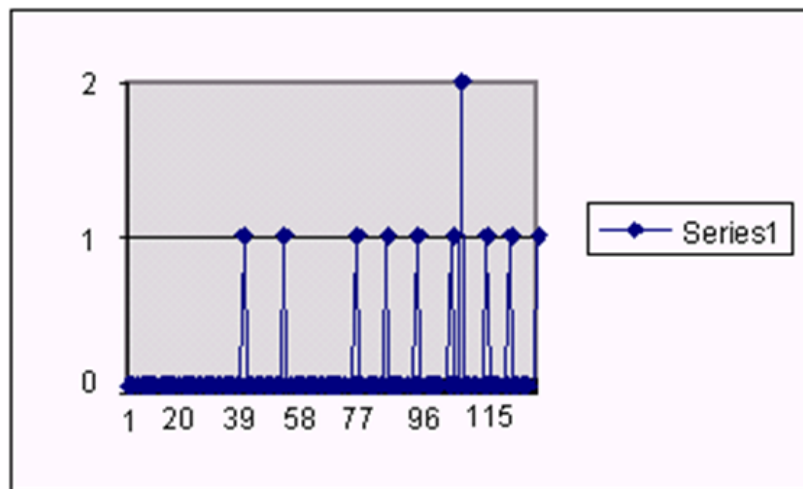
Croston's method is used when the input series contains a large number of zero data points (that is, intermittent demand data). The method involves splitting the original time series into two new series:

- Magnitude series
- Frequency series

The magnitude series contains all the non-zero data points, while the frequency series consists of the time intervals between consecutive non-zero data points. A Simple Exponential Smoothing model is then applied to each of these newly created series to forecast a magnitude level as well as a frequency level. The ratio of the magnitude estimate over the frequency estimate is the forecast level reported for the original series.

Figure 3–4 shows a sales history of data where the demand for a given period is often zero.

Figure 3–4 Croston's Method



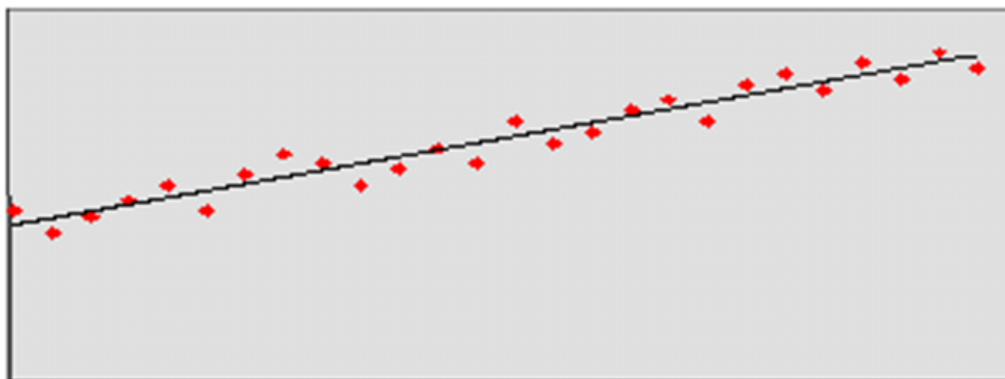
Simple/Intermittent Exponential Smoothing

This method is a combination of the SimpleES and Croston's (IntermittentES) methods. The SimpleES model is applied to the time series unless a large number of zero data points are present. In this case, the Croston's model is applied.

Holt Exponential Smoothing

Holt exponential smoothing treats data as linearly trended but non-seasonal. The Holt model provides forecast point estimates by combining an estimated trend (for the forecast horizon - h) and the smoothed level at the end of the series. RDF Cloud Service uses a damped Holt model that decays the trend component so that it disappears over the first few weeks. This improves forecasts created using Holt over longer forecast horizons.

When this forecasting method is selected, the forecasts are seen as trending either up or down, as shown in Figure 3–5.

Figure 3–5 Holt Exponential Smoothing**Multiplicative Winters Exponential Smoothing**

Overall, a forecast point estimate is evaluated as:

$$\hat{Y}_t(h) = \left(L_t + \left[\sum_{i=1}^h \varphi^i \right] T_t \right) \hat{S}_t(h),$$

a function of level, trend, seasonality, and trend dampening factor.

The Level at the end of the series (time t) is:

$$L_t = \alpha \frac{Y_t}{S_{t-p}} + (1 - \alpha)(L_{t-1} + T_{t-1})$$

The Trend at the end of the series (time t) is:

$$T_t = \gamma(L_t - L_{t-1}) + (1 - \gamma)T_{t-1}$$

The Seasonal Index for the time series (applied to the forecast horizon) is:

$$S_t = \delta \frac{Y_t}{L_t} + (1 - \delta)S_{t-p}$$

Oracle Winters calculates initial seasonal indices from a baseline Holt forecast. Seasonal indices, level, and trend are then updated in separate stages, using Winter's model as a basis for the updates.

Oracle Winters

Oracle Winters is the current seasonal forecasting approach, which uses a combination of Winters approach and decomposition. Decomposition allows level and trend to be optimized independently while maintaining a seasonal curve.

From sufficient data, RDF Cloud Service extracts seasonal indexes that are assumed to have multiplicative effects on the de-seasonalized series.

Note: The component describing the de-seasonalized values, which is multiplied by the seasonal index:

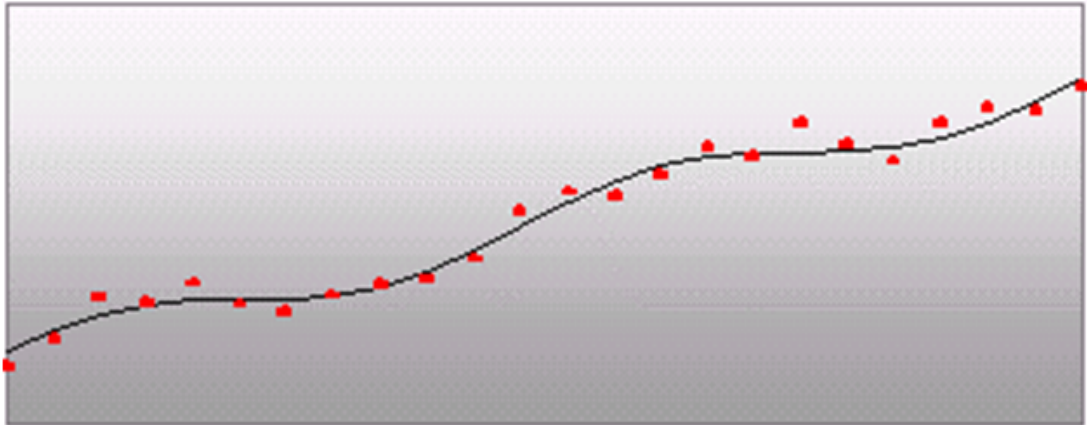
$$\hat{S}_t(h)$$

is the Holt model previously described.

In this case, three parameters are used to control smoothing of the components of level, trend, and seasonality.

When the Multiplicative Seasonal forecasting method is selected, the forecasts tend to look squiggly, as shown in [Figure 3–6](#).

Figure 3–6 Multiplicative Winters Exponential Smoothing



Additive Winters Exponential Smoothing

Overall, a forecast point estimate is evaluated as:

$$\hat{Y}_t(h) = L_t + \left[\sum_{i=1}^h \varphi^i \right] T_t + \hat{S}_t(h)$$

a function of level, trend, seasonality and trend dampening factor.

The Level at the end of the series (time t) is:

$$T_t = \gamma(L_t - L_{t-1}) + (1 - \gamma)T_{t-1}$$

and the Trend at the end of the series (time t) is:

$$T_t = \gamma(L_t - L_{t-1}) + (1 - \gamma)T_{t-1}$$

and the Seasonal Index for the time series (applied to the forecast horizon) is:

$$S_t = \delta(Y_t - L_t) + (1 - \delta)S_{t-p}$$

Oracle Winters is a Winters-based decomposition approach to update the level, trend, and seasonal indexes.

Refer to Multiplicative Winters Exponential Smoothing in this document for a description of each of the forecasting approaches.

Seasonal Exponential Smoothing (SeasonalES)

A combination of several seasonal methods. This method is generally used for known seasonal items or forecasting for long horizons. This method lets the Multiplicative Seasonal and Additive Seasonal models compete and picks the one with the better fit. If less than two years of data is available, a Seasonal Regression model is used. If there is too little data to create a seasonal forecast (in general, less than 52 weeks), the system selects from the Simple ES, Trend ES, and Intermittent ES methods.

Seasonal Regression

A common benchmark in seasonal forecasting methods is sales last year. A sales last year forecast is based entirely on sales from the same time period of last year. Forecasting using only sales last year involves simple calculations and often outperforms other more sophisticated seasonal forecasting models. This method performs best when dealing with highly seasonal sales data with a relatively short sales history.

The seasonal models used in earlier releases of RDF Cloud Service (Additive and Multiplicative Winters) were designed to determine seasonality. However, they were not designed to work with sales histories of shorter than two years. Because sales histories of longer than two years are often difficult to obtain, many retail environments need a seasonal forecast that can accommodate sales data histories of between one and two years. In addition, the Additive and Multiplicative Winters models search for short-term trends and have difficulties with trends occurring inside the seasonal indices themselves.

The current RDF Cloud Service Seasonal Regression forecasting model is designed to address these needs.

The Seasonal Regression Model uses simple linear regression with last year's data as the predictor variable and this year's sales as the target variable. The system determines the multiplicative and additive weights that best fit the data on hand. When optimizing the Seasonal Regression Model, the sales last year forecast is inherently considered, and it will automatically be used if it is the model that best fits the data. If there have been significant shifts in the level of sales from one year to the next, the model learns that shift and appropriately weigh last year's data (keeping the same shape from last year, but adjusting its scale).

As with other seasonal models, you can forecast demand for products with insufficient sales histories using this method if:

- You paste in fake history as needed, providing a seasonal profile for the previous year.
- You also forecast for a source-level (with the same seasonality profile as the forecast item and with more than one year of history) using seasonal regression and spread these forecast results down to the member products.

The Seasonal Regression Model is included in the AutoES family of forecasting models and is thus a candidate model that is selected if it best fits the data.

This method captures the trend of a series through the slope of the regression line while the series shifted by a cycle provides its seasonal profile. Using this method, the resulting forecast for the original series is calculated. The regression method provides a much better forecast of the series than was possible with the other exponential smoothing algorithms.

Based on the assumptions of the model that this method is trying to describe, versus the noisy data it is likely to receive, several exceptions to this regression technique are caught and corrected. First, since it is logically impossible to receive a negative value for the slope (such a value suggesting an inverse seasonality), whenever a negative slope is detected, the regression is rerun with the intercept fixed to zero. This guarantees that a positive slope is calculated and thus a more logical forecast is given.

The second noise-driven concession is to check the slope to determine if it is either too slight or too great. If this is the case, the method rejects itself out of hand and allows one of the other competing methods to provide the forecast.

Profile-Based Forecasting

The Profile-based forecasting method generates a forecast based on a seasonal profile. The profile may be loaded, manually entered, or generated by Curve. It can also be copied from another profile and adjusted.

This method should only be assigned to final forecasting levels.

Forecast Method

The Profile-based forecasting method proceeds as follows:

1. The historical data and the profile are loaded.
2. The data is de-seasonalized using the profile and then fed to Simple method.
3. The alpha is capped by 0.5.
4. The Simple forecast is re-seasonalized using the profiles.

Profile-Based Method and New Items

The Profile-based forecasting method can be successfully used to forecast new items. In order to do that, we need to have a profile (which can be copied from an item that shares the same seasonality) and a number that specifies the de-seasonalized demand (DD value). The forecast is calculated using the DD value multiplied by the profile. The confidence interval is set to 1/3 of the DD value.

If the DD value is used to forecast, the history (if it exists) of the product is ignored. Once we have enough history (number of data points exceed a global parameter), the forecast stops using the DD value, and it defaults to the normal Profile Based method.

Note: The Profile-based forecasting method is intended for a final forecasting level and not a source level.

Bayesian Forecasting

The Bayesian Forecasting method is based on combining historic sales data with sales plan data. It is especially effective for new products with little or no historic sales data.

Your sales plan can incorporate expert knowledge in two ways — shape and scale.

- Shape is the selling profile or lifecycle that can be derived from a sales plan. For example, the shape for certain fashion items might show sales ramping up quickly for the first four weeks and then trailing off to nothing over the next eight weeks.
- Scale, or magnitude, of a sales plan is the total quantity expected to be sold over the plan's duration.

Bayesian Forecasting assumes that the shape that sales takes is known, but the scale is uncertain. In Bayesian Forecasting, when no sales history is available, the sales forecast figures are equal to the sales plan figures. At this point, there is no reason to mistrust the sales plan. As point-of-sale data becomes available, the forecast is adjusted and the scale becomes a weighted average between the initial plan's scale and the scale reflected by known sales history. Confidence in the sales plan is controlled by the amount of sales data on hand and a Bayesian sensitivity constant (Bayesian Alpha), which you can set between zero and infinity.

Unlike standard time series forecasting, which requires only sales history to produce a forecast, Bayesian Forecasting requires a sales plan and sales history (if available). Because of this difference, Bayesian Forecasting is not included in AutoES. You must select it manually as a forecasting method in Forecast Administration or Forecast Maintenance.

Obtaining accurate short life-cycle product forecasts is very difficult, and standard statistical time series forecasting models frequently do not offer an adequate solution for many retailers. The following are major problems in automatically developing these forecasts:

- The lack of substantial sales history for a product (which especially makes obtaining seasonal forecasts very difficult).
- The difficulty of automatically matching a new product to a previous product or profile.
- The inability to include planners' intuition into a forecasting model. For example, the overall sales level of the product, how quickly the product takes off, how the product's sales is affected by planned promotions.

Using a Bayesian approach, a short life-cycle forecasting algorithm was developed that begins with a product's seasonal sales plan (that is developed externally to the system by the planner).

As sales information arrives during the first few days or weeks of the season, the model generates a forecast by merging the information contained in the sales plan with the information contained in the initial sales data. These forecast updates can be critical to a company's success and can be used to increase or cancel vendor orders.

As forecasting consultants and software providers, Oracle Retail assists clients in obtaining good forecasts for future demands for their products based upon historical sales data and available causal information. Depending on the information available, Oracle Retail's software supports various forms of exponential smoothing and

regression-based forecasting. Frequently, clients already have some expectations of future demands in the form of sales plans. Depending on the quality of their plans, they can provide very useful information to a forecasting algorithm (especially when only limited historical sales data is available). A forecasting algorithm was developed that merges a customer's sales plans with any available historical sales in a Bayesian fashion (that is, it uses new information to update or revise an existing set of probabilities).

Sales Plans versus Historic Data

In most retail situations, clients are interested in obtaining good product forecasts automatically with little or no human intervention. For stable products with years of historic sales data, our time series approaches (Simple, Holt, Winters, Regression based Causal, and so on) produce adequate results. The problem arises when attempting to forecast products with little or no history. In such instances, expert knowledge (generally in the form of sales plans) is required. Given that both sales plans and time series forecasts are available, an obvious question exists: When should the transition from sales plan to time series forecasting occur? In answering that question (in a particular scenario), suppose that we have determined that 13 weeks of history is the transition point. Does that mean that at 12 weeks the time series results are irrelevant and that at 14 weeks the sales plan has no value? Our intuition tells us that instead of a hard-edge boundary existing, there is actually a steady continuum where the benefits from the sales plan decrease as we gather more historic sales data. This was the motivation for developing an approach that would combine the two forecasts in a reasonable manner.

Bayesian Algorithm

Bayesian forecasting is primarily designed for product/location positions for which a plan exists. These product/locations can be, but are not limited to: items new in the assortment, fashion items, and so on. The following guidelines should be followed:

1. No more than one plan should exist for a given product/location position. If multiple plans are to be set up for different time periods, the domain should be set up with different forecasting levels for each time period of interest.
2. Any time period with non-zero Actuals for a given product/location position should have a corresponding plan component. Otherwise, the system assumes a plan exists and equals zero and acts accordingly.
3. The time period of interest for the Bayesian algorithm starts with the first non-zero value of the plan or the history start date (whichever is more recent), and ends at the end of the forecast horizon.

LoadPlan Forecasting Method

LoadPlan Forecasting Method copies the measure that was specified as Data Plan in the [Forecast Administration Workbook](#) into the Forecast measure. This method does not generate confidence and cumulative intervals when it is the final level method and no source level is specified. This method only generates confidence and cumulative intervals when a source level is specified and the source and final levels are the same.

This method can be assigned to final and source forecasting levels

Copy Forecasting Method

Copy Forecasting Method copies the measure that was specified as Forecast Data Source in the [Forecast Administration Workbook](#) into the Forecast measure. This method does not generate confidence and cumulative intervals.

Causal (Promotional) Forecasting Method

Causal, or promotional, forecasting requires four input streams:

- Time Series Data
- Historical Promotional Calendar
- Baseline Forecasts
- Future Promotional Calendar

Promote decomposes the problem of promotional forecasting into two sub-tasks:

- Estimating the effect that promotions have on demand
- Applying the effects on the baseline forecasts

To accomplish the first task, a stepwise regression sub-routine is used. This routine takes a time series and a collection of promotional variables and determines which variables are most relevant and what effect those relevant variables have on the series.

A promotion variable can represent an individual promotion or a combination of overlapping promotions. An individual promotion represents the case where for a particular time period a single promotion is enabled. Overlapping promotions represents the case where there are two or more promotions that happen at the same time period at the same location for the same product. Causal Forecasting Method can calculate not only each individual promotion effect, but also the overlapping promotions effects.

Thus, the output from the algorithm is a selection of promotional variables and the effects of those variables on the series. In the second step, knowing the effects and the baseline forecasts, we can generate a promotional forecast by applying the effects wherever the promotion or the overlapping promotion are active in the future.

The causal forecasting process has been simplified by first estimating the effects of promotions. Then the effects are applied on top of a baseline that is created externally from the causal forecasting process. For example, the baseline can be a loaded measure, or it can be generated in RDF Cloud Service using AutoES and source-level techniques.

It should be noted that just because promotional forecasting is selected, it does not necessarily imply that a promotional forecast results. In some instances, no promotional variables are found to be statistically significant. In these cases, the forecast ends up equivalent to standard time series forecasts.

If you want to force certain promotional variables into the model, this can be managed through forecasting maintenance parameters.

The Oracle Retail experience in promotional forecasting has led us to believe that there are a few requirements that are necessary to successfully forecast retail promotions:

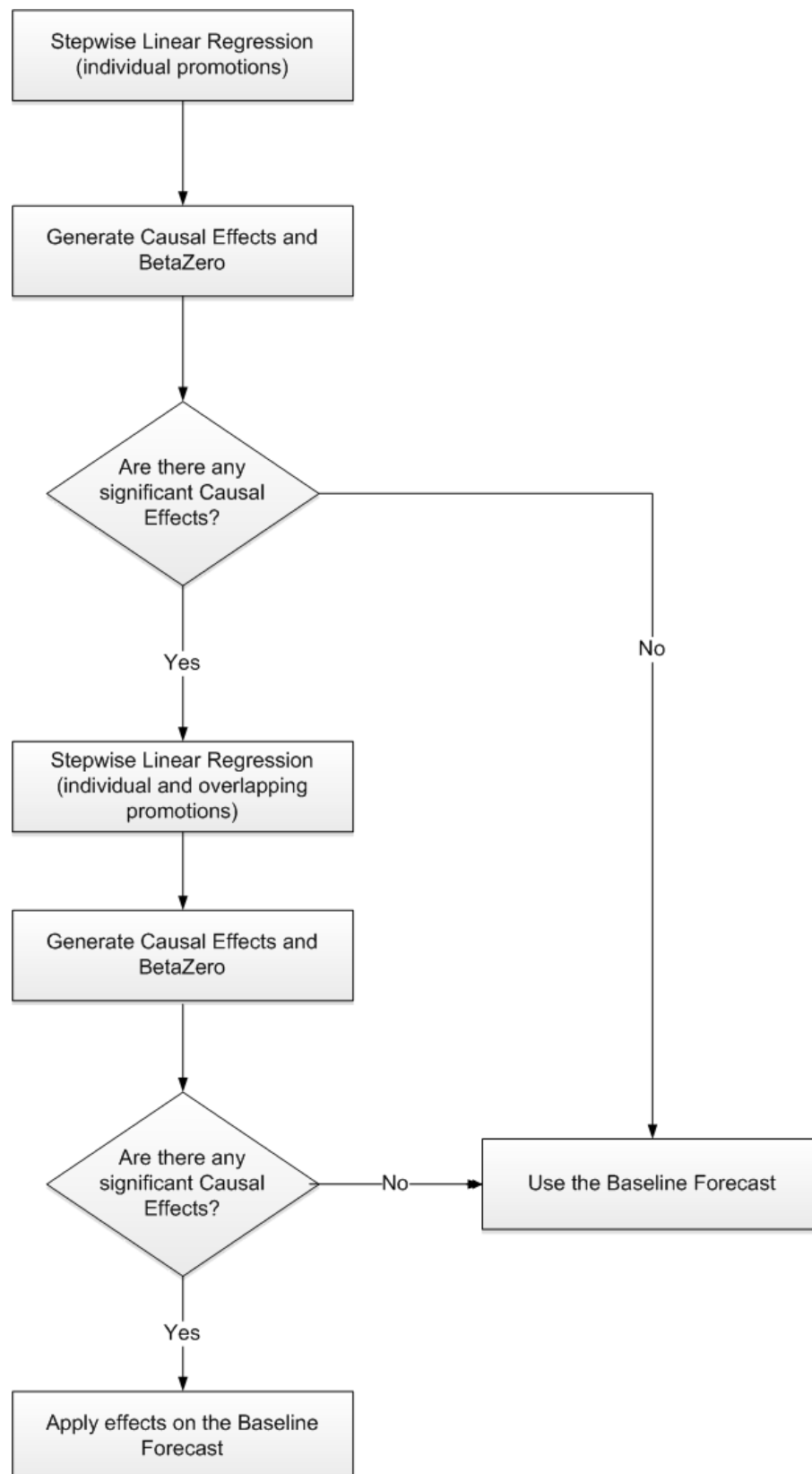
- Baseline forecasts need to consider seasonality; otherwise normal seasonal demand is attributed to promotional effects.
- Promotional Effects need to be able to be analyzed at higher levels in the retail product and location hierarchies. This produces cleaner signals and alleviates

issues involved in forecasting new items and new stores and issues involving data sparsity.

- Users need to be aware that the forecasting models cannot tell the difference between causal effects and correlated effects. What this means is that users should be wary of promotional effects attributed to an event that occurs at the same time every year. The system cannot distinguish between the promotional effect and the normal seasonality of the product. The same can be said for any two events that always occur at the same time. The combined effect is most likely attributed to one or the other event.

Causal Forecasting with Baselines

Rather than use a sales history that may not have sufficient or accurate data, users can load a baseline into the RDF Cloud Service Causal Engine instead. Baselines are often generated using data that is rolled up to a higher dimension than item/store, providing a greater depth of data and hence a less-noisy sales history. The sales data used to generate the baseline can be corrected for out-of-stock, promotional, and other short-term event information using Preprocessing. These baselines are then spread back to the item/store level and then loaded in the RDF Cloud Service Causal Engine. The Engine uses the baseline along with the historic promotional data and future planned promotions data to create the system forecast, which is the baseline with the lifts, which were calculated from the promotional data, applied on top.

Figure 3–7 Baseline Process

Causal Forecasting Using the Baseline Process

When a baseline is used, the AutoES binary code executes in the following manner:

1. The binary reads the history of the time series.
2. The binary reads the type of each promotional variable into the system.
3. The binary reads in all the promotional variables that apply to the series.
4. The binary creates an internal promotional variable to allow the modeling of trend.
5. Promotional variables, internal promotional variables, promotional variable types, and the series itself are passed to the stepwise regression routine, with the historic data serving as the dependent variables.
6. If the regression finds no significant promotional variables, the casual method is considered to have failed to fit. In this case, the forecast equals the baseline.
7. The fit at time t , $\text{fit}(t)$, is defined in terms of b_0 , the intercept of the regression, b_i , the effect corresponding to promotional variable i , and $p_i(t)$, is the value of promo variable i , in time t as:
$$\text{fit}(t) = b_0 + \sum b_i p_i(t)$$
8. The forecast is obtained by re-causalizing the baseline. This is done by adding back the causal effects for the product/location/time positions, where the corresponding promo variables are on in the forecast region.
9. The binary writes the winning promotional variables effects back to the database.
10. The selected model is recorded in the database.
11. The binary records the forecast and the baseline in the database.

Causal Forecasting for Short-lifecycle Items

To forecast short-lifecycle promotional items, Causal deprices, depromotes, and smoothes the forecasting data source to generate the short lifecycle forecast causal baseline. In essence, this is the causal forecasting process where the generation of the baseline and the estimation of the promotional lifts are modified for items with short lifecycle.

First, the baseline is generated. Then the forecast data source is depriced, depromoted and smoothed. The resulting feed is aggregated and then spread down using rate of sales as a profile to create a lifecycle curve. The lifecycle curve is shifted and stretched or shrunk to fit the new season length. This curve represents the pre-season baseline forecast. In season, the pre-season forecast serves as a forecast plan to the Bayesian forecasting method. The Bayesian forecast is the causal baseline for short lifecycle items. The next step is to calculate the promotional lifts.

To do this, the promotional lifts are filtered from the historical sales and applied on top of the item's rate of sale. The resulting measure is regressed against the promotional variables to determine the promotion effects. Finally, the promotion effects are applied on top of the short-lifecycle causal baseline to generate the final forecast.

Causal Forecasting at the Daily Level

The causal forecasting at the daily level is calculated by spreading the weekly causal forecast down to day. The spreading utilizes causal daily profiles, thus obtaining a causal forecast at the day granularity.

The daily casual forecast process executes in the following manner:

1. Preprocess the day-level promotional variables by multiplication with daily profiles. Aggregate the preprocessed continuous day level promotional variables to the week level.
2. Calculate the causal forecast at the weekly level. Set promotional effects if desired. Use the RDF Cloud Service causal engine to generate the forecast.
3. Calculate the multiplicative promotional effects at the item/store level for every promo variable. The effects can be either:
 - Manually preset (See Step 1).
 - Calculated. When calculating the causal forecast, the calculated causal effects are written back to the database. If the effects are calculated at higher level than item/store, the effects are replicated down to item/store since the effects are multiplicative. If source-level forecasting is used and causal method is used both at the source-level and at the final-level, the effects from the final-level is used.
4. Daily profiles are calculated using the Curve module. Since as much history as possible is used and is averaged over seven days, it's assumed that these profiles are de-causalized. The de-causalized daily profiles capture the day-of-week effect and should be quite stable.
5. Causal effects are applied to the daily profiles. The profiles are multiplied by the causal effects and then the profiles have to renormalize.

Example

For every item/store combination, calculate a normal week-to-day profile based on historic data. Note that this profile is already computed for spreading the weekly forecasts to the day level. Suppose for a certain product, the profile is as follows:

Mon	Tues	Wed	Thu	Fri	Sat	Sun	Week
10%	10%	10%	10%	20%	30%	10%	100%

Suppose that in the past, the promotion was held on Wednesday, Thursday, and Friday of week w6:

Mon	Tues	Wed	Thu	Fri	Sat	Sun
		P	P	P		

Then the continuous weekly indicator for this promotion in w6 should be set to 0.4, which is the sum of the weights of Wednesday, Thursday, and Friday.

Now assume that the same promotion is held in a future week (w36), but only on Thursday:

Mon	Tues	Wed	Thu	Fri	Sat	Sun
			P			

Then the continuous weekly indicator for w36 should be set to 0.1, which is the weight of Thursday only.

The approach to use the continuous promotion indicators to generate an accurate causal forecast at the day level is as follows:

- Calculate the weekly multiplicative effect for the promotion using the standard causal forecasting system with continuous indicators.
- Calculate the forecast for w36 using the standard causal forecasting system with continuous indicators.
- Update the week-to-day profile of w36 so that the weight of Thursday is doubled (the multiplicative factor is 2):

Mon	Tues	Wed	Thu	Fri	Sat	Sun	Week
10%	10%	10%	20%	20%	30%	10%	110%

- Normalize the profile for w36:

Mon	Tues	Wed	Thu	Fri	Sat	Sun	Week
9%	9%	9%	18%	18%	27%	9%	100%

Finally, spread the forecast of w36 using the normalized profile.

Final Considerations About Causal Forecasting

In the Oracle Retail approach to causal forecasting, the causal effects are obtained by fitting a stepwise linear regression model that determines which variables are most relevant and what effect those relevant variables have on the series. The data used to fit the regression is the fit history of each time series, so basically a model is fit per time series. A problem arises due to potential lack of significant data (that is, when a promotional variable is not represented in the history, but it is present in the forecast region). In that case, the effect for that variable would not be computed at all, thus affecting the accuracy of the forecast. There are a few solutions that make use of the effects from other similar time series. One solution would be to do source-level causal forecasting and then spread down to the final-level.

This would be equivalent to using the effects at the source-level for time series that have no causal variable instances in the history. This has a serious conceptual drawback. By aggregating the promotional variables at the source-level, we would force the effects on the other time series in the same aggregation class that would otherwise not have the causal variables on at the same time. An alternate solution is whenever a causal effect cannot be computed because of lack of significant data. An averaged effect from another time-series in the same aggregation class is going to be used instead. Refer to [Table 12–3, "Promo Effect Types"](#) for information on the Override Higher Level type.

New Item & Locations Task

This chapter describes these two features:

- Item attributes — which are used to make automatic like item recommendations for new items.
- New items — including:
 - workflow around handling
 - reviewing and approving their automatic like item recommendation
 - the manual process for like stores selection with new stores

In general, an item is considered new if it satisfies the following conditions:

- Forecast start date override is in the future *or* Sales history length is less than the time series duration parameter
- The substitution method is blank
- Has no like item assigned

These workbooks help you achieve this task:

- [New Item Administration Workbook](#)
- [New Item Review Workbook](#)
- [New Item Maintenance Workbook](#)
- [Business Support Like Store Workbook](#)
- [Forecaster Like Store Workbook](#)

New Item & Locations Workbooks, Steps, and Views

The following table lists the workbooks, steps, and views for the New Item & Locations task.

Note: The full functionality of these workbooks is available only when item attributes are loaded and thus the like item recommendation is automated.

When item attributes are not available. Then like items are selected manually, and the attribute-based functionality is unavailable.

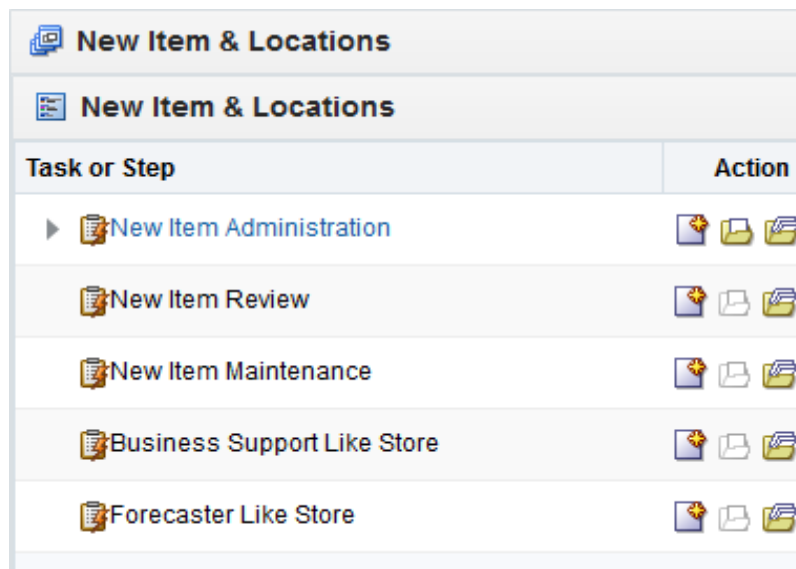
Workbook	Steps	Views
New Item Administration Workbook	New Item Settings Step	Clone Adjustment Parameters View New Item Basic Parameters View
New Item Review Workbook	Review Aggregate Step	Aggregate Level View
	Review Ranking Step	Attribute Match View Existing Item Thresholds Maintenance View New Item Attribute Maintenance View New Item Attributes View Similarity Score View
	Review Detailed Step	Item & Location Recommendation View Regenerate Like Item Assignment View
	Like Item - Select and Approve Step	Select and Approve View
New Item Maintenance Workbook	Review Ranking Step	Attribute Match View New Item Attributes View Similarity Score View
	Ongoing Maintenance Step	New Item Maintenance View
Business Support Like Store Workbook	Business Support Like Store Assignment Step	Business Support Like Store Assignment View
Forecaster Like Store Workbook	Forecaster Like Store Assignment Step	Forecaster Like Store Assignment View

New Item Administration Workbook

To build the New Item Administration workbook, perform these steps:

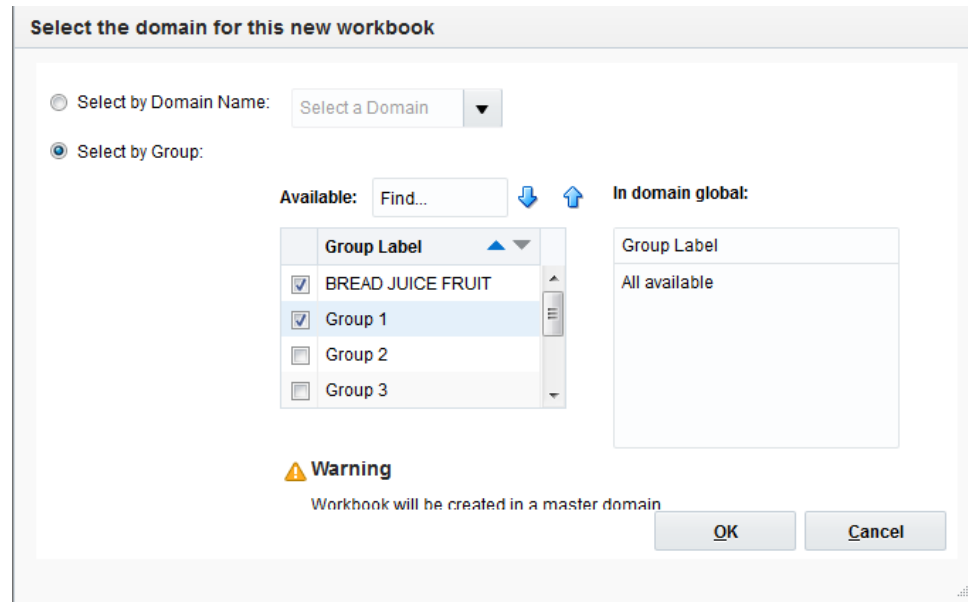
1. Click the New Workbook icon in the New Item Administration task in the New Item & Locations activity.

Figure 4–1 New Item & Locations Task



2. The Workbook wizard opens. Select the domain for this workbook and click **OK**.

Figure 4–2 Workbook Wizard: Select the Domain



The New Item & Location Administration workbook is built.

New Item Settings Step

This step contains views that allow you to set default values for some parameters related to the new item functionality

The available views are:

- [Clone Adjustment Parameters View](#)
- [New Item Basic Parameters View](#)

Clone Adjustment Parameters View

The Clone Adjustment Parameters view is used to review default values for some parameters related to the new item functionality

Figure 4–3 Clone Adjustment Parameters View

Cloned History Adjustment - Alpha	0.00
Cloned History Adjustment - Calculation Window Length	0
Cloned History Adjustment - Recent Sales Threshold	0

Measures: Clone Adjustment Parameters View

The Clone Adjustment Parameters view contains the following measures:

Cloned History Adjustment - Alpha (Range 0-1)

This parameter is used to calculate the ratio that is applied to the cloned history. If this parameter is close to zero (0), then the cloned sales will be scaled so that they are aligned with the sales level. If this parameter is close to one (1), then little scaling of the cloned history will occur.

Cloned History Adjustment - Recent Sales Threshold

This parameter represents a specific number of periods. If it is less than the number of periods from the first sale date to the current date, then the cloned history is adjusted. If it is greater than the number of periods from the first sale date to the current date, then no adjustment is made to the cloned history.

Cloned History Adjustment - Calculation Window Length

This parameter is the number of periods that are considered when adjusting the cloned history.

Figure 4–4 Adjustment Ratio Formula

$$adjustment\ ratio = \left(\frac{sum\ of\ first\ M\ periods\ of\ sales}{sum\ of\ last\ M\ periods\ of\ cloned\ history} \right)^{(1-alpha)}$$

Figure 4–5 Cloned History Formula

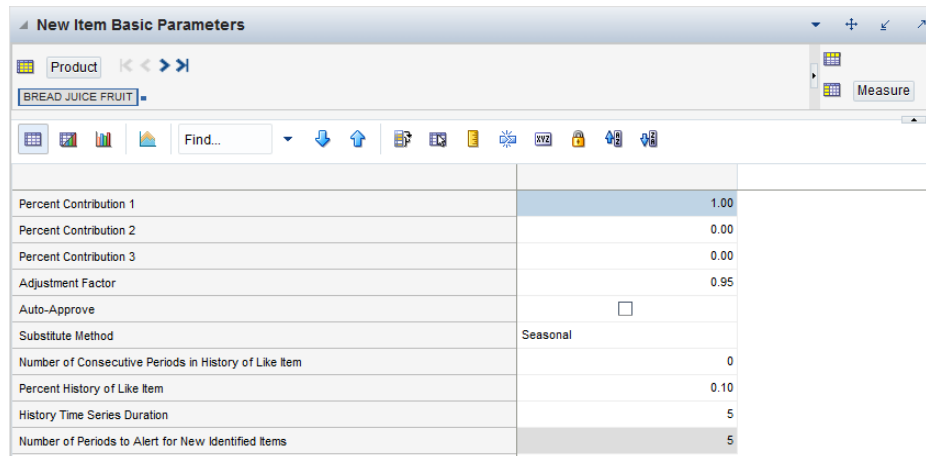
$$cloned\ history = adjustment\ ratio * unadjusted\ cloned\ history$$

New Item Basic Parameters View

The New Item Basic Parameters view is used to set default values for some parameters related to the new item functionality.

Note: If no item attributes are available, then this view has a subset of measures.

Figure 4–6 *New Item Basic Parameters View*



Parameter	Value
Percent Contribution 1	1.00
Percent Contribution 2	0.00
Percent Contribution 3	0.00
Adjustment Factor	0.95
Auto-Approve	<input type="checkbox"/>
Substitute Method	Seasonal
Number of Consecutive Periods in History of Like Item	0
Percent History of Like Item	0.10
History Time Series Duration	5
Number of Periods to Alert for New Identified Items	5

Measures: New Item Basic Parameters View

The New Item Basic Parameters view contains the following measures:

Note: If no item attributes are available, then History Time Series Duration is the only measure for this view.

Percent Contributions

Percent Contribution1, Percent Contribution2, Percent Contribution3

Adjustment Factor

You may enter an Adjustment Factor to apply to the cloned history of the new location. This is a real number between [zero (0), infinity). The default (NA) value is 1.00 (in other words 100%), which translates to no adjustment.

Example 4–1 *Adjustment Factor*

If demand for a new store is expected to be 30% greater than its clone store, the Adjustment Factor would be set to 1.30. If demand for a new store is expected to be 30% less than its clone store, the Adjustment percent would set to 0.70.

Note: Adjustment Factors and Clone Contributions specified in the Product Cloning and Location Cloning views are used together while evaluating the result for a given item/store.

Example 4–2 Adjustment Factors and Clone Contributions

SKU1	
SKU2	SKU3
20%	80%
Adjustment Factor = 1	

STR1:	
STR2	STR3
50%	50%
Adjustment Factor = 0.5	
The contributions are calculated as: SKU2/STR2 at 5% ($=20\% \times 0.5 \times 50\%$), SKU2/STR3 at 5%, SKU3/STR2 at 20% ($=80\% \times 0.5 \times 50\%$), SKU3/STR3 at 20%	

Auto-Approve

You decide if automatic like item recommendations are automatically approved by selecting this measure. Automatically approved like items also trigger an alert and the New Item Maintenance workbook is using the alert to pre-range the new items only to approved items positions. If the automatic like item recommendations are not automatically approved, the new items are alerted in a not approved alert and can be viewed and adjusted in the New Item Review workbook.

Substitute Method

This measure displays a list where you can select the substitute method. When a Substitute Method is used to forecast, the method set for an intersection is cleared once the Default Forecast Start Date is greater than the Forecast Start Date Override plus the Like TS Duration for the intersection. Valid options are:

Substitute Method	Description
None	No Forecast is created for the time series (product location combination)
Seasonal	You provide a like item/location that has a similar seasonality pattern. The new time series' forecast is the like item/locations demand forecast with the applied adjustment. The forecast is set to zero (0) for all dates before the new product/location's start date.
Lifecycle	You provide a like item/location that had a similar lifecycle pattern as the new item/location. The new item/location's forecast is the like/location's actual historical demand with the applied adjustment shifted such that the like item/locations first sales matches the new item/location's forecast start date.
Cloning	You provide a like item/location that has a similar selling pattern as the new item/location. The historical demand of the like item/location is copied into the historical sales of the new item/location. During forecasting, the forecast of the new item/location is generated based on the new item/location's own, copied historical demand.

Substitute Method	Description
Base Rate of Sales	<p>You provide a base rate of sales for a new item/store combination. The new product's forecast is a combination of the seasonality of the forecast at the corresponding source level and the base rate of sales. Specifically, the formula to calculate the forecast is:</p> <p><i>Forecast at time t = source level forecast at time t divided by the average of the source level forecast times the base rate of sales.</i></p> <p>The base rate of sale is a convenient way to generate (seasonal) forecasts for a new item. No Like item or Clone item is needed. What is necessary is a value for how much the item is selling on average per period. That value works as the interim forecast used to spread the source level forecast down to final level.</p> <p>Because this item is new, the system knows that as you have specified a history start date.</p> <p>The base rate of sale forecast is generated until the TS duration is reached.</p> <p>The TS duration is the difference between forecast start date and history start date.</p> <p>Usually the default history start date is empty, which means it is the beginning of the calendar.</p> <p>If the history start date override is also empty, the forecast start date less the beginning of the calendar (≥ 2 years) is probably much more than the TS duration, so the item is not considered new.</p> <p>In this case base rate of sales or any new item method, will not work.</p>

Number of Consecutive Periods in History of Like Item

In this measure, you enter a threshold for the number of consecutive periods in the most recent history, where the demand was positive. If the actual number is larger than the threshold, then the time series qualifies to serve as like item/location for a new item/location. For instance, the threshold is set to three, and the demand pattern is:

0,2,3,1,2,1,0,1,2,2,1,today

The calculated number of consecutive periods with positive demand is 4, and the item/location qualifies as a possible like item/location.

Percent History of Like Item

In this measure, you enter the threshold for the data density. If the actual density is larger

than the threshold, the time series qualifies to serve as like item/location for a new item/location. The data density is calculated as:

data density = number of periods with demand larger than zero / total length of demand

For a time series with the following demand values:

0,1,0,1,0,today

The data density is $2/4 = 50\%$

History Time Series Duration

In this measure you can enter the threshold for the historical demand duration to determine if a time series is considered. If the demand history is less than the

threshold, the forecast of the new time series is generated using the new item/store functionality. If the demand length is larger than the threshold, the time series is not considered new anymore, and its own demand is used to generate the forecast.

Number of Periods to Alert for New Identified Items

This measure defines how many periods of new item/stores display in the [New Item Review Workbook](#) and [New Item Maintenance Workbook](#).

New Item Review Workbook

Note: This workbook is only available if item attributes exist.

This workbook is intended for new items that have received like item recommendations, but which were not auto-approved. You can review recommendations, as well as metrics that support the recommendations. The recommendations are based on similarity of items, which in turn is based on how close new items' attributes are compared to all existing items' attributes.

Note: The Like Item 2 field is ignored when there is no Like Item 1.

The workbook can be built two ways, either:

- Use the unapproved items alert
- Use the task flow, in which case a pre-range mask narrows down the product hierarchy to only the relevant new and existing items

To build the New Item Review workbook, perform these steps:

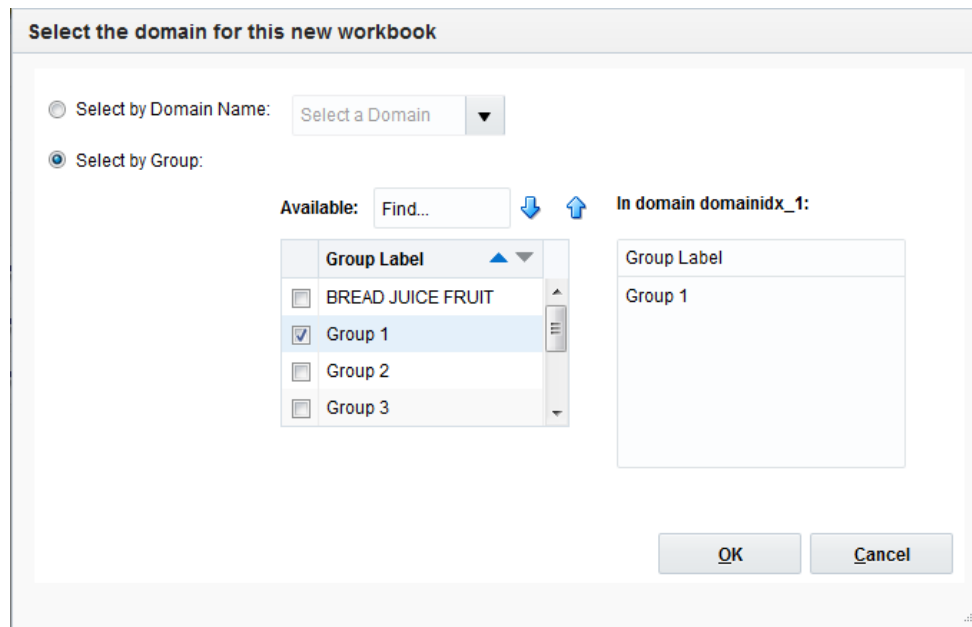
1. Click the New Workbook icon in the New Item Review task in the New Item & Locations activity.

Figure 4–7 *New Item Review Task*

New Item & Locations	
New Item & Locations	
Task or Step	Action
New Item & Location Administration	
New Item Review	
New Item Maintenance	
Business Support Like Store	
Forecaster Like Store	

2. The Workbook wizard opens. Select the domain for this workbook and click **OK**.

Figure 4–8 Workbook Wizard: Select Domain



The New Item Review workbook is built.

Review Aggregate Step

This step is the first place to go after the like item recommendation was run in batch. You can check what like items were recommended for a certain new item. There may be more than one like item, due to the assortment of each store. For instance, a very good fit for a new item is only sold in a certain store format, so for other store formats different like items are recommended. For each like item picked, the store count for which the like item is valid is displayed.

The available view is:

- [Aggregate Level View](#)

Aggregate Level View

The Aggregate Level view is at the item/item RHS intersection. The item represents the new items, while the item RHS represents the like items. Both dimensions are ranged to only relevant positions. For instance, the item dimension only displays items that are considered new. And the item RHS dimension has only positions that were identified as like items for new items.

Figure 4–9 Aggregate Level View

	Aggregated Store Count
70010046 - Folgers 100% Columbian Non-Flavored Regular - Caffeinated 12 oz Can	0
70010047 - Folgers Dark Roast Non-Flavored Regular - Caffeinated 12 oz Can	0
70010050 - PL French Roast Non-Flavored Regular - De-Caffeinated 12 oz Bag	0
70010060 - Folgers French Roast Non-Flavored De-Caffeinated 12 oz Jar	0
70010072 - Peet's 100% Columbian Un-Flavored Regular - Caffeinated 12 oz Bag	0
70010073 - Gevalia 100% Columbian Un-Flavored Regular - Caffeinated 30 oz Can	0

Measures: Aggregate Level View

The Aggregate Level View view contains the following measure:

Aggregated Store Count

This measure displays the number of stores at which an item RHS position was identified as the most suitable like item for a new item. For instance, for new item A, item BA was identified to be the like item for 20 stores. For the rest of 42 stores, it was item CA. This can happen simply because the best fit - in this case item BA - is not sold in all stores. Item CA is the second best fit, but it's sold in more stores, and thus the subjective better fit.

Review Ranking Step

After the high level like item recommendation was checked, you may want to review details about the recommended like items and the new item's attribute and weights. This step enables you to find this information in the views that it contains.

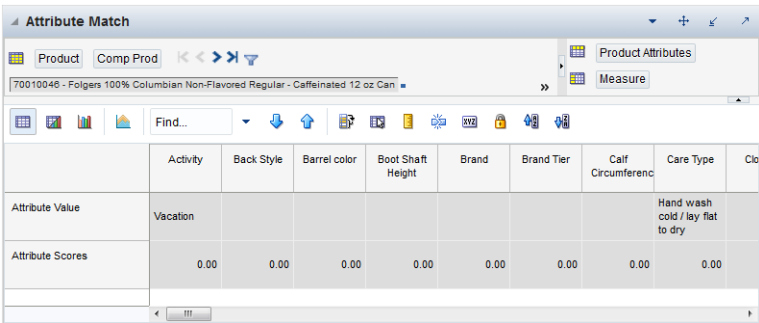
The available views are:

- [Attribute Match View](#)
- [Existing Item Thresholds Maintenance View](#)
- [New Item Attribute Maintenance View](#)
- [New Item Attributes View](#)
- [Similarity Score View](#)

Attribute Match View

The Attribute Match view is at the item/item RHS/attribute intersection. The item dimension is ranged to new items, while the item RHS dimension is ranged to only relevant existing items. The two measures show the attribute values and how they match between the new and existing items.

Figure 4–10 Attribute Match View



The screenshot shows the 'Attribute Match' window. It has a toolbar with icons for product, comparison, and search. Below the toolbar is a table with columns: Activity, Back Style, Barrel color, Boot Shaft Height, Brand, Brand Tier, Calf Circumferenc, Care Type, and Clo. The table has three rows: 'Attribute Value' with 'Vacation' in the Activity column, 'Attribute Scores' with '0.00' in all other columns, and a blank row. The window title is 'Attribute Match'.

Measures: Attribute Match View

The Attribute Match View view contains the following measures:

Attribute Value

This measure displays the content of the attribute. For instance the unit of measure (UOM) attribute can have different values. It can be inch or XL for fashion items. Or it can be ounce or grams for grocery items.

Attribute Scores

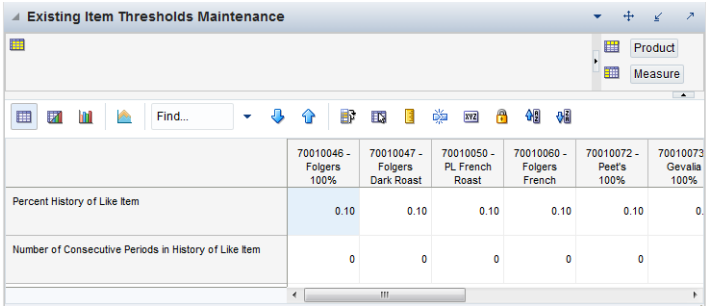
This measure displays the quantitative fit of the attribute values between new and existing items. For instance we can compare the UOM attribute between a coffee pack and a pair of jeans. The relevance of matching ounces and inches may not be very high, and the attribute score is likely zero. However, if we compare color attribute of a shirt and a t-shirt, the match be more relevant and the score is larger than zero.

This measure incorporates the goodness of the fit in attributes between new and existing items, as well as how important an attribute is for the new item. If the new item is a carbonated drink, the brand attribute may be much more relevant than the price tier, because the consumer is prepared to pay a higher price for a brand item

Existing Item Thresholds Maintenance View

The Existing Item Thresholds Maintenance view is at the item intersection. The positions are ranged to only new items. The information in this view determines which existing items are eligible to be recommended for a certain new item. The decision is made using the included measures.

Figure 4–11 Existing Item Thresholds Maintenance View



The screenshot shows the 'Existing Item Thresholds Maintenance' window. It has a toolbar with icons for product, comparison, and search. Below the toolbar is a table with columns: 70010046 - Folgers 100%, 70010047 - Folgers Dark Roast, 70010050 - PL French Roast, 70010060 - Folgers French, 70010072 - Peet's 100%, and 70010073 Gevalia 100%. The table has two rows: 'Percent History of Like Item' with values 0.10, 0.10, 0.10, 0.10, 0.10, 0.10 and 'Number of Consecutive Periods in History of Like Item' with values 0, 0, 0, 0, 0, 0. The window title is 'Existing Item Thresholds Maintenance'.

Measures: Existing Item Thresholds Maintenance View

The Existing Item Thresholds Maintenance view contains the following measures:

Percent History Like Item

In this measure, you enter the threshold for the data density. If the actual density is larger than the threshold, the time series qualifies to serve as like item/location for a new /item/location. The data density is calculated as:

data density = number of periods with demand larger than zero / total length of demand

For a time series with the following demand values:

0,1,0,1,0,today

The data density is $2/4 = 50\%$

The information entered here is an override of the default value, specified in the New Item Administration task.

Number of Consecutive Periods in History of Like Item

In this measure, you enter a threshold for the number of consecutive periods in the most recent history, where the demand was positive. If the actual number is larger than the threshold, then the time series qualifies to serve as like item/location for a new /item/location. For instance, the threshold is set to three, and the demand pattern is: 0,2,3,1,2,1,0,1,2,2,1,today

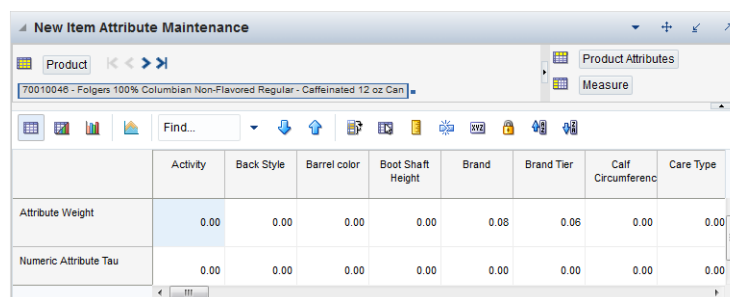
The calculated number of consecutive periods with positive demand is 4, and the item/location qualifies as a possible like item/location.

The information entered here is an override of the default value, specified in the New Item Administration task.

New Item Attribute Maintenance View

The New Item Attribute Maintenance view is used to review and adjust the attribute-related information for the new items.

Figure 4–12 *New Item Attribute Maintenance View*



	Activity	Back Style	Barrel color	Boot Shaft Height	Brand	Brand Tier	Calf Circumferenc	Care Type
Attribute Weight	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
Numeric Attribute Tau	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Measures: New Item Attribute Maintenance View

The New Item Attribute Maintenance view contains the following measures:

Attribute Weight

This measure displays the relative importance of the attributes for a given new item. While the flavor family may not be important for a t-shirt, and the attribute has a weight of zero, the brand and color attributes definitely are. Their relative importance may be 0.2 for the color and 0.3 for the brand.

Note: That the sum of all attribute weights doesn't need to be 1 for every item. The automatic like item recommendation algorithm is taking care of it. The most likely scenario is that this measure is loaded, but it can be review and adjusted in this view.

Numeric Attribute Tau

This measure helps decide the goodness of fit between two attribute values. If we compare the colors of two items, the values are either equal (red = red) or not (red != black). However there are cases when two values are very close but not equal, and the user sets a threshold to help decide if the values should be a match or not.

For instance the size of a bottle of water is 16 fl. oz., which is roughly 473 ml. When comparing this item with another bottle of water which is 500 ml., the numbers are not matching. However, this may be a case where the user sets a value for tau, that allows the 500 ml. to be in the acceptable range of the 473 ml. The formula to decide if a match is acceptable is given below. If both attribute values are not Null, then

If $\text{abs}(\text{value1} - \text{value2})$ is less equal $\text{threshold tau} * \max(\text{value1}, \text{value2})$

Then the match=1

Otherwise the match is 0

New Item Attributes View

The New Item Attributes View is used to only review the attribute-related information for the new items.

Figure 4–13 New Item Attributes View

The screenshot shows a software window titled "New Item Attributes". It has a top navigation bar with "Product" and "Measure" tabs. Below the tabs is a search bar containing "70010048 - Folgers 100% Columbian Non-Flavored Regular - Caffeinated 12 oz Can". A toolbar with various icons is located below the search bar. The main area contains a table with the following data:

	Activity	Back Style	Barrel color	Boot Shaft Height	Brand	Brand Tier	Calf Circumferenc	Care Type
Attribute Weight	0.00	0.00	0.00	0.00	0.08	0.06	0.00	0.1
Attribute Value					Folgers	Value		
Tau (numeric threshold)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1

Measures: New Item Attributes View

The New Item Attributes View contains the following measures:

Attribute Weight

This measure displays the relative importance of the attributes for a given new item. While the flavor family may not be important for a t-shirt, and the attribute has a

weight of zero, the brand and color attributes definitely are. Their relative importance may be 0.2 for the color and 0.3 for the brand.

Note: That the sum of all attribute weights doesn't need to be 1 for every item. The automatic like item recommendation algorithm is taking care of it. The most likely scenario is that this measure is loaded, but it can be review and adjusted in this view.

Numeric Attribute Tau

This measure helps decide the goodness of fit between two attribute values. If we compare the colors of two items, the values are either equal (red = red) or not (red != black). However there are cases when two values are very close but not equal, and the user sets a threshold to help decide if the values should be a match or not.

For instance the size of a bottle of water is 16 floz, which is roughly 473 ml. When comparing this item with another bottle of water which is 500 ml, the numbers are not matching. However, this may be a case where the user sets a value for tau, that allows the 500 ml to be in the acceptable range of the 473 ml. The formula to decide if a match is acceptable is given below. If both attribute values are not Null, then:

*If $abs(value1 - value2)$ is less equal threshold $\tau * \max(value1, value2)$*

Then the match=1

Otherwise the match is 0

Similarity Score View

The Similarity Score view is at the item/item RHS/attribute intersection. The item dimension is ranged to new items, while the item RHS dimension is ranged to only relevant existing items. The two measures show the calculated similarity between new and existing items.

Figure 4–14 Similarity Score View

	70010046 - Folgers 100%	70010047 - Folgers Dark Roast	70010050 - PL French Roast	70010060 - Folgers French	70010072 - Peet's 100%	70010073 - Gevalia 100%	70010090 - Tully's Light Roast	700101 Pencil S Peact
Similarity Scores	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Measures: Similarity Score

The Similarity Score view contains the following measure:

Similarity Scores

The Similarity Score is a measure of how well a new item's demand behavior can be modeled after a certain existing item's. The higher the score, the better the fit, and the better the chance that the existing item is going to be the like item

Review Detailed Step

This step includes these available views:

- [Attribute Match View](#)
- [Existing Item Thresholds Maintenance View](#)

Item & Location Recommendation View

The Item & Location Recommendation view is at the item / store intersection. For new items it displays the top existing item for a certain store.

Figure 4–15 Item & Location Recommendation View

Location	Product	Measure
5th Avenue	70010046 - Folgers 100% Dark Roast	
	70010047 - Folgers 100% PL French Roast	
	70010050 - Folgers 100% French	
	70010060 - Peet's 100%	
	70010072 - Gevalia 100%	
	70010073 - Tully's Light Roast	
	70010090 - Pencil Skirt Peach	
	70010101 - Pencil Skirt Navy	
	70010102 - Pencil Skirt Navy	
	70010096 - Folgers 100% Columbian Non-Flavored Regular - Caffeinated 12 oz Jar	
	70010099 - Folgers 100% Columbian Non-Flavored Regular - Caffeinated 12 oz Jar	
	70010048 - Folgers 100% PL Medium Roast Non-Flavored Regular - Caffeinated 12 oz Bag	
	70010043 - Folgers Breakfast Roast Non-Flavored Regular - De-Caffeinated 12 oz Can	
	70010084 - Starbucks Original Un-Flavored Regular - Caffeinated 12 oz Bag	
	70010070 - Gevalia Breakfast Roast Un-Flavored Regular - Caffeinated 12 oz Bag	
	70010092 - Tully's French Roast Non-Flavored Regular - Caffeinated 12 oz Can	
	70010137 - Running Short Grey	
	70010039 - Knee-Length Black	
	70010103 - A-L Tw	

Measures: Item & Location Recommendation View

The Item & Location Recommendation view contains the following measure:

System Recommended Like Item 1

This measure displays the top like item (based on similarity and store ranging) for every store. For a given new item, the like item may be different by store. The reason is that for some stores, the existing item with the highest similarity is not available for sale. Then, the algorithm is picking the existing item with the highest score for that store.

Regenerate Like Item Assignment View

The Regenerate Like Item Assignment view is used to forecast a new item by modeling it after an existing item.

Figure 4–16 Regenerate Like Item Assignment View

Product	Measure
70010046 - Folgers 100% Dark Roast	<input type="checkbox"/>
70010047 - Folgers 100% PL French Roast	<input type="checkbox"/>
70010050 - Folgers 100% French	<input type="checkbox"/>
70010060 - Peet's 100%	<input type="checkbox"/>
70010072 - Gevalia 100%	<input type="checkbox"/>
70010073 - Tully's Light Roast	<input type="checkbox"/>
70010090 - Pencil Skirt Peach	<input type="checkbox"/>
70010101 - Pencil Skirt Navy	<input type="checkbox"/>
70010102 - Pencil Skirt Navy	<input type="checkbox"/>
70010096 - Folgers 100% Columbian Non-Flavored Regular - Caffeinated 12 oz Jar	<input type="checkbox"/>
70010099 - Folgers 100% Columbian Non-Flavored Regular - Caffeinated 12 oz Jar	<input type="checkbox"/>
70010048 - Folgers 100% PL Medium Roast Non-Flavored Regular - Caffeinated 12 oz Bag	<input type="checkbox"/>
70010043 - Folgers Breakfast Roast Non-Flavored Regular - De-Caffeinated 12 oz Can	<input type="checkbox"/>
70010084 - Starbucks Original Un-Flavored Regular - Caffeinated 12 oz Bag	<input type="checkbox"/>
70010070 - Gevalia Breakfast Roast Un-Flavored Regular - Caffeinated 12 oz Bag	<input type="checkbox"/>
70010092 - Tully's French Roast Non-Flavored Regular - Caffeinated 12 oz Can	<input type="checkbox"/>
70010137 - Running Short Grey	<input type="checkbox"/>
70010039 - Knee-Length Black	<input type="checkbox"/>
70010103 - A-L Tw	<input type="checkbox"/>

Measures: Regenerate Like Item Assignment View

The Regenerate Like Item Assignment view contains the following measure:

Regenerate Flag

After reviewing and possibly adjusting the attribute-related measures, you can choose to rerun the like item recommendation. Do this by selecting this measure and committing the changes. The next time the batch is run, new like item recommendations are generated.

Like Item - Select and Approve Step

After reviewing all attributes, similarities, and like item recommendations, this step allows you to approve/override and setup the like item options.

The available view is:

- [Select and Approve View](#)

Select and Approve View

The Select and Approve view allows you to has the option to override the system recommendations, and/or trigger the approval, at the granular item / store intersection. This view has a custom menu, Approve New Items, and it approves the like items recommendations for new items. The recommendations are the system recommended or overrides, depending on the approve settings.

Figure 4–17 Select and Approve View

	5th Avenue	1111 Charlotte	1121 Atlanta	1131 Jacksonville	1141 Nashville	1151 Texas	1211 Boston	1221 New York	1231 Philadelphia*	1241 Cleveland	1271 Shakopee, MN	1311 Chicago*
Approve flag	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approve date	10/06/201...											
Approve	Approve S...	Approve S...	Approve S...	Approve S...	Approve S...	Approve S...	Approve S...	Approve S...	Approve S...	Approve S...	Approve S...	Approve S...
Substitute Method	Seasonal	None	None	None	None	None	None	None	None	None	None	None
Percent Contribution of Like Item 1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Contribution of Like Item 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent Contribution of Like Item 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
System Recommended Like Item 1 Label	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated	70010096 - Folgers 100% Colombian Non-Flavored Regular - Caffeinated

Measures: Select and Approve View

The Select and Approve view contains the following measures:

Approve Flag

Select this measure when you agree with the like item selections. These are either the system generated or the overrides. All approved item recommendations that have the measure checked are approved next time the custom menu is run.

Approve Date

This measure displays the date when the like item recommendation was approved by running the custom menu

Approve

This measure determines which recommendations are approved the next time the custom menu is run. The options are:

- Null— no like item is recommended
- Approve System — the system recommended like item is approved
- Approve Override — your selected like item is approved. Note that if no user selections are available, then no like item is approved.

Substitute Method

This measure displays a list where you can select the substitute method. When a Substitute Method is used to forecast, the method set for an intersection is cleared once the Default Forecast Start Date is greater than the Forecast Start Date Override plus the Like TS Duration for the intersection. Valid options are:

Substitute Method	Description
None	No Forecast is created for the time series (product location combination)
Seasonal	You provide a like item/location that has a similar seasonality pattern. The new time series' forecast is the like item/locations demand forecast with the applied adjustment. The forecast is set to zero (0) for all dates before the new product/location's start date.
Lifecycle	You provide a like item/location that had a similar lifecycle pattern as the new item/location. The new item/location's forecast is the like/location's actual historical demand with the applied adjustment shifted such that the like item/locations first sales matches the new item/location's forecast start date.
Cloning	You provide a like item/location that has a similar selling pattern as the new item/location. The historical demand of the like item/location is copied into the historical sales of the new item/location. During forecasting, the forecast of the new item/location is generated based on the new item/location's own, copied historical demand.

Substitute Method	Description
Base Rate of Sales	<p>You provide a base rate of sales for a new item/store combination. The new product's forecast is a combination of the seasonality of the forecast at the corresponding source level and the base rate of sales. Specifically, the formula to calculate the forecast is:</p> <p><i>Forecast at time t = source level forecast at time t divided by the average of the source level forecast times the base rate of sales.</i></p> <p>The base rate of sale is a convenient way to generate (seasonal) forecasts for a new item. No Like item or Clone item is needed. What is necessary is a value for how much the item is selling on average per period. That value works as the interim forecast used to spread the source level forecast down to final level.</p> <p>Because this item is new, the system knows that as you have specified a history start date.</p> <p>The base rate of sale forecast is generated until the TS duration is reached.</p> <p>The TS duration is the difference between forecast start date and history start date.</p> <p>Usually the default history start date is empty, which means it is the beginning of the calendar.</p> <p>If the history start date override is also empty, the forecast start date less the beginning of the calendar (≥ 2 years) is probably much more than the TS duration, so the item is not considered new.</p> <p>In this case base rate of sales or any new item method, will not work.</p>

Percent Contribution of Like Item 1

This measure determines the percentage of Like item 1's forecast that is going to be applied towards the forecast of the new item.

Percent Contribution of Like Item 2

This measure determines the percentage of Like item 2's forecast that is going to be applied towards the forecast of the new item.

Percent Contribution of Like Item 3

This measure determines the percentage of Like item 3's forecast that is going to be applied towards the forecast of the new item.

Adjustment Factor

This measure determines how much the combined forecasts are scaled up or down to create the forecast of the new item.

System Recommended Like Item 1

This measure displays the top like item for a given store

System Recommended Like Item 2

This measure displays the second like item for a given store

System Recommended Like Item 3

This measure displays the third like item for a given store

User Selected Like-Item 1

You can override in this measure the top like item for a given store

User Selected Like-Item 2

You can override in this measure the second like item for a given store

User Selected Like-Item 3

You can override in this measure the third like item for a given store

Base Rate of Sales

This measure represents the average sales of a new item/store combination. It is used when specifying 'Base Rate of Sales New SKU' as the Substitution Method to create a forecast for the new item/store combination. The measure can be generated in another application and loaded into RDF Cloud Service, or it can be manually entered by a user.

Forecast Start Date Override

This parameter represents the date to start forecasting for an item/location combination. This parameter can be set in the future if using like-item or Sister-Store functionality, and, upon reaching that time, the forecast is generated. If this date is set to the past, it is ignored in favor of the Forecast Start Date from the [Forecast Administration Workbook](#). This means that the Forecast Start Date for this intersection needs to be edited once it is no longer in the future. For like-item or sister store, the Forecast Start Date and the History Start Date should be set to the same date. It is important to understand how Forecast Start Date should be used in conjunction with Forecast End Date. No value is in this measure if the system default set in the [Forecast Administration Workbook](#) is to be used.

Note: This measure can also be set in the [Forecast Maintenance Workbook](#). Changes to this measure can be seen in the Forecast Maintenance task. The most recent commit (between either of the tasks) is the value used by the system.

Forecast End Date Override

This parameter represents the last point in time for which the Forecasting Engine forecasts for an item/location combination. Should this parameter be set to a date less than the Forecast Start Date plus the Forecast Length (in the [Forecast Administration Workbook](#)), the engine forecasts zero (0) past this date. If Forecast End Date is more than Forecasting Start Date plus Forecasting Length, no forecast is generated outside Forecasting Start Date plus Forecasting Length window. In other words, both Forecast Start Date and Forecasting End Date are relevant for time periods within the forecast horizon set at the global level. No value is in this measure if the system default set in the [Forecast Administration Workbook](#) is to be used.

Forecast End Date can be used for new item or location forecasting if the item or location needs to be forecast for a period shorter than the Like TS Duration (set globally in [Forecast Administration Workbook](#)).

Note: This measure can also be set in the [Forecast Maintenance Workbook](#). Changes to this measure can be seen in the [Forecast Maintenance Workbook](#). The most recent commit (between either of the tasks) is the value used by the system.

History Start Date Override

This parameter represents the first point in time from which the Forecasting Engine begins training and modeling (that is, if there are two years of history, but only one year is required, set the start date to a year ago). This parameter overrides at the item/store level from the global settings in the [Forecast Administration Workbook](#). This can be used to level out past sales. For example, if there is a large spike in the first three weeks of sales for an item was on sale, set the Historical Start Date to one week past that period. Those first few weeks are not used when generating the forecast.

It is also important to note that the system ignores leading zeros that begin at the history start date. For example, if your history start date is January 1, 2011 and an item/location does not have sales history until February 1, 2011, the system considers the starting point in that item/location's history to be the first data point where there is a non-zero sales value.

The History Start Date for the new item or new store should be set with the same date as the Forecast Start Date.

Note: When using any of the Lifecycle Methods, the History Start Date for the substitute item or location must be set to the point in the sales history that the new item or location begins using as its sales.

Note: This measure can also be set in the [Forecast Maintenance Task](#) workbook. Changes to this measure can be seen in the [Forecast Maintenance Task](#) workbook. The most recent commit (between either of the tasks) is the value used by the system.

New Item Maintenance Workbook

This workbook is intended for new items that have received like item recommendations, and were auto-approved. You can review recommendations, as well as metrics that support the recommendations. The recommendations are made by similarity of items, which in turns is based on how close a new item's attributes are compared to all existing items' attributes.

The workbook can be built two ways, either:

- Use the approved items alert
- Use the task flow, in which case a pre-range mask narrows down the product hierarchy to only the relevant items

To build the New Item Maintenance workbook, perform these steps:

1. Click the New Workbook icon in the New Item Maintenance task in the New Item & Locations activity.

Figure 4–18 New Item Maintenance Administration Task

New Item & Locations	
New Item & Locations	
Task or Step	Action
New Item & Location Administration	
New Item Review	
New Item Maintenance	
Business Support Like Store	
Forecaster Like Store	

2. The Workbook wizard opens. Select the domain for this workbook and click **OK**.



Figure 4–19 Workbook Wizard: Select Domain

Select the domain for this new workbook

☐ Select by Domain Name:

Select a Domain ▼

☒ Select by Group:

Available: Find...  

Group Label
<input type="checkbox"/> BREAD JUICE FRUIT
<input checked="" type="checkbox"/> Group 1
<input type="checkbox"/> Group 2
<input type="checkbox"/> Group 3

In domain domainidx_1:

Group Label
Group 1

OK

Cancel

The New Item Maintenance workbook is built.

Review Ranking Step

This step contains these available views:

- [Attribute Match View](#)
- [New Item Attributes View](#)
- [Similarity Score View](#)

Attribute Match View

The Attribute Match view is the same view as in the New Item Review workbook, but with different items. The new items included in this workbook have approved like item recommendations.

Figure 4–20 Attribute Match View

	Activity	Back Style	Barrel color	Boot Shaft Height	Brand	Brand Tier	Calf Circumferenc	Care Type	Closure
Attribute Value	Vacation							Hand wash cold / lay flat to dry	
Attribute Scores	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Measures: Attribute Match View

The Attribute Match view contains the following measures:

Attribute Value

This measure displays the content of the attribute. For instance the unit of measure (UOM) attribute can have different values. It can be inch or XL for fashion items. Or it can be ounce or grams for grocery items.

Attribute Scores

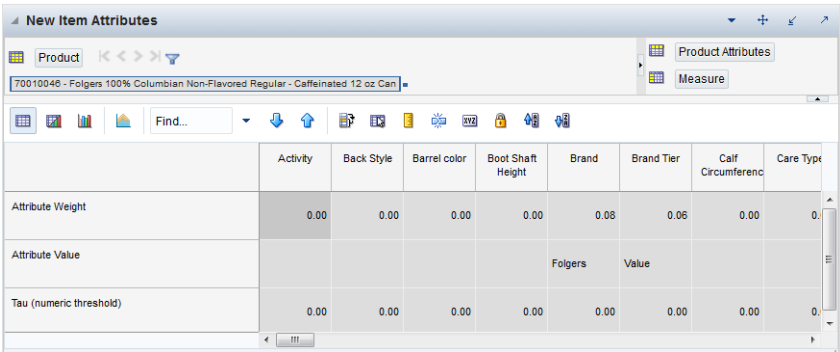
This measure displays the quantitative fit of the attribute values between new and existing items. For instance we can compare the UOM attribute between a coffee pack and a pair of jeans. The relevance of matching ounces and inches may not be very high, and the attribute score is likely zero. However, if we compare color attribute of a shirt and a t-shirt, the match be more relevant and the score is larger than zero.

This measure incorporates the goodness of the fit in attributes between new and existing items, as well as how important an attribute is for the new item. If the new item is a carbonated drink, the brand attribute may be much more relevant than the price tier, because the consumer is prepared to pay a higher price for a brand item

New Item Attributes View

The New Item Attributes view displays attribute information about new items.

Figure 4–21 New Item Attributes View



Measures: New Item Attributes View

The New Item Attributes view contains the following measures:

Attribute Weight

This measure displays the relative importance of the attributes for a given new item. While the flavor family may not be important for a t-shirt, and the attribute has a weight of zero, the brand and color attributes definitely are. Their relative importance may be 0.2 for the color and 0.3 for the brand.

Note: That the sum of all attribute weights doesn't need to be 1 for every item. The automatic like item recommendation algorithm is taking care of it. The most likely scenario is that this measure is loaded, but it can be review and adjusted in this view.

Numeric Attribute Tau

This measure helps decide the goodness of fit between to attribute values. If we compare the colors of two items, the values are either equal (red = red) or not (red!= black). However there are cases when two values are very close but not equal, and the user sets a threshold to help decide if the values should be a match or not.

For instance the size of a bottle of water is 16 floz, which is roughly 473 ml. When comparing this item with another bottle of water which is 500 ml, the numbers are not matching. However, this may be a case where the user sets a value for tau, that allows the 500 ml to be in the acceptable range of the 473 ml. The formula to decide if a match is acceptable as shown. If both attribute values are not Null, then

*If abs(value1-value2) is less equal threshold tau * max(value1, value2)*
Then the match=1
Otherwise the match is 0

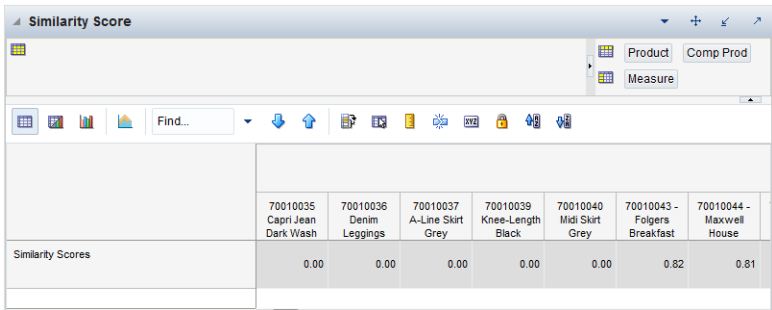
Attribute Value

This measure displays the content of the attribute. For instance the unit of measure (UOM) attribute can have different values. It can be inch or XL for fashion items. Or it can be ounce or grams for grocery items.

Similarity Score View

The Similarity Score view is the same view as in the New Item Review workbook, but with different items. The new items included in this workbook have approved like item recommendations.

Figure 4–22 Similarity Score View



The screenshot shows a software window titled "Similarity Score". It features a toolbar with icons for grid, chart, find, and other functions. Below the toolbar is a table with similarity scores. The table has a header row with product names and a row labeled "Similarity Scores" with corresponding numerical values.

	70010035 Capri Jean Dark Wash	70010036 Denim Leggings	70010037 A-Line Skirt Grey	70010039 Knee-Length Black	70010040 Mid Skirt Grey	70010043 - Folgers Breakfast	70010044 - Maxwell House
Similarity Scores	0.00	0.00	0.00	0.00	0.00	0.82	0.81

Measures: Similarity Score

The Similarity Score view contains the following measure:

Similarity Scores

The Similarity Score is a measure of how well a new item's demand behavior can be modeled after a certain existing item's. The higher the score, the better the fit, and the better the chance that the existing item is going to be the like item

Ongoing Maintenance Step

This step contains this view:

- [New Item Maintenance View](#)

New Item Maintenance View

The New Item Maintenance view is a subset of a the Select and Approve view in the New Item Review workbook, but with different items. The new items included in this workbook have approved like item recommendations.

Figure 4–23 New Item Maintenance View

	5th Avenue
Substitute Method	Seasonal
Percent Contribution of Like Item 1	1.00
Percent Contribution of Like Item 2	0.00
Percent Contribution of Like Item 3	0.00
Adjustment Factor	1.00
Approved Like-Item 1	70010096 - Folgers 100% Columbian Non-Flavored Reg...
Approved Like-Item 2	70010070 - Gevalia Breakfast Roast Un-Flavored Regul...
Approved Like-Item 3	70010089 - Gevalia 100% Columbian Un-Flavored Regul...
Forecast Start	01/01/2016
Forecast End	

Measures: New Item Maintenance View

The New Item Maintenance view contains the following measures:

Substitute Method

This measure displays a list where you can select the substitute method. When a Substitute Method is used to forecast, the method set for an intersection is cleared once the Default Forecast Start Date is greater than the Forecast Start Date Override plus the Like TS Duration for the intersection. Valid options are:

Substitute Method	Description
None	No Forecast is created for the time series (product location combination)
Seasonal	You provide a like item/location that has a similar seasonality pattern. The new time series' forecast is the like item/locations demand forecast with the applied adjustment. The forecast is set to zero (0) for all dates before the new product/location's start date.
Lifecycle	You provide a like item/location that had a similar lifecycle pattern as the new item/location. The new item/location's forecast is the like/location's actual historical demand with the applied adjustment shifted such that the like item/locations first sales matches the new item/location's forecast start date.
Cloning	You provide a like item/location that has a similar selling pattern as the new item/location. The historical demand of the like item/location is copied into the historical sales of the new item/location. During forecasting, the forecast of the new item/location is generated based on the new item/location's own, copied historical demand.

Substitute Method	Description
Base Rate of Sales	<p>You provide a base rate of sales for a new item/store combination. The new product's forecast is a combination of the seasonality of the forecast at the corresponding source level and the base rate of sales. Specifically, the formula to calculate the forecast is:</p> <p><i>Forecast at time t = source level forecast at time t divided by the average of the source level forecast times the base rate of sales.</i></p> <p>The base rate of sale is a convenient way to generate (seasonal) forecasts for a new item. No Like item or Clone item is needed. What is necessary is a value for how much the item is selling on average per period. That value works as the interim forecast used to spread the source level forecast down to final level.</p> <p>Because this item is new, the system knows that as you have specified a history start date.</p> <p>The base rate of sale forecast is generated until the TS duration is reached.</p> <p>The TS duration is the difference between forecast start date and history start date.</p> <p>Usually the default history start date is empty, which means it is the beginning of the calendar.</p> <p>If the history start date override is also empty, the forecast start date less the beginning of the calendar (≥ 2 years) is probably much more than the TS duration, so the item is not considered new.</p> <p>In this case base rate of sales or any new item method, will not work.</p>

Percent Contribution of Like Item 1

This measure determines the percentage of Like item 1's forecast that is going to be applied towards the forecast of the new item.

Percent Contribution of Like Item 2

This measure determines the percentage of Like item 2's forecast that is going to be applied towards the forecast of the new item.

Percent Contribution of Like Item 3

This measure determines the percentage of Like item 3's forecast that is going to be applied towards the forecast of the new item.

Adjustment Factor

This measure determines how much the combined forecasts are scaled up or down to create the forecast of the new item.

System Recommended Like Item 1

This measure displays the top like item for a given store

System Recommended Like Item 2

This measure displays the second like item for a given store

System Recommended Like Item 3

This measure displays the third like item for a given store

Base Rate of Sales

This measure represents the average sales of a new item/store combination. It is used when specifying 'Base Rate of Sales New SKU' as the Substitution Method to create a forecast for the new item/store combination. The measure can be generated in another application and loaded into RDF Cloud Service, or it can be manually entered by a user.

Forecast Start Date Override

This parameter represents the date to start forecasting for an item/location combination. This parameter can be set in the future if using like-item or Sister-Store functionality, and, upon reaching that time, the forecast is generated. If this date is set to the past, it is ignored in favor of the Forecast Start Date from the [Forecast Administration Workbook](#). This means that the Forecast Start Date for this intersection needs to be edited once it is no longer in the future. For like-item or sister store, the Forecast Start Date and the History Start Date should be set to the same date. It is important to understand how Forecast Start Date should be used in conjunction with Forecast End Date. No value is in this measure if the system default set in the [Forecast Administration Workbook](#) is to be used.

Note: This measure can also be set in the [Forecast Maintenance Workbook](#). Changes to this measure can be seen in the Forecast Maintenance task. The most recent commit (between either of the tasks) is the value used by the system.

Forecast End Date Override

This parameter represents the last point in time for which the Forecasting Engine forecasts for an item/location combination. Should this parameter be set to a date less than the Forecast Start Date plus the Forecast Length (in the [Forecast Administration Workbook](#)), the engine forecasts zero (0) past this date. If Forecast End Date is more than Forecasting Start Date plus Forecasting Length, no forecast is generated outside Forecasting Start Date plus Forecasting Length window. In other words, both Forecast Start Date and Forecasting End Date are relevant for time periods within the forecast horizon set at the global level. No value is in this measure if the system default set in the [Forecast Administration Workbook](#) is to be used.

Forecast End Date can be used for new item or location forecasting if the item or location needs to be forecast for a period shorter than the Like TS Duration (set globally in [Forecast Administration Workbook](#)).

Note: This measure can also be set in the [Forecast Maintenance Workbook](#). Changes to this measure can be seen in the [Forecast Maintenance Workbook](#). The most recent commit (between either of the tasks) is the value used by the system.

History Start Date Override

This parameter represents the first point in time from which the Forecasting Engine begins training and modeling (that is, if there are two years of history, but only one year is required, set the start date to a year ago). This parameter overrides at the item/store level from the global settings in the [Forecast Administration Workbook](#). This can be used to level out past sales. For example, if there is a large spike in the first three weeks of sales for an item was on sale, set the Historical Start Date to one week past that period. Those first few weeks are not used when generating the forecast.

It is also important to note that the system ignores leading zeros that begin at the history start date. For example, if your history start date is January 1, 2011 and an item/location does not have sales history until February 1, 2011, the system considers the starting point in that item/location's history to be the first data point where there is a non-zero sales value.

The History Start Date for the new item or new store should be set with the same date as the Forecast Start Date.

Note: When using any of the Lifecycle Methods, the History Start Date for the substitute item or location must be set to the point in the sales history that the new item or location begins using as its sales.

Note: This measure can also be set in the [Forecast Maintenance Task](#) workbook. Changes to this measure can be seen in the [Forecast Maintenance Task](#) workbook. The most recent commit (between either of the tasks) is the value used by the system.













Business Support Like Store Workbook

This workbook does not have an automated like store recommendation for new stores. The assignment is made manually. In this view the selection of the like store is for all products carried in a store. You must know which stores are new and select them in the wizard during the workbook build.

To build the Business Support Like Store workbook, perform these steps:

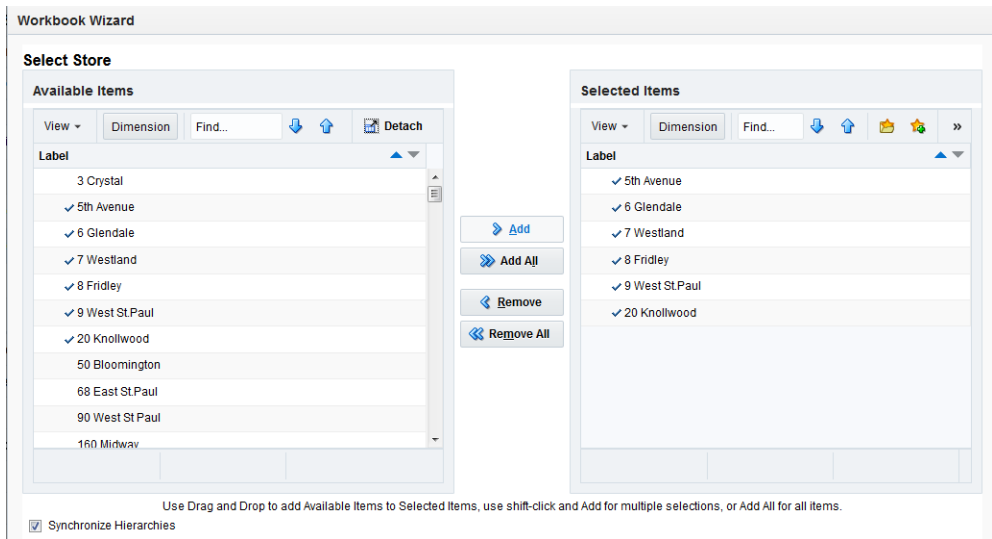
1. Click the New Workbook icon in the Business Support Like Store task in the New Items & Locations activity.

Figure 4–24 Business Support Like Store Administration Task

 New Item & Locations	
 New Item & Locations	
Task or Step	Action
 New Item & Location Administration	
 New Item Review	
 New Item Maintenance	
 Business Support Like Store	
 Forecaster Like Store	

2. The Workbook wizard opens. Select the stores you want to work with and click and click **Finish**

Figure 4–25 Workbook Wizard: Forecast Level



The Business Support Like Store workbook is built.

Business Support Like Store Assignment Step

This step contains views for like store assignments that must be made manually.

The available view is:

- [Business Support Like Store Assignment View](#)

Business Support Like Store Assignment View

The Business Support Like Store Assignment view does not have an automated like store recommendation for new stores. The assignment is made manually. In this view the selection of the like store is for all products carried in a store. You must know which stores are new and select them in the wizard during the workbook build.

Figure 4–26 Business Support Like Store Assignment View

Full Like Store Assignment						
	5th Avenue	6 Glendale	7 Westland	8 Fridley	9 West St.Paul	20 Knollwood
Like Store						
Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00
Substitute Method	None	None	None	None	None	None
Forecast Start						
Forecast End						
Approve By						

Measures: Business Support Like Store Assignment View

The Business Support Like Store Assignment view contains the following measures:

Like Store

In this measure, you can specify an existing store to serve as like store for all available products.

Adjustment Factor

This measure determines how much the combined forecasts are scaled up or down to create the forecast of the new item.

Substitute Method

This measure displays a list where you can select the substitute method. When a Substitute Method is used to forecast, the method set for an intersection is cleared once the Default Forecast Start Date is greater than the Forecast Start Date Override plus the Like TS Duration for the intersection. Valid options are:

Substitute Method	Description
None	No Forecast is created for the time series (product location combination)
Seasonal	You provide a like item/location that has a similar seasonality pattern. The new time series' forecast is the like item/locations demand forecast with the applied adjustment. The forecast is set to zero (0) for all dates before the new product/location's start date.
Lifecycle	You provide a like item/location that had a similar lifecycle pattern as the new item/location. The new item/location's forecast is the like/location's actual historical demand with the applied adjustment shifted such that the like item/locations first sales matches the new item/location's forecast start date.
Cloning	You provide a like item/location that has a similar selling pattern as the new item/location. The historical demand of the like item/location is copied into the historical sales of the new item/location. During forecasting, the forecast of the new item/location is generated based on the new item/location's own, copied historical demand.

Substitute Method	Description
Base Rate of Sales	<p>You provide a base rate of sales for a new item/store combination. The new product's forecast is a combination of the seasonality of the forecast at the corresponding source level and the base rate of sales. Specifically, the formula to calculate the forecast is:</p> <p><i>Forecast at time t = source level forecast at time t divided by the average of the source level forecast times the base rate of sales.</i></p> <p>The base rate of sale is a convenient way to generate (seasonal) forecasts for a new item. No Like item or Clone item is needed. What is necessary is a value for how much the item is selling on average per period. That value works as the interim forecast used to spread the source level forecast down to final level.</p> <p>Because this item is new, the system knows that as you have specified a history start date.</p> <p>The base rate of sale forecast is generated until the TS duration is reached.</p> <p>The TS duration is the difference between forecast start date and history start date.</p> <p>Usually the default history start date is empty, which means it is the beginning of the calendar.</p> <p>If the history start date override is also empty, the forecast start date less the beginning of the calendar (≥ 2 years) is probably much more than the TS duration, so the item is not considered new.</p> <p>In this case base rate of sales or any new item method, will not work.</p>

Forecast Start Date Override

This parameter represents the date to start forecasting for an item/location combination. This parameter can be set in the future if using like-item or Sister-Store functionality, and, upon reaching that time, the forecast is generated. If this date is set to the past, it is ignored in favor of the Forecast Start Date from the [Forecast Administration Workbook](#). This means that the Forecast Start Date for this intersection needs to be edited once it is no longer in the future. For like-item or sister store, the Forecast Start Date and the History Start Date should be set to the same date. It is important to understand how Forecast Start Date should be used in conjunction with Forecast End Date. No value is in this measure if the system default set in the [Forecast Administration Workbook](#) is to be used.

Note: This measure can also be set in the [Forecast Maintenance Workbook](#). Changes to this measure can be seen in the Forecast Maintenance task. The most recent commit (between either of the tasks) is the value used by the system.

Forecast End Date Override

This parameter represents the last point in time for which the Forecasting Engine forecasts for an item/location combination. Should this parameter be set to a date less than the Forecast Start Date plus the Forecast Length (in the [Forecast Administration Workbook](#)), the engine forecasts zero (0) past this date. If Forecast End Date is more than Forecasting Start Date plus Forecasting Length, no forecast is generated outside Forecasting Start Date plus Forecasting Length window. In other words, both Forecast Start Date and Forecasting End Date are relevant for time periods within the forecast horizon set at the global level. No value is in this measure if the system default set in the [Forecast Administration Workbook](#) is to be used.

Forecast End Date can be used for new item or location forecasting if the item or location needs to be forecast for a period shorter than the Like TS Duration (set globally in [Forecast Administration Workbook](#)).

Note: This measure can also be set in the [Forecast Maintenance Workbook](#). Changes to this measure can be seen in the [Forecast Maintenance Workbook](#). The most recent commit (between either of the tasks) is the value used by the system.

Approve Date

This measure displays the date when the like store recommendation was approved by running the custom menu.

Approve By

This measure displays the user name who approved the like store recommendation by running the custom menu.













Forecaster Like Store Workbook

If the setup available in the Business Support view is not enough for some or all new stores, you can be more specific in this workbook.

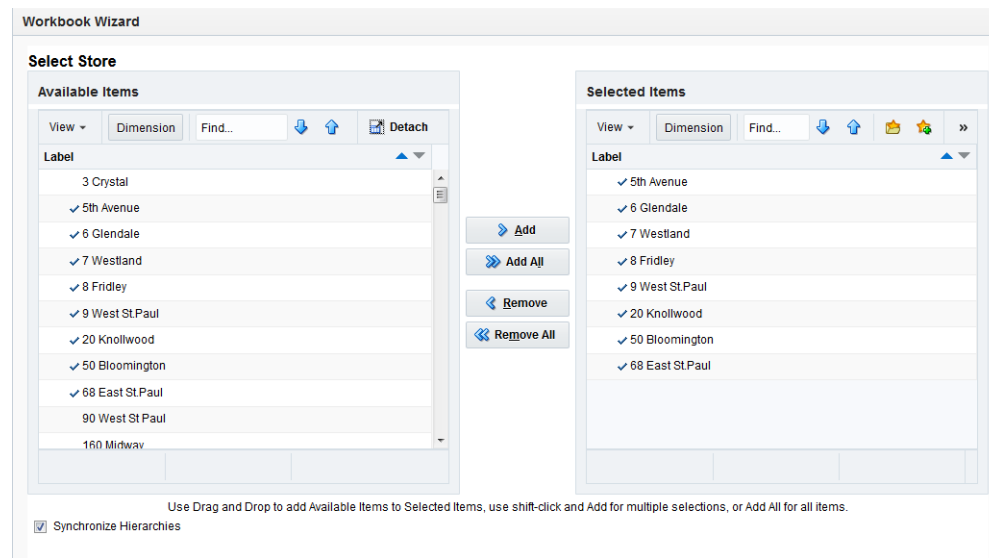
To build the Forecaster Like Store workbook, perform these steps:

1. Click the New Workbook icon in the Forecaster Like Store task in the New Items & Locations activity.

Figure 4–27 Forecaster Like Store Administration Task

 New Item & Locations	
 New Item & Locations	
Task or Step	Action
 New Item & Location Administration	
 New Item Review	
 New Item Maintenance	
 Business Support Like Store	
 Forecaster Like Store	

2. The Workbook wizard opens. Select the stores you want to work with and click and click **Finish**.

Figure 4–28 Workbook Wizard: Forecast Level

The Forecaster Like Store workbook is built.

Forecaster Like Store Assignment Step

This step contains views more specific than in the [Business Support Like Store Assignment View](#).

The available view is:

- [Forecaster Like Store Assignment View](#)

Forecaster Like Store Assignment View

The Forecaster Like Store Assignment view is at the intersection of prod/location, so all parameters can vary by product. For instance a new store opening in the Midwest can have a like store from Alaska for items in the Shovels department. However, for Summer items, the like store is picked from the Northeast region.

All measures can be adjusted by product, but there are some where a default value is available for all items.

Figure 4–29 Forecaster Like Store Assignment View

	1Canned	3 Whisky	8 to 100 disc chang	81Chips	100+ disc changer	111Fashion	112Basic	113Percale 200	121Roll-On	122Loafer
Scalar Like Store										
Scalar Adjustment Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Scalar Substitute Method	None	None	None	None	None	None	None	None	None	None
Like Store 1										
Like Store 2										
Like Store 3										

Measures: Forecaster Like Store Assignment View

The Forecaster Like Store Assignment view contains the following measures:

Scalar Like Store

This measure displays the like store that was selected in the Business Support step. The information is read only. The selection can be further refined by using other measures in this view.

Scalar Adjustment Factor

This measure displays the adjustment factor that was selected in the Business Support step. The information is read only. The selection can be further refined by using other measures in this view.

Scalar Substitution Method

This measure displays the substitute method that was selected in the Business Support step. The information is read only. The selection can be further refined by using other measures in this view.

Like Store 1

In this measure the user can specify the first like store. Note how the like store can be different by product. In RDF Cloud Service, a different first like store selection can be made for every subclass.

Like Store 2

In this measure the user can specify the second like store. Note how the like store can be different by product. In RDF Cloud Service, a different second like store selection can be made for every subclass.

Like Store 3

In this measure the user can specify the third like store. Note how the like store can be different by product. In RDF Cloud Service, a different third like store selection can be made for every subclass.

Adjustment Factor

This measure determines how much the combined forecasts are scaled up or down to create the forecast of the new item.

Substitute Method

This measure displays a list where you can select the substitute method. When a Substitute Method is used to forecast, the method set for an intersection is cleared once the Default Forecast Start Date is greater than the Forecast Start Date Override plus the Like TS Duration for the intersection. Valid options are:

Substitute Method	Description
None	No Forecast is created for the time series (product location combination)
Seasonal	You provide a like item/location that has a similar seasonality pattern. The new time series' forecast is the like item/locations demand forecast with the applied adjustment. The forecast is set to zero (0) for all dates before the new product/location's start date.
Lifecycle	You provide a like item/location that had a similar lifecycle pattern as the new item/location. The new item/location's forecast is the like/location's actual historical demand with the applied adjustment shifted such that the like item/locations first sales matches the new item/location's forecast start date.
Cloning	You provide a like item/location that has a similar selling pattern as the new item/location. The historical demand of the like item/location is copied into the historical sales of the new item/location. During forecasting, the forecast of the new item/location is generated based on the new item/location's own, copied historical demand.
Base Rate of Sales	<p>You provide a base rate of sales for a new item/store combination. The new product's forecast is a combination of the seasonality of the forecast at the corresponding source level and the base rate of sales. Specifically, the formula to calculate the forecast is:</p> <p><i>Forecast at time t = source level forecast at time t divided by the average of the source level forecast times the base rate of sales.</i></p> <p>The base rate of sale is a convenient way to generate (seasonal) forecasts for a new item. No Like item or Clone item is needed. What is necessary is a value for how much the item is selling on average per period. That value works as the interim forecast used to spread the source level forecast down to final level.</p> <p>Because this item is new, the system knows that as you have specified a history start date.</p> <p>The base rate of sale forecast is generated until the TS duration is reached.</p> <p>The TS duration is the difference between forecast start date and history start date.</p> <p>Usually the default history start date is empty, which means it is the beginning of the calendar.</p> <p>If the history start date override is also empty, the forecast start date less the beginning of the calendar (≥ 2 years) is probably much more than the TS duration, so the item is not considered new.</p> <p>In this case base rate of sales or any new item method, will not work.</p>

Percent Contribution of Like Store 1

This measure determines the percentage of Like Store 1's forecast that is going to be applied towards the forecast of the new item.

Percent Contribution of Like Store 2

This measure determines the percentage of Like Store 2's forecast that is going to be applied towards the forecast of the new item.

Percent Contribution of Like Store 3

This measure determines the percentage of Like Store 3's forecast that is going to be applied towards the forecast of the new item.

Preprocessing Administration Task

This chapter describes how the preprocessing functionality is implemented in RDF Cloud Service using the [Preprocess Administration Workbook](#).

Use the [Preprocess Administration Workbook](#) to perform the steps for this task:

- [Preprocess Admin Step](#)
- [Preprocess Parameters Steps](#)

Note: Similar to the [Preprocess Administration Workbook](#) is the [Source Measure Maintenance Workbook](#). For functionality differences, see [Source Measure Maintenance Functionality](#).

About Preprocessing

Preprocessing is a module that is used to correct historical data prior to forecast generation when history does not represent general demand patterns. It is meant to automatically make adjustments to the raw POS (Point Of Sales) data so the next demand forecasts do not replicate undesired patterns.

Data Preprocessing is commonly used to:

- Correct for lost sales due to stock-outs
- Cleanse data for effects of promotions and short-term price changes (optional)
- Correct for outliers – unusually high or low values introduced by human error or special events (hurricane that left a store closed for a week)
- Scrub data manually to fake history and override user history
- Adjust demand for the occasional 53rd calendar week
- Manage demand created during events and holidays that do not occur in the same period every year, for example, Back to School.

Preprocessing runs after the data has been loaded from the host system and prior to forecast generation. Use the [Preprocess Administration Workbook](#) to produce and review data. It is common for an environment to require preprocessing to run multiple times to properly smooth the history. Commonly, there are up to three or four runs to go from raw sales to the data source that is used to generate the forecast. For RDF Cloud Service, a maximum of six runs is allowed for one data source. For example, if there is one baseline and one causal level, there can be up to six preprocessing runs allowed to create the data source for the baseline forecast, and up to six runs allowed to create the data source for the causal forecast.

Preprocessing Data in the RDF Cloud Service Workflow

Preprocessing offers a variety of Algorithm methods to support the business requirements. The main reason for preprocessing is to transform the raw sales data into a measure that gets as close as possible to unconstrained demand.

The preprocessing step is most often implemented in batch, by invoking a preprocessing special expression. The special expression takes several measures as input. For instance, one needs to specify the measure to be corrected, the desired algorithm, and the number of periods to be considered. However, you can go into more detail, and specify several filter window lengths, or exponential smoothing parameters.

Preprocess Administration Workbooks, Steps, and Views

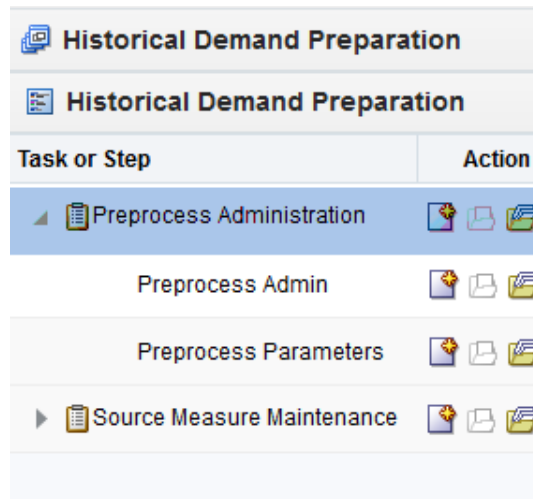
The following table lists the workbooks, steps, and views for the Preprocess Administration task.

Workbook	Steps	Views
Preprocess Administration Workbook	Preprocess Admin Step	Preprocess Admin View
	Preprocess Parameters Step	Preprocess Panel for Baseline View Preprocess Panel for Causal View Preprocess Method Parameters for Baseline View Preprocess Method Parameters Override for Baseline View Preprocess Method Parameters for Causal View Preprocess Method Parameters Override for Causal View

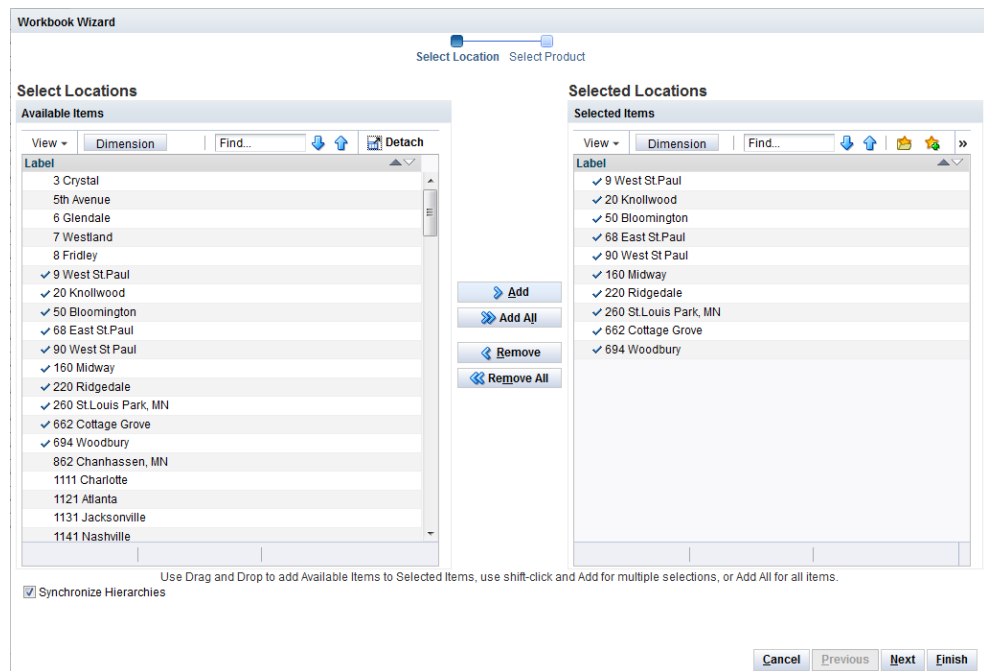
Preprocess Administration Workbook

To build the Preprocess Administration workbook, perform these steps:

1. Click the New Workbook icon in the Preprocess Administration task in the Historical Demand Preparation activity.

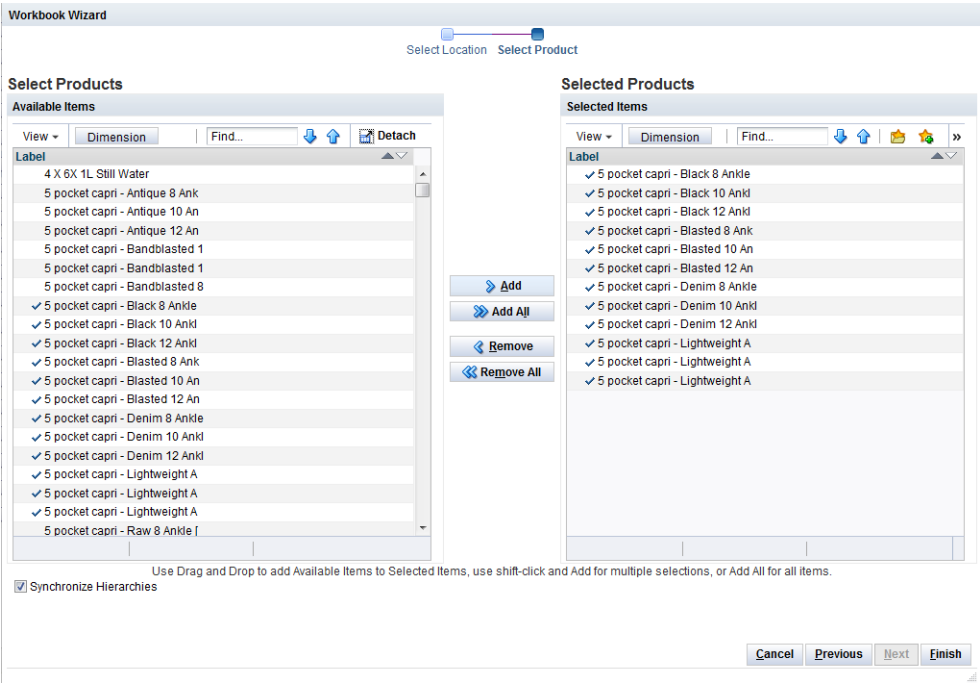
Figure 5–1 Preprocess Administration Task

2. The Workbook wizard opens. Select the specific locations that you want to view and click **Next**.

Figure 5–2 Workbook Wizard: Locations

3. Select the products you want to work with and click **Finish**.

Figure 5–3 Workbook Wizard: Select Products



The Preprocess Administration workbook is built.

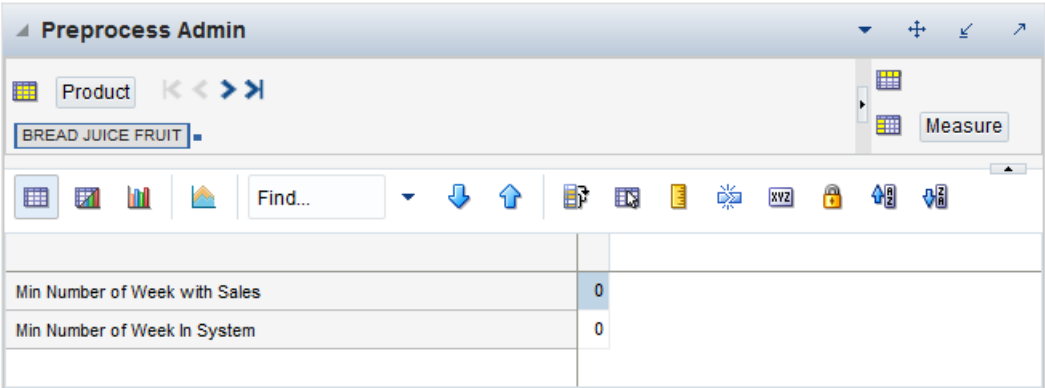
Preprocess Admin Step

This step contains the Preprocess Admin view.

Preprocess Admin View

The Preprocess Admin view allows you to define the scope of the preprocessing run, as well as filter out item/locations where preprocessing does not make sense because of lack of enough historical sales.

Figure 5–4 Preprocess Admin View



Measures: Preprocess Admin View

The Preprocess Admin view contains the following measures:

Min Number of Weeks in System

This parameter defines the number of periods from when an item was introduced in the system. Usually the introduction time is considered to be the date when the item first sold. This check is also introduced to stop making data corrections for items that are very new, and where cleansing would be unreliable.

Min Number of Weeks with Sales

This parameter defines the number of weeks with sales that an item/store combination needs to have to qualify for data cleansing. The reasoning behind this check is that for items without enough data, corrections may not be reliable. Once there is enough data, and trends become clearer, corrections can be made.

Preprocess Parameters Step

This step has six views:

- [Preprocess Panel for Baseline View](#)
- [Preprocess Panel for Causal View](#)
- [Preprocess Method Parameters for Baseline View](#)
- [Preprocess Method Parameters Override for Baseline View](#)
- [Preprocess Method Parameters for Causal View](#)
- [Preprocess Method Parameters Override for Causal View](#)

These views make available the preprocessing parameters for four rounds of preprocessing runs, necessary to calculate the data source for baseline forecasting and promotional forecasting.

In RDF Cloud Service, preprocessing is configured to create the data sources for baseline forecasting, as well as, causal forecasting. The creation of each of the sources can go through at most six runs of preprocessing. For example, to generate the causal data source, it is configured for three runs and for the baseline data source, it is configured for four runs.

Preprocess Panel for Baseline View

The view displays the measures necessary to create the data source for baseline forecasting. This involves four rounds of preprocessing that run in batch or online in this order:

1. Correcting for stockouts
2. Correcting for outliers
3. Depromoting sales
4. Smooth sales

Figure 5–5 Preprocess Panel for Baseline View

	run 1	run 2	run 3	run 4
Input Data Source Baseline				
First Parameter Baseline	preosind	preoutind	prepiind	
Preprocess Methods Baseline	Lost Sales - Std ES	Standard Exponential Smoo...	Standard Exponential S...	Standard Median
Output Data Measure Baseline				
Run Label Baseline	Correct OOS	Correct Outliers	Depromote Sales	Smooth Sales
Run Preprocess Flag Baseline	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Second Parameter Baseline				

Measures: Preprocessing Panel for Baseline View

Note: Measures are replicated for each round of preprocessing.

The Preprocessing Panel for Baseline view contains the following measures:

Input Data Source

Indicates the measure that will be corrected. This is the input to the first preprocessing run. There are no inputs available for other runs other than the first run.

First Time-Phased Parameter Causal

This measure stores the first time-phased measure that is required for some preprocessing methods. For instance, for the STD ES LS method, this measure would store the measure name of the outage flag. Or for the STD ES method, it could store the name of the outlier flag.

Preprocess Method

Name of the preprocessing method to be used for each run. This method is selected in the Configuration Tools

Output Data Measure

Indicates the measure that stores the result of the last configured preprocessing run. For instance, for the Preprocess Panel for Baseline, the output comes from run 4.

Run Label

A label denoting the purpose of the preprocessing run, for example, Correct Outliers, or Depromote Sales.

Run Preprocess Flag

Boolean measure indicating if this run should be enabled or skipped.

Second Time-Phased Parameter Causal

This measure stores the second time-phased measure that is required for some preprocessing methods. For instance, for the Forecast Sigma method, this measure would store measure name of the confidence intervals. Or for the Override method it could store the measure name of the outage flag.

Preprocess Panel for Causal View

This view displays the measures necessary to create the data source for baseline forecasting. This involves three rounds of preprocessing that run in this order:

1. Correcting for stockouts
2. Correcting for outliers
3. Deseasonalizing the measure to create the causal data source

The first two runs are the same used to generate the baseline data source. Hence they use the same parameters as the ones in the [Preprocess Panel for Baseline View](#). The third run deseasonalizes the demand.

Figure 5–6 Preprocess Panel for Causal View

	run 1	run 2	run 3	run 4	run 5	run 6
Input Data Source Causal						
First Parameter Causal	preosind	preoutind	preseaprof			
Preprocess Methods Causal	Lost Sales - Std ES	Standard Exponenti...	DeSeasonalize			
Output Data Measure Causal						
Run Label Causal	Correct OOS	Correct Outliers	Deseasonalize Sales			
Run Preprocess Flag Causal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Second Parameter Causal						

Measures: Preprocessing Panel for Causal View

Note: Measures are replicated for each round of preprocessing.

The Preprocessing Panel for Causal view contains the following measures:

Input Data Source

Indicates the measure that will be corrected. This is the input to the first preprocessing run. There are no inputs available for other runs other than the first run.

First Time-Phased Parameter Causal

This measure stores the first time-phased measure that is required for some preprocessing methods. For instance, for the STD ES LS method, this measure would store the measure name of the outage flag. Or for the STD ES method, it could store the name of the outlier flag.

Preprocess Method

Name of the preprocessing method to be used for each run. This method is selected in the Configuration Tools

Output Data Measure

Indicates the measure that stores the result of the last configured preprocessing run. For instance, for the Preprocess Panel for Causal, the output comes from Run 3.

Run Label

A label denoting the purpose of the preprocessing run, for example, Correct Outliers, or Deseasonalize Sales.

Run Preprocess Flag

Boolean measure indicating if this run should be enabled or skipped.

Second Time-Phased Parameter Causal

This measure stores the second time-phased measure that is required for some preprocessing methods. For instance, for the Forecast Sigma method, this measure would store measure name of the confidence intervals. Or for the Override method it could store the measure name of the outage flag.

Preprocess Method Parameters for Baseline View

There are actually two views with the same set of measures, where, you can enter values for parameters specific for some of the preprocessing methods available in the special expression to create the data sources for the baseline and causal forecasts. There is a set of parameters for each of the maximum six runs allowed. However, very likely not all six are configured. For example, when generating the causal data source, three runs are configured. The parameters are entered at the class/store intersection

Figure 5–7 Preprocess Method Parameters for Baseline View

	run 1	run 2	run 3	run 4	run 5	run 6
Alpha Baseline	0.70	0.70	0.70	0.70	0.70	0.70
Future Weeks Baseline	2	2	2	2	2	2
Last Date Baseline						
Partial Outage Flag Baseline	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Preprocessing Window Baseline	100	100	100	100	100	100
Past Weeks Baseline	2	2	2	2	2	2
Standard Median Window Baseline	13	13	13	13	13	13
Stop Event Baseline	0.00	0.00	0.00	0.00	0.00	0.00

Measures: Preprocessing Methods Parameters for Baseline View

The Preprocessing Methods Parameters for Baseline view contains the following measures:

Alpha

Exponential smoothing coefficient used to calculate past and future velocities.

Future Weeks

This represents the maximum number of data points to calculate the future velocity, when using the Standard Exponential Smoothing or Lost Sales Standard Exponential Smoothing preprocessing methods.

Last Date

This represents the end date of the preprocessing window; it is typically today's date, but can be any date in the past.

Past Weeks

This represents the maximum number of data points to calculate the past velocity, when using the Standard Exponential Smoothing or Lost Sales Standard Exponential Smoothing preprocessing methods.

Preprocessing Window

Number of historical data points that are preprocessed.

Standard Median Window

Filter window length for the Standard Median preprocessing method.

Partial Outage

A scalar parameter indicating if the period immediately following an out-of-stock period should be adjusted. The default behavior is for the flag to be True.

Stop at Event

This parameter determines which periods are included in the calculation of past/future velocities.

If the flag is set to True, then the algorithm only includes periods before the first event flag or event indicator.

If the flag is False, then all available, non-flagged periods, within the windows defined by `nfut` and `npast`, are used in the calculation of the past and future velocities.

The default setting for the flag is False.

Preprocess Method Parameters Override for Baseline View

In this view at the item/store level, you can override values for parameters specific for some of the preprocessing methods available in the special expression. There are two views, corresponding to the preprocessing runs necessary to create the data sources for the baseline and causal forecasts.

After all parameters are set and committed back to the domain, usually a batch job will run the pre-processing steps and prepare the data source s for forecast generation.

Figure 5–8 Preprocess Method Parameters Override for Baseline View

Preprocess Method Parameters Override for Baseline						
[70010039 Knee-Length Black, 3 Crystal]						
	run 1	run 2	run 3	run 4	run 5	run 6
Alpha Ovr Baseline	0.70	0.70	0.70	0.70	0.70	0.70
Delta Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Future Weeks Ovr Baseline	2	2	2	2	2	2
Last Date Ovr Baseline						
Max Price Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Partial Outage Flag Ovr Baseline	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Preprocessing Window Ovr Baseline	100	100	100	100	100	100
Price Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Past Weeks Ovr Baseline	2	2	2	2	2	2
Reference Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Stop Event Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Time Series Mask Ovr Baseline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upward Adjustment Ratio Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Window1 Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Window2 Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Window3 Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Window4 Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00
Window5 Ovr Baseline	0.00	0.00	0.00	0.00	0.00	0.00

Measures: Preprocessing Method Parameters Override for Baseline View

The Preprocessing Method Parameters Override for Baseline view contains the following measures:

Alpha Override

Exponential smoothing coefficient used to calculate past and future velocities.

Future Weeks Override

This represents the maximum number of data points to calculate the future velocity, when using the Standard Exponential Smoothing or Lost Sales Standard Exponential Smoothing preprocessing methods.

Last Date Override

This represents the end date of the preprocessing window; it is typically today's date, but can be any date in the past.

Past Weeks Override

This represents the maximum number of data points to calculate the past velocity, when using the Standard Exponential Smoothing or Lost Sales Standard Exponential Smoothing preprocessing methods.

Preprocessing Window Override

Number of historical data points that are preprocessed.

Standard Median Window Override

Filter window length for the Standard Median preprocessing method.

Partial Outage Override

A scalar parameter indicating if the period immediately following an out-of-stock period should be adjusted. The default behavior is for the flag to be True.

Stop at Event Override

This parameter determines which periods are included in the calculation of past/future velocities.

If the flag is set to True, then the algorithm only includes periods before the first event flag or event indicator.

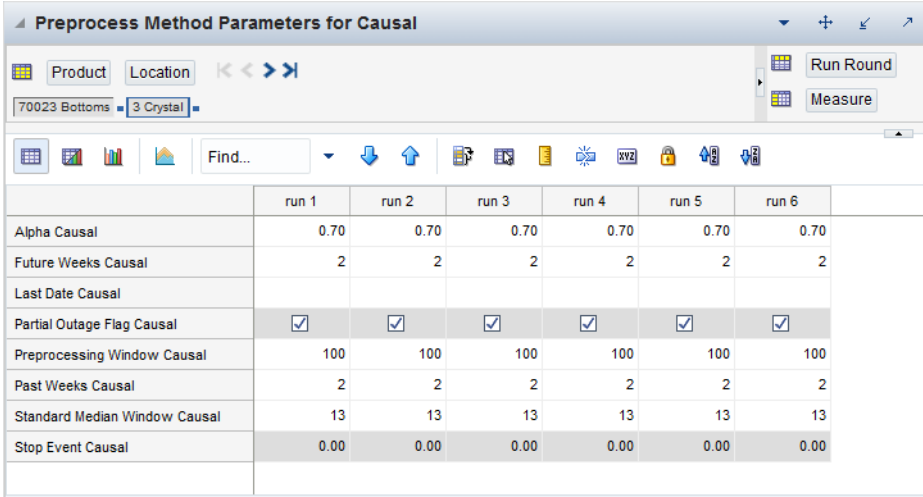
If the flag is False, then all available, non-flagged periods, within the windows defined by *nfut* and *npast*, are used in the calculation of the past and future velocities.

The default setting for the flag is False.

Preprocess Method Parameters for Causal View

There are actually two views with the same set of measures, where, you can enter values for parameters specific for some of the preprocessing methods available in the special expression to create the data sources for the baseline and causal forecasts. There is a set of parameters for each of the maximum six runs allowed. However, very likely not all six are configured. For example, when generating the causal data source, three runs are configured. The parameters are entered at the class/store intersection

Figure 5–9 Preprocess Method Parameters for Causal View



	run 1	run 2	run 3	run 4	run 5	run 6
Alpha Causal	0.70	0.70	0.70	0.70	0.70	0.70
Future Weeks Causal	2	2	2	2	2	2
Last Date Causal						
Partial Outage Flag Causal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Preprocessing Window Causal	100	100	100	100	100	100
Past Weeks Causal	2	2	2	2	2	2
Standard Median Window Causal	13	13	13	13	13	13
Stop Event Causal	0.00	0.00	0.00	0.00	0.00	0.00

Measures: Preprocessing Method Parameters Override View

The Preprocessing Method Parameters Override view contains the following measures:

Alpha

Exponential smoothing coefficient used to calculate past and future velocities.

Future Weeks

This represents the maximum number of data points to calculate the future velocity, when using the Standard Exponential Smoothing or Lost Sales Standard Exponential Smoothing preprocessing methods.

Last Date

This represents the end date of the preprocessing window; it is typically today's date, but can be any date in the past.

Past Weeks

This represents the maximum number of data points to calculate the past velocity, when using the Standard Exponential Smoothing or Lost Sales Standard Exponential Smoothing preprocessing methods.

Preprocessing Window

Number of historical data points that are preprocessed.

Standard Median Window

Filter window length for the Standard Median preprocessing method.

Partial Outage

A scalar parameter indicating if the period immediately following an out-of-stock period should be adjusted. The default behavior is for the flag to be True.

Stop at Event

This parameter determines which periods are included in the calculation of past/future velocities.

If the flag is set to True, then the algorithm only includes periods before the first event flag or event indicator.

If the flag is False, then all available, non-flagged periods, within the windows defined by `nfut` and `npast`, are used in the calculation of the past and future velocities.

The default setting for the flag is False.

Preprocess Method Parameters Override for Causal View

In this view at the item/store level, you can override values for parameters specific for some of the preprocessing methods available in the special expression. There are two views, corresponding to the preprocessing runs necessary to create the data sources for the baseline and causal forecasts.

After all parameters are set and committed back to the domain, usually a batch job will run the pre-processing steps and prepare the data source s for forecast generation.

Figure 5–10 Preprocess Method Parameters Override for Causal View

Preprocess Method Parameters Override for Causal							
	run 1	run 2	run 3	run 4	run 5	run 6	
Alpha Ovr Causal	0.70	0.70	0.70	0.70	0.70	0.70	
Delta Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Future Weeks Ovr Causal	2	2	2	2	2	2	
Last Date Ovr Causal							
Max Price Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Partial Outage Flag Ovr Causal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Preprocessing Window Ovr Causal	100	100	100	100	100	100	
Price Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Past Weeks Ovr Causal	2	2	2	2	2	2	
Reference Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Stop Event Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Time Series Mask Ovr Causal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Upward Adjustment Ratio Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Window1 Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Window2 Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Window3 Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Window4 Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	
Window5 Ovr Causal	0.00	0.00	0.00	0.00	0.00	0.00	

Measures: Preprocessing Method Parameters Override View

The Preprocessing Method Parameters Override view contains the following measures:

Alpha Override

Exponential smoothing coefficient used to calculate past and future velocities.

Future Weeks Override

This represents the maximum number of data points to calculate the future velocity, when using the Standard Exponential Smoothing or Lost Sales Standard Exponential Smoothing preprocessing methods.

Last Date Override

This represents the end date of the preprocessing window; it is typically today's date, but can be any date in the past.

Past Weeks Override

This represents the maximum number of data points to calculate the past velocity, when using the Standard Exponential Smoothing or Lost Sales Standard Exponential Smoothing preprocessing methods.

Preprocessing Window Override

Number of historical data points that are preprocessed.

Standard Median Window Override

Filter window length for the Standard Median preprocessing method.

Partial Outage Override

A scalar parameter indicating if the period immediately following an out-of-stock period should be adjusted. The default behavior is for the flag to be True.

Stop at Event Override

This parameter determines which periods are included in the calculation of past/future velocities.

If the flag is set to True, then the algorithm only includes periods before the first event flag or event indicator.

If the flag is False, then all available, non-flagged periods, within the windows defined by `nfut` and `npast`, are used in the calculation of the past and future velocities.

The default setting for the flag is False.

Source Measure Maintenance Task

This chapter describes how the preprocessing functionality is implemented in RDF Cloud Service using the [Source Measure Maintenance Workbook](#).

The functionality in the [Source Measure Maintenance Task](#) is a superset of the functionality in the [Preprocessing Administration Task](#). The purpose and functionality between the two is described in [Source Measure Maintenance Functionality](#).

Use the [Source Measure Maintenance Workbook](#) to perform the steps for this task:

- [Preprocess Admin Step](#)
- [Preprocess Parameters Step](#)
- [Review Step](#)

Note: For information about preprocessing and RDF Cloud Service, see [Preprocessing Data in the RDF Cloud Service Workflow](#)

Source Measure Maintenance Functionality

The [Preprocess Administration Workbook](#) and the [Source Measure Maintenance Workbook](#) have a large set of common content.

The main difference is that while the [Source Measure Maintenance Workbook](#) has the calendar hierarchy, on top of the product and location, and the [Preprocess Administration Workbook](#) has only the product and location.

The additional hierarchy allows the review of the time-phased preprocessing measures, as well as the calculated forecasting data sources.

Due to their additional dimension of *week*, these measures add to the size of the workbook, and also make workbook operations slower. For instance, workbook build, refresh, commit, and so on, take longer than in the otherwise similar [Preprocess Administration Workbook](#).

Preprocess Administration Workbook

The [Preprocess Administration Workbook](#), described in [Chapter 5](#) is at the product/location intersection, so it can be built with a lot of positions, without experiencing poor performance. The purpose is to set preprocessing parameters, which are inputs to the special expression that is run in batch.

Source Measure Maintenance Workbook

The [Source Measure Maintenance Workbook](#), described in this chapter, is at the product/location/calendar intersection, and is a lot more data intensive. The purpose

is to set preprocessing parameters and run the data filtering online, with the ability to review the results without having to wait for an overnight batch. If the results are not as expected, or you want to experiment with different settings, you can make changes to the parameters and rerun the custom menus. To achieve this it is expected that only a small subset of the available product/locations is included in the workbook.

Source Measure Maintenance Workbooks, Steps, and Views

The following table lists the workbooks, steps, and views for the Preprocess Review and What-if task.

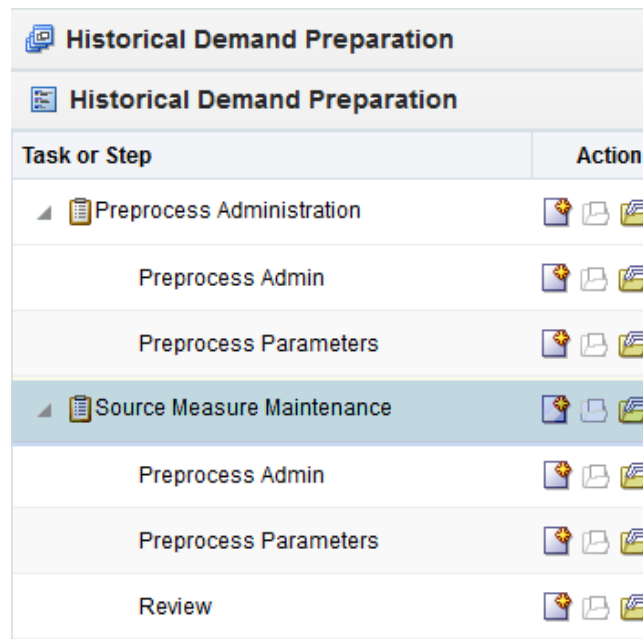
Workbook	Steps	Views
Source Measure Maintenance Workbook	Preprocess Admin Step	Preprocessing Admin View
	Preprocess Parameters Step	Preprocess Panel View
	Review Step	Source Maintenance View Source Maintenance Plot View

Source Measure Maintenance Workbook

To build the Source Measure Maintenance workbook, perform these steps:

1. Click the New Workbook icon in the Source Measure Maintenance task in the Historical Demand Preparation activity.

Figure 6–1 Source Measure Maintenance Task



2. The Workbook wizard opens. Select your path and click **Next**.

Figure 6–2 Workbook Wizard: Available Paths

Workbook Wizard

Path Selection Production Selection Location Selection ...

Available Paths

Available Items

View ▾ Dimension Find... [Down Arrow] [Up Arrow] [Detach]

Label

- ✓ Baseline
- Causal

Selected Paths

Selected Items

View ▾ Dimension Find... [Down Arrow] [Up Arrow] [Add] [Remove] [Add All] [Remove All]

Label

- ✓ Baseline

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

3. Select the products you want to work with and click **Next**.

Note: It is important to include all products that are members of the Merchandise dimensions in the forecast levels to be analyzed. For example, if you select to view a forecast level that is defined at subclass/store/week, you must include all items that are members of the particular subclass to be analyzed. It is recommended that Position Query functionality or selection from aggregate levels in the Merchandise hierarchy is employed if the task supports an AutoTask build.

Figure 6–3 Workbook Wizard: Select Products

Workbook Wizard

Path Selection **Production Selection** Location Selection ...

Available Product

Available Items

View ▾ Dimension Find... [Icons] Detach

Label

- 10000313Leather Loafer - Chocolate 9 B
- 10000316CS Spring Water 6 X 0.5 liter
- 10000322Molson Light
- 10000325Molson Dry
- 10000327Johnnie Walker Black Label 112
- 10000328Marlboro KSF box 200
- ✓ 10000335Ladies cashmere jersey - Black
- ✓ 10000336Ladies cashmere jersey - Black
- ✓ 10000337Ladies cashmere jersey - Black
- ✓ 10000338Ladies cashmere jersey - Cream
- 10000339Ladies cashmere jersey - Cream

Selected Product

Selected Items

View ▾ Dimension Find... [Icons] »

Label

- ✓ 10000046Kangaroo Pocket Sweater - Blac
- ✓ 10000047Kangaroo Pocket Sweater - Blac
- ✓ 10000049Buzz Lightyear -
- ✓ 10000053Bohemian 5 Pocket Jeans - Ston
- ✓ 10000054Bohemian 5 Pocket Jeans - Ston
- ✓ 10000055Bohemian 5 Pocket Jeans - Ston
- ✓ 10000056Bohemian 5 Pocket Jeans - Ston
- ✓ 10000335Ladies cashmere jersey - Black
- ✓ 10000336Ladies cashmere jersey - Black
- ✓ 10000337Ladies cashmere jersey - Black
- ✓ 10000338Ladies cashmere jersey - Cream

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

- The Workbook wizard opens. Select the specific locations that you want to view and click **Next**.

Note: It is important to include all locations that are members of the location dimensions in the forecast levels to be analyzed. For example, if you select to view a forecast level that is defined at item/chain/week, you should include all locations that are members of the particular chain to be analyzed. It is recommended that Position Query functionality or selection from aggregate levels in the location hierarchy is employed if the task supports an AutoTask build.

Figure 6–4 Workbook Wizard: Locations

Workbook Wizard

Path Selection Production Selection **Location Selection** ...

Available Locations

Available Items

View ▾ Dimension Find... [Down Arrow] [Up Arrow] [Detach]

Label

3 Crystal
5th Avenue
6 Glendale
✓ 7 Westland
✓ 8 Fridley
✓ 9 West St Paul
✓ 20 Knollwood
✓ 50 Bloomington
✓ 68 East St Paul
✓ 90 West St Paul
✓ 160 Midway

➤ Add
➤➤ Add All
⬅ Remove
⬅⬅ Remove All

Selected Locations

Selected Items

View ▾ Dimension Find... [Down Arrow] [Up Arrow] [Add] [Remove] [Refresh] [More]

Label

✓ 7 Westland
✓ 8 Fridley
✓ 9 West St Paul
✓ 20 Knollwood
✓ 50 Bloomington
✓ 68 East St Paul
✓ 90 West St Paul
✓ 160 Midway

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

5. Select the weeks of the forecast you wish to review and click **Finish**:

Figure 6–5 Workbook Wizard: Available Calendar Positions

Workbook Wizard

Path Selection Production Selection **Location Selection** ...

Available Calendar Positions

Available Items

View ▾ Dimension Find... [Down Arrow] [Up Arrow] [Detach]

Label

9/27/2013
10/4/2013
✓ 10/11/2013
✓ 10/18/2013
✓ 10/25/2013
✓ 11/1/2013
✓ 11/8/2013
✓ 11/15/2013
✓ 11/22/2013
✓ 11/29/2013
12/6/2013

➤ Add
➤➤ Add All
⬅ Remove
⬅⬅ Remove All

Selected Calendar Positions

Selected Items

View ▾ Dimension Find... [Down Arrow] [Up Arrow] [Add] [Remove] [Refresh] [More]

Label

✓ 10/11/2013
✓ 10/18/2013
✓ 10/25/2013
✓ 11/1/2013
✓ 11/8/2013
✓ 11/15/2013
✓ 11/22/2013
✓ 11/29/2013

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

The Source Measure Maintenance workbook is built.

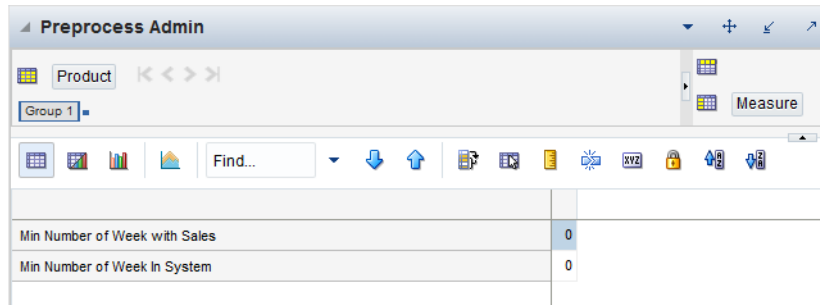
Preprocess Admin Step

This step contains the Preprocess Admin view that allows you to define the scope of the preprocessing run, as well as filter out item/locations where preprocessing does not make sense because of lack of enough historical sales.

Preprocessing Admin View

The Preprocessing Admin view displays the scope of the preprocessing run.

Figure 6–6 Preprocessing Admin View



Measures: Preprocessing Admin View

The Preprocessing Admin view contains the following measures:

Min Number of Weeks in System

This parameter defines the number of periods from when an item was introduced in the system. Usually the introduction time is considered to be the date when the item first sold. This check is also introduced to stop making data corrections for items that are very new, and where cleansing would be unreliable.

Min Number of Weeks with Sales

This parameter defines the number of weeks with sales that an item/store combination needs to have to qualify for data cleansing. The reasoning behind this check is that for items without enough data, corrections may not be reliable. Once there is enough data, and trends become clearer, corrections can be made.

Preprocess Parameters Step

This step has this view:

- [Preprocess Panel View](#)

Preprocess Panel View

Depending on your wizard selection for either baseline or causal, the view shows the preprocessing parameters for each relevant run. For example if baseline is selected, the view displays preprocessing information for the four runs that are configured. If causal is selected, the view shows preprocessing parameters for three runs.

Baseline View

The baseline view displays the measures necessary to create the data source for baseline forecasting. This involves four rounds of preprocessing that run in batch or online in this order:

1. Correcting for stockouts
2. Correcting for outliers
3. Depromoting sales
4. Smooth sales

Figure 6–7 Preprocess Panel for Baseline View

	run 1	run 2	run 3	run 4	run 5	run 6
Input Data Source Baseline						
First Parameter Baseline	preoosind	preoutind	preppiind			
Preprocess Methods Baseline	Lost Sales ...	Standard E...	Standard E...	Standard M...		
Output Data Measure Baseline						
Run Label Baseline	Correct OOS	Correct Outliers	Depromote Sales	Smooth Sales		
Run Preprocess Flag Baseline	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Second Parameter Baseline						

Causal View

The causal view displays the measures necessary to create the data source for causal forecasting. This involves three rounds of preprocessing that are run in batch:

1. Correcting for stockouts
2. Correcting for outliers
3. Deseasonalizing the measure to create the causal data source

Figure 6–8 Preprocess Panel for Causal View

	run 1	run 2	run 3	run 4	run 5	run 6
Input Data Source Causal						
First Parameter Causal	preosind	preoutind	preseaprof			
Preprocess Methods Causal	Lost Sales ...	Standard E...	DeSeasona...			
Output Data Measure Causal						
Run Label Causal	Correct OOS	Correct Outliers	DeSeasonalize Sales			
Run Preprocess Flag Causal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Second Parameter Causal						

Note: In Figure 6–8, baseline was the selected wizard option when building the [Source Measure Maintenance Workbook](#).

Measures: Preprocessing Panel (for Baseline or Causal) View

The Preprocessing Panel (for Baseline or Causal) view contains the following measures:

Input Data Source

Indicates the measure that will be corrected. This is the input to the first preprocessing run. There are no inputs available for other runs other than the first run.

First Time-Phased Parameter Causal

This measure stores the first time-phased measure that is required for some preprocessing methods. For instance, for the STD ES LS method, this measure would store the measure name of the outage flag. Or for the STD ES method, it could store the name of the outlier flag.

Preprocess Method

Name of the preprocessing method to be used for each run. This method is selected in the Configuration Tools.

Output Data Measure

Indicates the measure that stores the result of the last configured preprocessing run. For instance, for the Preprocess Panel for Causal, the output comes from run 3.

Run Label

A label denoting the purpose of the preprocessing run, for example, Correct Outliers, or Smooth Sales.

Run Preprocess Flag

Boolean measure indicating if this run should be enabled or skipped.

Second Time-Phased Parameter Causal

This measure stores the second time-phased measure that is required for some preprocessing methods. For instance, for the Forecast Sigma method, this measure

would store measure name of the confidence intervals. Or for the Override method it could store the measure name of the outage flag.

Review Step

The main purpose of this step is to display time-phased measures that represent input and output to the preprocessing stages, run in batch based on the settings selected in the Preprocessing Admin tasks.

Source Maintenance View

This view displays measures that represent input and output of the preprocessing runs, in table format.

Figure 6–9 Source Maintenance View

	1/9/2015	1/16/2015	1/23/2015	1/30/2015	2/6/2015	2/13/2015	2/20/2015	2/27/2015
User Adjustment Baseline	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Out of Stock Indicator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outlier Indicator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promotion Indicator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weekly Sales	4.00	3.00	4.00	3.00	4.00	4.00	4.00	5.00
data source 1	4.00	3.00	4.00	3.00	4.00	4.00	4.00	5.00

Measures: Source Maintenance View

The Source Maintenance view contains the following measures:

User Adjustment

In this measure, you can enter values that are going to be added to the preprocessing adjustments to create the data sources.

The logic is: data source = weekly sales + preprocessing adjustments + user adjustment

This measure is read/write.

Weekly Sales

This measure stores the raw sales loaded in RDF Cloud Service. This is the input to the first run of preprocessing. This measure is read only.

Data Source

This measure represents the output of the preprocessed raw sales, as well as incorporates the user adjustments according to the formula:

data source = weekly sales + preprocessing adjustments + user adjustments.

Out of Stock Indicator

This measure is either loaded or calculated by the rules in the custom menu. It is used during the pre-processing run that corrects sales for lost sales.

Outliers Indicator

This measure is either loaded or calculated by the rules in the custom menu. It is used during the pre-processing run that corrects the sales for outliers.

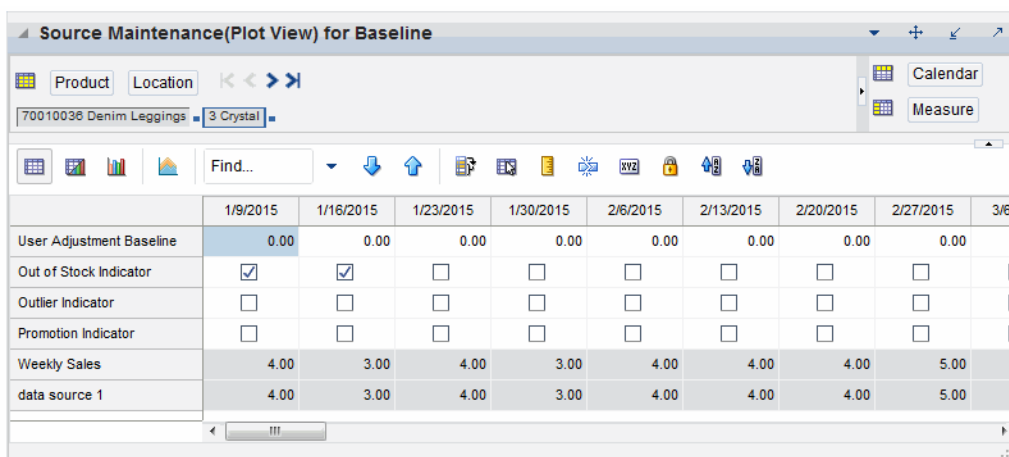
Promotion Indicator

This measure is usually calculated as the or of all available Boolean promotional variables. It is used during the preprocessing run that removes promotional sales.

Source Maintenance Plot View

This view displays measures that represent input and output of the preprocessing runs, in table format. The measures are the same as in the [Source Maintenance View](#), but displayed in chart form.

Figure 6–10 Source Maintenance Plot View



	1/9/2015	1/16/2015	1/23/2015	1/30/2015	2/6/2015	2/13/2015	2/20/2015	2/27/2015	3/6/2015
User Adjustment Baseline	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Out of Stock Indicator	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Outlier Indicator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Promotion Indicator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weekly Sales	4.00	3.00	4.00	3.00	4.00	4.00	4.00	5.00	
data source 1	4.00	3.00	4.00	3.00	4.00	4.00	4.00	5.00	

Measures: Source Maintenance Plot View

The Source Maintenance Plot view contains the following measures:

User Adjustment

In this measure, you can enter values that are going to be added to the preprocessing adjustments to create the data sources.

The logic is: data source = weekly sales + preprocessing adjustments + user adjustment

This measure is read/write.

Weekly Sales

This measure stores the raw sales loaded in RDF Cloud Service. This is the input to the first run of preprocessing. This measure is read only.

Data Source

This measure represents the output of the preprocessed raw sales, as well as incorporates the user adjustments according to the formula:

data source = weekly sales + preprocessing adjustments + user adjustments.

Out of Stock Indicator

This measure is either loaded or calculated by the rules in the custom menu. It is used during the pre-processing run that corrects sales for lost sales.

Outliers Indicator

This measure is either loaded or calculated by the rules in the custom menu. It is used during the pre-processing run that corrects the sales for outliers.

Promotion Indicator

This measure is usually calculated as the or of all available Boolean promotional variables. It is used during the preprocessing run that removes promotional sales.

Forecast Scorecard Task

This chapter describes the purpose and content of the Forecast Scorecard and the steps required in order to create and access this task. This chapter also discusses the two types of views contained in the Forecast Scorecard task, as well as the definitions of parameters that exist in each. Evaluating forecast accuracy through the use of error statistics is discussed, as is the process of comparing historical forecasts to actual sales data.

The purpose of the Forecast Scorecard is to monitor the accuracy of both approved system forecasts and approved final forecasts. Once a forecast has been generated and actual point-of-sale data is received for the forecast period, statistical information can be reviewed to help you analyze the accuracy of forecasting models and methods.

The Forecast Scorecard consists of a wizard and two views.

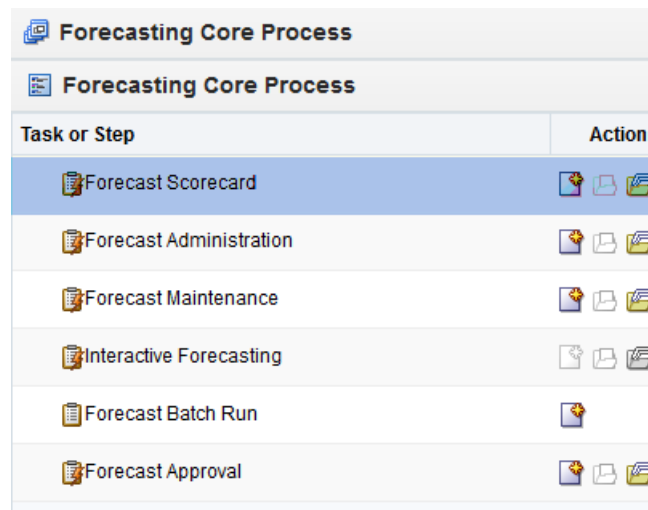
Based on your selections in the wizard, the Forecast Scorecard provides statistical information and comparison data that allow you to monitor the accuracy of system-generated forecasts and final approved forecasts.

















- The Final Error Measure view displays statistical information, such as mean error and root mean squared error, that reflects the accuracy of the forecast.
- The Final Actuals versus Forecasts view displays forecast results and actual point-of-sale values for specified product/location/calendar combinations.

Forecast Scorecard Workbook

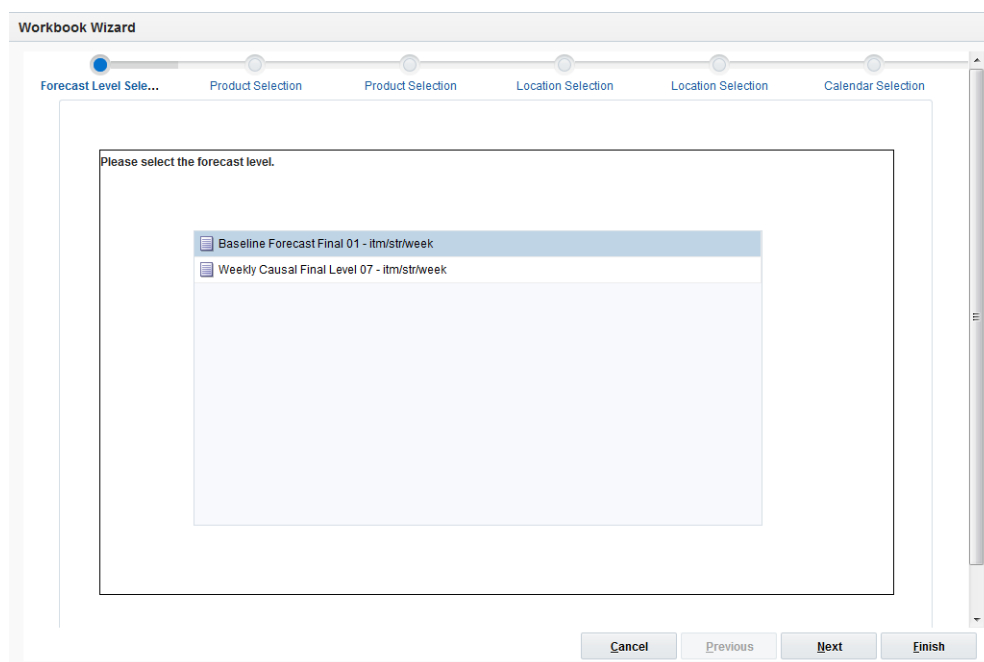
To build the Forecast Scorecard workbook, perform these steps:

1. Click the New Workbook icon in the Forecast Scorecard task in the Forecasting Core Process activity.

Figure 7–1 Forecast Scorecard Task

Forecasting Core Process	
Task or Step	Action
Forecast Scorecard	  
Forecast Administration	  
Forecast Maintenance	  
Interactive Forecasting	  
Forecast Batch Run	
Forecast Approval	  

2. The Workbook wizard opens. Select the final forecast level that you want to evaluate and click **Next**.

Figure 7–2 Workbook Wizard: Final Forecast Level

3. Select the products you want to work with and click **Next**.

Figure 7-3 Workbook Wizard: Select Products

Forecast Level Selection

Product Selection

Product Selection

Location Selection

Location Selection

Calendar Selection

Available Products

Available Items

View ▾

Dimension

Find...

⬇

⬆

📄 Detach

Label

✓ 61-Disk CD Player

✓ 100% Pure Pumpkin 15 oz

✓ 300-Disk CD Player

✓ 620 MCA Marine Battery

✓ 660 CCA Truck Battery

✓ 720 MCA Marine Battery

✓ 750 CCA Truck Battery

✓ 900 CCA Truck Battery

✓ 900 MCA Marine Battery

✓ 2009 Sanctus Saint-Emilion

2000001 item 01

➤ Add

➤➤ Add All

⬅ Remove

⬅⬅ Remove All

Selected Products

Selected Items

View ▾

Dimension

Find...

⬇

⬆

📄

🌟

»

Label

✓ 5 pocket capri - Antique 8 Ank

✓ 5 pocket capri - Antique 10 An

✓ 5 pocket capri - Antique 12 An

✓ 5 pocket capri - Bandblasted 1

✓ 5 pocket capri - Bandblasted 1

✓ 5 pocket capri - Bandblasted 8

✓ 5 pocket capri - Black 8 Ankle

✓ 5 pocket capri - Black 10 Ankl

✓ 5 pocket capri - Black 12 Ankl

✓ 5 pocket capri - Blasted 8 Ank

✓ 5 pocket capri - Blasted 10 An

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel

Previous

Next

Finish

4. Select the specific locations that you want to view and click **Next**.

Figure 7-4 Workbook Wizard: Select Locations

Forecast Level Selection...

Product Selection

Product Selection

Location Selection

Location Selection

Calendar Selection

Available Locations

Available Items

View ▾

Dimension

Find...

↓

↑

Detach

Label

3 Crystal

✓ 5th Avenue

✓ 6 Glendale

✓ 7 Westland

✓ 8 Fridley

✓ 9 West St Paul

✓ 20 Knollwood

✓ 50 Bloomington

✓ 68 East St Paul

✓ 90 West St Paul

✓ 160 Midway

Add

Add All

Remove

Remove All

Selected Positions

Selected Items

View ▾

Dimension

Find...

↓

↑

✎

★

»

Label

✓ 5th Avenue

✓ 6 Glendale

✓ 7 Westland

✓ 8 Fridley

✓ 9 West St Paul

✓ 20 Knollwood

✓ 50 Bloomington

✓ 68 East St Paul

✓ 90 West St Paul

✓ 160 Midway

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

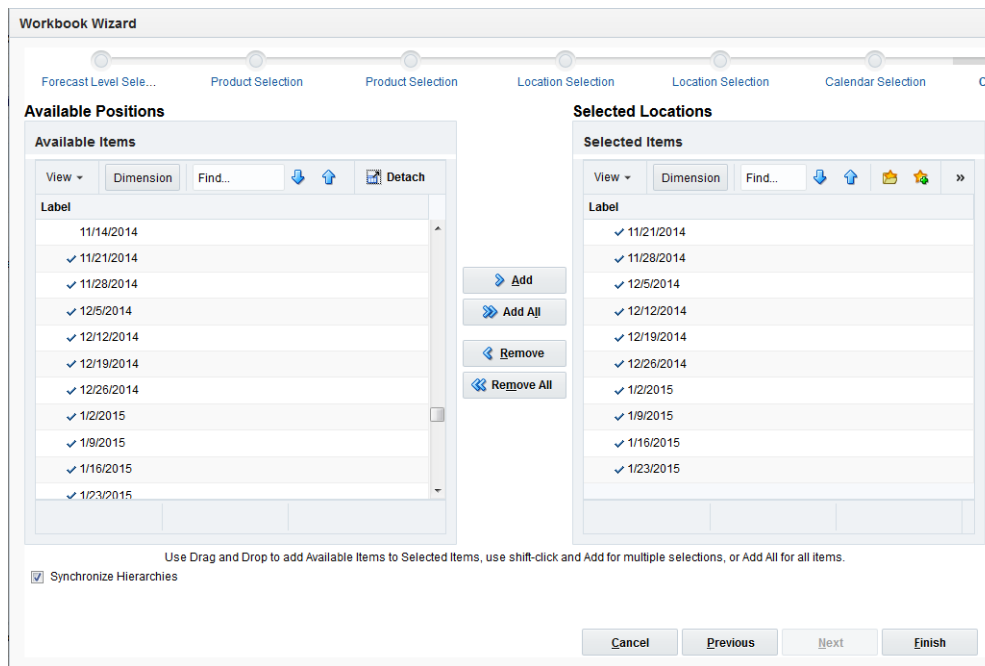
Cancel

Previous

Next

Finish

- 5.** Select the weeks of the forecast you wish to review and click **Finish**:

Figure 7–5 Workbook Wizard: Available Positions

The Forecast Scorecard workbook is built.

About Error Measure Views

There are two Error Measure views:

- Error Measure - Low Level
- Error Measure - Aggregate Level

The intersection of the view, as well as the contents are identical. They are both at the same low level product/location intersection, for instance item/store. The reason there are two is for analysis purposes.

These views display statistical information that reflects the accuracy of the forecast measures selected in the wizard process. You may need to evaluate a variety of such statistics to verify and compare forecast accuracy.

Given the situation, different levels of forecast accuracy can be useful. For example, in a situation with noisy data and no forecast previously available, a 200% error can be considered excellent and useful. In another situation with smooth data, if an old method of forecasting provided forecasts with a 10% error, a new method of forecasting with a 20% error would not be considered useful.

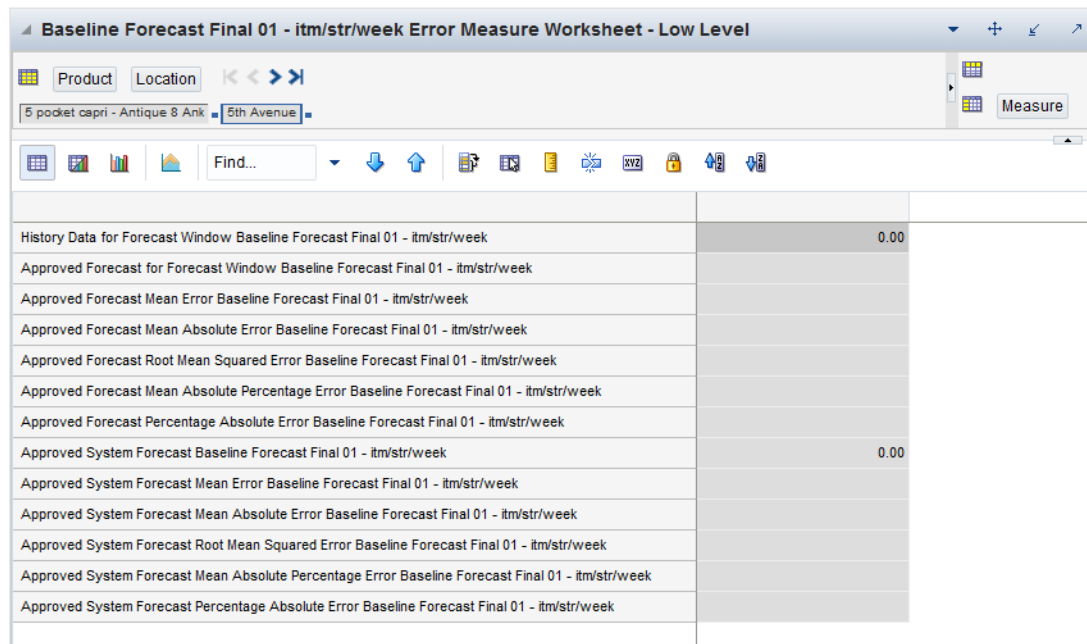
Different levels of forecasting accuracy are obtained at different levels of product aggregation. Item level forecasts with a 200% error can roll up into division-level forecasts with a 10% error. Therefore, the error measures are most useful when comparing different methods of forecasting or when looking at a particular model's accuracy over time. Accurate forecasts should lead to a reduction in inventory holding costs or to an increase in customer service levels; forecast errors should be converted into dollars saved.

Note: All error statistics are calculated over periods in the calendar that were selected in the wizard process.

Error Measure - Low Level

This view is intended to report on the errors at the final forecast intersection. Ultimately, this is the level where the user wants the accuracy criteria to be met.

Figure 7–6 Error Measure - Low Level View



Baseline Forecast Final 01 - itm/str/week Error Measure Worksheet - Low Level	
History Data for Forecast Window Baseline Forecast Final 01 - itm/str/week	0.00
Approved Forecast for Forecast Window Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Mean Error Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Mean Absolute Error Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Root Mean Squared Error Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Mean Absolute Percentage Error Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Percentage Absolute Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Baseline Forecast Final 01 - itm/str/week	0.00
Approved System Forecast Mean Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Mean Absolute Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Root Mean Squared Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Mean Absolute Percentage Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Percentage Absolute Error Baseline Forecast Final 01 - itm/str/week	

Measures: Error Measure - Low Level View

The Error Measure - Low Level view contains the following measures:

History Data for Forecast Window

The sum of the forecast data source for the selected time periods. For example, during the wizard process when the following calendar periods are selected: week 1, week 3 and week 10 for year 2015. Then the history data measure displays - at the item store level - the sum of the demand for the three selected weeks.

Forecast Measures

There forecast errors are calculated between the historical demand, and two forecast metrics: the approved forecast and the approved system forecast. The error of the approved forecast takes into account adjustments of the forecast user, while the error of the approved system forecast truly reflects the quality of the forecasts generated by the system, without human intervention.

Mean Error

The error of a forecast observation is the difference between the forecast value and the actual POS value. The Mean Error statistic is a measure of the average error over time.

This is calculated by summing the errors for all observations, and then dividing by the number of observations to obtain the average. It measures forecast accuracy by calculating the error in units. Because a positive error in one period can cancel out a negative error in another period, this measure is useful when you are interested in how well the forecast predicts over the forecast horizon rather than on a period-to-period basis. Mean error is useful as a measure of forecast bias. A negative mean error suggests that overall the forecasting model overstates the forecast, while a positive mean error indicates forecasts that are generally too low.

Mean Absolute Error

The absolute error of a forecast observation is the absolute value of the difference between the forecast value and the actual POS value. The Mean Absolute Error statistic is a measure of the average absolute error. This is calculated by summing the absolute errors for all observations and then dividing by the number of observations to obtain the average. Mean Absolute Error gives you a better indication of how the forecast performed period by period because the absolute value function ensures that negative errors in one period are not canceled out by positive errors in another. Mean Absolute Error is most useful for comparing two forecast methods for the same series.

Root Mean Squared Error

This is the square root of the Mean Squared Error. The Root Mean Squared Error is one of the most commonly used measures of forecast accuracy because of its similarity to the basic statistical concept of a standard deviation. It evaluates the magnitude of errors in a forecast on a period-by-period basis, and it is best used to compare alternative forecasting models for a given series.

Mean Absolute Percentage Error

The percentage error of a forecast observation is the difference between the actual POS value and the forecast value, divided by the actual POS value. The result of this calculation expresses the forecast error as a percentage of the actual value. The Mean Absolute Percentage Error statistic measures forecast accuracy by taking the average of the sum of the absolute values of the percentage error calculations across all observations. This method is useful when comparing the accuracy of forecasts for different volume products (it normalizes error by volume).

Percentage Absolute Error

The absolute error of a forecast observation is the absolute value of the difference between the forecast value and the actual POS value. The Percentage Absolute Error statistic measures forecast accuracy by calculating the total absolute error as a percentage of the total actual POS. It is calculated by summing the absolute errors for all observations, dividing this value by the absolute value of the sum of all Actuals, and dividing the result by the number of observations in the series. Finally, multiply the total by 100 to obtain a percentage result.

Error Measure - Aggregate Level

In this view, although the data is still at the low level, it can be rolled up to any intersection, and the error metrics are recalculated. This information can be useful in several scenarios. For example, if you decide that the forecast accuracy at the low level is inadequate, then you can roll up to different intersections, and check at what level, the forecast accuracy starts to deteriorate. Or the rolled-up level can be preset, and you first check the aggregate level accuracy. You can expect that the low level accuracy will be at most on par with the accuracy at the aggregate level.

Figure 7-7 Error Measure - Aggregate Level View

Baseline Forecast Final 01 - itm/str/week Error Measure Worksheet - Aggregate Level	
Product	Location
5 podiet capri - Antique 8 Ank	5th Avenue
Find...	
History Data for Forecast Window Baseline Forecast Final 01 - itm/str/week	
Approved Forecast for Forecast Window Baseline Forecast Final 01 - itm/str/week	0.00
Approved Forecast Mean Error Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Mean Absolute Error Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Root Mean Squared Error Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Mean Absolute Percentage Error Baseline Forecast Final 01 - itm/str/week	
Approved Forecast Percentage Absolute Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Baseline Forecast Final 01 - itm/str/week	0.00
Approved System Forecast Mean Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Mean Absolute Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Root Mean Squared Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Mean Absolute Percentage Error Baseline Forecast Final 01 - itm/str/week	
Approved System Forecast Percentage Absolute Error Baseline Forecast Final 01 - itm/str/week	

Measures: Error Measure - Aggregate Level View

The Error Measure - Aggregate Level view contains the following measures:

History Data for Forecast Window

The sum of the forecast data source for the selected time periods. For example, during the wizard process when the following calendar periods are selected: week 1, week 3 and week 10 for year 2015. Then the history data measure displays - at the item store level - the sum of the demand for the three selected weeks.

Forecast Measures

There forecast errors are calculated between the historical demand, and two forecast metrics: the approved forecast and the approved system forecast. The error of the approved forecast takes into account adjustments of the forecast user, while the error of the approved system forecast truly reflects the quality of the forecasts generated by the system, without human intervention.

Mean Error

The error of a forecast observation is the difference between the forecast value and the actual POS value. The Mean Error statistic is a measure of the average error over time. This is calculated by summing the errors for all observations, and then dividing by the number of observations to obtain the average. It measures forecast accuracy by calculating the error in units. Because a positive error in one period can cancel out a negative error in another period, this measure is useful when you are interested in how well the forecast predicts over the forecast horizon rather than on a period-to-period basis. Mean error is useful as a measure of forecast bias. A negative mean error suggests that overall the forecasting model overstates the forecast, while a positive mean error indicates forecasts that are generally too low.

Mean Absolute Error

The absolute error of a forecast observation is the absolute value of the difference between the forecast value and the actual POS value. The Mean Absolute Error statistic is a measure of the average absolute error. This is calculated by summing the absolute errors for all observations and then dividing by the number of observations to obtain the average. Mean Absolute Error gives you a better indication of how the forecast performed period by period because the absolute value function ensures that negative errors in one period are not canceled out by positive errors in another. Mean Absolute Error is most useful for comparing two forecast methods for the same series.

Root Mean Squared Error

This is the square root of the Mean Squared Error. The Root Mean Squared Error is one of the most commonly used measures of forecast accuracy because of its similarity to the basic statistical concept of a standard deviation. It evaluates the magnitude of errors in a forecast on a period-by-period basis, and it is best used to compare alternative forecasting models for a given series.

Mean Absolute Percentage Error

The percentage error of a forecast observation is the difference between the actual POS value and the forecast value, divided by the actual POS value. The result of this calculation expresses the forecast error as a percentage of the actual value. The Mean Absolute Percentage Error statistic measures forecast accuracy by taking the average of the sum of the absolute values of the percentage error calculations across all observations. This method is useful when comparing the accuracy of forecasts for different volume products (it normalizes error by volume).

Percentage Absolute Error

The absolute error of a forecast observation is the absolute value of the difference between the forecast value and the actual POS value. The Percentage Absolute Error statistic measures forecast accuracy by calculating the total absolute error as a percentage of the total actual POS. It is calculated by summing the absolute errors for all observations, dividing this value by the absolute value of the sum of all Actuals, and dividing the result by the number of observations in the series. Finally, multiply the total by 100 to obtain a percentage result.

Actuals versus Forecasts View

This view displays forecast results and actual demand values for each product, location, and time period specified in the wizard. This view allows you to compare the results of both system-approved forecasts and final approved forecasts to actual demand quantities.

Figure 7–8 Actuals versus Forecast View

	11/21/2014	11/28/2014	12/5/2014	12/12/2014	12/19/2014	12/26/2014	1/2/2015
History Data Baseline Forecast Final 01 - itm/str/week	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Approved Forecast Baseline Forecast Final 01 - itm/str/week	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Approved System Forecast Baseline Forecast Final 01 - itm/str/week	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Measures: Actuals versus Forecasts View

The Actuals versus Forecasts view contains the following measures:

History Data

History Data displays the actual demand quantities for the product, location, and calendar combinations displayed.

Forecast Measures

Your task includes the following forecast measures: Approved Forecast and Approved System. These Forecast measures are selected in the wizard process. These measures display the forecast quantity for the product, location, and calendar combinations included in the task.

Forecast Administration Task

The Forecast Administration task allows you to set up RDF Cloud Service to generate forecasts.

Forecast Administration Task Components

This section describes the components of the Forecast Administration.

Basic versus Advanced

Forecast Administration is the first task used in setting up RDF Cloud Service to generate forecasts. It provides access to forecast settings and parameters that govern the whole domain (database). These settings and parameters are divided into two areas, Basic and Advanced, and are available beneath the Forecast Administration task.

The Basic Settings are used to establish a final-level forecast horizon, the commencement and frequency of forecast generation, and the specification of aggregation levels (Source Levels) and spreading (Profile) methods used to yield the final-level forecast results. For information on the views in Basic Settings, refer to [Forecast Administration Workbook: Basic Settings](#).

The Advanced Settings are used to set default values for parameters affecting the algorithm and other forecasting techniques used to yield final-level and source-level forecasts, thus eliminating the need to define these parameters individually for each product and location. If certain products or locations require parameter values other than the defaults, these fields can be amended on a case-by-case basis in the [Forecast Maintenance Workbook](#). For information on the views in Advanced Settings, refer to [Forecast Administration Workbook: Advanced Settings](#).

Final versus Source Level Forecasts

Often, forecast information is required for items at a very low level in the hierarchy. However, problems can arise in that data is often too sparse and noisy to identify clear patterns at these lower levels. For this reason, it sometimes becomes necessary to aggregate sales data from a low level to a higher level in the hierarchy in order to generate a reasonable forecast. Once this forecast is created at the higher or source-level, the results can be allocated to the lower-level or final-level dimension based on the lower level's relationship to the total.

In order to spread this forecast information back down to the lower level, it is necessary to have some idea about the relationship between the final-level and the source-level dimensions. Often, an additional interim forecast is run at the low level in order to determine this relationship. Forecast data at this low level might be sufficient

to generate reliable percentage-to-whole information, but the actual forecast numbers are more robust when generated at the aggregate level.

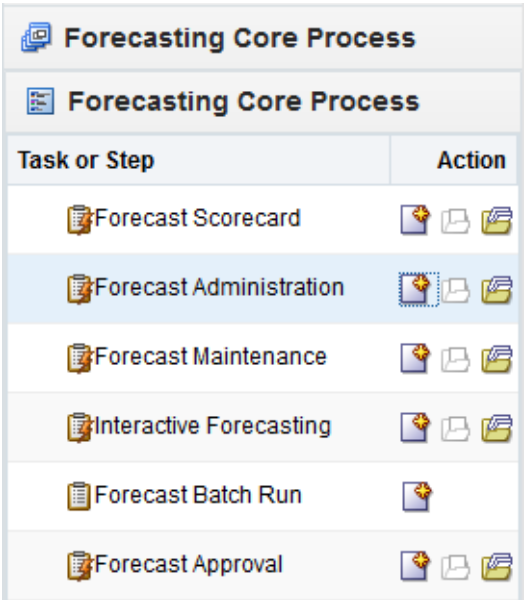
The Final Level view represents forecast parameters for the lower (final) level, the level to which source forecast values are ultimately spread. Forecast data must appear at some final-level in order for the data to be approved or exported to other systems. The Source Level view represents the default values for forecast parameters at the more robust aggregate (source) level.























Forecast Administration Workbook

To build the Forecast Administration workbook, perform these steps:

1. Click the New Workbook icon in the Forecast Administration task in the Forecasting Core Process activity.

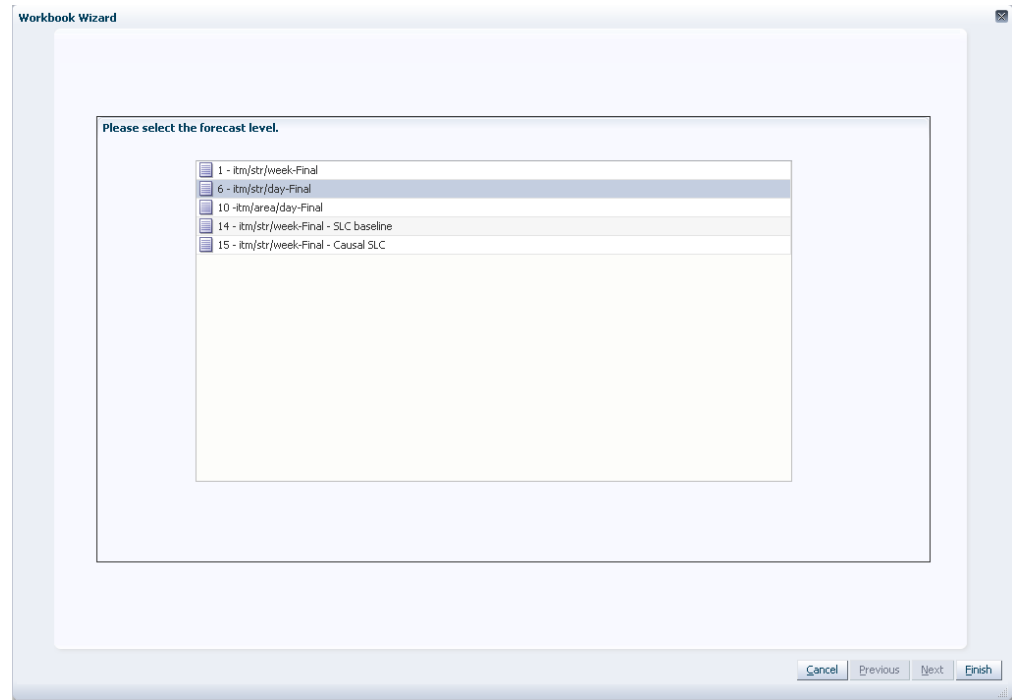
Figure 8–1 Forecast Administration Task



Forecasting Core Process	
Forecasting Core Process	
Task or Step	Action
 Forecast Scorecard	  
 Forecast Administration	  
 Forecast Maintenance	  
 Interactive Forecasting	  
 Forecast Batch Run	
 Forecast Approval	  

2. The Workbook wizard opens. Select the forecast level you want to work with and click **Finish**.

Note: The final forecast level is a level at which approvals and data exports can be performed. Depending on your organization's setup, you may be offered a choice of several final forecast levels. Make the appropriate selection.

Figure 8–2 Workbook Wizard: Select Forecast Level

The Forecast Administration workbook is built.

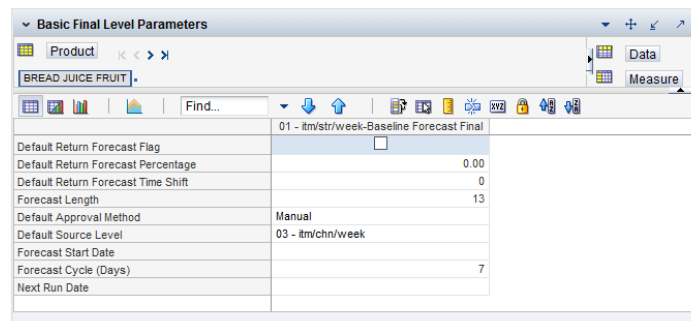
Forecast Administration Workbook: Basic Settings

The Forecast Administration Basic Settings workbooks contains two views:

- [Final Level View - Basic Settings](#)
- [Final and Source Level Parameters View - Basic Settings](#)

Final Level View - Basic Settings

The Final Level view allows you to set the forecast horizon information, frequency of review, and all default parameters for the lower or final-level forecast (the level to which aggregate forecast data is ultimately spread). Forecast approvals and data exports can only be performed on forecasts at a final-level. [Figure 8–3](#) provides an example of a view of the Final Level Parameters view in a master domain with three partitions/local domains, partitioned based on group.

Figure 8–3 Final Level Parameters View

Measures: Final Level View - Basic Settings

The Final Level View - Basic Settings contains the following measures:

Default Approval Method

This field is a list from which you select the default automatic approval policy for forecast items. Valid values are:

Field	Description
Manual	The system-generated forecast is not automatically approved. Forecast values must be manually approved by accessing and amending the Forecast Approval Workbook .
Automatic	The system-generated quantity is automatically approved as is.
By Alert	This list of values may also include any Forecast Approval alerts that have been configured for use in the forecast approval process. Alerts are configured during the implementation. Refer to the <i>Oracle Retail Predictive Application Server Configuration Tools User Guide</i> for more information on the Alert Manager.

Default Return Forecast Flag

If this Boolean measure is checked, it indicates that a returns forecast will be generated.

Default Return Forecast Percentage

This measure indicates the percentage of the merchandise sold in a time period that is expected to be returned to the store. A value of zero indicates that no returns will be calculated.

Default Return Forecast Time Shift

This measure indicates the number of time periods between when the merchandise was sold until it was returned. For instance, if the measure is set to one, the merchandise is expected to be returned one week after it was sold.

Default Source Level

The pick list of values displayed in this field allows you to change the forecast level that is used as the primary level to generate the source forecast. The source-levels are set up in the RPAS Configuration Tools. A value from the pick list is required in this field at the time of forecast generation.

Forecast Cycle

The Forecast Cycle is the amount of time (measured in days) that the system waits between each forecast generation. Once a scheduled forecast has been generated, this field is used to automatically update the Next Run Date field. A non-zero value is required in this field at the time of forecast generation.

Forecast Start Date

This is the starting date of the forecast. If no value is specified at the time of forecast generation, the system uses the data/time at which the batch is executed as the default value. If a value is specified in this field and it is used to successfully generate the batch forecast, this value is cleared.

Forecast Length

The Forecast Length is used with the Forecast Start Date to determine forecast horizon. The forecast length is based on the calendar dimension of the final-level. For example, if the forecast length is to be 10 weeks, the setting for a final-level at day is 70 (10 x 7 days).

Next Run Date

The Next Run Date is the date on which the next batch forecast generation process automatically runs. RDF Cloud Service automatically triggers a set of batch processes to be run at a pre-determined time period. When a scheduled batch is run successfully, the Next Run Date automatically updates based on the Start Date value and the Forecast Cycle. No value is required in this field when the [Run Batch Forecast Workbook](#) wizard is used to generate the forecast or if the batch forecast is run from the back-end of the domains using the override *True* option. Refer to the *Oracle Retail Demand Forecasting Cloud Service Implementation Guide* for more information on forecast generation.

Enable New Item Functionality

The New Item functionality is not automatically available for every forecast level. You can enable it for a certain level by checking this measure.

Causal Run Mode

Note: This measure is not displayed for baseline levels.

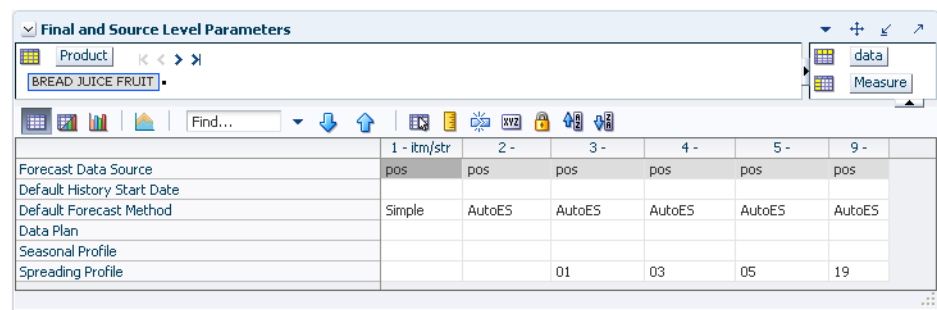
Allows you to select the default behavior of the causal engine. There are three options:

- Run Pooling Estimation — the promotion effects are estimated at the specified source levels. No forecast is generated.
- Run Forecast — the promotion effects are estimated at the final forecast level. Then, if specified, the promotion effects from the final and source levels are blended. Finally, the blended promotion effects are used to generate the forecast.
- Run Both — the causal engine will perform all the actions described in the other options.

Final and Source Level Parameters View - Basic Settings

The Final and Source Level view allows you to set the default parameters that are common to both the final and source-level forecasts.

Figure 8–4 Final and Source Level Parameters View



Measures: Final and Source Level Parameters View - Basic Settings

The Final and Source Level Parameters View - Basic Settings contains the following measures:

Forecast Data Source

This is a read-only value that displays the sales measure (the measure name) that is the data used for the generation of forecasts (for example, POS). The measure that is displayed here is determined at configuration time in the RPAS Configuration Tools. Different Data Sources can be specified for the Final and Source Levels.

Default History Start Date

This field indicates to the system the point in the historical sales data at which to use in the forecast generation process. If no date is indicated, the system defaults to the first date in your calendar. It is also important to note that the system ignores leading zeros that begin at the history start date. For example, if your history start date is January 1, 2011 and an item/location does not have sales history until February 1, 2011, the system considers the starting point in that item/location's history to be the first data point where there is a non-zero sales value. Different History Start Dates can be specified for the Final and Source Levels.

Data Plan

Note: This measure is not displayed for causal levels.

Used in conjunction with the Bayesian forecast method, Data Plan is used to input the measure name of a sales plan that should be associated with the final-level forecast. Sales plans, when available, provide details of the anticipated shape and scale of an item's selling pattern. If the Data Plan is required, this field should include the measure name associated with the Data Plan.

Default Forecast Method

Note: If this a Causal forecast level, then the only available methods are Causal and No Forecast. Alternately, when the level is non-causal, the Causal method is not available.

The Default Forecast Method is a complete list of available forecast methods from which you can select the primary forecast method that is used to generate the forecast. A summary of methods is provided in [Forecasting Methods Available in RDF Cloud Service](#). The chapter, "Oracle Retail Demand Forecasting Cloud Service Methods", covers each method in greater detail.

It is important to note that Causal should not be selected unless the forecast level was set as a Causal level during the configuration. Refer to the *Oracle Retail Demand Forecasting Cloud Service Configuration Guide* for more information on configurations using the Causal forecast method.

Seasonal Profile

Note: This measure is not displayed for causal levels.

Used in conjunction with the Profile-Based forecasting method, this is the measure name of the seasonal profile that is used to generate the forecast at either the source or final-level. Seasonal profiles, when available, provide details of the anticipated seasonality (shape) of an item's selling pattern. The seasonal profile can be generated or loaded, depending on your configuration. The original value of this measure is set during the configuration of the RDF Cloud Service solution.

Spreading Profile

Note: This measure is not displayed for causal levels.

Used for source-level forecasting, the value of this measure indicates the profile level that is used to determine how the source-level forecast is spread down to the final-level. No value is needed to be entered at the final-level. For dynamically generated profiles, this value is the number associated with the final profile level (for example, 01). Note that profiles one (1) through 9 have a zero (0) preceding them in Curve—this is different than the forecasting level numbers.

For profiles that must be approved, this is the measure associated with the final profile level. This measure is defined as apvp +level (for example, apvp01 for the approved profile for level 01 in Curve).

Source Level Forecast Data Source

You can specify a measure to serve as a forecast data source at the source-level. If the measure is left blank for a certain source-level, the source measure from the corresponding final-level is used.

Source Level History Start Date

This is the starting date for historical sales data at the source-level. For example, if your system start date is January 1, 2003, but you only want to use historical sales data from the beginning of 2011, you need to set your History Start Date to January 1, 2011. Only history after this date is used for generating the forecast. The default is the system start date unless otherwise specified. If sales data is collected weekly or monthly, RDF Cloud Service generates forecasts only using data from sales periods after the one containing the history start date.

It is also important to note that the system ignores leading zeros that begin at the history start date. For example, if your history start date is January 1, 2011, and an item/location does not have sales history until February 1, 2011, the system considers the starting point in that item/location's history to be the first data point where there is a non-zero sales value.

Note: History start dates for final and source-levels can be different.

Forecast Administration Workbook: Advanced Settings

The Forecast Administration Advanced Settings workbooks contain these views:

- [Causal Parameters View - Final Level](#)
- [Causal Parameters - Source Levels](#)
- [Final Level Parameters View - Advanced Settings](#)
- [Final and Source Level Parameters View - Advanced Settings](#)

The Forecast Administration Advanced Settings workflow activity is used to set parameters related to either the data that is stored in the system or the forecasting methods that are used at the final or source-levels. The parameters on this workflow activity are not as likely to be changed on a regular basis as the ones on the Basic Settings workflow activity.

Causal Parameters View - Final Level

The Causal Parameters view allows you to set the parameters that support promotional forecasting. The parameters that support overlapping promotions are also specified in this view. Overlapping promotions are promotions that happen at the same time period at the same location for the same product. This view only includes the causal forecast levels for the final-level selected during the wizard process. This view is not visible if Promote/Promotional Forecasting is not implemented in your RDF Cloud Service environment.

Figure 8–5 Causal Parameters View

Parameter	Value
Causal Aggregation Profile	07 - itm/str
Causal Data Source	
Causal Calculation Intersection	
Causal Calculation Intersection Periodicity	0
Causal Higher Intersection	
Disable Causal	<input type="checkbox"/>
Causal Spread Profile	
Use Causal Capping	<input type="checkbox"/>
Causal Capping Number	
Causal Capping Ratio	
Minimum Causal Capping History (Periods)	0
Causal External Baseline	
Causal SLC - ROS	
Causal - Effects Only	<input type="checkbox"/>
Default Overlapping Promotions Behavior	Adjustable ...
Default Overlapping Promotion Adjustment Factor	1.00

Measures: Causal Parameters View - Advanced Settings - Final Level

The Causal Parameters View - Advanced Settings contains the following measures:

Aggregated Promotional Lift Override

This parameter contains the name of the measure that stores the higher level (aggregated) promotional peak override. The name is implementation specific. If populated, during the causal forecasting generation the aggregated lift is spread down to the appropriate final level intersection.

Causal - Lift Estimate

The parameter gives you the option to use either the multiplicative or hybrid models to decausalize the sales history.

- **Multiplicative**—this model extracts promotional lifts that are assumed to have multiplicative effects in order to de-causalized the history.
- **Hybrid**—this model extracts the promotional lifts as additive effects in the de-causalized phase to decausalize the history. Then later in the forecast phase, it applies the promotional lifts as multiplicative effect to the forecast baseline. This is the system default value.

Causal Aggregation Profile

Used only for Daily Causal Forecasting, the Causal Aggregation Profile is measure name of the profile used to aggregate promotions defined at day up to the week. The value entered in this field is the measure name of profile. If this profile is generated within Curve, the format of the measure name is apvp+level (for example, apvp01). Note that the only aggregation of promotion variables being performed here is along the Calendar hierarchy. RDF Cloud Service does not support aggregation of promotion variables along other hierarchies such as product and location hierarchies.

Causal Beta Scale

As part of the causal forecasting process, the average sales of non-promo periods in history are divided by the Beta Scale. If the resulting ratio is less than beta zero, the causal forecasting method succeeds. If not, the causal forecasting method fails and the baseline serves as the forecast for the time series.

Causal Calculation Intersection

Used only for Daily Causal Forecasting, the Causal Calculation Intersection is the intersection at which the causal forecast is run. The format needs to match the hierarchy dimension names set in the RPAS Configuration Tools (such as itemstr_week). Each dimension must have only four characters. The order of the dimension does not matter. There is no validation of correct format of this intersection.

Note: When using Daily Causal Forecasting, it is recommended that the calculation is performed at the week level.

Causal Calculation Intersection Periodicity

This measure is obsolete if a baseline forecast is provided to the causal calculation. Used only for Daily Causal Forecasting, the Causal Calculation Intersection Periodicity must be set to the periodicity of Causal Calculation Intersection. Periodicity is the number of periods within one year that correspond to the calendar dimension (for example, 52 if the Causal Calculation Intersection is defined with the week dimension).

Causal Capping Number

The value of this parameter is a measure based on the same product and location intersection as the forecast level. This measure contains the maximum value to use for calculating the causal forecast for time series that meet the Causal Capping conditions. If Use Causal Capping is set to *True*, the history for the time series is greater than or equal to the Minimum Causal Capping History, and the preliminary forecast is greater than or equal to the value in the Causal Capping Number measure, then the forecast is recalculated to be the value in the Causal Capping Number measure multiplied by the value in the Causal Capping Ratio measure.

Causal Capping Ratio

The value of this parameter is a measure based on the same product and location intersection as the forecast level. This measure contains the ratio to be used to calculate the forecasts for time series that meet the Causal Capping conditions. If Use Causal Capping is set to *True*, the history for the time series is greater than or equal to the value in the Minimum Causal Capping History measure, and the preliminary forecast is greater than or equal to the value in the Causal Capping Number measure, then the forecast is recalculated to be the Causal Capping Number multiplied by the value in the Causal Capping Ratio measure.

Causal Data Source

Used only for Daily Causal Forecasting, the Causal Data Source is an optional setting that contains the measure name of the sales data to be used if the data for causal forecasting is different than the Data Source specified at the Final level. If needed, this field should contain the measure name of the source data measure (for example, DPOS).

If set to *True*, Seasonal Regression is excluded from the choice of methods for baseline calculation within Causal.

Note: This parameter does not impact the choice of forecast methods within Seasonales.

Causal Baseline

Enter the measure name that you want to serve as the baseline for the causal forecast at this level. The measure can be loaded or it can be generated in a different forecast run.

Causal Higher Intersection

An optional setting for Causal Forecasting, this intersection is the aggregate level to model promotions if the causal intersection cannot produce a meaningful causal effect. This intersection applies to promotions that have a Promotion Type is set to Override From Higher Level (set in the [Promo Effect Maintenance Workbook](#)). The format of this intersection needs to match the hierarchy dimension names set in the RPAS Configuration Tools such as sclsrgrn_ (Subclass/Region), and it must not contain the calendar dimension. Each dimension must have only four characters. The order of the dimension does not matter. There is no validation of correct format of this intersection.

Causal SLC - ROS

Enter the name of the measure that stores the rate of sale values for item/locations that are forecast using the Causal short life cycle methodology.

Causal Spread Profile

Used only for Daily Causal Forecasting, the Causal Spread Profile is the measure name of the profile used to spread the causal baseline forecast from the Causal Calculation Intersection to the Final Level. If this profile is generated in Curve, this measure value is apvp+level (for example, apvp01).

Default Overlapping Promotion Adjustment Factor

This Default Overlapping Promotion Adjustment Factor specifies at a high level how the individually calculated promotions interact with each other when they are overlapping in the forecast horizon. This parameter serves as a global setting, but can be overridden at lower levels. The default value is 1.

- A value greater than 1 means the promotion effects will be compressed when applied in the model, instead of linearly summing up to get the total promotion effect. The larger the value is, the larger the compression effect will be, meaning the smaller the total effect will be.
- A value between 0 and 1 means the promotion effects will be amplified when applied in the model, instead of linearly summing up to get the total promotion effect. The smaller the value is, the larger the amplification effect will be, meaning the larger the total effect will be.

- If a value less than or equal to 0 is put in the cell, the calculation engine will find the best adjustment factor to fit the history data. This factor is then used to combine overlapping promotions in the forecast horizon. With few exceptions, the value should be anywhere from 1 to 5. This factor is then used to combine overlapping promotions in the forecast horizon

Caution: The process to find the best adjustment factor can be time consuming and introduce performance issues.

Minimum Causal Capping History

Used only in Causal forecasting, this parameter is the minimum number of historical time periods that are required for Causal Capping to be used to produce the Causal forecast. Otherwise, no capping is applied. The algorithm currently uses 52 weeks of history as the default for this parameter.

Minimum Causal Capping History (Periods)

If Use Causal Capping is set to *True*, this parameter is used to set minimum number of historical time periods required before the system considers a time series for causal capping.

Use Causal Capping

Place a check in this parameter (set to *True*) if capping is to be applied to the causal forecast. Also required for causal capping are the following parameters:

Default Promo Effect Mode

This measure specifies which effect version of a certain promotion is used when forecast is generated. The available options are:

- Final Level — This is the effect generated at the final level intersection, and is different for every item store combination
- Source Level — This is the effect generated at the source level using pooled data. It is the same for all item store combinations inside a source level dimension
- Blend — This effect is combining the Final and Source effects. It gives more weight to the Final or Source Level effect, based on a parameter as described in the following formula.

The formula used to combine the effects is:

$$\text{Blend} = \text{blend parameter} * \text{Source} + (1 - \text{blend parameter}) * \text{Final}$$

The measure can be overridden in the Forecast Maintenance workbook.

Default Blending Parameter

This parameter sets the weights for combining the Final and Source Level promotion effects, when calculating the blended effect. The range of the parameter is 0 to 1. A value closer to 1 will yield a blended effect closer to the Source Final Level effect. A value closer to zero yields an effect closer to the Final Level effect. The value can be overridden in the Forecast Maintenance workbook.

- Causal Capping Number
- Causal Capping Ratio
- Minimum Causal Capping History

Note: More detailed information on the Causal forecasting algorithm is provided in [Forecasting Methods Available in RDF Cloud Service](#).

Causal Parameters - Source Levels

This view allows you to select actions specific for causal source levels. At the source level, promotion and demand data is not simply aggregated. The final level data for all time series in a source level dimension is analyzed at the same time, resulting in potentially huge amounts of data.

Figure 8–6 Causal Parameters - Source Levels View

	14 - itm/rgn/week	15 - pgrp/grpd/we	16 - scis/str/week
Number of Extra Data Points	1	1	1
Run Estimate Flag	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Last Estimate Date			

Measures: Causal Parameters - Source Levels

The Causal Parameters - Source Levels contains the following measures:

Number of Extra Data Points

This measure determines the number of periods before and after that the causal engine analysis when determining the causal effects. For instance if the number is 1, and we have one promoted period in history, then the input to the causal engine is the demand for the period prior to the promoted period, the promo period demand and the demand for the period past the promoted period, for a total of 3 data points. If the value of the measure is 2, then the total number of data points is 5. This measure is very important because it influences the effect estimation, both in accuracy and processing time. If the number is too high, too many data points are processed by the engine, resulting in poor performance.

Run Estimate Flag

This measure indicates if the effect estimation should be performed for a certain source level, the next time the estimation is run.

Last Estimate Date

This measure displays the date when the effect estimation was run for a certain source level. This is useful when deciding if a rerun is necessary. For instance if there are three source levels, and two have a Estimate Date of last week, and the third a date from last month. The user may want to enable estimation only for the source level with the earlier date. There was not much activity such that a re-estimation is necessary for the other two source levels.

Final Level Parameters View - Advanced Settings

The Final Level view allows you to set the advanced parameters for the final-level forecasts. Figure 8–7 provides an example of a view of this view in a master domain with three partitions/Local Domains, partitioned based on group.

Figure 8–7 Final Level Parameters View

Final Level Parameters	
Product	1 - itm/str/week-Final
Group 4	
Default Interaction Factor	2.00
Default Apply Interaction Factor	<input type="checkbox"/>
Generate Baseline Forecasts	<input type="checkbox"/>
Generate Cumulative Intervals	<input type="checkbox"/>
Generate Intervals	<input type="checkbox"/>
Generate Methods	<input type="checkbox"/>
Generate Parameters	<input type="checkbox"/>
Updating Last Week Forecast Number of Weeks	0
Updating Last Week Forecast	No Change
Days to Keep Forecasts	14
Like TS Duration (Periods)	10
Item End Date Action	Apply 0 After Spreading
Store Interim Forecast	<input type="checkbox"/>
Default Keep Last Changes	None
Interval Cap Lower Ratio	0.30
Interval Cap Upper Ratio	1.00
Components - Baseline	
Components - Baseline Interval	
Components - Regular Price Lifts	
Components - Promotional Lifts	

Measures: Final Level Parameters View - Advanced Settings

The Final Level Parameters view - Advanced Settings contains the following measures:

Components - Baseline

Note: This measure is not displayed for causal levels.

This measure stores the name of the measure that serves as baseline in the Components forecasting measure. If no measure is specified, the Components forecasting method assesses the value as one (1).

Components - Baseline Interval

Note: This measure is not displayed for causal levels.

This measure stores the name of the measure that serves as baseline interval in the Components forecasting measure. If no measure is specified, the Components forecasting method assesses the value as one (1).

Components - Regular Price Lifts

Note: This measure is not displayed for causal levels.

This measure stores the name of the measure that serves as regular price lifts in the Components forecasting measure. If no measure is specified, the Components forecasting method assesses the value as one (1).

Components - Promotional Lifts

Note: This measure is not displayed for causal levels.

This measure stores the name of the measure that serves as promotional lifts in the Components forecasting measure. If no measure is specified, the Components forecasting method assesses the value as one (1).

Days to Keep Forecasts

This field is used to set the number of days that the system stores forecasts based on the date/time the forecast is generated. The date/time of forecast generation is also referred to as birth date of the forecast. A forecast is deleted from the system if the birth date plus the number of days since the birth date is greater than the value set in the Days to Keep Forecast parameter. This process occurs when either the [Run Batch Forecast Workbook](#) wizard is used to generate the forecast or when PreGenerateForecast is executed.

When you start the [Run Batch Forecast Workbook](#), one of the first steps that RDF Cloud Service takes is to remove forecasts older than the value given in the Days to Keep Forecasts parameter. RDF Cloud Service uses the value of that parameter in your local domain. However, because forecasts are registered globally, the Forecast Delete has a global effect. That is, if you set the parameter to some low value, for example, one day, all forecasts in all local domains older than one day are removed. This can adversely impact other users of the system if done without consideration.

When the PreGenerate utility is used, typically for automated batch production of forecasts, RDF Cloud Service uses the value for the Days to Keep Forecasts parameter in the first local domain. Again, if this is set to a value that is not expected by the other users, it can cause unintended disruption.

Refer to the *Oracle Retail Demand Forecasting Cloud Service Implementation Guide* for more information on PreGenerateForecast.

Default Keep Last Changes

This field is a list from which you select the default change policy for forecast items. Valid values are:

Field	Description
Keep Last Changes (None)	There are no changes that are introduced into the adjusted forecast. The adjusted forecast is equal to the system forecast.
Keep Last Changes (Total)	This method allows you to keep previous adjusted forecast value if there is any adjustment existing. For each product/location/week in the forecast horizon, when the last approved system forecast is different from last approved forecast, it means that you have made an adjustment previously. The last approved forecast is used to populated the current adjusted forecast. If the last approved system forecast is the same as last approved forecast, it means that you have not made any adjustment previously and the current adjusted forecast will be populated with current system forecast.

Field	Description
Keep Last Changes (Diff)	This method allows you to keep the difference between previous adjusted forecast and system forecast if there is any adjustment existing. For each product/location/week in the forecast horizon, when last approved system forecast is different from last approved forecast, it means that you have made an adjustment previously. The last approved forecast minus the last approved forecast plus the current system forecast is used to populated the current adjusted forecast. If the last approved system forecast is the same as last approved forecast, it means that you have not made any adjustment previously and the current adjusted forecast will be populated with current system forecast.
Keep Last Changes (Ratio)	This method allows you to keep the ratio of last adjusted forecast versus the last system forecast if there is any adjustment existing. For each product/location/week in the forecast horizon, when the last approved system forecast is different from last approved forecast, it means that you have made an adjustment previously. The last approved forecast/last approved system forecast multiplied by the current system forecast is used to populated the current adjusted forecast. If the last approved system forecast is the same as last approved forecast, it means that you have not made any adjustment previously and the current adjusted forecast will be populated with current system forecast.

Note: Populating adjusted forecast is the 5th step of the ["Batch Flow Process in RDF Cloud Service"](#). Populating adjusted forecast happens before forecast approval. At the time of applying keep last changes, the approved forecast and approved system forecast contains forecast values from last batch. At that moment, RDF Cloud Service checks the value of approved forecast, approved system forecast and current system forecast to populate the adjusted forecast. Once forecast approval is done, approved forecast and approved system forecast is populated with current forecast values.

Generate Baseline Forecasts

A check should be indicated in this field (set to *True*) if the baseline forecast is to be generated to be viewed in any task. This parameter should be set if the level is used for Causal forecasting and the baseline is needed for analysis purposes.

Generate Cumulative Interval

A check in this field (set to *True*) specifies whether you want RDF Cloud Service to generate cumulative intervals (this is similar to cumulative standard deviations) during the forecast generation process. Cumulative Intervals are a running total of Intervals and are typically required when RDF Cloud Service is integrated with the Oracle Retail Merchandising System. If you do not need cumulative intervals, you can eliminate excess processing time and save disk space by clearing the check box. The calculated cumulative intervals can be viewed within the [Forecast Approval Workbook](#).

Generate Intervals

A check in this field (set to *True*) indicates that intervals (similar to Standard Deviations) should be stored as part of the batch forecast process. Intervals can be displayed in the [Forecast Approval Workbook](#). If you do not need intervals, excess

processing time and disk space may be eliminated by clearing the check box. For many forecasting methods, intervals are calculated as standard deviation, but for Simple, Holt, and Winters the calculation is more complex. Intervals are not exported.

Generate Methods

A check in this field (set to *True*) indicates that when an ES forecast method is used, the chosen forecast method for each fitted time series should be stored. The chosen method can be displayed in the [Forecast Approval Workbook](#).

Generate Parameters

A check in this field (set to *True*) indicates that the alpha, level, and trend parameters for each fitted time series should be stored. These parameters can be displayed in the [Forecast Approval Workbook](#).

Interval Cap Lower Ratio

The value entered in this field multiplied by the forecast represents the lower bound of the confidence interval for a given period in the forecast horizon.

Interval Cap Upper Ratio

The value entered in this field multiplied by the forecast represents the upper bound of the confidence interval for a given period in the forecast horizon.

Item End Date Action

This parameter allows the option for items with end dates within the horizon to have zero demand applied to time series before or after the interim forecast is calculated. The two options are:

Option	Description
Apply 0 After Spreading	This is the default value. Spreading ratios are calculated for time series with no consideration made to the end date of an item. It is after the source forecast is spread to the final-level when zero is applied to the System Forecast.
Apply 0 to Interim	For items that have an end date within the forecast horizon, zero is applied to the Interim Forecast before the spreading ratios are calculated. This ensures that no units are allocated to the final-level for time series that have ended.

Like TS Duration (Periods)

The Like TS Duration is the number of periods of history required, after which RDF Cloud Service stops using the substitution method and starts using the system forecast generated by the forecast engine. A value must be entered in this field if using Like-item/Sister-Store functionality. When the difference between the forecast start date and the history start date is greater than the Like TS Duration, RDF Cloud Service starts using the system forecast for the item.

The Like TS Duration determines for how long RDF Cloud Service applies the Like-item/Sister-Store functionality. In general, the difference between history start date and the forecast start date is compared to the Like TS Duration. If the difference is larger than the Like TS Duration, it means that the new item has been selling for a period long enough, such that RDF Cloud Service can create the forecast based on its own history.

The forecast start date has an override, which is usually used whenever the forecast start date is checked.

However, in the case of Like-item/Sister-Store, if the override references a date prior to the forecast start date, the forecast start date - instead of the override - is used when calculating the difference and comparing it to the Like TS Duration.

The reason behind this exception is that the override does not change unless it is initiated by a user. Hence, the difference between forecast start date override and history start date is always the same, so the Like-item functionality is always in effect.

If the override is ignored, the forecast start date is advancing every period, so the difference between it and history start date is always growing. Eventually it will become larger than the Like TS Duration, and thus turning off the Like-item functionality for the item.

Store Interim Forecast

Note: This measure is not displayed for causal levels.

A check should be placed in this field (set to *True*) if the interim forecast is stored. The Interim Forecast is the forecast generated at the Final Level. This forecast is used as the Source Data within Curve to generate the profile (spreading ratios) for spreading the source-level forecast to the final-level. The interim forecast should only be stored if it is necessary for any analysis purposes.

Updating Last Week Forecast

This field is a list from which you can select the method for updating the Approved Forecast for the last specified number of weeks of the forecast horizon. This option is valid only if the Approval Method Override (set in the [Forecast Administration Workbook](#)) is set to Manual or Approve by alert, and the alert was rejected. This parameter is used with the Updating Last Week Forecast Number of Weeks parameter.

Method	Description
No Change	When using this method, the last week in the forecast horizon does not have an Approved Forecast value. The number of weeks is determined by the value set in the Updating Last Week Forecast Number of Weeks parameter.
Replicate	When using this method the last week in the forecast horizon is forecast using the Approved Forecast for the week prior to this time period. To determine the appropriate forecast time period, the value set in Updating Last Week Forecast Number of Weeks is subtracted from the Forecast Length. For example, if your Forecast Length is set to 52 weeks and Updating Last Week Forecast Number of Weeks is set to 20, week 32's Approved Forecast is copied into the Approved Forecast for the next 20 weeks.
Use Forecast	When using this method, the System Forecast for the last weeks in the forecast horizon is approved.

Updating Last Week Forecast Number of Weeks

The Approved Forecast for the last weeks in the forecast horizon is updated using the method specified from the Updating Last Week Forecast list.

Final and Source Level Parameters View - Advanced Settings

The Final and Source Level view allows you to set the advanced parameters that are common to both the final and source-level forecasts.

Note: This view is not available for causal levels.

Figure 8–8 Final and Source Level Parameters View

	11 - itm/str/week-	12 - scl/rgn/week
Default Bayesian Alpha	1.00	1.00
Bayesian Cap Ratio	1.50	1.50
DD Duration (Periods)	0	0
Max Alpha (Profile)	1.00	1.00
Max Alpha (Simple Holt)	1.00	1.00
Max Alpha (Winters)	1.00	1.00
Crostons Min Gaps	5	5
Holt Min Hist (Periods)	13	13
Winters Min Hist (Periods)	104	104
Trend Damping Factor	0.50	0.50
Fall Back Method	Default	Default
Seasonal Smooth Index	0.80	0.80
Default Winters Mode	Oracle Winters	Oracle Winters
Default Moving Average Window Length	0	0
Max Gamma (Winters)	0.20	0.20
Max Gamma (Holt)	0.20	0.20
Deseasonalized Demand Array		
Extra Week Interpret Method	Use average	Use average
Extra Week Indicator Data Source	week53mask	week53mask
Fit Error Factor Source		

Measures: Source Level View - Advanced Settings

The Source Level View - Advanced Settings contains the following measures:

Bayesian Alpha (range (0, infinity))

When using the Bayesian forecasting method, historic data is combined with a known sales plan in creating the forecast. As POS data comes in, a Bayesian forecast is adjusted so that the sales magnitude is a weighted average between the original plan's scale and the scale reflected by known history. This parameter displays the value of alpha (the weighted combination parameter). An alpha value closer to one (or infinity) weights the sales plan more in creating the forecast, whereas alpha closer to zero weights the known history more. The default is one (1).

Bayesian Cap Ratio

The Bayesian Cap ratio is used to cap the resulting Bayesian forecast if it deviates significantly from the sale plan. The Bayesian Cap ratio is used as follows:

Example 8–1

```
If forecast I > Bayesian Cap ratio * Max value of Past Sales AND
forecast I > Bayesian Cap ratio * Max value of Past Plan AND
forecast I > Bayesian Cap ratio * Plan I
then
forecast I = Plan I
```

It defaults to a value of 1.5.

Croston's Min Gaps

The Croston's Min Gaps is the default minimum number of gaps between intermittent sales for the batch forecast to consider Croston's (Simple/IntermittentES) as a potential AutoES forecasting method for a time series. If there are not enough gaps between sales in a given product's sales history, the Croston's model is not considered a valid candidate model. The system default is five minimum gaps between intermittent sales. The value must be set based on the calendar dimension of the level. For example, if the value is to be 5 weeks, the setting for a final-level at day is 35 (5x7days) and a source-level at week is 5.

DD Duration (weeks)

Used with Profile Based forecast method, the DD Duration is the number of weeks of history required after which the system stops using the DD (De-seasonalized Demand) approach and defaults to the normal Profile-Based method. The value must be set based on the calendar dimension of the level. For example, if the value is to be 10 weeks, the setting for a final-level at day is 70 (10x7days) and a source-level at week is 10.

Default Moving Average Window Length

Used with Moving Average forecast method, this is the Default number of data points in history used in the calculation of Moving Average. This parameter can be overwritten at item/location from the [Forecast Maintenance Workbook](#).

Deseasonalized Demand Array

Enter the name of the measure that serves as the deseasonalized data source in the profile-based forecasting method. If left blank, the system uses the forecast data source in combination with a seasonal profile to generate the deseasonalized demand.

Extra Week Interpret Method

This measure indicates how the forecasting value should be calculated if for a week that was flagged extra, or 53rd. This is necessary when an extra week is added within the forecast horizon, because initially no value is calculated for that week.

The options to calculate the value are:

- Use average: the value for the extra week is calculated as the average of the values of the weeks immediately prior and after the flagged week.
- Use before: the value for the extra week is a replication of the value in the previous week
- Use after: the value for the extra week is equal to the value of the following week

Extra Week Indicator Data Source

This measure stores the name of the measure that indicates which week is the 53rd, or extra week. To set this measure, use the [Extra Week Indicator](#) found in the [Extra Week Administration Workbook](#).

Fit Error Factor Source

The measure stores the measure name that error factor of sales vs forecast. This measure needs to be at the intersection of the final forecast level, less the calendar dimension, example, item/store.

The Error Factor is necessary for the calculation of the Confidence Intervals.

For the majority of the forecasting methods, the error factor is calculated during forecast generation, but for the following methods the calculation is not possible and needs to be input:

- Copy
- LoadPlan
- Component

Fallback Method

Set this parameter only if the Fallback Method is to vary from the default Fallback Methods used by the selected forecasting algorithm. If the method selected as the Default Forecast Method or Forecast Method Override does not succeed for a time series, this method is used to calculate the forecast and the default Fallback Methods in the forecasting process is skipped entirely. The default Fallback Methods are as follows:

Table 8–1 Fallback Methods

Fallback Method	Steps
If either the Causal, Bayesian, or Profile-Based are selected as the Default Forecast Method or Forecast Method Override and the method does not fit the data.	<ol style="list-style-type: none"> 1. RDF attempts to fit SeasonalES 2. RDF attempts to fit TrendES 3. RDF attempts to fit Simple/IntermittentES
If the SeasonalES is selected as the Default Forecast Method or Forecast Method Override and neither Multiplicative Seasonal or Additive Seasonal fits the data.	<ol style="list-style-type: none"> 1. RDF attempts to fit TrendES 2. RDF attempts to fit Simple/IntermittentES
If either the Multiplicative Seasonal or Additive Seasonal are selected as the Default Forecast Method or Forecast Method Override and the method does not fit the data.	<ol style="list-style-type: none"> 1. RDF attempts to fit TrendES 2. RDF attempts to fit Simple/IntermittentES
If the TrendES is selected as the Default Forecast Method or Forecast Method Override and the method does not fit the data.	<ol style="list-style-type: none"> 1. RDF attempts to fit Simple/IntermittentES

Holt Min Hist (Periods)

Used with the AutoES forecast method, Holt Min Hist is the minimum number of periods of historical data necessary for the system to consider Holt (TrendES) as a potential forecasting method. RDF Cloud Service fits the given data to a variety of AutoES candidate models in an attempt to determine the best method; if not enough periods of data are available for a given item, Holt is not be considered as a valid option.

The system default is 13 periods. The value must be set based on the calendar dimension of the level. For example, if the value is to be 13 weeks, the setting for a final-level at day is 91 (13x7days) and a source-level at week is 13.

Max Alpha (Profile) (range [0.001 to 1])

In the Profile-based model-fitting procedure, alpha, which is a model parameter capturing the level, is determined by optimizing the fit over the de-seasonalized time series. The time series is de-seasonalized based on a seasonal profile. This field displays the maximum value (that is, cap value) of alpha allowed in the model-fitting process. An alpha cap value closer to one (1) allows more reactive models (alpha = 1, repeats the last data point), whereas alpha cap closer to zero (0) only allows less reactive models. The default is one (1).

Max Alpha (Simple, Holt) (range [0.001 to 1])

In the Simple or Holt (TrendES) model-fitting procedure, alpha (a model parameter capturing the level) is determined by optimizing the fit over the time series. This field displays the maximum value (cap value) of alpha allowed in the model-fitting process. An alpha cap value closer to one (1) allows more reactive models (alpha = 1, repeats the last data point), whereas alpha cap closer to zero (0) only allows less reactive models. The default is one (1).

Max Alpha (Winters) (range [0.001 to 1])

In the Winters (SeasonalES) model-fitting procedure, alpha (a model parameter capturing the level) is determined by optimizing the fit over the time series. This field displays the maximum value (cap value) of alpha allowed in the model-fitting process. An alpha cap value closer to one (1) allows more reactive models (alpha = 1, repeats the last data point), whereas alpha cap closer to zero (0) only allows less reactive models. The default is one (1).

Max Gamma (Holt) (range [0,1])

In the Holt (TrendES) model-fitting procedure, gamma (a model parameter capturing the trend) is determined by optimizing the fit over the time series. This field displays the maximum value (cap value) of gamma allowed in the model-fitting process.

Max Gamma (Winters) (range [0,1])

In the Winters (SeasonalES) model-fitting procedure, gamma (a model parameter capturing the trend) is determined by optimizing the fit over the time series. This field displays the maximum value (cap value) of gamma allowed in the model-fitting process.

Seasonal Smooth Index

This parameter is used in the calculation of seasonal index. The current default value used within forecasting is 0.80. Changes to this parameter impacts the value of seasonal index directly and impact the level indirectly. When seasonal smooth index is set to one (1), seasonal index is closer to the seasonal index of last year sales. When seasonal smooth index is set to zero (0), seasonal index is set to the initial seasonal indexes calculated from history.

This parameter is used for Oracle Winters.

Trend Damping Factor (range [0,1])

This parameter determines how reactive the forecast is to trending data. A value close to zero (0) is a high damping, while a value of one (1) implies no damping. The default is 0.5.

Winters Min Hist (Periods)

Used with the AutoES forecast method, the value in this field is the minimum number of periods of historical data necessary for Winters to be considered as a potential forecast method. If not enough years of data are available for a given time series, Winters is not used. The system default is two years of required history. The value must be set based on the calendar dimension of the level. For example, if the value is to be 104 weeks/2 years, the setting for a final-level at day is 728 (104 weeks x 7 days) and a source-level at week is 104.

Winters Mode

When any forecast method calls multiplicative or additive Winters, the system executes the Oracle Winters forecasting approach.

Winters Mode Impact on AutoES and Causal

The Winters Mode measure determines which Forecasting Approach to use within AutoES and Causal. Also, the errors that are used to calculate the BIC may be different for different Forecasting Approaches and could impact the choice of Forecast Method within AutoES and Causal.

It is recommended that you choose a Forecasting Approach that best suits the nature of your business. The default forecasting approach is Oracle Winters. For additional information on the forecasting approaches, refer to the section, [Forecasting Methods Available in RDF Cloud Service](#).

Note: If patching this change into a domain, in order to view this measure in the [Forecast Administration Workbook](#), you must add it to the [Final and Source Level Parameters View - Basic Settings](#) by selecting it from the Show/Hide dialog within the RPAS Client.

Forecast Maintenance Task

The Forecast Maintenance task allows you to select and modify forecasting parameters for product/location combinations when the values of these parameters differ from the default values that are assigned in the [Forecast Administration Workbook](#).

Suppose, for example, that the default forecast method of all the products in the database was set in the [Forecast Administration Workbook](#) to be AutoES. For a particular product, however, you know that a SeasonalES model is a better predictor of sales performance. To make this change, you must access the Forecast Maintenance task, select the product/location intersection to be reviewed, and make the appropriate change to the forecast method.

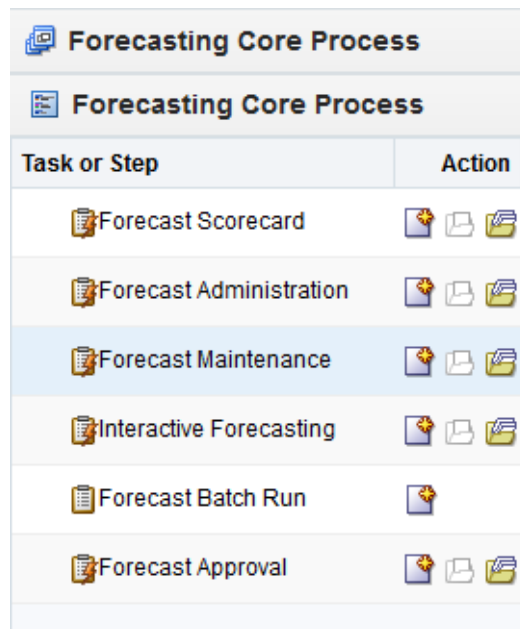
The Forecast Maintenance task is split into three workflow activities:

- Basic Settings - Includes all Final Level views and their respective Source Level views.
- Intermediate Settings - To better manage returns forecast, an intermediate level was introduced for the subclass/region intersection so that some parameters can be managed.
- Advanced Settings - Includes the Forecast Start Date, End Date, and History Start Date measures for the selected Final Level.

Forecast Maintenance Workbook

To build the Forecast Maintenance workbook, perform these steps:

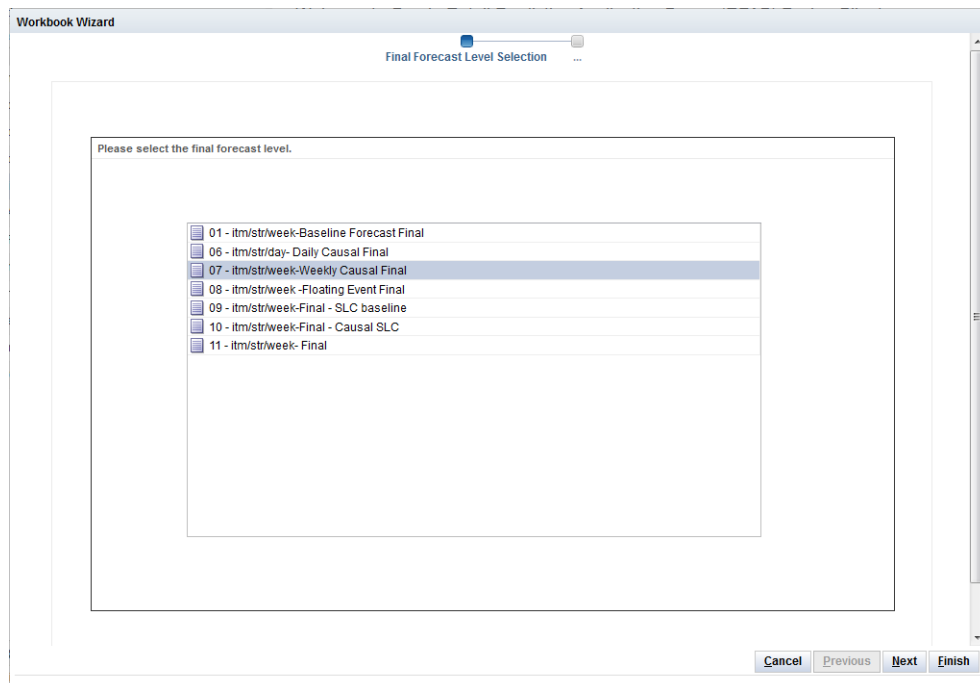
1. Click the New Workbook icon in the Forecast Maintenance task in the Forecasting Core Process activity.

Figure 9–1 Forecast Maintenance Task

The screenshot shows a window titled "Forecasting Core Process". Inside, there is a sub-header "Forecasting Core Process" and a table with two columns: "Task or Step" and "Action". The table lists several tasks, with "Forecast Maintenance" highlighted in blue.

Task or Step	Action
Forecast Scorecard	[Add] [Edit] [Delete]
Forecast Administration	[Add] [Edit] [Delete]
Forecast Maintenance	[Add] [Edit] [Delete]
Interactive Forecasting	[Add] [Edit] [Delete]
Forecast Batch Run	[Add]
Forecast Approval	[Add] [Edit] [Delete]

2. The Workbook wizard opens. Select the forecast level that you want to evaluate and click **Next**.

Figure 9–2 Workbook Wizard: Causal Level

3. Select the specific locations that you want to view and click **Next**.

Figure 9–3 Workbook Wizard: Select Locations

Workbook Wizard

Final Forecast Level Selection Location Selection ...

Available Locations

Available Items

View ▾ Dimension Find... ⬇ ⬆ ⬇ Detach

Label
3 Crystal
5th Avenue
6 Glendale
7 Westland
8 Fridley
✓ 9 West St Paul
✓ 20 Knollwood
✓ 50 Bloomington
✓ 68 East St Paul
✓ 90 West St Paul
✓ 160 Midway
✓ 220 Ridgedale
✓ 260 St.Louis Park, MN
662 Cottage Grove
694 Woodbury
862 Chanhassen, MN
1111 Charlotte
1121 Atlanta
1131 Jacksonville
1141 Nashville

Selected Locations

Selected Items

View ▾ Dimension Find... ⬇ ⬆ ⬇ Add Add All Remove Remove All

Label
✓ 9 West St Paul
✓ 20 Knollwood
✓ 50 Bloomington
✓ 68 East St Paul
✓ 90 West St Paul
✓ 160 Midway
✓ 220 Ridgedale
✓ 260 St.Louis Park, MN

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

- Select the products you want to work with and click **Next**.

Figure 9–4 Workbook Wizard: Select Products

Workbook Wizard

Final Forecast Level Selection Location Selection Product Selection ...

Available Products

Available Items

View ▾ Dimension Find... ⬇ ⬆ ⬇ Detach

Label
10000328Marlboro KSF box 200
10000536Benson & Hedges 200 Pack
✓ 10000537Merit 200 Pack
✓ 10000539Parliament Pack 200
✓ 10000629Marlboro light's Single Pack
✓ 10002328Marlboro KSF box 200
✓ 10002536Benson & Hedges 200 Pack
✓ 10002537Merit 200 Pack
✓ 10002539Parliament Pack 200
10002629Marlboro light's Single Pack

Selected Products

Selected Items

View ▾ Dimension Find... ⬇ ⬆ ⬇ Add Add All Remove Remove All

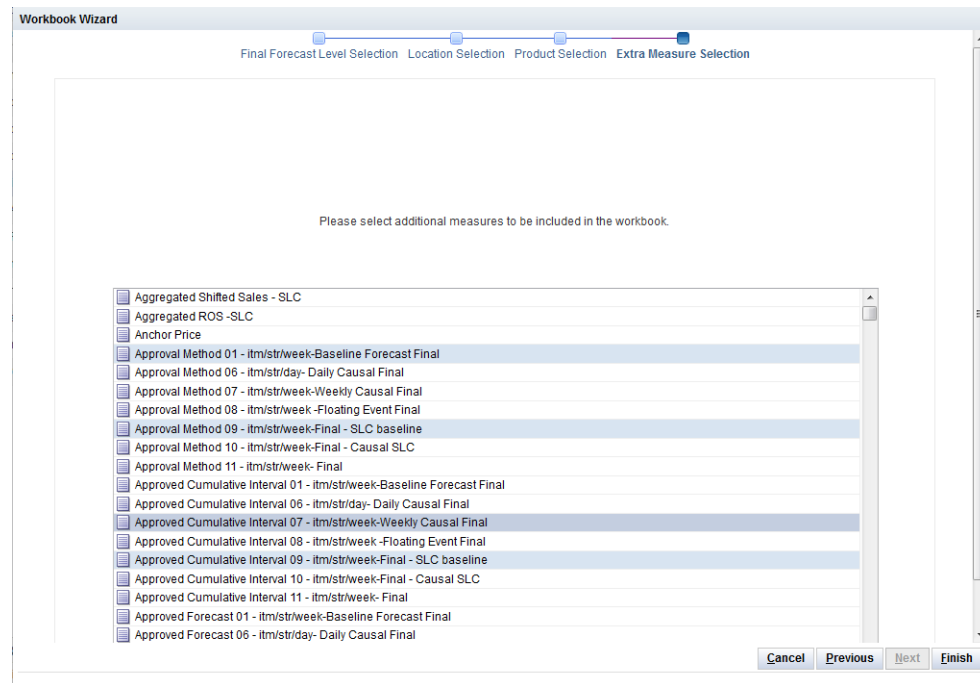
Label
✓ 10000537Merit 200 Pack
✓ 10000539Parliament Pack 200
✓ 10000629Marlboro light's Single Pack
✓ 10002328Marlboro KSF box 200
✓ 10002536Benson & Hedges 200 Pack
✓ 10002537Merit 200 Pack
✓ 10002539Parliament Pack 200

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

- Select any additional measures with and click **Finish**.

Figure 9–5 Workbook Wizard: Select Extra Measures

The Forecast Maintenance workbook is built.

Forecast Maintenance Workbook: Basic Settings

The Forecast Maintenance Basic Settings workbook includes [Final and Source Level Views - Basic Settings](#).

Final and Source Level Views - Basic Settings

The Final Level View and Source Level view allows for certain parameters set at a global level (in Forecast Administration) to vary at different item/locations. [Figure 9–6](#) and [Figure 9–7](#) show the Final Level and Source Level views.

Figure 9–6 Final Level View - Basic Settings

Basic Final Level Parameters

Product: [Product] [Group: 1]

Find...

01 - km/br/week-Baseline Forecast Final	
Default Return Forecast Flag	<input type="checkbox"/>
Default Return Forecast Percentage	0.00
Default Return Forecast Time Shift	0
Forecast Length	13
Default Approval Method	Manual
Default Source Level	03 - km/br/week
Forecast Start Date	
Forecast Cycle (Days)	7
Next Run Date	
Enable New Item Functionality	<input type="checkbox"/>

Figure 9–7 Source Level View - Basic Settings

Basic Final and Source Level Parameters

Product: << >>

Group: 1

Find: []

	01 - itm/str /week- Baseline	02 - itm/str/week	03 - itm/chn/week	04 - sbc/str/week	05 - lrg/str/week	13 - pgrp/grpd/we
Forecast Data Source	totaldbasesis	totaldbasesis	totaldbasesis	totaldbasesis	totaldbasesis	totaldbasesis
Default History Start Date						
Default Forecast Method	Simple	1	1	1	1	1
Data Plan						
Seasonal Profile						
Spreading Profile						

Measures: Final and Source Level Views - Basic Settings

The Final and Source Level Views - Basic Settings contains the following measures:

Approval Method Override

Set only at the final-level, the Approval Method Override is a list from which you select the approval policy for individual product/location combinations. No value is in this field if the system default set in the [Forecast Administration Workbook](#) is to be used. Valid values are:

Field	Description
Manual	The System Forecast and Adjusted Forecast are not automatically approved. Forecast values must be manually approved by accessing and amending the Forecast Approval Workbook .
Automatic	The Adjusted Forecast is automatically approved as is.

Field	Description
By Alert <name of the alert>	This list of values may also include any Forecast Approval alerts that have been configured for use in the forecast approval process. Alerts are configured during the implementation. Refer to the <i>Oracle Retail Predictive Application Server Configuration Tools User Guide</i> for more information on the Alert Manager and the <i>Oracle Retail Demand Forecasting Cloud Service Configuration Guide</i> for more information on configuring Forecast Approval Alerts.

Note: If you select a specific alert as your approval method and later on you delete the alert, the approval works as manual. The same happens if the alert is on a wrong intersection.

Forecast Method Override

Set at both final and source-levels, the Forecast Method Override is a list from which you can select a different forecast method than the Default Forecast Method set in the [Forecast Administration Workbook](#). *No Override* appears in this field if the system default set in the [Forecast Administration Workbook](#) is to be used. Valid options depend on your system setup.

Keep Last Changes Override

Set only at final-levels, Keep Last Changes Override field may be used to override the default setting at a product/location intersection. *None* appears in this field if there is no override applied to the intersection.

Source Level Override

Set only at final-levels, the Source Level Override is the level at which the aggregate, more robust forecast is run. Forecast data from this level is spread down to the lowest level based on the relationship between the two levels in the hierarchy. *No Override* appears in this field if the system default set in the [Forecast Administration Workbook](#) is to be used.

Measures: Final and Source Level Views - Basic Settings

The Final and Source Level Views - Basic Settings contains the following measures:

Approval Method Override

Set only at the final-level, the Approval Method Override is a list from which you select the approval policy for individual product/location combinations. No value is in this field if the system default set in the [Forecast Administration Workbook](#) is to be used. Valid values are:

Field	Description
Manual	The System Forecast and Adjusted Forecast are not automatically approved. Forecast values must be manually approved by accessing and amending the Forecast Approval Workbook .
Automatic	The Adjusted Forecast is automatically approved as is.

Field	Description
By Alert <name of the alert>	This list of values may also include any Forecast Approval alerts that have been configured for use in the forecast approval process. Alerts are configured during the implementation. Refer to the <i>Oracle Retail Predictive Application Server Configuration Tools User Guide</i> for more information on the Alert Manager and the <i>Oracle Retail Demand Forecasting Cloud Service Configuration Guide</i> for more information on configuring Forecast Approval Alerts.

Note: If you select a specific alert as your approval method and later on you delete the alert, the approval works as manual. The same happens if the alert is on a wrong intersection.

Bayesian Alpha Override

Note: This measure is not displayed for causal levels.

This is the override of the Bayesian Alpha parameter that is specified globally in the [Forecast Administration Workbook](#). The override can be specified at every forecasting level, that is, final and source-levels.

An alpha value closer to one (or infinity) weights the sales plan more in creating the forecast, whereas alpha closer to zero weights the known history more. The default is one (1).

Forecast Method Override

Set at both final and source-levels, the Forecast Method Override is a list from which you can select a different forecast method than the Default Forecast Method set in the [Forecast Administration Workbook](#). *No Override* appears in this field if the system default set in the [Forecast Administration Workbook](#) is to be used. Valid options depend on your system setup.

Keep Last Changes Override

Set only at final-levels, Keep Last Changes Override field may be used to override the default setting at a product/location intersection. *None* appears in this field if there is no override applied to the intersection.

Moving Average Window Length Override

Note: This measure is not displayed for causal levels.

Used with Moving Average forecast method, this is the number of data points in history used in the calculation of Moving Average. This parameter, when set to a non-zero value, overrides the value in the [Forecast Administration Workbook](#).

Optimal Source Levels

Displayed only at final-levels, a value is populated in this field if AutoSource has been run on the final-level. The AutoSource executable evaluates all levels associated to a final-level and returns the source-level that yields the optimal forecast results. For

more information on AutoSource, refer to the *Oracle Retail Demand Forecasting Cloud Service Implementation Guide*.

Note: For item/stores that are new or highly seasonal, AutoSource may not return the best recommendation since new items may not have an adequate sales history length and highly seasonal items may only sell for a short period during the year. For these items, you should not set the AutoSource recommendation as default at the final-level. Only use AutoSource recommendations for item/stores that have an adequate sales history.

Pick Optimal Level

Set only at final-levels, a check in this field (set to *True*) indicates that the batch forecast should use the Optimal Source Level selected by AutoSource. For more information on AutoSource, refer to the *Oracle Retail Demand Forecasting Cloud Service Implementation Guide*.

Return Forecast Flag Override

If this Boolean measure is checked, it indicates that a returns forecast will be generated for the desired product/location combinations.

Return Forecast Percentage Override

This measure overrides the default value of the percentage of the merchandise sold in a time period that is expected to be returned to the store. A value of zero indicates that no returns will be calculated.

Return Forecast Time Shift Override

This measure overrides the default value of the number of time periods between when the merchandise was sold until it was returned. For instance, if the measure is set to one, the merchandise is expected to be returned one week after it was sold.

Source Level Override

Set only at final-levels, the Source Level Override is the level at which the aggregate, more robust forecast is run. Forecast data from this level is spread down to the lowest level based on the relationship between the two levels in the hierarchy. *No Override* appears in this field if the system default set in the [Forecast Administration Workbook](#) is to be used.

Winters Mode Override

Note: This measure is not displayed for causal levels.

Used only by Forecasting Methods calling Additive or Multiplicative Winters. This parameter allows you to override the Winters Mode setting assigned in the [Forecast Administration Workbook](#). The default setting for this parameter is No Override.

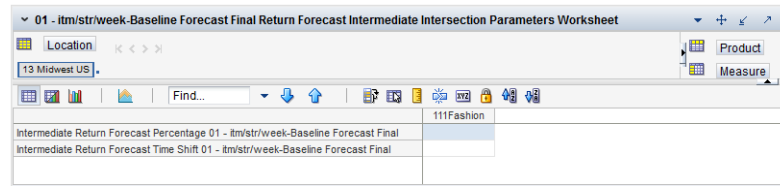
Forecast Maintenance Workbook: Intermediate Settings

The Intermediate Settings workflow activity is used to better manage returns forecast for the subclass/region intersection so that some parameters can be managed. in the [Forecast Administration Workbook](#).

Final Return Forecast Intermediate Intersection Parameters View

Figure 9–8 shows the Final Return Forecast Intermediate Intersection Parameters view.

Figure 9–8 *Final Return Forecast Intermediate Intersection Parameters View*



Measures: Final Return Forecast Intermediate Intersection Parameters View

The Final Return Forecast Intermediate Intersection Parameters view contains the following measures:

Intermediate Return Forecast Percentage

This measure overrides the default value of the percentage of the merchandise sold in a time period that is expected to be returned to the store. A value of zero indicates that no returns will be calculated. The intersection of the measure is subclass/region.

Intermediate Return Time Shift

This measure overrides the default value of the number of time periods between when the merchandise was sold until it was returned. For instance, if the measure is set to one, the merchandise is expected to be returned one week after it was sold. The intersection of the measure is subclass/region.

Forecast Maintenance Workbook: Advanced Settings

The Advanced Settings workflow activity is used to override the dates that are used in the forecast generation process as well as historical start dates for any intersection at the final-level that varies from the default settings in the [Forecast Administration Workbook](#).

Advanced Final Parameter View

Figure 9–9 shows the Advanced Final Parameter view.

Figure 9–9 Advanced Final Parameter View

08 - itm/str/week -Floating Event Final Advanced Final Level Parameters												
Location	Product											
5th Avenue	Measure											
Find...												
	5 pocket capri - Antique 12	5 pocket capri - Bandblasted	5 pocket capri - Bandblasted	5 pocket capri - Bandblasted	5 pocket capri - Black 8	5 pocket capri - Black 10	5 pocket capri - Black 12	10000113Bos TG4 Hot Melt Glue	10000114Ban Roll On - Unscented	10000115Cre Tooth Paste [75ml]	10000117Cre Tooth Paste [150ml]	
Forecast Start Date Override 08 - itm/str/week -Floating Event Final												
Forecast End Date Override 08 - itm/str/week -Floating Event Final												
Apply Interaction Factor Override 08 - itm/str/week -Floating Event Final												
Interaction Factor Override 08 - itm/str/week -Floating Event Final												
Forecast Length Override 08 - itm/str/week -Floating Event Final												
History Start Date Override 08 - itm/str/week -Floating Event Final												
Overlapping Promotions Behavior Override 08 - itm/str/week -Floating Event Final	No Override	No Override	No Override	No Override	No Override	No Override	No Override	No Override	No Override	No Override	No Override	No
Apply Promotional Lift Override 08 - itm/str/week -Floating Event Final	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Overlapping Promotion Adjustment Factor Override 08 - itm/str/week -Floating Event Final	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Measures: Advanced Final Parameter View

The Advanced Final Parameter view contains the following measures:

Apply Promotion Cannibalization Lift Override

This parameter is only effective if the Apply Promotional Lift override is selected (set to *True*).

For this parameter, select a value from the list to instruct RDF Cloud Service to apply or override the system generated Cannibalization effects.

- **Yes** — applies the system generated Cannibalization effects
- **No** — does not apply any Cannibalization lifts
- **No Override** — uses the default setting from Forecast Administration

This is an override of the global setting.

Apply Promotion Halo Lift Override

This parameter is only effective if the Apply Promotional Lift override is selected (set to *True*).

For this parameter, select a value from the list to instruct RDF Cloud Service to apply or override the system generated Halo effects.

- **Yes** — applies the system generated Halo effects
- **No** — does not apply any Halo lifts
- **No Override** — uses the default setting from Forecast Administration

This is an override of the global setting.

Apply Promotional Lift Override

Note: This measure is not displayed for baseline levels.

Select this parameter (set to *True*) if you want RDF Cloud Service to ignore the system calculated lifts, and apply the overrides.

Forecast End Date Override

This parameter represents the last point in time for which the forecasting engine forecasts for a particular intersection. Should this parameter be set to a date less than the Forecast Start Date plus the Forecast Length (in Forecast Administration), the engine forecasts zero (0) past this date. If Forecast End Date is more than Forecasting Start Date plus Forecasting Length, you do not get a forecast outside Forecasting Start Date plus Forecasting Length. In other words, both Forecast Start Date and Forecasting End Date are relevant for time periods within the forecast horizon set at the global level. No value is in this measure if the system default set in the [Forecast Administration Workbook](#) is to be used.

Note: Changes to this measure can be seen in the [Forecast Maintenance Workbook](#). The most recent commit (in either task) is the value used by the system.

Forecast Start Date Override

This parameter represents the date to start forecasting at a particular intersection. If this date is set to the past, it is ignored in favor of the Forecast Start Date from the [Forecast Administration Workbook](#). This means that you do not need to change the Forecast Start Date once it is no longer in the future. It is important to understand how Forecast Start Date should be used in conjunction with [Forecast End Date Override](#). No value is in this measure if the system default set in the [Forecast Administration Workbook](#) is to be used.

Note: Changes to this measure can be seen in the [Forecast Maintenance Workbook](#). The most recent commit (between either task) is the value used by the system.

History Start Date Override

This parameter represents the first point in time from which the Forecasting Engine begins training and modeling (that is, if there are two years of history, but you only want to use one year, you set the start date to a year ago). This parameter overrides the History Start Date set in the [Forecast Administration Workbook](#) to the desired item/location intersection. For example, if you have a large spike in the first three weeks of sales for an item on sale, you can set the Historical Start Date to one week past that period, and those first few weeks are not used when generating the forecast.

It is also important to note that the system ignores leading zeros that begin at the history start date. For example, if your history start date is January 1, 2003, and an item/location does not have sales history until February 1, 2003, the system considers the starting point in that item/location's history to be the first data point where there is a non-zero sales value.

If this parameter is set into the future, there would be no forecast, as the history training window is read as zero.

Note: Changes to this measure can be seen in the [Forecast Maintenance Workbook](#). The most recent commit (between either task) is the value used by the system.

Overlapping Promotion Adjustment Factor Override

Note: This measure is not displayed for baseline levels.

The Overlapping Promotion Adjustment Factor Override measure is applied if Adjustable Approach is selected for Overlapping Promotion Behavior for the item/location level. This is an override of the global setting.

The Overlapping Promotion Adjustment Factor Override specifies at an item/location how the individually calculated promotion effects are combined with each other when the promotions are overlapped in the forecast horizon. The default value is 1. More details can be found in Forecast Administration Task ([link](#))

Advanced Source Parameter View

[Figure 9–10](#) shows the Advanced Final Parameter view.

Figure 9–10 Advanced Source Parameter View

	5 pocket capri - Stonewashed	5 pocket capri - Stonewashed	5 pocket capri - Stonewashed	5 pocket capri - Stonewashed	5 pocket capri - White 8	5 pocket capri - White 10	5 pocket capri - White 12	5 Pocket Frayed Jeans -	5 Pocket Frayed Jeans -
History Start Date Override 02 - itm/str/week									
Overlapping Promotions Behavior Override 02 - itm/str/week	No Override	No Override	No Override	No Override	No Override	No Override	No Override	No Override	No Override
Overlapping Promotion Adjustment Factor Override 02 - itm/str/week	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Measures: Advanced Source Level View

The Advanced Source Level view contains the following measures:

History Start Date Override

This parameter represents the first point in time from which the Forecasting Engine begins training and modeling (that is, if there are two years of history, but you only want to use one year, you set the start date to a year ago). This parameter overrides the History Start Date set in the [Forecast Administration Workbook](#) to the desired item/location intersection. For example, if you have a large spike in the first three weeks of sales for an item on sale, you can set the Historical Start Date to one week past that period, and those first few weeks are not used when generating the forecast.

It is also important to note that the system ignores leading zeros that begin at the history start date. For example, if your history start date is January 1, 2003, and an item/location does not have sales history until February 1, 2003, the system considers the starting point in that item/location's history to be the first data point where there is a non-zero sales value.

If this parameter is set into the future, there would be no forecast, as the history training window is read as zero.

Note: Changes to this measure can be seen in the [Forecast Maintenance Workbook](#). The most recent commit (between either task) is the value used by the system.

Overlapping Promotion Adjustment Factor Override

Note: This measure is not displayed for baseline levels.

The Overlapping Promotion Adjustment Factor Override measure is applied if Adjustable Approach is selected for Overlapping Promotion Behavior for the item/location level. This is an override of the global setting.

The Overlapping Promotion Adjustment Factor Override specifies at an item/location how the individually calculated promotion effects are combined with each other when the promotions are overlapped in the forecast horizon. The default value is 1. More details can be found in Forecast Administration Task ([link](#))

Overlapping Promotions Behavior Override

Note: This measure is not displayed for baseline levels.

The Overlapping Promotion Behavior measure allows you to specify that the overlapping promotions function should be activated during the batch run. More details can be found in Default Overlapping Promotions Behavior in the [Forecast Administration Workbook](#).

For this parameter, select a value from the list to instruct RDF Cloud Service to apply or override the globally selected Default Overlapping Promotions Behavior.

- Enhanced Approach — applies the Enhanced Approach
- Adjustable Approach — applies the Adjustable Approach
- No Override— uses the default setting from Forecast Administration

This is an override of the global setting.

Run Batch Forecast Task

The Run Batch Forecast Task wizard allows you to manually execute the forecast generation process at a time other than the regularly scheduled batch job. If a global domain environment is implemented, forecasts generated in the Local domain can be viewed in the Master domain; however this forecast is isolated to the data in the Local domain. The execution of PreGenerateForecast at the Master domain, then passing the output of the process to Generate from the back-end of each Local domain allows for the Local domains to share a birth date, thus supporting a view to forecast data across Local domains in the Master domain. Refer to the *Oracle Retail Demand Forecasting Cloud Service Implementation Guide* for more information on PreGenerateForecast and Generate.

Running a Batch Forecast Manually

The following sections describe the procedures to manually run a batch forecast.

Before You Begin

Prior to using the Run Batch Forecast Task wizard, at minimum the following tasks must be performed:

1. Create or access a [Forecast Administration Workbook](#).
2. In the Forecast Start Date measure, enter the starting date of the forecast horizon; otherwise the system defaults to the system date (today).
3. Set a Default Forecasting Method for the Final and Source Level.
4. Set a Default Source Level for the Final Level.
5. Set the Forecast Length if there is no value already in this measure.
6. Set the Spreading Profile if the Source Levels are at aggregate dimensions above the Final Level.
7. Commit any changes by selecting from the **File** menu, then select **Commit Now**.
8. Close the task.

Procedure

Follow these steps to manually run a batch forecast:

1. Within the Local or Simple domain, select **New** from the File menu.
2. Select the Forecast tab to display a list of task workbooks for statistical forecasting. Highlight Run Batch Forecast and click **OK**.

3. The Run Batch Forecast wizard opens and prompts you to select the Final Levels to forecast. Select **Next** or **Finish**.

The Run Batch wizard automatically executes PreGenerateForecast and Generate within the Simple or Local Domain. If **Next** is selected from the last wizard window, the wizard does not advance to the completion message until the forecast has been generated. Depending on the amount of product/locations to be forecast and the forecast horizon, it may take a several minutes before the system advances to the final window. When the forecast generation is completed, the wizard displays a window that notifies you of the forecast generation ID.

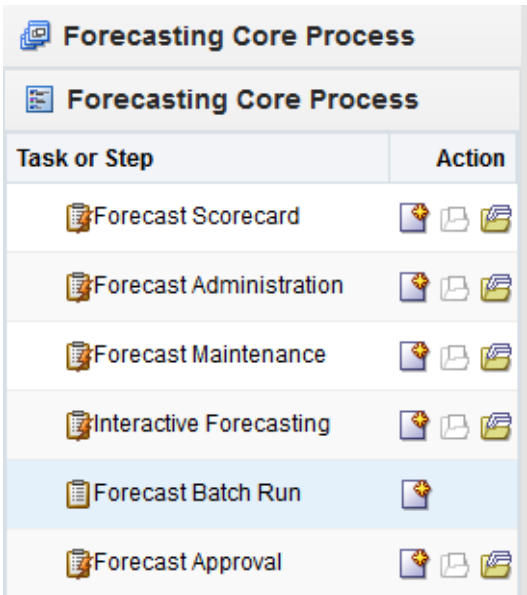
After a forecast is generated, the Forecast Start Date field is cleared. This ensures that the same forecast is not generated again on the same date. The Next Run Date field is also updated based on the birth date of the forecast plus the Forecast Cycle. Both fields can be viewed in the [Forecast Administration Workbook](#).

















Run Batch Forecast Workbook

To build the Run Batch Forecast workbook, perform these steps:

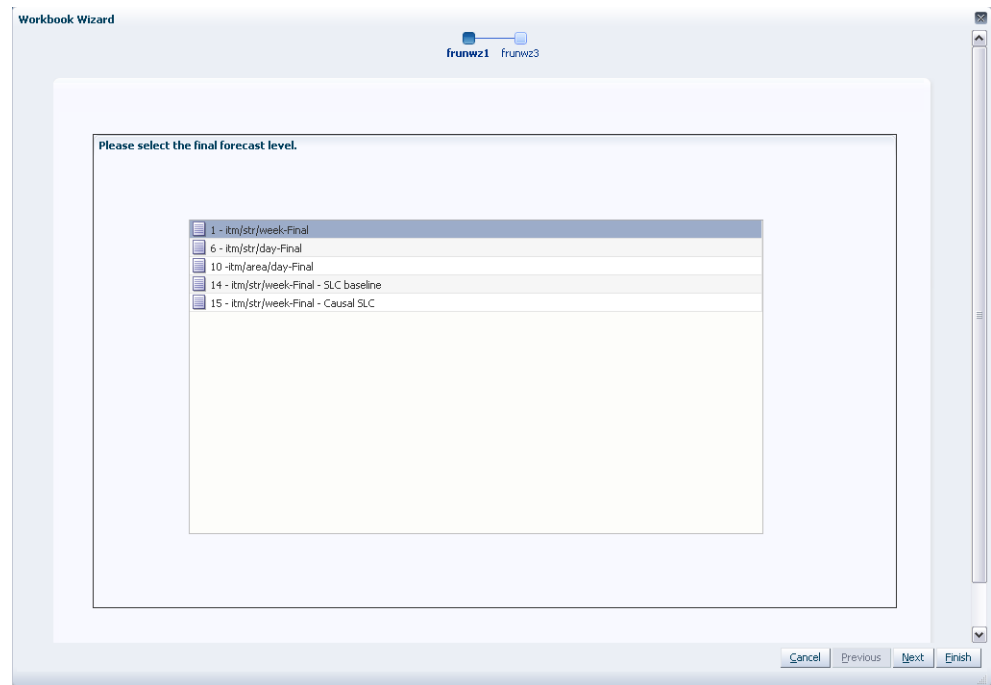
1. Click the New Workbook icon in the Run Batch Forecast task in the Forecasting Core Process activity.

Figure 10–1 Run Batch Forecast Task

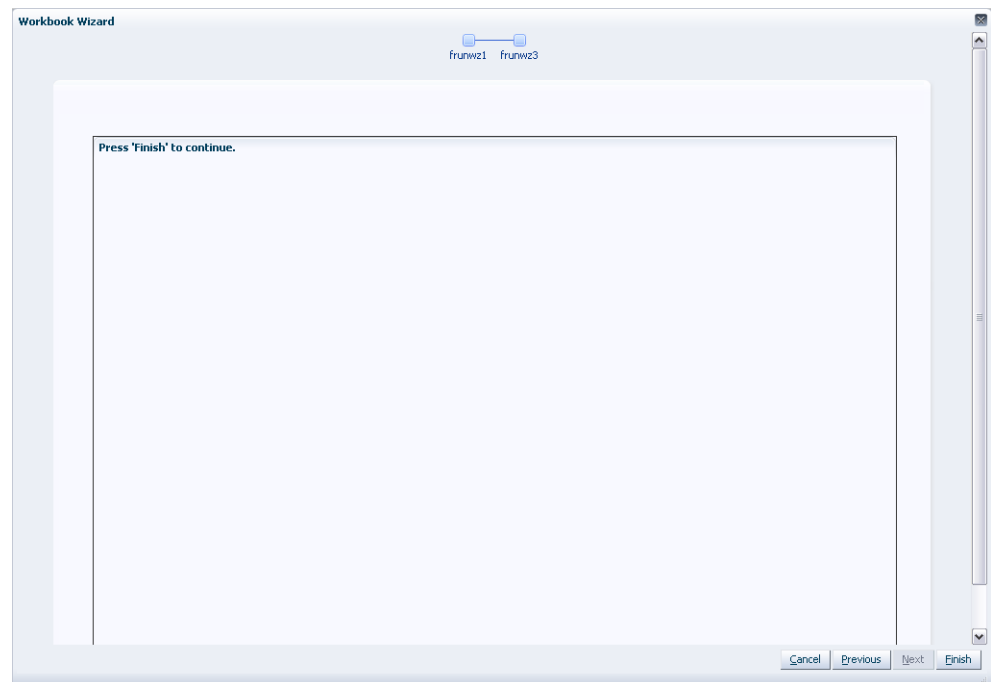


Forecasting Core Process	
Forecasting Core Process	
Task or Step	Action
Forecast Scorecard	  
Forecast Administration	  
Forecast Maintenance	  
Interactive Forecasting	  
Forecast Batch Run	
Forecast Approval	  

2. The Workbook wizard opens. Select the levels to work with and click **Next**.

Figure 10–2 Workbook Wizard: Select Final Forecast Level

3. Verify and click **Finish**.

Figure 10–3 Workbook Wizard: Verify

The Run Batch wizard automatically executes PreGenerateForecast and Generate within the Simple or Local Domain. Depending on the amount of product/locations to be forecast and the forecast horizon, it may take a several minutes before the system advances to the final window. When the forecast generation is completed, the wizard displays a window that notifies you of the forecast generation ID.

After a forecast is generated, the Forecast Start Date field is cleared. This ensures that the same forecast is not generated again on the same date. The Next Run Date field is also updated based on the birth date of the forecast plus the Forecast Cycle. Both fields can be viewed in the [Forecast Administration Workbook](#).

Forecast Approval Task

After the forecast is generated, the next steps in the forecasting process are analysis and approval. Approval of forecasts is required before the forecast data can be exported to other processes, such as replenishment programs. The Forecast Approval task allows you to view, analyze, adjust, and approve forecast results.

Some system forecasts may be set to be automatically approved by the system. The default approval method for items in a forecast is set in the [Forecast Administration Workbook](#), and these policies can be amended for individual product/location combinations in the [Forecast Maintenance Workbook](#). Any forecasts not set to Automatic Approval may require evaluation, adjustments, and ultimately approval before subsequent processes are executed.

You can view and analyze forecast data at multiple forecast levels (source-level and final-level) simultaneously. Revisions to and approvals of final-level forecast values are made on the appropriate views in the Forecast Approval task. The Forecast Approval task can contain these views:

Table 11–1 Views for the Forecast Approval Workbook

View	Description
Final Level View	This view allows you to review final-level system-forecast quantities and make revisions to them if needed.
Approval View	This view allows you to specify the manual approval policy of forecasts by product and location.
Valid Forecast Run View	This view allows you to review the partition dimensions in which the generated forecast was run.
Source Level View	This view displays the system-generated source-level forecast and allows you to compare this data with final-level forecast values.
Final or Source System Parameters View	<p>The <i>Final System Parameters</i> view is only available if Generate System Parameters or Generate Methods is turned on in the Forecast Administration Workbook.</p> <p>The <i>Source System Parameters</i> view is only available if Generate System Parameters or Generate Methods is turned on in the Forecast Administration Workbook, and a Source Level was designated in Forecast Administration.</p>

When the Forecast Approval task is displayed, you may review the system-generated forecast and measures for any levels included in the task and make adjustments to forecast values at the final-level. Forecast values are overwritten in the Adjusted Forecast measure on the Final Forecast view. Approvals are made for each product/location combination in the Approval Method measure of the Forecast Approval view.

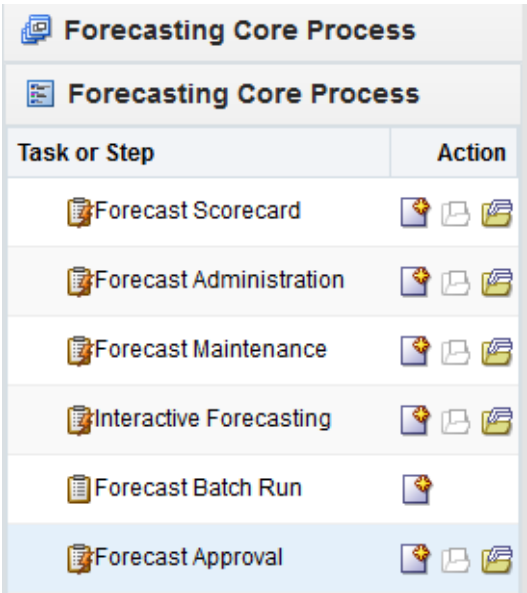
After you complete your work, you can save the task using the Save function on the File menu. To update the master database with the approved forecast values, you must commit the task using the Commit Now or Commit Later option on the File menu. Once the task is committed, the forecast values are stored in the master database and can be used by other processes.























Forecast Approval Workbook

To build the Forecast Approval workbook, perform these steps:

1. Click the New Workbook icon in the Forecast Approval task in the Forecasting Core Process activity.

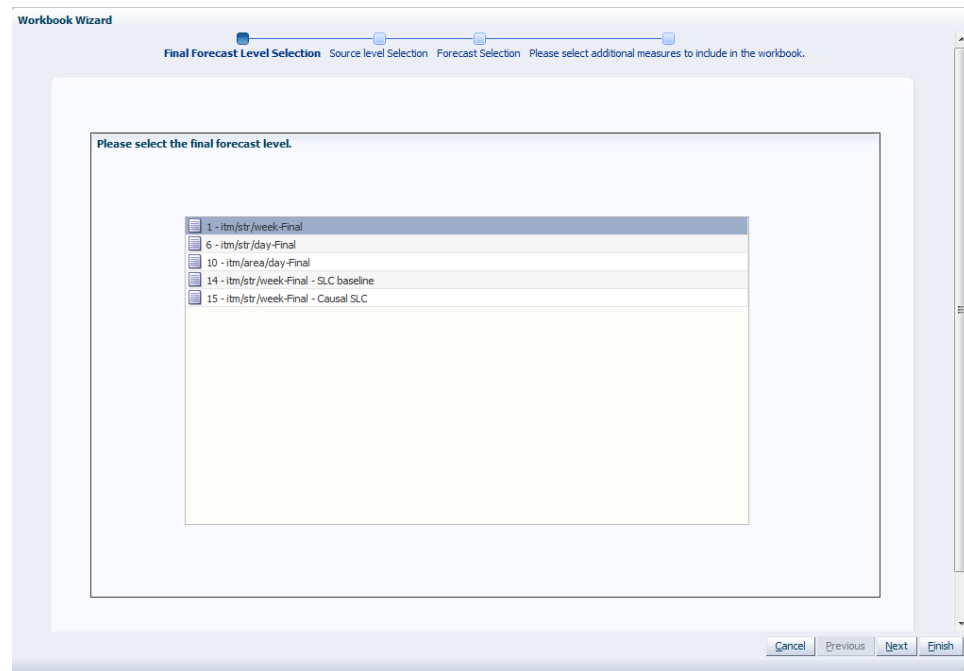
Figure 11–1 Forecast Approval Task



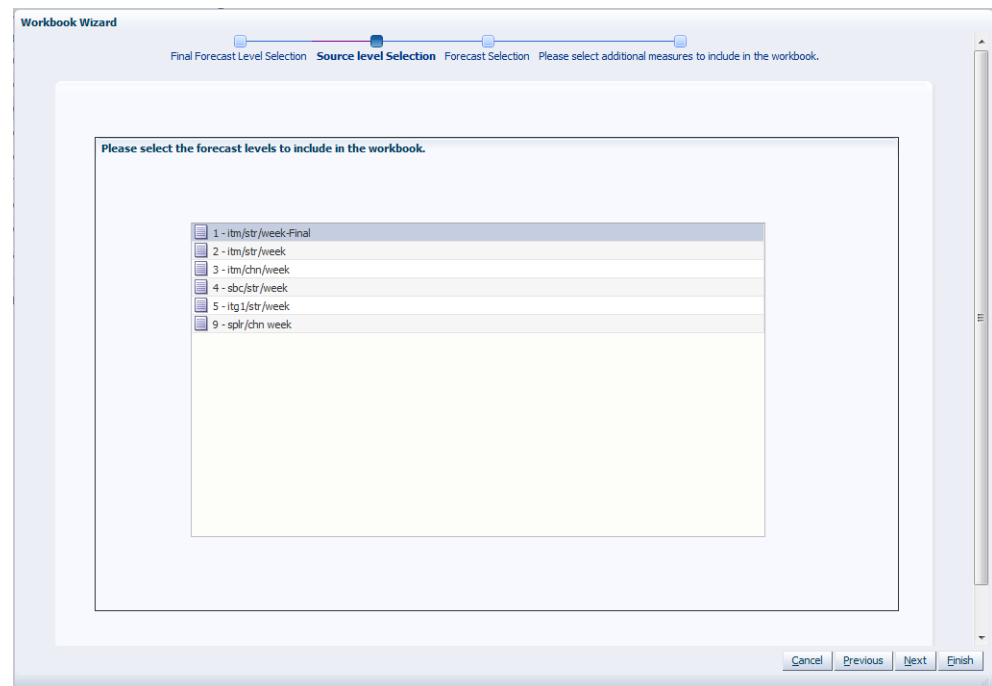
Forecasting Core Process	
Forecasting Core Process	
Task or Step	Action
 Forecast Scorecard	  
 Forecast Administration	  
 Forecast Maintenance	  
 Interactive Forecasting	  
 Forecast Batch Run	
 Forecast Approval	  

2. The Workbook wizard opens. Select the final forecast level you want to work with and click **Next**.

Note: In the Source Level wizard, the source levels for a Causal Final Level are not displayed, only the Causal Final Level is displayed.

Figure 11–2 Workbook Wizard: Select Final Forecast Level

3. Select the forecast levels you want to work with and click **Next**. Select as many forecast levels as necessary for comparison.

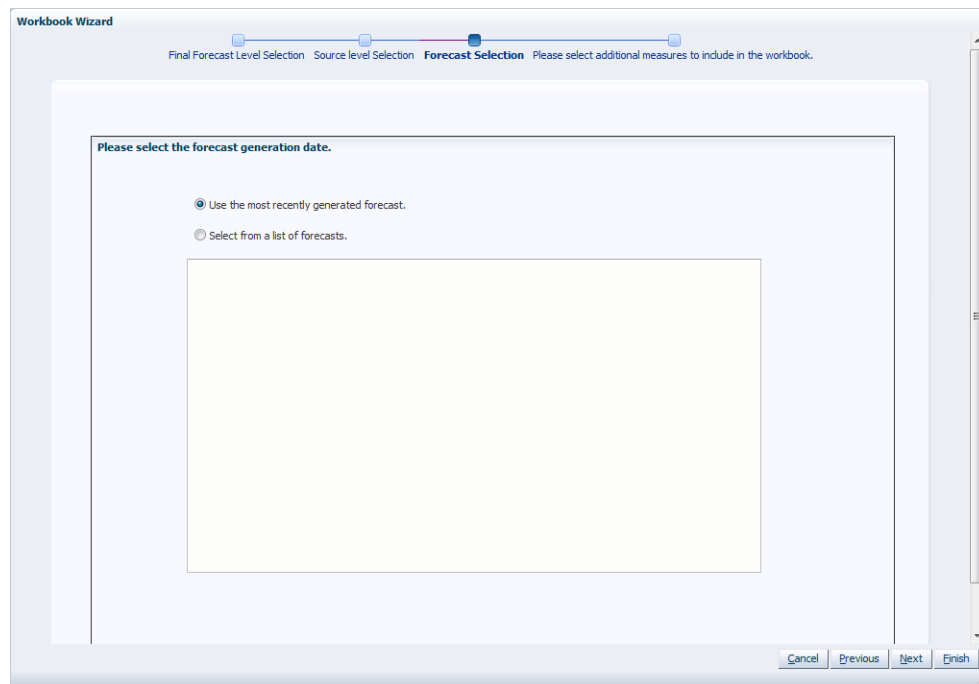
Figure 11–3 Workbook Wizard: Select Forecast Levels

4. Select the forecast generation date you want to work with and click **Next**.
 - Select **Use the most recently generated forecast** to build a task containing the most recent forecast values.

Note: Use the most recently generated forecast - it must be selected if the task supports an AutoTask build.

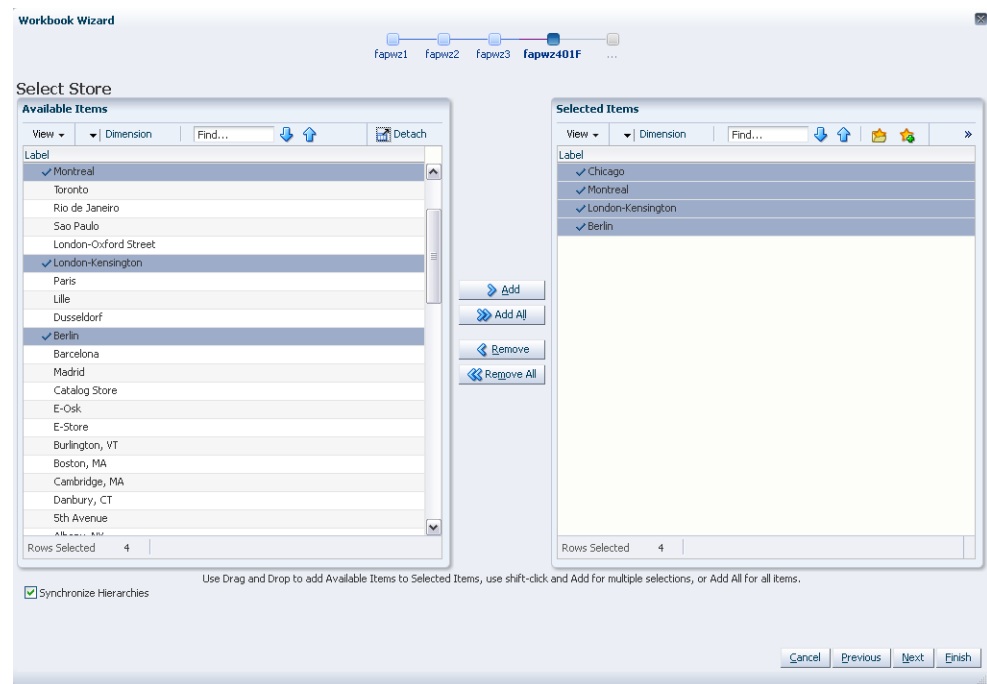
- Click **Select from a list of forecast** to select from a list of previously generated forecasts stored in the system. Note that if this option is selected, the system automatically highlights the first forecast in the list, and if no further selections are made by you, this first forecast is used.
- If no selection is made by you, the birth date defaults to the latest generated generation ID.

Figure 11–4 Workbook Wizard: Select Forecast Generation Date



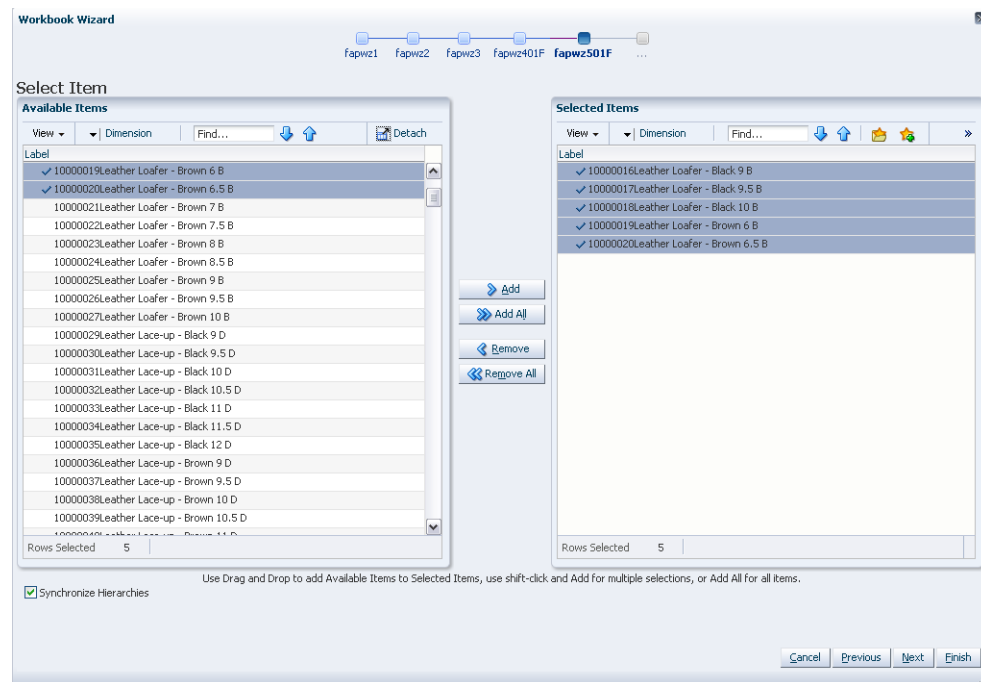
5. Select the stores you want to work with and click **Next**.

Note: It is important to include all locations that are members of the location dimensions in the forecast levels to be analyzed. For example, if you select to view a forecast level that is defined at item/chain/week, you should include all locations that are members of the particular chain to be analyzed. It is recommended that Position Query functionality or selection from aggregate levels in the Location hierarchy is employed if the task is generated using AutoTask build.

Figure 11–5 Workbook Wizard: Select Stores

6. Select the items you want to work with and click **Next**.

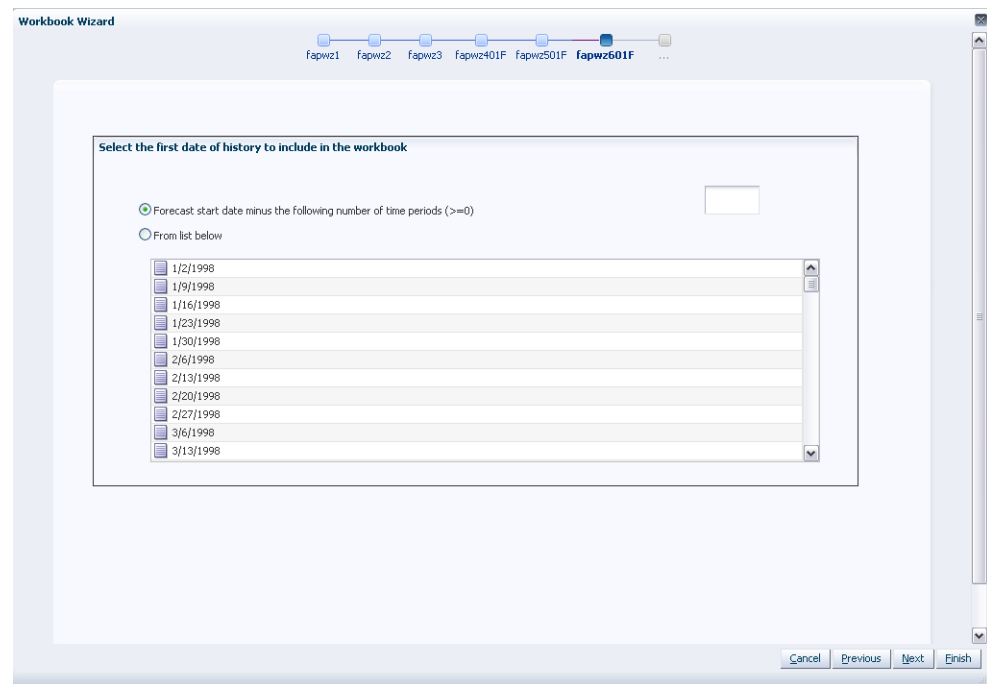
Note: It is important to include all products that are members of the Merchandise dimensions in the forecast levels to be analyzed. For example, if you select to view a forecast level that is defined at subclass/store/week, you must include all items that are members of the particular subclass to be analyzed. It is recommended that Position Query functionality or selection from aggregate levels in the Merchandise hierarchy is employed if the task is generated using AutoTask build.

Figure 11–6 Workbook Wizard: Select Item

7. Select the first date of history you want to work with and click **Next**.

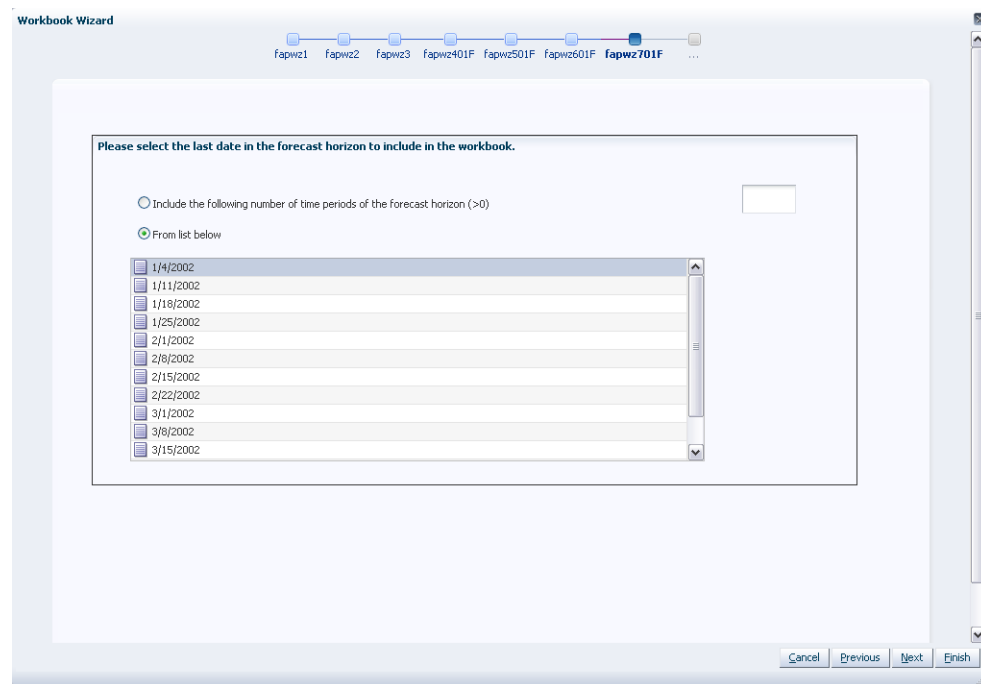
You may choose to either set the **Forecast Start Date minus the number of periods** or select the first date of history from the displayed list. It is recommended that the **Forecast Start Date minus the number of periods** is set if the task is generated using AutoTask build.

Note: If you make no selection, the system uses the forecast start date.

Figure 11–7 Workbook Wizard: History First Date

8. Select the last date in the forecast horizon you want to work with and click **Next**.

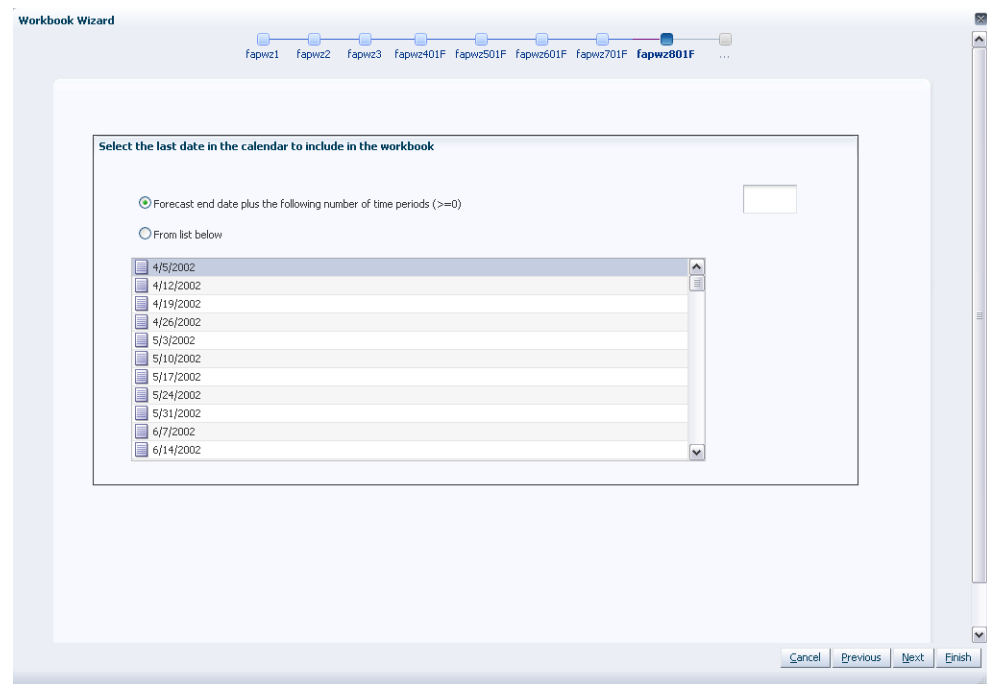
You may either choose to **Include the following number of time periods** of the forecast horizon or select the last date to include of the horizon from the displayed list. It is recommended that **Include the following number of time periods of the forecast horizon** is set if the task is generated using AutoTask build. The value entered must be within the forecast horizon. Click **Next**.

Figure 11–8 Workbook Wizard: Forecast Horizon Last Date

9. Select the last date in the calendar you want to work with and click **Next**.

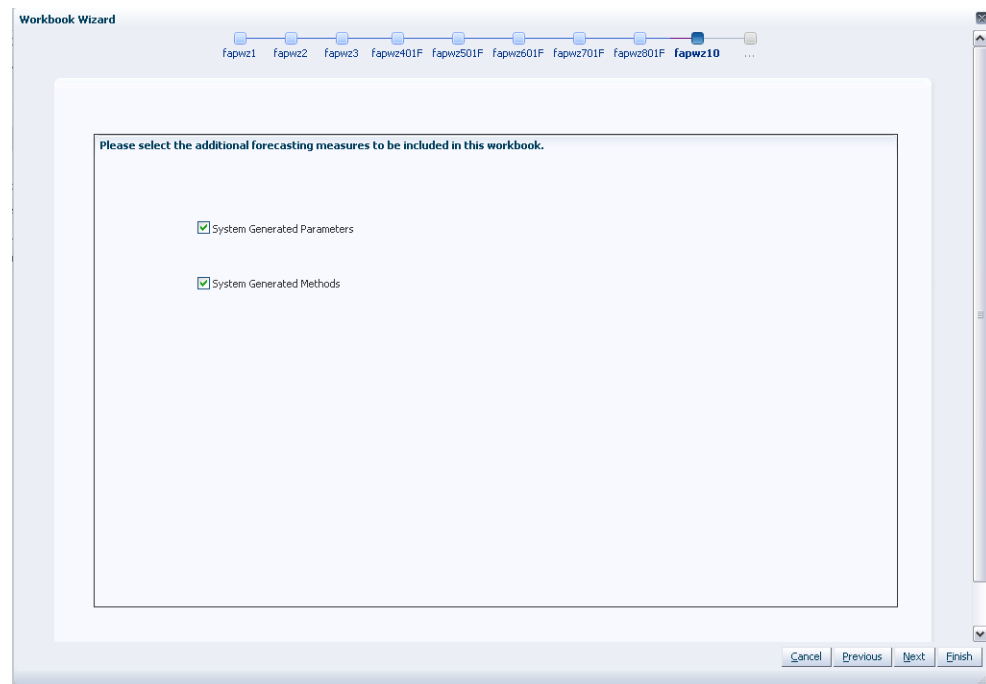
You may choose to either set the **Forecast end date plus the following number of time periods** or select the last date to include of the post-horizon calendar from the displayed list. It is recommended that **Forecast end date plus the following number of time periods** is set if the task is generated using AutoTask build. Click **Next**.

Note: If you make no selection, the system uses the last date in the forecast horizon chosen by you in the previous wizard window.

Figure 11–9 Workbook Wizard: Calendar Last Date

10. Select any additional forecast measures you want to work with in your task. The valid values of these measures may only be viewed if **Generate Intervals**, **Generate Cumulative Intervals**, **Generate Methods**, **Generate Parameters**, **Generate Baselines**, or **Store Interim Forecasts** were selected in the [Forecast Administration Workbook](#). Click **Finish**.

Note: If any of these parameters are included in the Forecast Approval task using AutoTask build and are later deselected for generation in the [Forecast Administration Workbook](#), AutoTask must be set again.

Figure 11–10 Workbook Wizard: Additional Forecasting Measures

The Forecast Approval workbook is built.

Final Level View

The Final Level view allows you to review the forecast quantities and make adjustments to forecasts if needed. The primary objective in the Forecast Approval task is to review and edit forecast values using the Adjusted Forecast field on the Final Level view and ultimately approve forecasts that have been user-adjusted or require manual approval.

Figure 11–11 Final Level View

	7/6/2001	7/13/2001	7/20/2001	7/27/2001	8/3/2001	8/10/2001	8/17/2001	8/24/2001	8/31/2001
Adjusted Forecast 1 - itm/str/week-Final	0.00	155.77	149.54	41.59	37.81	19.00	19.00	18.00	18.00
System Forecast 1 - itm/str/week-Final	0.00	155.77	149.54	41.59	37.81	19.00	19.00	18.00	18.00
Approved Forecast 1 - itm/str/week-Final	0.00	155.77	149.54	41.59	37.81	19.00	19.00	18.00	18.00
Last Approved Forecast 1 - itm/str/week-Final	0.00	155.77	149.54	41.59	37.81	19.00	19.00	18.00	18.00
Approved System Forecast 1 - itm/str/week-Final	0.00	155.77	149.54	41.59	37.81	19.00	19.00	18.00	18.00
History Data - Weekly Sales	25.00	22.00	19.00	17.00	20.00	17.00	22.00	19.00	17.00
Overlapping Promotion Flag 1 - itm/str/week-Final	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Regular Price Lift Units 1 - itm/str/week-Final	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demand Transference Lift Units 1 - itm/str/week-Final	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interaction Multipliers 1 - itm/str/week-Final	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Promotion Lift Units 1 - itm/str/week-Final	0.00	130.77	125.54	19.59	17.81	0.00	0.00	0.00	0.00
System Baseline 1 - itm/str/week-Final	0.00	25.00	24.00	22.00	20.00	19.00	19.00	18.00	18.00
Adjusted Baseline 1 - itm/str/week-Final	0.00	25.00	24.00	22.00	20.00	19.00	19.00	18.00	18.00
Total Peak 1 - itm/str/week-Final	0.00	130.77	125.54	19.59	17.81	0.00	0.00	0.00	0.00
Adjusted Peak 1 - itm/str/week-Final	0.00	130.77	125.54	19.59	17.81	0.00	0.00	0.00	0.00

Measures: Final Level View

The Final Level view contains the following measures:

Adjusted Cumulative Interval

When changes are made to the Adjusted Forecast, the value of the Forecast Cumulative Interval is recalculated in this measure. The values in this measure are read-only. To view and store this measure:

- Generate Cumulative Intervals must be selected in the [Forecast Administration Workbook](#).
- Cumulative Intervals must be selected to be viewed in the Forecast Approval wizard.

Adjusted Forecast

The value in this field initially defaults to the System Forecast if the forecast is automatically approved by the system or through a Forecast Approval Alert. Otherwise, the value in the Adjusted Forecast is different than the System Forecast if:

- Adjusted Forecast has been updated by you.
- Keep Last Changes is set to Total, Difference or Ratio.
- Update Last Weeks Forecast is set to Replicate.

Changes to the Adjusted Forecast are automatically approved. The Approval view updates with the date of the adjustment and the name of the user who made the adjustment.

Note: Changes to the Adjusted Forecast for periods outside of the forecast horizon are not committed.

Edits to any non-committed values in the [Forecast Approval Workbook](#) are overwritten when data is refreshed.

Approved Cumulative Interval

The Approved Cumulative Interval is the cumulative interval that was approved at the time of the task build. The values contained in this measure are read-only. If changes are made to the Adjusted Forecast, the Approved Cumulative Interval reflects the recalculated values when the task is committed and data is refreshed.

Approved Forecast

The Approved Forecast is the forecast quantity that was approved at the time of the task build. The values contained in this measure are read-only. If changes are made to the Adjusted Forecast, then click **Calculate** to show the new value in the Approved Forecast.

Approved System Forecast

The Approved System Forecast is populated with the last System Forecast approved for a time series:

1. Approval Method set to Automatic Approval
2. Approval Method set to a Forecast Approval Alert and the alert is not triggered
3. Update Last Weeks Forecast is set to Use Forecast

The values in this measure are read-only.

Forecast Cumulative Interval

Cumulative Intervals are used in safety stock calculation within allocation and replenishment systems. This value is similar to a running total of the Forecast Interval and is read-only. To see this measure:

- Generate Cumulative Intervals must be selected in the [Forecast Administration Workbook](#).
- Cumulative Intervals must be selected to be viewed in the Forecast Approval wizard.

Forecast Interval

The Forecast Interval is calculated on the particular forecast region as capped standard deviation for some methods. It takes into consideration the system forecast for capping as well.

The forecast interval for any given week i is capped to a maximum of:

$$\text{Forecast}(i) * \text{upperCapRatio}$$

This cap is applied once the interval exceeds the system forecast, and it is applied for every value of the interval after that. The upperCapRatio (Interval Cap Upper Ratio) is a parameter set in the [Forecast Administration Workbook](#).

The forecast interval is capped to a minimum of $\text{Forecast}(i) * \text{lowerCapRatio}$ whenever the interval is less than this quantity. The lowerCapRatio (Interval Cap Lower Ratio) is another parameter set in the [Forecast Administration Workbook](#).

When forecasts are approved, the corresponding Intervals and Cumulative Interval measures are approved. To see this measure:

- Generate Intervals must be selected in the [Forecast Administration Workbook](#).
- Intervals must be selected to be viewed in the Forecast Approval wizard.

Forecast vs. Last Approved Forecast Workbook Alert

This measure is the target measure of a real time alert. It compares current forecast with the forecast generated last period, and if the difference is more than a threshold, the alert is triggered which is visible by the different format of the cells.

Forecast vs. Recent Sales Workbook Alert

This measure is the target measure of a real time alert. It compares forecast with recent/ past sales, and if the difference is more than a threshold, the alert is triggered which is visible by the different format of the cells.

History Data

History Data (a read-only measure) is the sales data used to generate the forecast. This allows you to compare Actuals to forecast values. When the task is created, the Data Source measure is copied into History Data.

Interaction Multiplier

The value in this field equals to the combined total lift divided by the linearly added up lifts

If Apply Interaction Factor is set to False, or the Interaction Factor is set to 1, the value in this field will equal to 1.

Interim Forecast

The Interim Forecast is the forecast generated at the final-level that is used as the Data Source in Curve to produce the Spreading Profile. This profile determines how the Source Forecast is spread down to the Final Forecast level. The values in this measure are read-only. To see this measure:

- Generate Interim Forecast must be selected in the [Forecast Administration Workbook](#).
- Interim Forecast must be selected to be viewed in the Forecast Approval wizard.

Last Approved Forecast

The Last Approved Forecast is the approved system forecast value when an approval occurred on a previous batch forecast for the time series. The values contained in this measure are read-only.

Overlapping Promotion Flag

If this read-only measure is checked (True), it indicates that a given item/location has active overlapping promotions for at least one time period in the forecast horizon. To view and store this measure:

- Enhanced Approach must be selected for Overlapping Promotion Behavior in the [Forecast Administration Workbook](#)) or overwritten in [Forecast Maintenance Workbook](#)
- A specific overlapping promotion is found significant during the stepwise regression.
- The significant overlapping promotion is in the forecast horizon.

Return Forecast

If the Return Forecast option is enabled, this measure displays the units per week that are returned to the store.

System Baseline

The System Baseline is a forecast generated on past sales data that contains no promotions (that is, normal demand given no causal effects). To see a generated Baseline Forecast:

- Promotional Forecasting must be implemented.
- Generate Baseline must be selected in the [Forecast Administration Workbook](#).
- The System Baseline must be selected to be viewed in the Forecast Approval wizard.

System Forecast

The System Forecast displays the system-generated forecast for the time series. The values contained in this field are read-only. This measure includes baseline as well as promotional lifts, if applicable.

If the Interaction function is enabled, the displayed lift is the result of the combination of various lift types.

If the Interaction function is enabled, the displayed lift is the result of the combination of various lift types.

Total Peak

This measure stores the total lift that an item can have on top of its baseline demand. The total lift is the sum of the Total Promotion Lift Units, the Total Regular Price Lift Units and the Demand Transference lift.

Total Promotion Lift Units

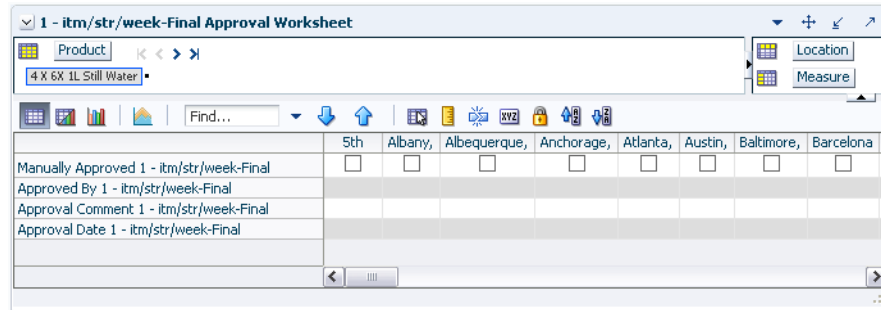
This measure displays the total effect that promotions can have on an item's sales units. It is the combination of Promotion Self Lift Units, Promotion Halo Lift Units and Promotion Cannibalization Lift Units. The default way to combine the promotional lifts is to sum them up. However, if the Default Apply Interaction Factor is set to True and the Default Interaction Factor is set to a value other than one, the Total Promotion Lift Units is not the straight summation of the three promotion lift measures.

More information on the total lift and its components can be found in the Advanced Final Level view.

Approval View

The Forecast Approval view allows for non-adjusted System Forecast to be approved. This view can also be used to view the approval date of forecast values and to display the name of the user that manually approved forecast values for a given product/location combination. The default Approval Method is set in [Forecast Administration Workbook](#), and for product/location combinations that vary from the default, the [Forecast Maintenance Workbook](#) can be used.

Figure 11–12 Approval View



Measures: Approval View

The Approval view contains the following measures:

Approval Comment

Approval Comment is a field in which notes may be entered regarding the forecast values or any pertinent information for specified product/location combinations.

Approval Date

Approval Date is a read-only field that displays the date that the forecast quantity is approved either automatically during the batch forecast process or when changes are made to the Adjusted Forecast. This information is necessary for RDF Cloud Service to carry out any subsequent processes, such as replenishment procedures.

Approved By

Approved By is a read-only field that displays the name of the user to approve forecasts for an item/location. This field may be populated with *Sys* if the system was set to automatically approve forecasts during the batch forecast process.

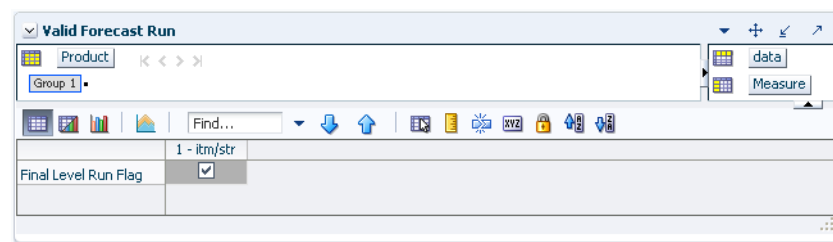
Manually Approved

Manually Approved is a Boolean flag. This field may be checked if you want to accept the System Forecast quantity for a time series that has yet to be approved. The flag is also activated when a change is made to the Adjusted Forecast and *Calculate* occurs. When this flag is activated, the time series for an item/location are approved and both the Approval Date and Approved By fields are updated.

Valid Forecast Run View

In a global domain environment, the Valid Forecast Run view allows you to identify which Local domains share the forecast birth date selected in the wizard when viewed in the Master domain. If in a Local domain, only the single position of the partition dimension is displayed.

Figure 11–13 Valid Forecast Run View



Measures: Valid Forecast Run View

The measure displayed on this view is viewed at the final-level/partition intersection. The Valid Forecast Run view includes the following standard measure:

Final Level Run Flag

The Final Level Run Flag is a read-only Boolean measure. A check (set to *True*) displayed in this field indicates which positions from the partition dimension had a successful forecast run for the birth date selected in the Forecast Approval wizard.

Note: Edits to the Adjusted Forecast can only be committed for partitions that have an activated Final Level Run Flag.

Source Level View

The Source Level view displays the system-generated source-level forecast. Final-level forecast values in the Final Level view can be viewed alongside and compared with their corresponding source-level forecasts.

Note: This view is not displayed for causal final levels.

Figure 11–14 Source Level View

	12/14/2001	12/21/2001	12/28/2001	1/4/2002	1/11/2002	1/18/2002	1/25/2002	2/1/2002	2/8/2002
System Forecast 3 - itm/chn/week	0.00	0.00	0.00	359.17	372.22	361.54	358.37	341.41	365.69
History Data - Weekly Sales	368.00	358.00	358.00	367.00	347.00	332.00	350.00	356.00	325.00
System Baseline 3 - itm/chn/week	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Measures: Source Level View

The Source Level view contains the following measures:

History Data

History Data (a read-only measure) is the sales data used to generate the forecast. This allows you to compare Actuals to forecast values. When the task is created, the Data Source measure is copied into History Data.

System Baseline

The System Baseline is a forecast generated on past sales data that contains no promotions (that is, normal demand given no causal effects). To see a generated Baseline Forecast:

- Promote must be implemented.
- Generate Baseline must be selected in the [Forecast Administration Workbook](#).
- The System Baseline must be selected to be viewed in the Forecast Approval wizard.

System Forecast

The System Forecast displays the system-generated forecast for the time series. The values contained in this field are read-only.

Final or Source System Parameters View

The Final or Source Parameters views allow you to view the alpha, level, and trend parameters for each fitted time series. These parameters are only available to be viewed if Generate Parameters or Generate Methods are available in the Advanced settings of the [Forecast Administration Workbook](#).

Figure 11–15 System Parameters View

	Bricks & Mortar	Catalog	E-ask	E-store	Retailer
Forecast Picked Method 3 - itm/chn/week	Multiplicative Seasonal	Multiplicative Seasonal	Multiplicative Seasonal	Multiplicative Seasonal	No Generated Forecast
System Generated Level 3 - itm/chn/week	391.84	44.95	4.46	13.33	0.00
System Generated Alpha 3 - itm/chn/week	0.05	0.05	0.00	0.01	0.00
System Generated Trend 3 - itm/chn/week	0.00	0.00	-0.00	0.00	0.00
System Generated Gamma 3 - itm/chn/week	0.00	0.00	0.05	0.04	0.00

Measures: Final or Source System Parameters View

The Final or Source Parameters view contains the following measures.

To see these measures:

- **Generate Parameters** must be selected in the [Forecast Administration Workbook](#).
- **System Generated Parameters** must be selected to be viewed in the Forecast Approval wizard.

Fit Error Factor

This is the a relative error calculated at source level and transformed to become the error factor for the final level.

The transformation is a two step process. First, the source level error is replicated at the final level intersection. Then it is multiplied with a profile - still at the final level intersection, to add some variability for each product/location combination.

The value is multiplied with the forecast to create the confidence intervals.

Forecast Method Picked

This is the system-calculated alpha value (which is an internal optimization parameter that corresponds to the rate of decay of the weighting on the historical values) for the corresponding product/location combination if the chosen method is one of the following methods: Simple, Holt, Additive Winters, Multiplicative Winters, and Profile Based.

System Generated Alpha

This is the system-calculated alpha value (which is an internal optimization parameter that corresponds to the rate of decay of the weighting on the historical values) for the corresponding product/location combination if the chosen method is one of the following methods: Simple, Holt, Additive Winters, Multiplicative Winters, and Profile Based.

System Generated Level

This is the system-calculated level (which is the constant baseline forecast) if the chosen method is one of the following methods: Simple, Holt, Additive Winters, Multiplicative Winters, and Seasonal Regression.

System Generated Gamma

This is the system-calculated gamma value for the corresponding product/location combination if the chosen method is one of the following methods: Simple, Holt, Additive Winters, Multiplicative Winters, and Profile Based.

System Generated Trend

This is the system-calculated trend (which is the rate of change of the baseline forecast with time) if the chosen method is one of the following methods: Holt, Additive Winters, Multiplicative Winters, and Seasonal Regression.

Promote (Promotional Forecasting) Task

This chapter provides an introduction to promotional forecasting and explains how it differs from the traditional statistical forecasting methodology. It discusses the advantages and limitations of both statistical and promotional forecasting models, and it outlines the use of Oracle Retail's Causal method of forecasting demand. It describes terminology used in the context of promotional forecasting, and it concludes with detailed descriptions of the tasks contained in Promote.

About Promote

Promote is an optional add-on automated predictive solution that allows you to incorporate the effects of promotional and causal events (such as radio advertisements and holiday occurrences) into your time-series forecasts. The promotional forecasting process uses both past sales data and promotional information to forecast future demand.

What Is Promotional Forecasting?

Traditional statistical forecasting methods provide significant benefits to the process of forecasting consumer demand because they are good at predicting level, trend, and seasonality based on sales history. The limitation of traditional statistical methods is that they forecast with less accuracy when there are special events that cause significant deviations in selling patterns.

For example, the Easter holiday, for which companies often run promotions, occurs on a different date each year. Traditional statistical forecast methods can identify seasonality in sales history, but this seasonality is based on periodic similarities in the sales pattern. Since Easter occurs on different dates from year to year (that is, its period of recurrence is not regular), manual intervention is required to predict change in demand using the traditional statistical forecasting method. Events like this are called promotion events. Promotion events, such as advertisements, irregularly occurring holidays, competitor information, free gift with purchase offers, and so on are events that drive businesses from the normal selling cycle.

The goal of a promotional forecasting system is to improve time series forecasting by:

- Providing the forecasting system with visibility as to when certain promotion events were active in the past (for example, identifying which weeks of a given year were affected by an Easter promotion).
- Automatically determining the statistical effect, if any, of these events.
- Incorporating significant effects into the future forecasts for time periods also associated with the observed promotion event.

The Promote module combines the automation of statistical time series forecasting with the improved accuracy found in customized causal forecasting. Promote uses both past sales data and promotional information (for example, advertisements, holidays) to forecast future demand. In order to understand the underlying rationale for the promotional forecasting process, it is important to understand the advantages and limitations of its underlying components.

Comparison Between Promotional and Statistical Forecasting

Statistical time series forecasting uses past demand to predict future demand. The most basic component of the time series forecast is the level of sales. This is usually determined by looking at demand in the recent past. There often exists an underlying trend that can be detected within sales history. This is usually determined by looking at the change in demand in the recent past. A third factor influencing retail demand is seasonality. A forecasting algorithm trying to determine the effects of seasonality can only look for periodic similarities in the sales pattern. For example, December sales from previous years can be used to adjust the forecast for December only because December occurs regularly every 12 months. At every step, the time series approach is limited to using historical demand to predict future demand without regard to the underlying causes that are driving demand in the first place.

Promotional events, however, can create problems in estimating level, trend, and seasonality. Certain events, such as irregularly occurring holidays, newspaper/radio advertisements, free gift with purchase offers, and special discounts can cause significant deviations from the selling pattern.

Promotional forecasting, unlike statistical forecasting, attempts to predict future demand by identifying the factors that influence spikes and dips of past demand. Once these factors are known, the magnitude and direction of their effect can be evaluated. Their presence can then be incorporated into forecasting models for use during times when the causal factors are again expected to be present.

Developing Promotional Forecast Methods

This section describes how custom promotional forecast models have been developed in the past, leading to the discovery of several consistent findings. These findings have been incorporated into Oracle Retail's development of the Promote forecasting module.

Promotional forecasting uses promotional factors to predict future demand. The first step is to determine all of the pertinent information affecting sales and transform this information into variables that the system understands. Seasonality, for instance, can be represented by a single seasonal continuous variable, such as the number of daylight hours or average daily temperature.

Alternatively, it can be represented by 12 different indicator variables representing each of the months. An indicator variable consists only of 0's and 1's (1 indicates that the event is on). For example, a monthly indicator variable for January would consist of a 1 during the first month of the year and 0's for the remaining months.

Once a list of variables is determined, the model needs to represent the promotion events in terms of their influence on overall demand. For example, if a set of promotional variables has a multiplicative promotional effect on demand, a log transformation may be needed to improve the model. After a suitable model is developed, it must be implemented using multivariate linear regression or neural network architecture with custom code handling the data loading and variable transformations. The final custom model may be quite accurate over the data set on which it was developed.

However, this model may not be general enough to be used universally across all data sets, thus requiring the development of multiple custom models to cover a client's entire domain. This has been found to be very time consuming and costly.

The process of developing custom promotional models has, however, brought to light a number of consistent patterns:

- Level, trend, and seasonality are universal components of almost any forecast.
- Including a time-series forecast as an input variable often improves promotional models.
- Indicator variables are robust in that they can represent both additive and multiplicative effects.

These findings have led Oracle Retail to develop a novel approach to promotional forecasting that combines the automation and generalization of time series forecasting with the improved (albeit data set specific) accuracy met through customized causal forecasting.

Promotional Forecasting Approach

Oracle Retail combines time series forecast methods with causal forecast methods, resulting in a new forecast method supported by the promotional forecasting module. Promote uses the AutoES method of forecast generation to determine a baseline time series forecast and then uses indicator variables to represent promotional events of interest. By giving the forecasting routine visibility as to when certain events occurred in the past, the system can correlate changes in the sales demand with these events and determine each promotional event's effect on sales. Then whenever these events occur in the future, the promotional effects can be incorporated into the forecast.

The Promotional Forecasting module has been developed to produce generalized promotional models automatically with little human intervention. Combined with the system's ability to allow you to develop your own data loading routines, Promotional Forecasting provides a cost-effective means for producing forecasts using promotional information.

Promotional Forecasting Terminology and Workflow

Promotional Forecasting is designed to produce sales forecasts using both past sales history and event on/off information, both of which you provide. Using the sales data, the system first determines a seasonal time series model to describe the purchasing behavior of consumers. Differences between the seasonal model and the actual sales are then correlated with known events. Events that are found to have a statistically significant impact on sales are then included in a promotional forecast model as promotion events. For each promotion event, its promotion effect on sales is determined. The final promotional model consists of the seasonal model, promotion event on/off information, and each promotion event's resulting effect on sales. By combining these three, a final promotional forecast is computed.

Note: More detailed information on the Causal forecasting algorithm is provided in the section, [Forecasting Methods Available in RDF Cloud Service](#).

Examples of Promotion Events

The following are examples of promotional variables that could be created and the manner in which their associated on/off event status is specified:

Example 12–1 Promotion Event 1

Christmas Day applies to all products/locations. The Christmas promotional variable therefore has only one dimension, Day." Because Christmas Day falls on the 359th day of each non-leap year, the Day359 variable is set to True for every such year (all other days it is set to False).

Example 12–2 Promotion Event 2

A television advertisement is run locally in the New York/New Jersey area for the four weeks at the beginning of the spring fashion season. The TVAD promotional variable has two associated dimensions, State and Week. Week13, Week14, Week15, and Week16 is set to True only for states NY and NJ (all other states/weeks is set to False). Since no product dimension exists, the TV ad is assumed to have an effect on all products.

Example 12–3 Promotion Event 3

A holiday promotion is run involving all sporting goods items for the two weeks prior to Father's Day. The Father's Day promotional variable has two associated dimensions - item and Week. For this year, Week23 and Week24 is set to True only for individual items related to sporting goods items (all other weeks and all other items is set to False). Since no location dimension exists, the Father's Day promotion is assumed to apply to all stores.

After promotional variables have been loaded into RDF Cloud Service, you can use the Promotion Planner task to view, edit, and update associated values without having to reload new data.

Procedures in Promotional Forecasting

The following list outlines the standard procedures performed in order to set up the system to run a promotional forecast:

- [Setting Up the System to Run a Promotional Forecast](#)
- Setting forecast parameters in the [Forecast Administration Workbook](#)
- Setting forecast parameters in the [Forecast Maintenance Workbook](#)
- Setting promotions to be active in the [Promo Planner Task](#)
- Running the batch forecast
- Viewing and Edit Causal Forecast results
- Analyzing forecasts in the [Forecast Approval Workbook](#)
- Analyzing and editing causal effects in the [Promo Effect Maintenance Task](#)
- [Viewing a Forecast That Includes Promotion Effects](#)
- [Viewing and Editing Promotion System-Calculated Effects](#)

Setting Up the System to Run a Promotional Forecast

Perform the following procedure to set up the system to run a promotional forecast.

1. Build a [Forecast Administration Workbook](#).

- a. In the [Forecast Administration Workbook: Final Level Parameters View - Advanced Settings](#), select [Generate Baseline Forecasts](#).
 - b. Optional: **Set the Default Forecast Method** to **Causal** for the desired level if the level is to be use only for Promotional Forecasting.
 - c. Optional: **Set the Causal Higher Intersection** for the desired level if the Override from Higher Level promotion type is used.
 - d. Optional for use with Daily Causal Forecasting: Set the values for the following parameters:
 - Causal Aggregation Profile
 - Causal Calculation Intersection
 - Causal Calculation Intersection Periodicity
 - e. Commit your changes to the master database by selecting **Commit Now** from the File menu.
2. Build a [Forecast Maintenance Workbook](#).
 - a. Set the [Forecast Method Override](#) to **Causal** for any items/locations at the desired levels that use Promotional Forecasting.
 - b. Commit your changes to the master database by selecting **Commit Now** from the File menu.
 3. Build a [Promo Planner Workbook](#).
 - a. Set causal variables for items and locations historically in that the selected promotions are active.
 - b. Commit your changes to the master database by selecting **Commit Now** from the File menu.
 4. Select **Run Batch** and generate a Forecast.

Viewing a Forecast That Includes Promotion Effects

Perform this procedure to view a forecast that includes promotion effects.

1. Build a [Forecast Approval Workbook](#) and include System Baseline in your task.
2. In the [Final Level View](#), review the System Baseline and the System Forecast. The System Baseline is predicted demand given no causal effects. The System Forecast is the sum of the System Baseline and the Promotional Peak calculated during the forecast generation process based on the causal data and settings.

Viewing and Editing Promotion System-Calculated Effects

Perform this procedure to view and edit promotion system-calculated effects.

1. Build a [Promo Effect Maintenance Workbook](#).
 - a. In the [Final Promotion Effect Parameters View](#) PromoEffects view, review the [System Calculated Effect](#).
 - b. If the [System Calculated Effect](#) is to be modeled using a method other than Automatic, edit the [Promo Effect Type](#).
 - c. If you choose to adjust the system-calculated effect, adjustments can be made to the [System Effect Override](#). You must also set the [Promo Effect Type](#) to **Override All** or **Override Future Only**.
2. Select **Run Batch** and generate a Forecast.

Promote Tasks, Workbooks, and Views

The Promote tasks, workbooks and views allow you to manage the promotion events used in the system's promotional forecasting processes, and view/edit the system's analysis of the effects of these events on demand.

Note: External to Promote, the [Forecast Administration Workbook](#) includes several parameters that may be used as additional configuration options for promotional forecasting. For additional information, refer to [Procedures in Promotional Forecasting](#).

[Table 12–1](#) lists the Promote tasks, workbooks, and views in the Event Planning activity.

Table 12–1 Promote Tasks, Workbooks, and Views

Task Workbooks	Workbook and Description	Views
Promo Planner Task	Promo Planner Workbook Allows you to specify when certain promotional events were active in the past, and when they are active in the future.	Promotions View
Promotion Management Task	Promotion Management Workbook Allows you to enable and disable promotions for causal forecast levels and to specify whether promotions can have a negative effect.	Promo Variable Model Type View Promotion Enable View Accept Negative Lift View
Promo Effect Maintenance Task	Promo Effect Maintenance Workbook Allows you to review the system-calculated promotional lift effects, edit these effects, and determine how changes are factored into the promotional model.	Promotion Effect Parameters Views Final Promotion Effect Parameters View

Promo Planner Task

In order to correlate deviations from the seasonal forecast with the occurrence of historic promotion events, the system needs visibility as to when these events were active. The system must also be informed of dates on which the status of upcoming promotion events will again be on, so the anticipated promotion effects can be built into the forecasting model.

The Promo Planner task allows you to indicate to the system when certain events were active in the past and when they are active in the future. All promotional events should be represented as accurately as possible so the modeling routine can more precisely detect correlations between event occurrences and changes in sales values.

The Promo Planner task consists of as many views as are necessary to represent all unique dimensional intersections associated with the promotion events contained in the task. A separate view is constructed for each of the required intersections. For example, promotion events such as Advertisement and Gift with Purchase may be loaded at the item/store/week intersection, while an event such as Christmas is loaded at the [Day] level.

In this setup, the Advertisement and Gift with Purchase promotions would appear on one view, and Christmas would appear on another. Whenever a hierarchy is not

included in the base intersection (as in the case of the Christmas promotional event) the event is assumed to apply to all positions in the undefined hierarchy. Thus, Christmas is assumed to apply to all products and all locations, but only to the Day-level calendar positions specified in the [Promotions View](#).

This task has this view:

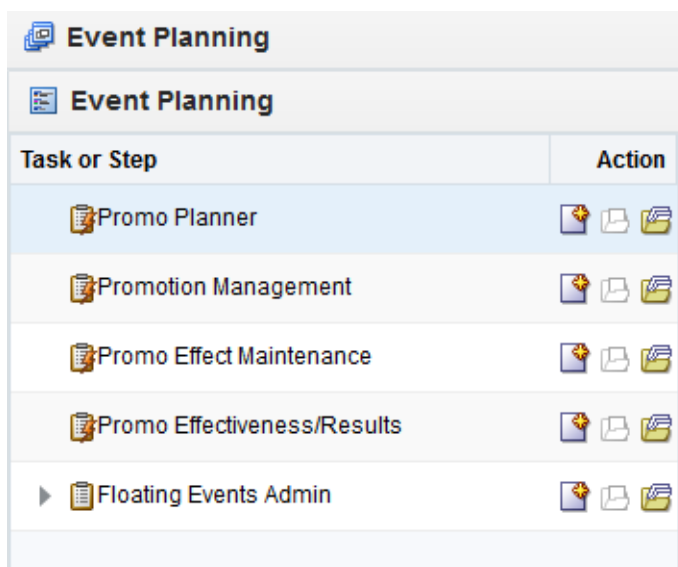
- [Promotions View](#)

Promo Planner Workbook

To build the Promo Planner workbook, perform these steps:

1. Click the New Workbook icon in the Promo Planner task in the Event Planning activity.

Figure 12–1 *Promo Planner Task*



2. The Workbook wizard opens. Select the promotion events to include and click **Next**.

Figure 12–2 Workbook Wizard: Select Promotions

Workbook Wizard

Promotion Selection Product Selection Location Selection Calendar Selection

Available Promotions

Available Items

View ▾ | Dimension ▾ | Find... | [Down Arrow] [Up Arrow] [Detach]

Label
Back to School
✓ Christmas
Christmas Season
Circular
Direct Mail
Easter
In-Store Display
✓ New Years Day
Promotional Price
✓ Signage

[Add] [Add All] [Remove] [Remove All]

Selected Promotions

Selected Items

View ▾ | Dimension ▾ | Find... | [Down Arrow] [Up Arrow] [Add] [Remove] [Finish]

Label
✓ Christmas
✓ New Years Day
✓ Signage

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

[Cancel] [Previous] [Next] [Finish]

3. Select the products to include and click **Next**.

Figure 12–3 Workbook Wizard: Select Products

Workbook Wizard

Promotion Selection **Product Selection** Location Selection Calendar Selection

Available Product

Available Items

View ▾ | Dimension ▾ | Find... | [Down Arrow] [Up Arrow] [Detach]

Label
24 X 16 oz Coke Crate
100% Pure Pumpkin 15 oz
All Free Clear Allergen 40 loads
All Fresh Rain 26 loads
All Liquid 115 oz
All Wild Fresh 32 loads
Arm & Hammer Clean Burst 40 loads
Carb Control 8 OZ:Blueberry
Carb Control 8 OZ:Cherry
Carb Control 8 OZ:Regular
Carb Control 8 OZ:Strawberry
Cheer Dark Formula 26 loads
Cheer Fresh Linen 32 loads
Cheer Ultra 26 loads
Cheer Ultra 32 loads
Cheer with color guard 40 loads
Clorox Bleach 44 oz
Coca Cola 2 ltr:Cherry Coke
Coca Cola 2 ltr:Coke
Coca Cola 2 ltr:Coke Zero
Coca Cola 2 ltr:Diet Coke

[Add] [Add All] [Remove] [Remove All]

Selected Product

Selected Items

View ▾ | Dimension ▾ | Find... | [Down Arrow] [Up Arrow] [Add] [Remove] [Finish]

Label
✓ Coca Cola Classic Fridge Pack 12 oz:Coke Zero
✓ One-Pie Pie Filling 15 oz
✓ Private Label Pumpkin 15 oz
✓ Snuggle 64 oz
✓ Tide Liquid Orig Scent 32 loads
✓ Ultra Tide 2 40 loads
✓ Yams in Heavy Syrup 15 oz

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

[Cancel] [Previous] [Next] [Finish]

4. Select the locations to include and click **Next**.

Figure 12–4 Workbook Wizard: Select Location

Workbook Wizard

Promotion Selection Product Selection **Location Selection** Calendar Selection

Available Locations

Available Items

View ▾ Dimension Find... [Icons]

Label
✓ Louisville, KY
Macon, GA
Madrid
Memphis, TN
Miami, FL
Milwaukee, WI
Minneapolis
Minneapolis, MN
Montreal
Nashville
New Orleans, LA
New York City
Oklahoma City, OK
Olympia, WA
Omaha, NE
Paramus Park, NJ
Paris
Phoenix, AZ
Pittsburgh, PA
Portland, OR
Portland, ME

Rows Selected 1

Selected Locations

Selected Items

View ▾ Dimension Find... [Icons]

Label
✓ Atlanta, GA
✓ Boston
✓ Burlington, VT
✓ Chapel Hill, NC
✓ Chicago, IL
✓ Cincinnati, OH
✓ Louisville, KY

Rows Selected 1

[Add] [Add All] [Remove] [Remove All]

☒ Synchronize Hierarchies

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

[Cancel] [Previous] [Next] [Finish]

5. Select the days you want to work with and click **Finish**

Figure 12–5 Workbook Wizard: Select Days

Workbook Wizard

Promotion Selection Product Selection Location Selection **Calendar Selection**

Available Calendar

Available Items

View ▾ Dimension Find... [Icons]

Label
✓ 10/31/2009
✓ 11/1/2009
✓ 11/2/2009
✓ 11/3/2009
✓ 11/4/2009
✓ 11/5/2009
✓ 11/6/2009
✓ 11/7/2009
✓ 11/8/2009
✓ 11/9/2009
11/10/2009
11/11/2009
11/12/2009
11/13/2009
11/14/2009
11/15/2009
11/16/2009
11/17/2009
11/18/2009
11/19/2009

Rows Selected 13

Selected Calendar

Selected Items

View ▾ Dimension Find... [Icons]

Label
✓ 10/28/2009
✓ 10/29/2009
✓ 10/30/2009
✓ 10/31/2009
✓ 11/1/2009
✓ 11/2/2009
✓ 11/3/2009
✓ 11/4/2009
✓ 11/5/2009
✓ 11/6/2009
✓ 11/7/2009
✓ 11/8/2009
✓ 11/9/2009

Rows Selected 13

[Add] [Add All] [Remove] [Remove All]

☒ Synchronize Hierarchies

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

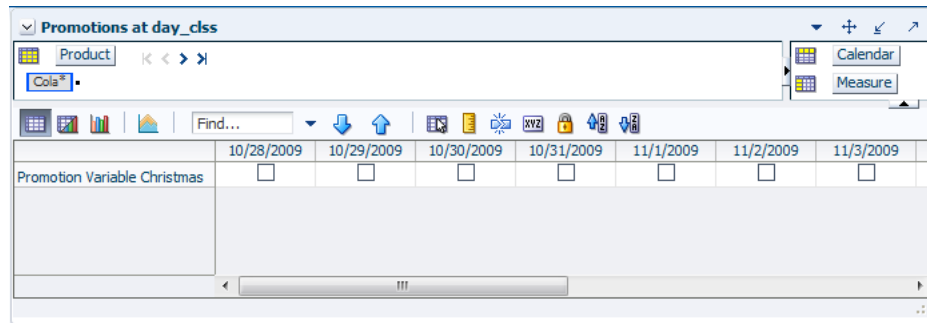
[Cancel] [Previous] [Next] [Finish]

The Promo Planner workbook is built.

Promotions View

The Promotions view allows you to view and edit the on/off information associated with each configured promotional event. This view provides an interface in which you can specify the time periods (and possibly products or locations) for which certain promotional variables are active.

Figure 12–6 Promotions View



Measures: Promotions View

The Promotions view contains the following measures:

Promotion Variables

Promotion Variable Type is defined through setting both Data Type and Model Type during the configuration process in the Promote Plug-in. The Promotion Variable Type includes Boolean, Exponential, and Real. The following table explains how Promotion Variable Type is defined through Data Type and Model Type settings.

When the Type is	And the Model is	Then the Promotion Variable Type is
Boolean	either Linear or Exponential	Boolean
Real	Linear	Real
Real	Exponential	Exponential

The Data Type includes Boolean and Real types. The Model Type includes Linear and Exponential types. When Data Type is set to Boolean, the Promotion Variable Type is Boolean. When Data Type is set to Real and the Model Type is set to Linear, the Promotion Variable Type is Real. If Data Type is set to Real and the Model Type is set to Exponential, the Promotion Variable Type is Exponential.

Refer to the *Oracle Retail Demand Forecasting Cloud Service Configuration Guide* for additional details on configuring the Promote solution.

Promotion Variable Type	Description
Boolean	<p>A check in a given cell indicates that the associated promotion event's status is on (or 100% of the lift effect applies) for that intersection. If no check is indicated, the event's status is off.</p> <p>Boolean promotions can be enabled together with other types of promotions at the same time.</p>

Promotion Variable Type	Description
Exponential	<p>Real numbers are expected in the cells. The value specified here is used in an exponential model which is an input to the stepwise regression sub-routine.</p> <p>A typical example of a metric modeled as exponential is the percent price change. Note how the percent price change can be positive (price increase) or negative (price decrease).</p> <p>Exponential promotions can be enabled together with Boolean promotions at the same time. However, they can not be enabled together with Real promotions.</p>
Real	<p>Non-negative values are expected in the cells.</p> <p>A value of 0 indicates that the event's status is off. A value greater than 0 will act as a weight when calculating the effects during the stepwise regression.</p> <p>Real promotions can be enabled together with Boolean promotions at the same time. However, they can not be enabled together with Exponential promotions.</p>

About Implementation

Among the ways Causal variables can be implemented include price or discount percent. Your Oracle Retail Consultant can best determine the most accurate setup of promotion variables based upon your promotional forecasting requirements.

Promotion Management Task

The Promotion Management task allows you to enable and disable promotions for causal forecast levels and to specify whether promotions can have a negative effect.

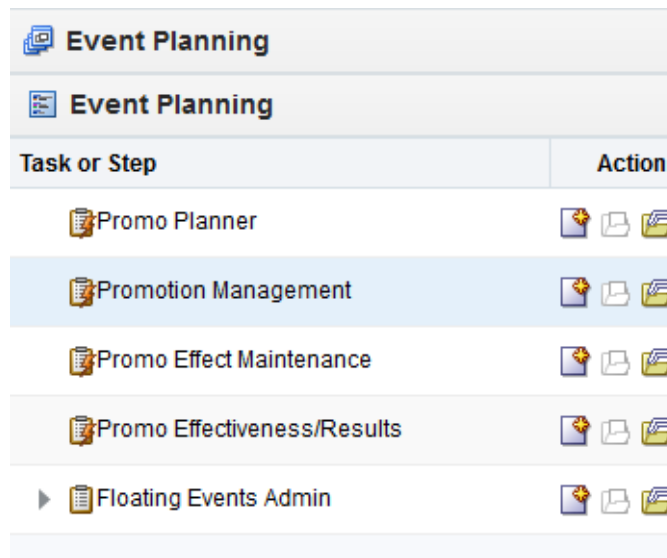
This task has these views:

- [Promo Variable Model Type View](#)
- [Promotion Enable View](#)
- [Accept Negative Lift View](#)

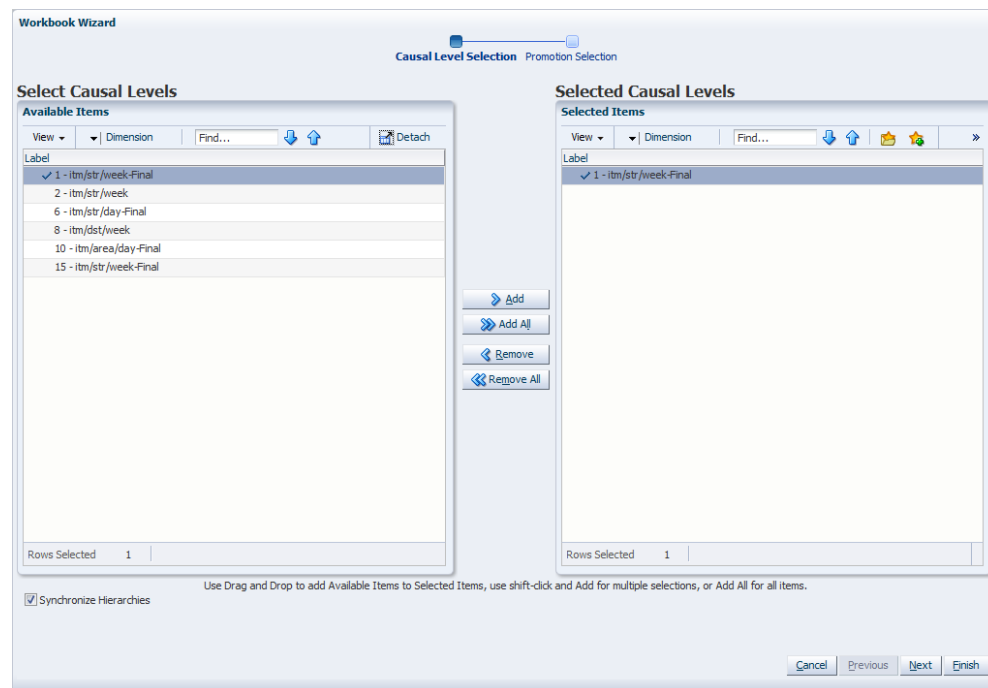
Promotion Management Workbook

To build the Promotion Management workbook, perform these steps:

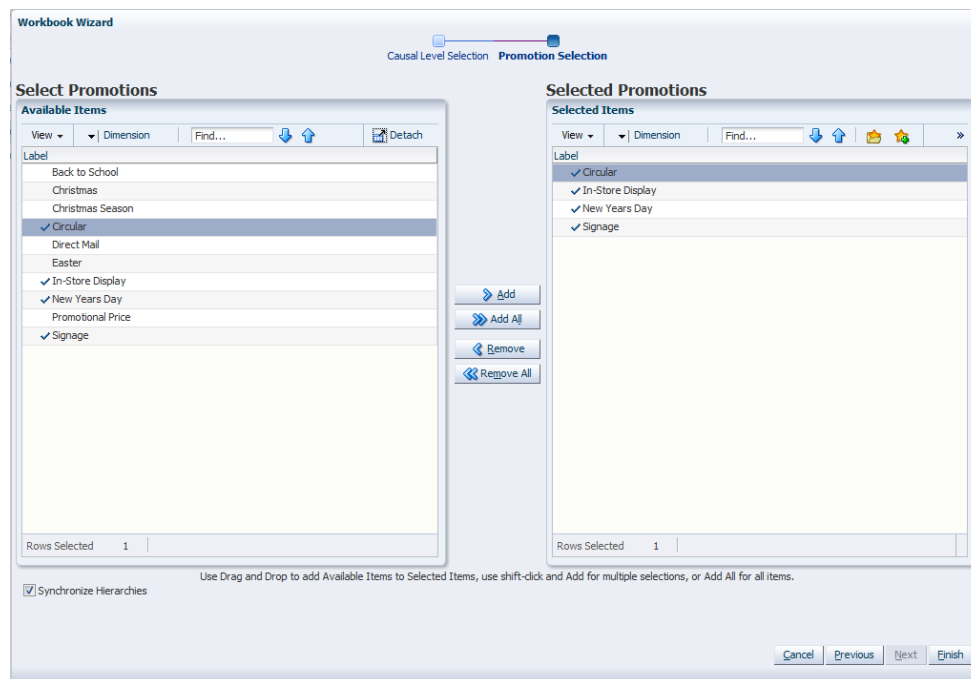
1. Click the New Workbook icon in the Promotion Management task in the Event Planning activity.

Figure 12–7 Promotion Management Task

- The Workbook wizard opens. Select the causal level and click **Next**.

Figure 12–8 Workbook Wizard: Select Causal Level

- Select the promotions you want to work with and click **Finish**.

Figure 12–9 Workbook Wizard: Select Promotions

The Promotion Management workbook is built.

Promo Variable Model Type View

The Promo Variable Model Type view allows you to view the model type for the selected promotion variables.

Figure 12–10 Promo Variable Model Type View

	Circular	In-Store	New Years	Signage
Model Type for promotional variable	Linear	Linear	Linear	Linear

Measure: Promo Variable Model Type View

The Promo Variable Model Type view contains the following measure:

Model Type for Promotional Variable

This measure stores the model type for the selected promotion variables. The choices are exponential and linear. An exponential model type is displayed if the promotion type is exponential. A linear model type is displayed when the promotion types are Real or Boolean.

For additional information, see ["Promotion Variables"](#) on page 12-10.

Promotion Enable View

The Promotion Enable view allows you to enable or disable a promotion for the causal forecast levels. The Promotion Enable view is built at the hierarchy intersections of the promotion variables and the causal levels selected during the wizard process.

Figure 12–11 Promotion Enable View

The screenshot shows the 'Promotion Enable Worksheet' interface. It features a toolbar with icons for grid, chart, and other functions, along with a 'Find...' search bar. The main area is a table with columns for different causal forecast levels and rows for various promotion types. The 'Enable Promotions' measure is selected in the top left.

	1 - itm/str/week-Final	2 - itm/str/week	6 - itm/str/day-Final
Back to School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Christmas	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Christmas Season	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Circular	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Direct Mail	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In-Store Display	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Multibuy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
New Years Day	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promotional Price	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Signage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TV Ad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Measures: Promotion Enable View

The Promotion Enable view contains the following measure:

Enable Promotions

This is a read/write Boolean measure. The Enable Promotions measure allows you to enable a subset of promotions for a certain causal forecast level. It defaults to *True* for all causal forecast levels.

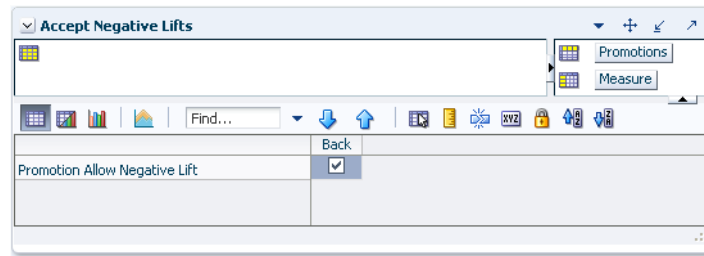
Note: Exponential promotions and Real promotions can not be enabled at the same time for the same level. In another word, Real promotions and Exponential promotions are not valid combinations. The valid promotion combinations are Boolean and Exponential promotions, as well as Boolean and Real promotions.

Each promotion's type is defined in the Configuration Tool. For additional information, see ["Promotion Variables"](#) on page 12-10.

Accept Negative Lift View

The Accept Negative Lift view allows you to specify whether a promotion is allowed to have negative effect. The Promotion Enable view is built at the hierarchy intersections of the promotion variables selected during the wizard process.

Figure 12-12 Accept Negative Lift View



Measures: Accept Negative Lift View

The Accept Negative Lift view contains the following measure:

Promotion Allow Negative Lift

This is a read/write Boolean measure. The Promotion Allow Negative Lift measure allows you to specify whether a promotion is allowed to have negative effect. When this measure is set to *False* for a promotion, the forecast engine does not allow that promotion to have any negative lift (Effect < 1). It defaults to *True* for all promotions.

Promo Effect Maintenance Task

The Promo Effect Maintenance task provides a view to the system-calculated and adjusted lift effects. You can edit effects at any product/location intersection and determine how these changes are factored into the promotional models. The Promo Effect Maintenance task contains one view. There may be multiple versions of this view, defined at various causal levels.

This task includes these views:

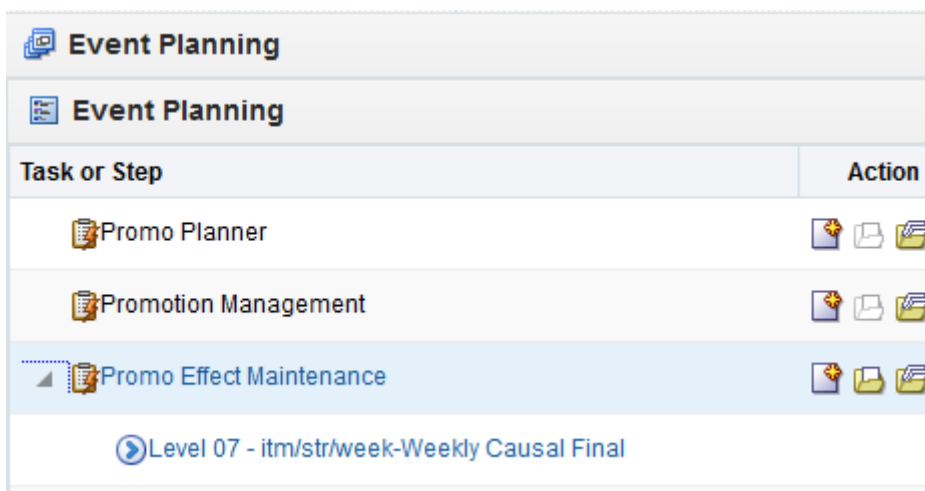
- [Promotion Effect Parameters Views](#)
- [Final Promotion Effect Parameters View](#)

Promo Effect Maintenance Workbook

To build the Promo Effect Maintenance workbook, perform these steps:

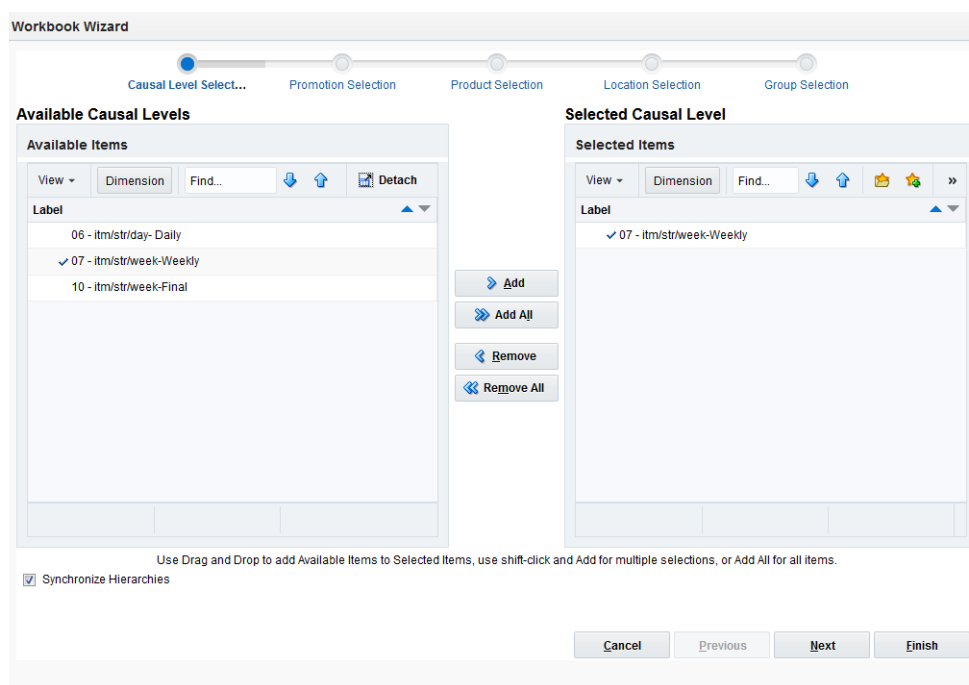
1. Click the New Workbook icon in the Promo Effect Maintenance task in the Event Planning activity.

Figure 12–13 Promo Effect Maintenance Task



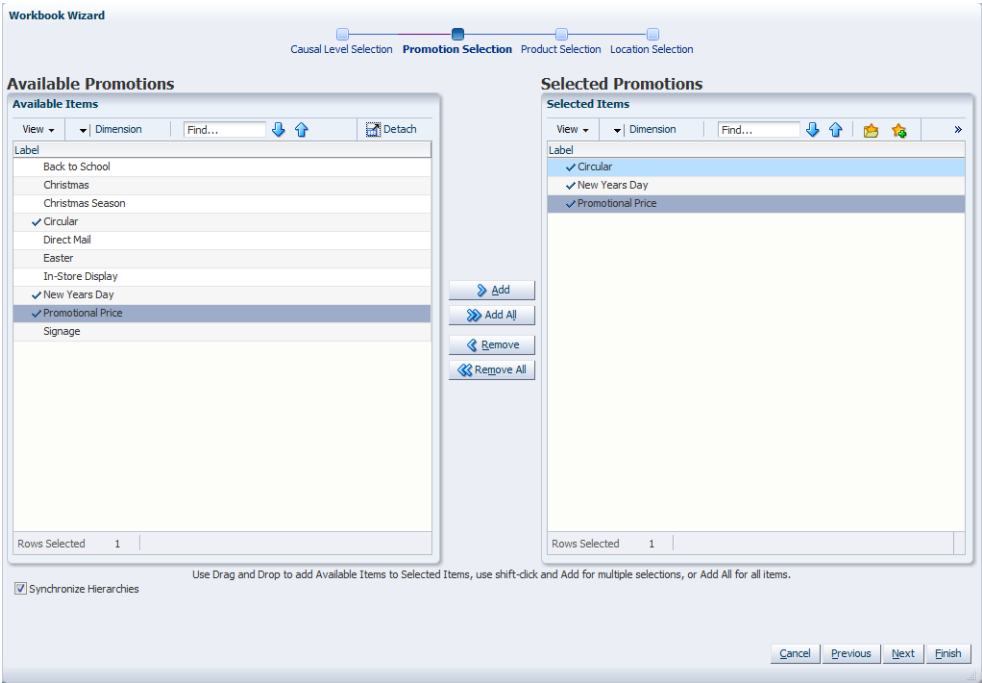
- The Workbook wizard opens. Select the causal final level and click **Next**.

Figure 12–14 Workbook Wizard: Causal Level



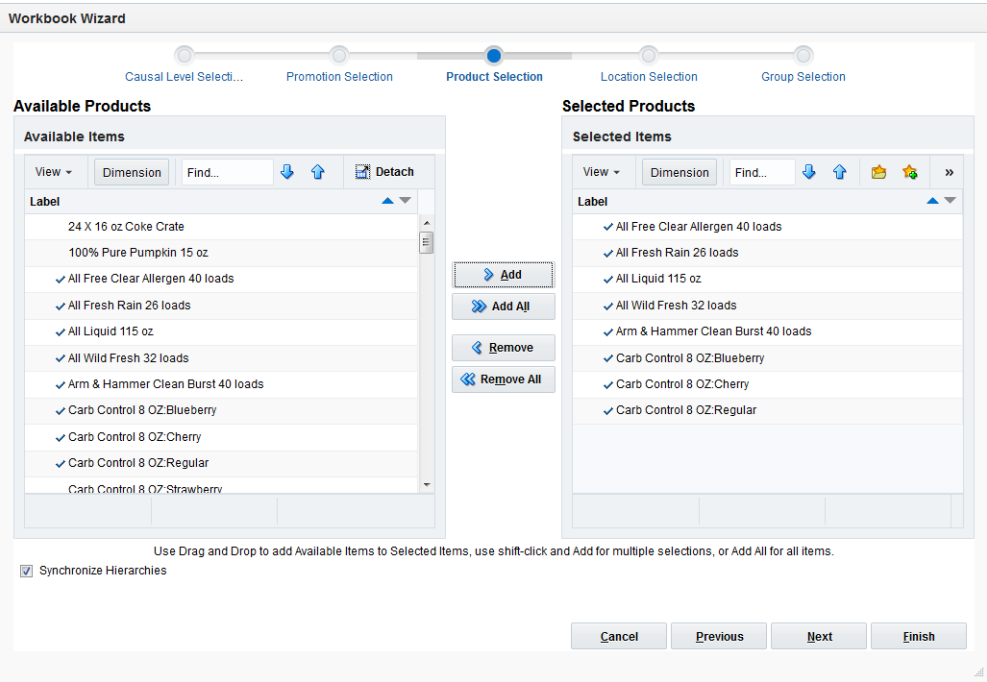
- Select the promotion events to include and click **Next**.

Figure 12–15 Workbook Wizard: Select Promotions



4. Select the products you want to work with and click **Next**.

Figure 12–16 Workbook Wizard: Select Products



5. Select the locations you want to work with and click **Finish**.

Figure 12–17 Workbook Wizard: Select Locations

Workbook Wizard

Causal Level Selection Promotion Selection Product Selection **Location Selection** Group Selection

Available Locations

Available Items

View Dimension Find... Detach

Label

- 3 Crystal
- 5th Avenue
- ✓ 6 Glendale
- ✓ 7 Westland
- ✓ 8 Fridley
- ✓ 9 West St Paul
- ✓ 20 Knollwood
- ✓ 50 Bloomington
- ✓ 68 East St Paul
- ✓ 90 West St Paul
- 160 Midway

➤ Add

➤➤ Add All

⬅ Remove

⬅⬅ Remove All

Selected Locations

Selected Items

View Dimension Find... Detach

Label

- ✓ 6 Glendale
- ✓ 7 Westland
- ✓ 8 Fridley
- ✓ 9 West St Paul
- ✓ 20 Knollwood
- ✓ 50 Bloomington
- ✓ 68 East St Paul
- ✓ 90 West St Paul

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

The Promo Effect Maintenance workbook is built.

Promotion Effect Parameters Views

The Promotion Effect Parameters view allows you to view and modify the system-calculated effects of a given promotion at the causal source level. There is one view for every causal source level.

Note: Changes that are committed in the Promo Effect Maintenance task are not incorporated into the forecast until another forecast is generated in RDF Cloud Service batch forecast process.

Figure 12–18 Promotion Effect Parameters View

	All Free Clear Allergen 40	All Fresh Rain 26 loads	All Liquid 115 oz	All Wild Fresh 32 loads	Arm & Hammer Clean Burst	Carb Control 8 OZ Blueberry	Carb Control 8 OZ Cherry	Carb Control 8 OZ Reg
Promo Effect Type 14 - itm/rgn/week Circular	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
Promo Effect Type 14 - itm/rgn/week Price Discount	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
Promo Effect Type 14 - itm/rgn/week Cover	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
Promo Effect Type 14 - itm/rgn/week TV Ad	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
Promo Effect Type 14 - itm/rgn/week Multibuy	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
System Effect Override 14 - itm/rgn/week Circular	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
System Effect Override 14 - itm/rgn/week Price Discount	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
System Effect Override 14 - itm/rgn/week Cover	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
System Effect Override 14 - itm/rgn/week TV Ad	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Measures: Promotion Effect Parameters View

The Promotion Effect Parameters view contains the following measures:

Promo Effect Type

Causal variable types define how causal variables are treated in the causal model-fitting process (which includes a call to the lower-level regression engine) and the forecast generation process where the model is used to extend the forecast over the forecast horizon. [Table 12–3](#) lists the options.

System Calculated Effect

The System Calculated Effect is a read-only measure indicating the lift effect generated by the system.

System Effect Override

The user-specified lift effect. This user-entered effect is active if used in conjunction with the Override All and Override Future Only Promotion Effect Types. Otherwise, it equals 1.00.

Table 12–2 Promo Effect Types

Causal Variable Type	Description
Automatic	The inclusion of the Promo Effect is decided by regression. If the Promo Effect is found to be significant on the training set, it is included in the model. Otherwise, it is rejected. Automatic is the system default Promotion Effect Type.
Forced In	The Promo Effect is forced in to the model, thus regression is not given a choice to reject even if the effect is considered insignificant by regression. As a result, we will always return an effect even if it has a negative impact to the demand forecast.
Disabled	The variable is excluded from the model, hence no effect is returned either.

Table 12–2 (Cont.) Promo Effect Types

Causal Variable Type	Description
Override All	This type allows you to specify a causal effect that is used during the forecasting process. For Promo Effects specified as Override All, you also specify the corresponding causal effect in the Promotion Effect Override. The causal engine de-causalizes the training data using the user-specified effect. During forecast generation, the user-specified effect is used to determine the causal forecast. Therefore, you must change the Promotion Effect Type when this user-specified effect is no longer to be used.
Override Future Only	This type allows you to specify a causal effect that is used during the forecasting process. For Promo Effects specified as Override Future, you also specify the corresponding causal effect in the Promotion Effect Override. The calculated effect is not written back to the effects measure, but it is used to de-causalize the data. During forecast generation the calculated effect is ignored, and, instead, the user-specified effect is used to produce a causal forecast. Therefore, you must change the Promotion Effect Type when this user-specified effect is no longer to be used.
Override from Higher Level	This promotion type is used in conjunction with the Causal Higher Intersection set in the Forecast Administration Workbook . If the Causal Higher Intersection is not specified, no promotional effect is calculated. It allows the system to use the geometric mean of causal effects computed from product/location combination in the same group (the intersection level specified in the Causal Higher Intersection during system setup) for product/location combinations for which from sales history alone a causal effect is unable to be computed for that Promo Effect. The way the system handles this, is by having the override effects measure filled in with higher-level effects for those variables specified as Override Higher Level. During forecast generation the effect calculated as average of low level effects is used to produce a causal forecast. Note that if no effects are found for any of the product/locations in the Causal Higher intersection group, then the system uses the geometric mean of causal effects calculated from all Product/Locations as the override effect being passed in.
Automatic Boolean	If the promotion variable is always be set to 0.00 or 1.00 (meaning inactive or active, respectively), this type produces the same results as the Automatic type; however, Automatic Boolean improves the performance (speed) of the forecasting engine during the batch run of the forecast.

Final Promotion Effect Parameters View

The Promotion Parameters view allows you to view and modify the system-calculated effects of a given promotion.

Note: Changes that are committed in the Promo Effect Maintenance task are not incorporated into the forecast until another forecast is generated in RDF Cloud Service batch forecast process.

Figure 12–19 Promotion Parameters View

	Albany, NY	Albuquerque,	Anchorage,	Boston, MA	Burlington,
Promo Effect Type 1 - itm/str/week-Final Circular	Automatic	Automatic	Automatic	Automatic	Automatic
System Effect Override 1 - itm/str/week-Final Circular	1.00	1.00	1.00	1.00	1.00
System Calculated Effect 1 - itm/str/week-Final Circular	1.00	1.00	1.00	1.00	1.00

Measures: Promotion Parameters View

The Promotion Parameters view contains the following measures:

Promo Effect Type

Causal variable types define how causal variables are treated in the causal model-fitting process (which includes a call to the lower-level regression engine) and the forecast generation process where the model is used to extend the forecast over the forecast horizon. [Table 12-3](#) lists the options.

Blended Promo Effect

This measure is registered for each promotion. This is the value for the promotion effect that was used to create the forecast if no override is specified. Depending on the administration and maintenance settings it can be one of the following:

- Item/store calculated effect
- Source (pool) calculated effect
- A combination of the two. The way the two effects are combined can also be determined by the user by specifying a blending parameter.

System Calculated Effect

The System Calculated Effect is a read-only measure indicating the lift effect generated by the system.

System Effect Override

The user-specified lift effect. This user-entered effect is active if used in conjunction with the Override All and Override Future Only Promotion Effect Types. Otherwise, it equals 1.00.

Table 12-3 *Promo Effect Types*

Causal Variable Type	Description
Automatic	The inclusion of the Promo Effect is decided by regression. If the Promo Effect is found to be significant on the training set, it is included in the model. Otherwise, it is rejected. Automatic is the system default Promotion Effect Type.
Forced In	The Promo Effect is forced in to the model, thus regression is not given a choice to reject even if the effect is considered insignificant by regression. As a result, we will always return an effect even if it has a negative impact to the demand forecast.
Disabled	The variable is excluded from the model, hence no effect is returned either.
Override All	This type allows you to specify a causal effect that is used during the forecasting process. For Promo Effects specified as Override All, you also specify the corresponding causal effect in the Promotion Effect Override. The causal engine de-causalizes the training data using the user-specified effect. During forecast generation, the user-specified effect is used to determine the causal forecast. Therefore, you must change the Promotion Effect Type when this user-specified effect is no longer to be used.

Table 12–3 (Cont.) Promo Effect Types

Causal Variable Type	Description
Override Future Only	This type allows you to specify a causal effect that is used during the forecasting process. For Promo Effects specified as Override Future, you also specify the corresponding causal effect in the Promotion Effect Override. The calculated effect is not written back to the effects measure, but it is used to de-causalize the data. During forecast generation the calculated effect is ignored, and, instead, the user-specified effect is used to produce a causal forecast. Therefore, you must change the Promotion Effect Type when this user-specified effect is no longer to be used.
Override from Higher Level	This promotion type is used in conjunction with the Causal Higher Intersection set in the Forecast Administration Workbook . If the Causal Higher Intersection is not specified, no promotional effect is calculated. It allows the system to use the geometric mean of causal effects computed from product/location combination in the same group (the intersection level specified in the Causal Higher Intersection during system setup) for product/location combinations for which from sales history alone a causal effect is unable to be computed for that Promo Effect. The way the system handles this, is by having the override effects measure filled in with higher-level effects for those variables specified as Override Higher Level. During forecast generation the effect calculated as average of low level effects is used to produce a causal forecast. Note that if no effects are found for any of the product/locations in the Causal Higher intersection group, then the system uses the geometric mean of causal effects calculated from all Product/Locations as the override effect being passed in.
Automatic Boolean	If the promotion variable is always be set to 0.00 or 1.00 (meaning inactive or active, respectively), this type produces the same results as the Automatic type; however, Automatic Boolean improves the performance (speed) of the forecasting engine during the batch run of the forecast.

Alert Thresholds Task

The Alert Thresholds task allows you to manage the thresholds used in the batch and workbook alerts included in RDF Cloud Service. The thresholds can be set at three levels:

- Domain level
- Intermediate level (lower than all Product in the merchandise hierarchy)
- Item/store level (allows threshold values to be overwritten)

Defined Alerts

The following sections provide the complete list of alerts defined for RDF Cloud Service. Most of the alerts have thresholds that can be adjusted in the Alert Threshold Task. The alerts that do not have any adjustable thresholds defined, are still listed, and their calculation expressions are mentioned.

The alert thresholds are available for the baseline as well as causal levels. However, based on the measures in the calculation expressions we specify for which level each alert is most relevant.

Forecast versus Recent Sales

Usually it is not expected that demand values differ very much from period to period. This also implies that the forecast magnitude generally is in line with the magnitude of the most recent sales. There are exceptions to this case. For instance, when an item enters a season, the forecast is probably higher than the sales in periods leading to the season. Or when an item is towards the end of the season, the forecast will be lower than sales in peak periods. For these exceptions, you can be alerted to review the forecast, rather than automatically approving it.

This alert is both a batch and a workbook alert.

Alert Expression

Where *length*, *threshold1*, and *threshold2* are adjustable parameters.

$$\frac{\sum_{today}^{today+length} system\ forecast(t)}{length} > threshold1$$

&&

$$\left| \frac{\sum_{today}^{today+length} adjusted\ forecast(t)}{\sum_{today-1-length}^{today-1} forecast\ source(t)} - 1 \right| > threshold2$$

The calculation expression for this alert involves thresholds which can be adjusted in the Alert Thresholds task.

The alert is mostly relevant for the baseline level. The reason is that there can be large differences in recent sales versus forecast due additional demand coming from past or upcoming promotions.

Note: The calculations are not performed for the entire forecast horizon, but rather by the number of periods determined by the length parameter. The reason is that the forecast horizon can sometimes be very long (52 weeks) and average demand over such a long time period can not be used as in-season versus out of season rate of sales.

Current Forecast versus Last Approved Forecast

Typically RDF Cloud Service generates forecasts weekly. Every week, new sales data is loaded and the forecast is regenerated. While the latest data points are expected to make the forecast more accurate, it is not expected that the difference in forecasts generated in two consecutive weeks to vary too much. If the forecasts differ, you are alerted to review the forecasts.

This alert is both a batch and a workbook alert.

Alert Expression

Where *length*, *threshold1*, and *threshold2* are adjustable parameters.

$$\left| \frac{\sum_{today}^{today+forecast\ length-1} system\ forecast(t)}{\sum_{today}^{today+forecast\ length-1} lappf(t)} - 1 \right| > threshold1$$

&&

$$\frac{\sum_{today}^{today+forecast\ length-1} system\ forecast(t)}{forecast\ length - 1} > threshold2$$

The calculation expression for this alert involves thresholds which can be adjusted in the Alert Thresholds task.

This alert is relevant for both baseline and causal forecasts.

Note: Summation of forecasts are not performed over the entire forecast length. It stops one period prior to the forecast horizon end, because this is the last populated period of the last approved forecast.

Forecast Accuracy Alert

The following steps implement the accuracy and alert calculations:

1. Calculate rate of sales (ROS) per item/store. There are several places where average sales are calculated. If available, reuse an available measure that stores the desired rate of sales.

2. Define thresholds for buckets of ROS. For example:

Low ROS value = 1

Medium ROS value = 10

High ROS value >10

3. Define error values by low/medium/high ROS. For example:

Low ROS error value = 10000%

Medium ROS error value = 100%

High ROS error value = 40%

4. Define the alert thresholds per rate of sales at the item/store intersection. For example, an item/store that has average sales of half a unit per week, is not worth the effort to be reviewed even if the forecast error is more than 100%. The logic for calculating the threshold is:

If ROS < Low ROS error value

Alert threshold = Low error value

Else if ROS < Medium ROS value

Alert threshold = Medium ROS error value

Else

Alert threshold = High ROS error value

5. Calculate the forecast error:

If ROS is less or equal to Low ROS error value for error calculation

Forecast error = $(\text{abs}(\text{sum of forecast}) - \text{abs}(\text{sum of sales})) / \text{sum of sales} * 100$

Else

Forecast error = $(\text{sum}(\text{abs}(\text{forecast} - \text{sales})) / \text{sum of sales} * 100$

Note: The second formula yields a higher error. This formula is applied to medium and high ROS items.

The calculation of the forecast error should happen on a window starting the period prior to today and going back an adjustable number of periods.

6. Trigger the alert if the error is larger than the threshold (calculated in Step 4).

If Forecast error > Alert threshold

Trigger alert

Forecast versus Last Year Sales

The most reliable forecasts are generated from data that has a repeatable pattern year over year. However, this is not always the case. A change in business strategy, merchandise reclassifications, new items can all lead to changing selling patterns over time.

To detect possible changes in selling patterns, the following alert will compare the last year's sales volume with the forecasted sales volume. If they are different by an adjustable percent, the alert is triggered.

Alert Expression

Where *threshold1*, and *threshold2* are adjustable parameters.

$$\left\{ \frac{\sum_{today}^{today+length-1} system\ forecast(t)}{length} > threshold1 \right. \\ || \\ \left. \frac{\sum_{today}^{today+length-1} forecast\ source\ LY(t)}{length} > threshold1 \right\} \\ \&\& \\ \frac{\sum_{today}^{today+length-1} adjusted\ forecast(t)}{\sum_{today}^{today+length-1} forecast\ data\ source\ LY(t)} > threshold2$$

First check if the forecast is close to the sales LY. If it is, no alert is triggered. If it is not, then check the rate of sales of the item. If the item is selling consistently, RDF Cloud Service triggers an alert. If the sales and forecast are different, but the rate of sales of the item is not significant, defined by threshold2, no alert is triggered. This way, RDF Cloud Service avoids prompting you to review forecasts for low selling items.

The calculation expression for this alert involves thresholds which can be adjusted in the Alert Thresholds task.

The alert is mostly relevant for the baseline level. The reason is that there can be large differences in last year sales versus forecast due additional demand coming from past or upcoming promotions.

New Item Alert

When a new item for any store is introduced into the assortment, forecasts need to be generated such that it is correctly replenished. Since no historical demand is available, RDF Cloud Service has a few mechanisms to create the forecasts. To do that, it first needs to be aware that new items have entered the system.

Alert Expression

If forecast startdate override is in the future

and POS length < TS duration

and substitution method is blank

and no like item is assigned

then item is considered new

The calculation expression for this alert does not involve thresholds which can be adjusted in the Alert Thresholds task.

The alert is not designed specifically for a forecast level, but rather to trigger the new item functionality available in RDF Cloud Service.

Causal Peaks Alert

The purpose of this alert is to check how large the forecast peaks are compared to promotional activity in the past.

There is a batch and a workbook alert, with similar calculations, but different intersections;

Batch Alert Expression

The batch alert has the following calculation:

Calculate the maximum historical causal data source:

-Max_hist_dmnd = maximum of source data for causal forecasting (item/store/week)

Calculate the maximum peaks in forecast region:

-frcst_pks = causal forecast -baseline forecast (item/store/week)

Calculate alert:

-If max(frcst_pks) > Max_hist_dmnd then trigger alert (item/store)

The business case this addresses is to alert you when the peaks in the forecast region are larger than anything observed in the past. There may be valid justification for this, for instance, several events are active in the same time period, thus creating a huge spike in demand. You can review the alert and take action.

Workbook Alert Expression

The workbook alert condition, based on the information already calculated in the batch version, is:

frcst_pks > Max_hist_dmnd

It should be applied to the adjusted forecast.

The advantage of the workbook alert is that you can immediately spot the values where the business rule is violated, instead of checking the values for the entire forecast region.

The calculation expression for this alert does not involve thresholds which can be adjusted in the Alert Thresholds task.

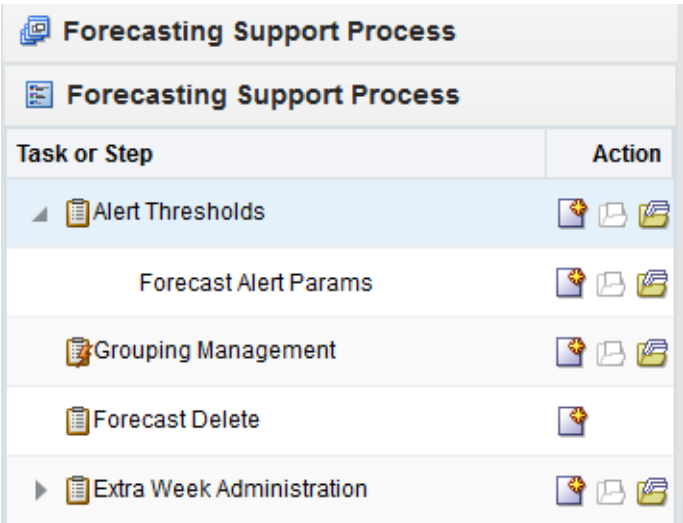
The alert is only relevant for the causal level, because only the causal forecast has peaks.

Alert Thresholds Workbook

To build the Alert Thresholds workbook, perform these steps:

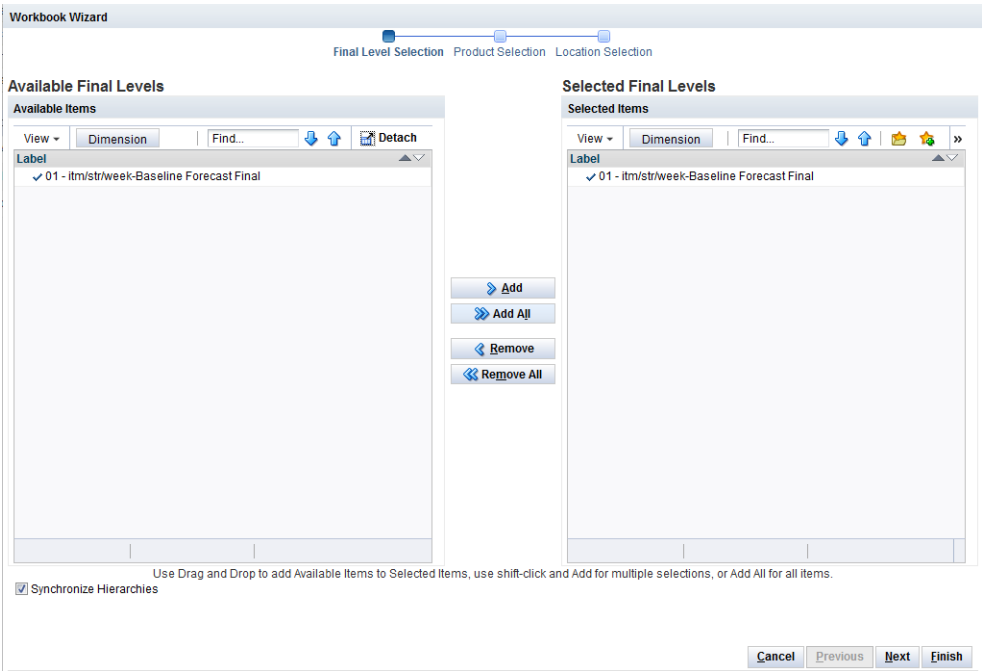
1. Click the New Workbook icon in the Alert Thresholds task in the Forecasting Support Process activity.

Figure 13–1 Alert Thresholds Task



2. The Workbook wizard opens. Select the final levels you want to work with and click **Next**.

Figure 13–2 Workbook Wizard: Select Final Levels



3. Select the products you want to work with and click **Next**.

Figure 13–3 Workbook Wizard: Select Products

Workbook Wizard

Final Level Selection Product Selection Location Selection

Available Product

Available Items

View ▾ Dimension Find... Detach

Label
4 X 6X 1L Still Water
5 pocket capri - Antique 8 Ank
5 pocket capri - Antique 10 An
✓ 5 pocket capri - Antique 12 An
✓ 5 pocket capri - Bandblasted 1
✓ 5 pocket capri - Bandblasted 1
✓ 5 pocket capri - Bandblasted 8
✓ 5 pocket capri - Black 8 Ankle
✓ 5 pocket capri - Black 10 Ankl
✓ 5 pocket capri - Black 12 Ankl
✓ 5 pocket capri - Blasted 8 Ank
✓ 5 pocket capri - Blasted 10 An
✓ 5 pocket capri - Blasted 12 An
✓ 5 pocket capri - Denim 8 Ankle
✓ 5 pocket capri - Denim 10 Ankl
5 pocket capri - Denim 12 Ankl
5 pocket capri - Lightweight A
5 pocket capri - Lightweight A
5 pocket capri - Lightweight A
5 pocket capri - Raw 8 Ankle I

Add
Add All
Remove
Remove All

Selected Product

Selected Items

View ▾ Dimension Find... Detach

Label
✓ 5 pocket capri - Antique 12 An
✓ 5 pocket capri - Bandblasted 1
✓ 5 pocket capri - Bandblasted 1
✓ 5 pocket capri - Bandblasted 8
✓ 5 pocket capri - Black 8 Ankle
✓ 5 pocket capri - Black 10 Ankl
✓ 5 pocket capri - Black 12 Ankl
✓ 5 pocket capri - Blasted 8 Ank
✓ 5 pocket capri - Blasted 10 An
✓ 5 pocket capri - Blasted 12 An
✓ 5 pocket capri - Denim 8 Ankle
✓ 5 pocket capri - Denim 10 Ankl
✓ 5 Year Maintenance Free Battery

Rows Selected 1

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

4. Select the locations you want to work with and click **Finish**.

Figure 13–4 Workbook Wizard: Select Locations

Workbook Wizard

Final Level Selection Product Selection Location Selection

Available Locations

Available Items

View ▾ Dimension Find... Detach

Label
3 Crystal
5th Avenue
6 Glendale
7 Westland
8 Fridley
✓ 9 West St Paul
✓ 20 Knollwood
✓ 50 Bloomington
✓ 68 East St Paul
✓ 90 West St Paul
✓ 160 Midway
✓ 220 Ridgedale
✓ 260 St Louis Park, MN
✓ 862 Cottage Grove
✓ 694 Woodbury
✓ 862 Chanhassen, MN
✓ 1111 Charlotte
1121 Atlanta
1131 Jacksonville
1141 Nashville

Add
Add All
Remove
Remove All

Selected Locations

Selected Items

View ▾ Dimension Find... Detach

Label
✓ 9 West St Paul
✓ 20 Knollwood
✓ 50 Bloomington
✓ 68 East St Paul
✓ 90 West St Paul
✓ 160 Midway
✓ 220 Ridgedale
✓ 260 St Louis Park, MN
✓ 862 Cottage Grove
✓ 694 Woodbury
✓ 862 Chanhassen, MN
✓ 1111 Charlotte
✓ New York City

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

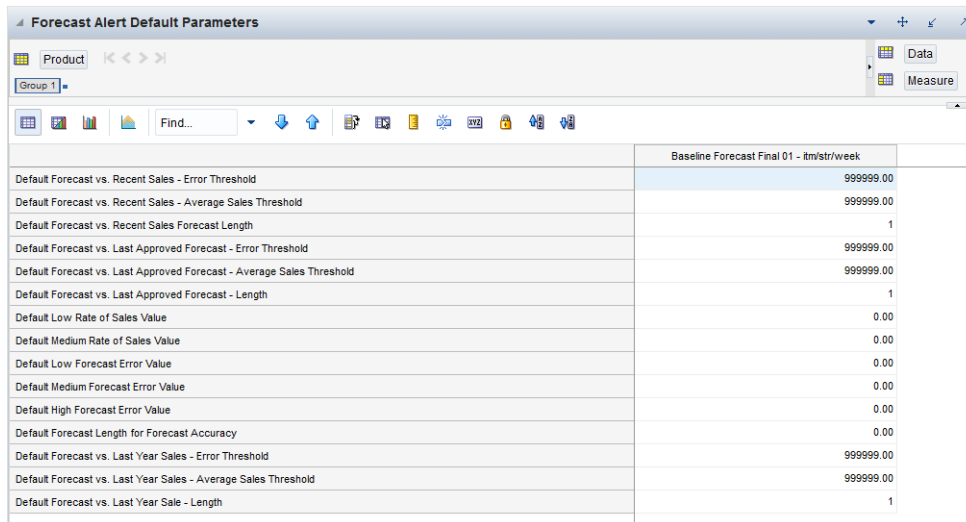
Cancel Previous Next Finish

The Alert Thresholds workbook is built.

Forecast Alert Default Parameters View

The Forecast Alert Default Parameters view allows you to adjust the default values for alert thresholds.

Figure 13–5 Forecast Alert Default Parameters View



	Baseline Forecast Final 01 - itm/str/week
Default Forecast vs. Recent Sales - Error Threshold	999999.00
Default Forecast vs. Recent Sales - Average Sales Threshold	999999.00
Default Forecast vs. Recent Sales Forecast Length	1
Default Forecast vs. Last Approved Forecast - Error Threshold	999999.00
Default Forecast vs. Last Approved Forecast - Average Sales Threshold	999999.00
Default Forecast vs. Last Approved Forecast - Length	1
Default Low Rate of Sales Value	0.00
Default Medium Rate of Sales Value	0.00
Default Low Forecast Error Value	0.00
Default Medium Forecast Error Value	0.00
Default High Forecast Error Value	0.00
Default Forecast Length for Forecast Accuracy	0.00
Default Forecast vs. Last Year Sales - Error Threshold	999999.00
Default Forecast vs. Last Year Sales - Average Sales Threshold	999999.00
Default Forecast vs. Last Year Sale - Length	1

Measures: Forecast Alert Default Parameters View

Note: All information in this view can be edited and represent domain level values.

The Forecast Alert Default Parameters view contains the following measures:

Default Forecast vs. Last Year Sales - Error Threshold

This parameter defines the allowable relative error between adjusted forecast and last year sales. If the error is higher than the threshold and the condition on the average sales is met, the alert is triggered for the product/location.

Default Forecast vs. Last Year Sales - Average Sales Threshold

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Default Forecast vs. Last Year Sales - Length

This parameter defines the time frame over which the calculations are performed for the forecast versus last year sales alert.

Default Forecast Length for Forecast Accuracy

This parameter defines the time frame over which the calculations are performed for the forecast accuracy alert.

Default Forecast vs. Last Approved Forecast - Average Sales Threshold

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Default Forecast vs. Last Approved Forecast Length

This parameter defines the time frame over which the alert calculations are performed. The value should not exceed the forecast length. The calculation is still performed but will likely not be accurate.

Default Forecast vs. Last Approved Forecast Threshold

This parameter defines the allowable relative error between system forecast and last approved fore-cast. If the error is higher than the threshold and the condition on the average rate of sales is met, the alert is triggered for the product/location.

Default Forecast vs. Recent Sales - Average Sales Threshold

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Default Forecast vs. Recent Sales - Forecast Length

This parameter defines the time frame over which the alert calculations are performed. The value should not exceed the forecast length. The calculation is still performed but will likely not be accurate.

Default Forecast vs. Recent Sales Threshold

This parameter defines the allowable relative error between system forecast and forecast data source. If the error is higher than the threshold and the condition on the average rate of sales is met, the alert is triggered for the product/location.

Default High Forecast Error Value

Forecast accuracy for items with high rate of sales, as defined by the Default Medium Rate of Sales Value, is tested against this parameter to determine if an alert is triggered.

Default Low Forecast Error Value

Forecast accuracy for items with low rate of sales, as defined by the Default Medium Rate of Sales Value, is tested against this parameter to determine if an alert is triggered.

Default Low Rate of Sales Value

If the rate of sales is less than this value, the item is considered to have a low rate of sale. Its forecast accuracy is tested against the Default Low Forecast Error Value, to determine if an alert is triggered.

Default Medium Forecast Error Value

Forecast accuracy for items with medium rate of sales, as defined by the Default Medium Rate of Sales Value, is tested against this parameter to determine if an alert is triggered.

Default Medium Rate of Sales Value

If the rate of sales is less than this value, the item is considered to have a medium rate of sale. Its forecast accuracy is tested against the Default Medium Forecast Error Value, to determine if an alert is triggered. If the rate of sales is more than this value, the item is considered to have a high rate of sale. Its forecast accuracy is tested against the Default High Forecast Error Value, to determine if an alert is triggered.

Forecast Alert Intermediate Intersection Parameters View

The Forecast Alert Intermediate Intersection Parameters view allows you to adjust the values for alert thresholds at an intermediate intersection.

Figure 13–6 Forecast Alert Intermediate Intersection Parameters View

	1140Women's Denim*
Intermediate Forecast vs. Recent Sales - Error Threshold Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast vs. Recent Sales - Average Sales Threshold Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast vs. Recent Sales Forecast - Length Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast vs. Last Approved Forecast - Error Threshold Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast vs. Last Approved Forecast - Average Sales Threshold Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast vs. Last Approved Forecast - Length Baseline Forecast Final 01 - itm/str/week	
Intermediate Low Rate of Sales Value Baseline Forecast Final 01 - itm/str/week	
Intermediate Medium Rate of Sales Value Baseline Forecast Final 01 - itm/str/week	
Intermediate Low Forecast Error Value Baseline Forecast Final 01 - itm/str/week	
Intermediate Medium Forecast Error Value Baseline Forecast Final 01 - itm/str/week	
Intermediate High Forecast Error Value Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast Length for Forecast Accuracy Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast vs. Last Year Sales - Error Threshold Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast vs. Last Year Sales - Average Sales Threshold Baseline Forecast Final 01 - itm/str/week	
Intermediate Forecast vs. Last Year Sale - Length Baseline Forecast Final 01 - itm/str/week	

Measures: Forecast Alert Intermediate Intersection Parameters View

Note: All information in this view can be edited. All are defined for measures at an intermediate intersection and are meant to serve as an override of the default level values.

The Forecast Alert Intermediate Intersection Parameters view contains the following measures:

Intermediate Forecast vs. Last Year Sales - Error Threshold

This parameter defines the allowable relative error between adjusted forecast and last year sales. If the error is higher than the threshold and the condition on the average sales is met, the alert is triggered for the product/location.

Intermediate Forecast vs. Last Year Sales - Average Sales Threshold

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Intermediate Forecast vs. Last Year Sales - Length

This parameter defines the time frame over which the calculations are performed for the forecast versus last year sales alert.

Intermediate Forecast Length for Forecast Accuracy

This parameter defines the time frame over which the calculations are performed for the forecast accuracy alert.

Intermediate Forecast vs. Last Approved Forecast Average Sales Threshold

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Intermediate Forecast vs. Last Approved Forecast Length

This parameter defines the time frame over which the alert calculations are performed. The value should not exceed the forecast length. The calculation is still performed but will likely not be accurate.

Intermediate Forecast vs. Last Approved Forecast Threshold

This parameter defines the allowable relative error between system forecast and last approved fore-cast. If the error is higher than the threshold and the condition on the average rate of sales is met, the alert is triggered for the product/location.

Intermediate Forecast vs. Recent Sales Forecast Length

This parameter defines the time frame over which the alert calculations are performed. The value should not exceed the forecast length. The calculation is still performed but will likely not be accurate.

Intermediate Forecast vs. Recent Sales Average Sales Threshold

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Intermediate Forecast vs. Recent Sales Threshold

This parameter defines the allowable relative error between system forecast and forecast data source. If the error is higher than the threshold and the condition on the average rate of sales is met, the alert is triggered for the product/location.

Intermediate High Forecast Error Value

Forecast accuracy for items with high rate of sales, as defined by the Intermediate Medium Rate of Sales Value, is tested against this parameter to determine if an alert is triggered.

Intermediate Low Forecast Error Value

Forecast accuracy for items with low rate of sales, as defined by the Intermediate Low Rate of Sales Value, is tested against this parameter to determine if an alert is triggered.

Intermediate Low Rate of Sales Value

If the rate of sales is less than this value, the item is considered to have a low rate of sale. Its forecast accuracy is tested against the Intermediate Low Forecast Error Value, to determine if an alert is triggered.

Intermediate Medium Forecast Error Value

Forecast accuracy for items with medium rate of sales, as defined by the Intermediate Medium Rate of Sales Value, is tested against this parameter to determine if an alert is triggered.

Intermediate Medium Rate of Sales Value

If the rate of sales is less than this value, the item is considered to have a medium rate of sale. Its forecast accuracy is tested against the Intermediate Medium Forecast Error Value, to determine if an alert is triggered. If the rate of sales is more than this value, the item is considered to have a high rate of sale. Its forecast accuracy is tested against the Intermediate High Forecast Error Value, to determine if an alert is triggered.

Forecast Alert Final Level Intersection Parameters View

The Forecast Alert Final Level Intersection Parameters view allows you to adjust the values for alert thresholds at the final level intersection.

Figure 13–7 Forecast Alert Final Level Intersection Parameters View

	5 pocket	5 pocket	5 pocket	5 pocket	5 pocket	5 pocket	5 pocket
Recent Sales - Error Threshold - override Baseline Forecast Final 01 - itm/str/week							
Recent Sales - Average Sales Threshold - override Baseline Forecast Final 01 - itm/str/week							
Recent Sales Forecast - Length - override Baseline Forecast Final 01 - itm/str/week							
Last Approved Forecast Threshold - override Baseline Forecast Final 01 - itm/str/week							
Last Approved Forecast - Average Sales Threshold - override Baseline Forecast Final 01 - itm/str/week							
Last Approved Forecast Length - override Baseline Forecast Final 01 - itm/str/week							
Sales Value - override Baseline Forecast Final 01 - itm/str/week							
of Sales Value - override Baseline Forecast Final 01 - itm/str/week							
st Error Value - override Baseline Forecast Final 01 - itm/str/week							
cast Error Value - override Baseline Forecast Final 01 - itm/str/week							
st Error Value - override Baseline Forecast Final 01 - itm/str/week							
ngth for Forecast Accuracy - override Baseline Forecast Final 01 - itm/str/week							
Last Year Sales - Error Threshold - override Baseline Forecast Final 01 - itm/str/week							
Last Year Sales - Average Sales Threshold - override Baseline Forecast Final 01 - itm/str/week							
Last Year Sale - Length Baseline Forecast Final 01 - itm/str/week							

Measures: Forecast Alert Final Level Intersection Parameters View

Note: All information in this view can be edited. All are defined for measures at the final level intersection. and are meant to serve as an override of the default and intermediate intersection values.

The Forecast Alert Final Level Intersection Parameters view contains the following measures:

Forecast vs. Last Year Sales - Error Threshold - override

This parameter defines the allowable relative error between adjusted forecast and last year sales. If the error is higher than the threshold and the condition on the average sales is met, the alert is triggered for the product/location.

Forecast vs. Last Year Sales - Average Sales Threshold - override

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Forecast vs. Last Year Sales - Length - override

This parameter defines the time frame over which the calculations are performed for the forecast versus last year sales alert.

Forecast Length for Forecast Accuracy - override

This parameter defines the time frame over which the calculations are performed for the forecast accuracy alert.

Forecast vs. Last Approved Forecast Average Sales Threshold - override

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Forecast vs. Last Approved Forecast Length - override

This parameter defines the time frame over which the alert calculations are performed. The value should not exceed the forecast length. The calculation is still performed but will likely not be accurate.

Forecast vs. Last Approved Forecast Threshold - override

This parameter defines the allowable relative error between system forecast and last approved fore-cast. If the error is higher than the threshold and the condition on the average rate of sales is met, the alert is triggered for the product/location.

Forecast vs. Recent Sales Average Sales Threshold - override

This parameter defines the minimum rate of sales a product/location must have in order to be considered in the alert calculation. If the rate of sales condition is met and the forecast error is higher than allowed, the alert is triggered for the product/location.

Forecast vs. Recent Sales Forecast Length - override

This parameter defines the time frame over which the alert calculations are performed. The value should not exceed the forecast length. The calculation is still performed but will likely not be accurate.

Forecast vs. Recent Sales Threshold - override

This parameter defines the allowable relative error between system forecast and forecast data source. If the error is higher than the threshold and the condition on the average rate of sales is met, the alert is triggered for the product/location.

High Forecast Error Value - override

Forecast accuracy for items with high rate of sales, as defined by the Medium Rate of Sales Value – override, is tested against this parameter to determine if an alert is triggered.

Low Forecast Error Value - override

Forecast accuracy for items with low rate of sales, as defined by the Low Rate of Sales Value – override, is tested against this parameter to determine if an alert is triggered.

Low Rate of Sales Value - override

If the rate of sales is less than this value, the item is considered to have a low rate of sale. Its forecast accuracy is tested against the Low Forecast Error Value – override, to determine if an alert is triggered.

Medium Forecast Error Value - override

Forecast accuracy for items with medium rate of sales, as defined by the Medium Rate of Sales Value – override, is tested against this parameter to determine if an alert is triggered.

Medium Rate of Sales Value - override

If the rate of sales is less than this value, the item is considered to have a medium rate of sale. Its forecast accuracy is tested against the Medium Forecast Error Value – override, to determine if an alert is triggered. If the rate of sales is more than this value, the item is considered to have a high rate of sale. Its forecast accuracy is tested against the High Forecast Error Value – override, to determine if an alert is triggered.

Grouping Management Task

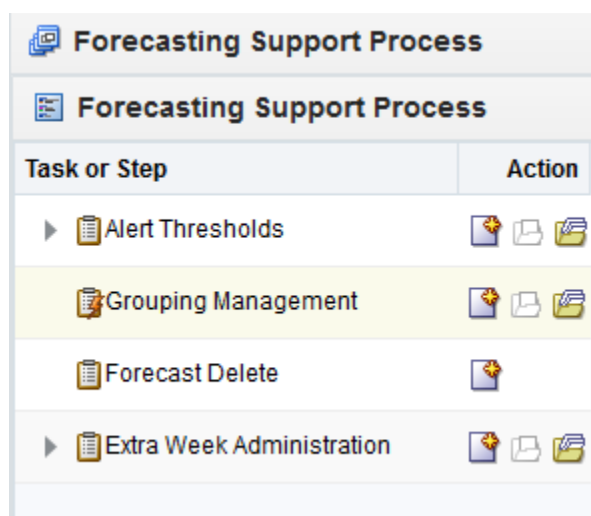
Grouping Management allows you to review the automatic group number assignments set for item/location. You can also change any group number assignments based on the information provided in the [Grouping Management Workbook](#).

Grouping Management Workbook

To build the Grouping Management workbook, perform these steps:

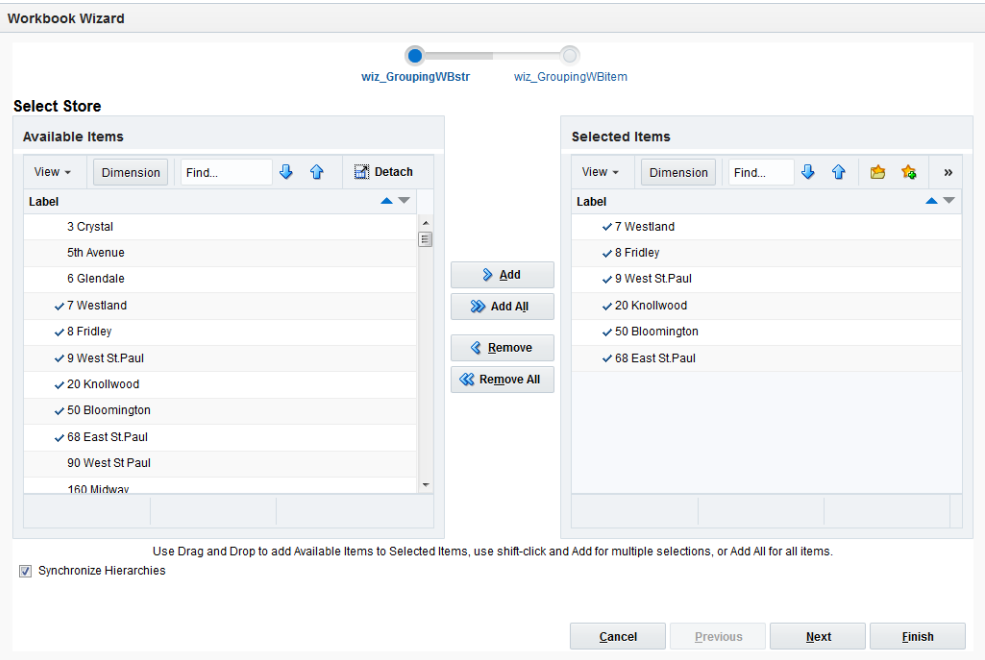
1. Click the New Workbook icon in the Grouping Management task in the Forecasting Support Process activity.

Figure 14–1 Grouping Management Task



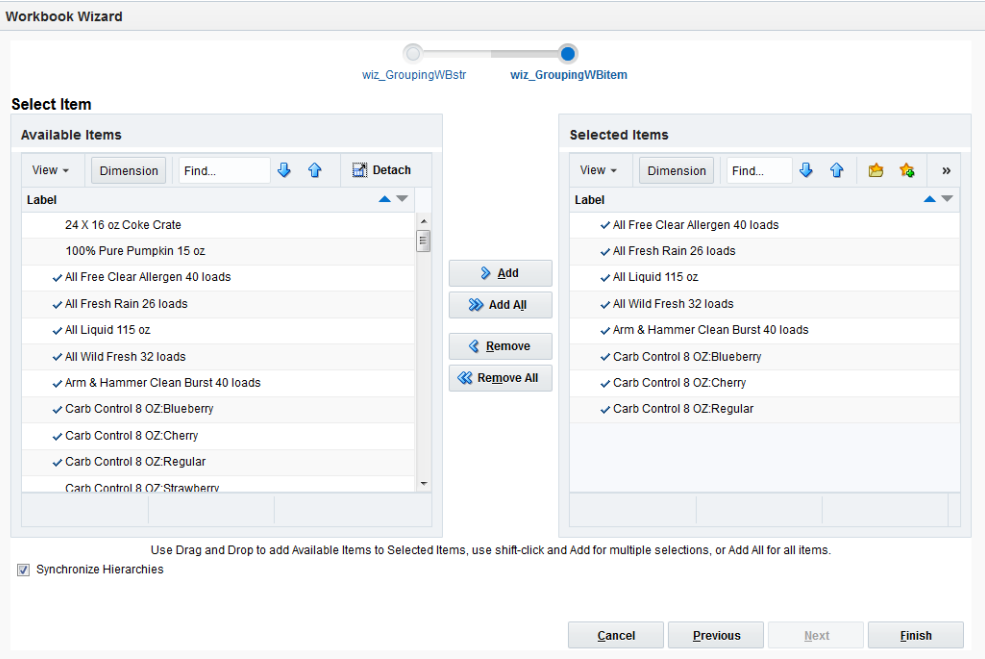
2. The Workbook wizard opens. Select the stores you want to work with and click Next.

Figure 14–2 Workbook Wizard: Select Stores



3. Select the items you want to work with and click **Finish**.

Figure 14–3 Workbook Wizard: Select Items



The Grouping Management workbook is built.

Review and Approve Group Assignments View

This view displays the group assignments and some historical demand information.

Figure 14–4 Review and Approve Group Assignments View

	7 Westland							
	All Free Clear Allergen 40	All Fresh Rain 26 loads	All Liquid 115 oz	All Wild Fresh 32 loads	Arm & Hammer Clean Burst	Carb Control 8 OZ:Blueberry	Carb Control 8 OZ:Cherry	Carb Control 8 OZ:Regular
Group Assignment								
History Length	0	0	0	0	0	0	0	0
History Length Tier	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

Measures: Review and Approve Group Assignments View

The Review and Approve Group Assignments view contains the following measures:

Group Assignment

This measure determines to which group a certain item/location combination belongs.

There are various ways to make the assignment. First, the assignment can be determined outside of RDF Cloud Service, and then loaded. Second, rules can be configured to determine item location combinations that belong to certain groups. Third, you can manually assign item location combinations to a group.

Note: Any item/location combination can only belong to one group.

History Length

This measure contains the number of periods in history since the first sale. It is calculated as:

$$\text{History Length} = \text{today} - \text{date of first sale}$$

This measure is useful when you want to manually assign time series to groups. For example, you may want to assign every item/location with 55 weeks of sales to Group number 3. Or you may want to assign every item/location with sales history less than three weeks to Group 5.

History Length Tier

This measure displays the classification for a range of history length. For example, RDF Cloud Service can display short, medium, or long history length tiers, that can be set as 0-10 weeks, 11-56 weeks, and 57 and higher.

Forecast Delete Task

The Days to Keep Forecasts parameter (set in the [Forecast Administration Workbook](#)) supports the automatic deletion of old forecasts when the Run Batch wizard or PreGenerateForecast is run. Occasionally, you may need to manually delete a forecast. Some reasons might include:

- A forecast was run with the wrong source-levels selected.
- The forecast horizon was not properly set.
- Old forecasts need to be deleted to save space on the server.

The Delete Forecasts wizard guides you through the process of deleting unwanted forecasts from the system. Deletions of forecasts are permanent.

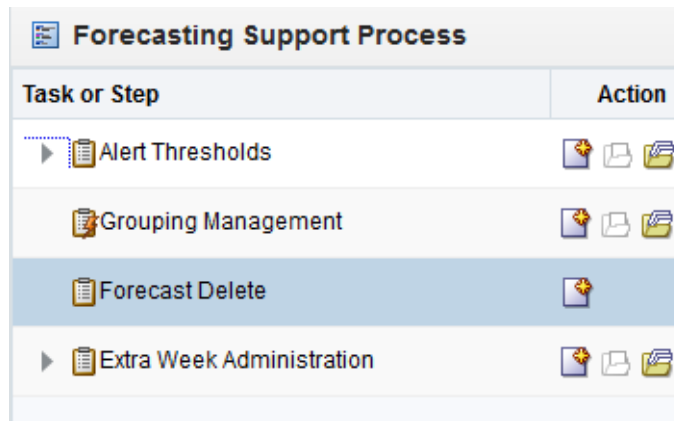
Forecast Delete Wizard

If the Forecast Delete wizard is used in a global domain environment. Deleting a forecast in the Master domain deletes the selected birth date within all domains. Deleting a forecast in the Local domain deletes the selected birth date only within the Local domain.

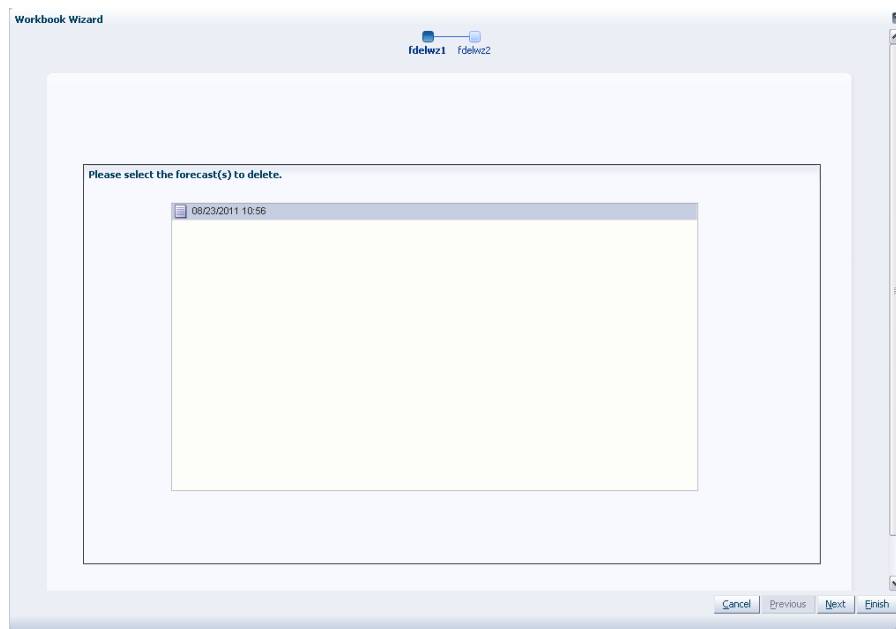
Note: The deletion of forecasts from RDF Cloud Service is permanent.

To use the Forecast Delete wizard, perform these steps:

1. Click the New Workbook icon in the Forecast Delete task in the Forecasting Support Process activity.

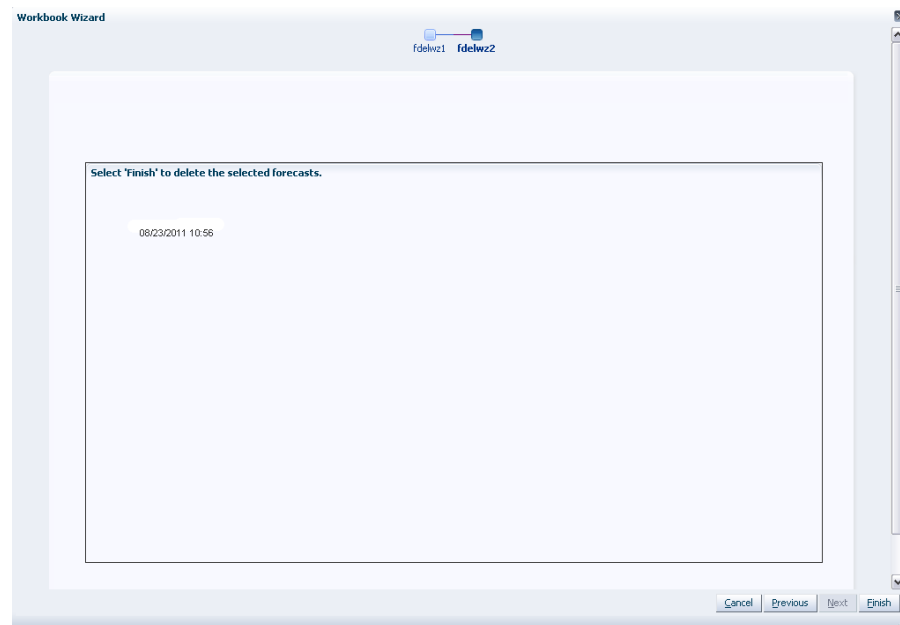
Figure 15–1 Forecast Delete Task

2. The Workbook wizard opens. Select the forecasts to delete and click **Next**.

Figure 15–2 Workbook Wizard: Select Forecasts to Delete

3. Select **Finish** to verify forecast deletion or **Cancel** to cancel deletion and exit the Forecast Delete wizard.

Figure 15–3 *Workbook Wizard: Verify Delete*



If **Finish** was selected on the final wizard window, the forecast is deleted.

Extra Week Administration Task

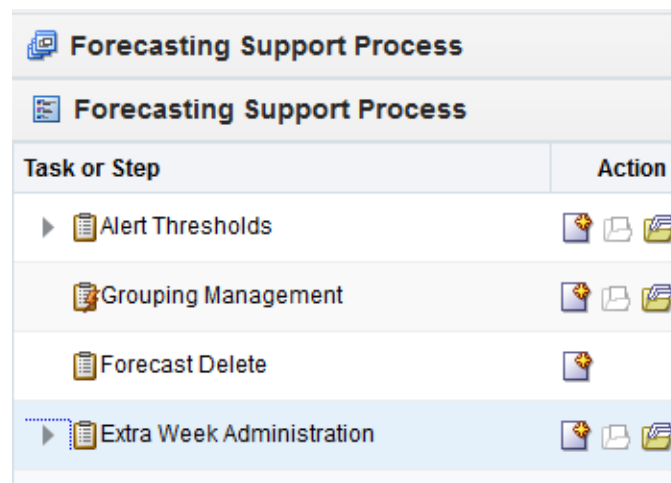
The Extra Week Administration task allows you to manage forecasts for years that include an extra 53rd week. For additional information, see the section, [53 Week Calendar](#).

Extra Week Administration Workbook

To build the Extra Week Administration workbook, perform these steps:

1. Click the New Workbook icon in the Extra Week Administration task in the Forecasting Support Process activity.

Figure 16–1 Extra Week Administration Task



2. The Workbook wizard opens. Select the weeks you want to work with and click Next.

Figure 16–2 Workbook Wizard: Select Week

Workbook Wizard

wiz_ExtraWkAdmweek wiz_ExtraWkAdmgrp

Select Week

Available Items

View	Dimension	Find...	Detach
Label			
1/2/1998			
1/9/1998			
1/16/1998			
1/23/1998			
✓ 1/30/1998			
✓ 2/6/1998			
✓ 2/13/1998			
✓ 2/20/1998			
✓ 2/27/1998			
✓ 3/6/1998			
✓ 3/13/1998			
✓ 3/20/1998			
3/27/1998			
4/3/1998			
4/10/1998			
4/17/1998			
4/24/1998			
5/1/1998			
5/8/1998			
5/15/1998			

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Selected Items

View	Dimension	Find...	Detach
Label			
✓ 1/30/1998			
✓ 2/6/1998			
✓ 2/13/1998			
✓ 2/20/1998			
✓ 2/27/1998			
✓ 3/6/1998			
✓ 3/13/1998			
✓ 3/20/1998			

Buttons: Add, Add All, Remove, Remove All

Navigation: Cancel, Previous, Next, Finish

3. Select the groups you want to work with and click **Finish**.

Figure 16–3 Workbook Wizard: Select Group

Workbook Wizard

wiz_ExtraWkAdmweek wiz_ExtraWkAdmgrp

Select Group

Available Items

View	Dimension	Find...	Detach
Label			
✓ BREAD JUICE FRUIT			
✓ Group IIP			
✓ Group 1			
✓ Group 2			
✓ Group 3			
✓ Group 4			

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Selected Items

View	Dimension	Find...	Detach
Label			
✓ BREAD JUICE FRUIT			
✓ Group IIP			
✓ Group 1			
✓ Group 2			
✓ Group 3			
✓ Group 4			

Buttons: Add, Add All, Remove, Remove All

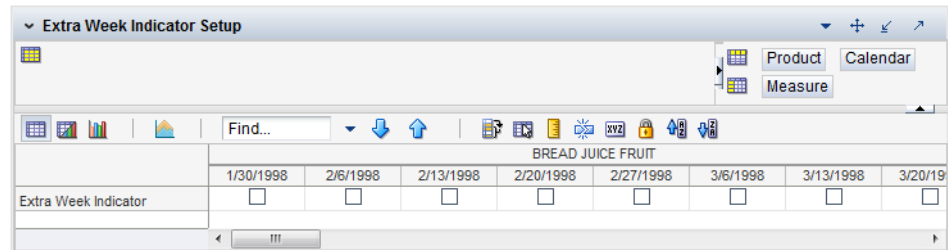
Navigation: Cancel, Previous, Next, Finish

The Extra Week Administration workbook is built.

Extra Week Indicator Setup View

The Extra Week Indicator Setup view allows you to set which week is the 53rd, or extra week. The measure can be selected in the [Extra Week Indicator Data Source](#) found in the [Final and Source Level Parameters View - Advanced Settings](#).

Figure 16–4 *Extra Week Indicator Setup View*



Measures: Extra Week Indicator Setup View

The Extra Week Indicator Setup view contains the following measure:

Extra Week Indicator

This indicator sets which week is the 53rd, or extra week. The [Extra Week Indicator Data Source](#) references the Extra Week Indicator.

Short Life Cycle Maintenance Task

This chapter describes the features that enable the short lifecycle capability within RDF Cloud Service. Merchandise with a short lifecycle is very common for some retailers. Fast fashion items can have a lifecycle of seven weeks, or even less. Exponential smoothing forecasting techniques usually require a much longer sales history to generate a forecast that is not a flat line. The approach to solve this challenge is using the Bayesian forecasting method as detailed in ["Forecasting Techniques Used in RDF Cloud Service"](#). It takes a few inputs, most notably the sales history and the sales plan. In pre-season, when no sales data is available, the forecast equals the plan. In-season, once the sales start coming in, the plan is adjusted based on actual sales, to create the forecast.

There are several ways to use the Bayesian forecasting method. First, a Bayesian plan can be interfaced or keyed in at the item/store level, and the forecast is run directly at the final level. Given the potential large number of item/stores this is an unlikely scenario.

A more likely case is when the Bayesian plan is interfaced at a higher level. For instance, a planner can more easily create a plan for example, at the item/region level. If this level is known, a source level can be created at this intersection, and the plan can be used to run the Bayesian method at the source level. The question remains how to spread the source level forecast down to the final level, since no historical sales are available to create the interim forecast. If Bayesian plans are available at the final level those will be used to create the interim forecast.

As mentioned, it is not very likely that Bayesian plans are available at this granular level. The other possibility is to automatically populate a Bayesian plan at the item/location level. To achieve this, a plan can be evenly spread from the source level by making sure plan values are available at the desired source level, and then clicking **Calculate**. In pre-season, the forecast equals the plan, while in-season, actual sales and plan are combined to create the forecast.

An important assumption underlying this short lifecycle approach is that all item/locations in a certain source level dimension share the same lifecycle dates.

Bayesian Plan Maintenance Step

The Bayesian Plan Maintenance step allows you to review and edit Bayesian plan values for every forecasting level (final + source) where baseline forecast is generated.

The available views are:

- [Bayesian Plan Final Level 01 View](#)
- [Bayesian Plan Final Level 02 View](#)

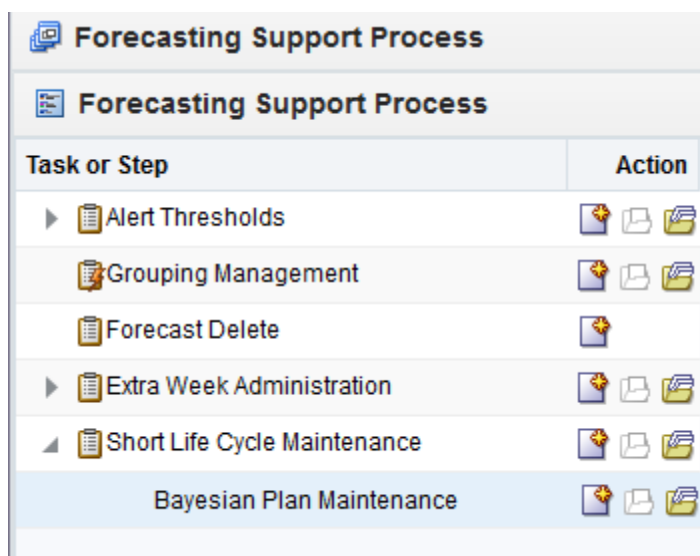
- [Bayesian Plan Final Level 03 View](#)
- [Bayesian Plan Final Level 04 View](#)
- [Bayesian Plan Final Level 05 View](#)
- [Bayesian Plan Final Level 06 View](#)

Bayesian Plan Maintenance Workbook

To build the Bayesian Plan Maintenance workbook, perform these steps:

1. Click the New Workbook icon in the Bayesian Plan Maintenance task in the Forecasting Support Process activity.

Figure 17–1 Bayesian Plan Maintenance Task



2. The Workbook wizard opens. Select the stores you want to work with and click Next

Figure 17–2 Workbook Wizard: Bayesian Plan Maintenance Stores

Workbook Wizard

wiz_COMM_slcmastr wiz_COMM_slcmailtem wiz_COMM_slcmaw...

Select Store

Available Items

View ▾ Dimension Find... [Icons] Detach

Label

- 3 Crystal
- 5th Avenue
- 6 Glendale
- 7 Westland
- ✓ 8 Fridley
- ✓ 9 West St.Paul
- ✓ 20 Knollwood
- ✓ 50 Bloomington
- ✓ 68 East St.Paul
- ✓ 90 West St Paul
- ✓ 160 Midway
- ✓ 220 Ridgedale
- ✓ 260 St.Louis Park, MN
- ✓ 662 Cottage Grove
- 694 Woodbury
- 662 Cottage Grove

Buttons: Add, Add All, Remove, Remove All

Selected Items

View ▾ Dimension Find... [Icons] »

Label

- ✓ 8 Fridley
- ✓ 9 West St.Paul
- ✓ 20 Knollwood
- ✓ 50 Bloomington
- ✓ 68 East St.Paul
- ✓ 90 West St Paul
- ✓ 160 Midway
- ✓ 220 Ridgedale
- ✓ 260 St.Louis Park, MN
- ✓ 662 Cottage Grove

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

3. Select the items you want to work with and click **Next**

Figure 17–3 Workbook Wizard: Bayesian Plan Maintenance Items

Workbook Wizard

wiz_COMM_slcmastr wiz_COMM_slcmailtem wiz_COMM_slcmaw...

Select Item

Available Items

View ▾ Dimension Find... [Icons] Detach

Label

- 70010092 - Tully's French Roast Non-Flavored Regular - Caffeinat
- 70010093 - Starbucks Breakfast Roast Un-Flavored Regular - Caf
- 70010094 - Starbucks Light Roast Un-Flavored Regular - Caffeina
- 70010095 - Seattle's Best French Roast Un-Flavored Regular - Ca
- 70010096 - Folgers 100% Columbian Non-Flavored Regular - Ca
- ✓ 70010098 Maxi Skirt Stripe
- ✓ 70010099 Pencil Skirt Black
- ✓ 70010100 Pencil Skirt Grey
- ✓ 70010101 Pencil Skirt Peach
- ✓ 70010102 Pencil Skirt Navy
- ✓ 70010103 Pencil Skirt Striped
- ✓ 70010104 Pencil Skirt Floral
- ✓ 70010105 Pencil Skirt Sun Flowers
- ✓ 70010106 A-Line Skirt White
- ✓ 70010107 A-Line Skirt Blue

Buttons: Add, Add All, Remove, Remove All

Selected Items

View ▾ Dimension Find... [Icons] »

Label

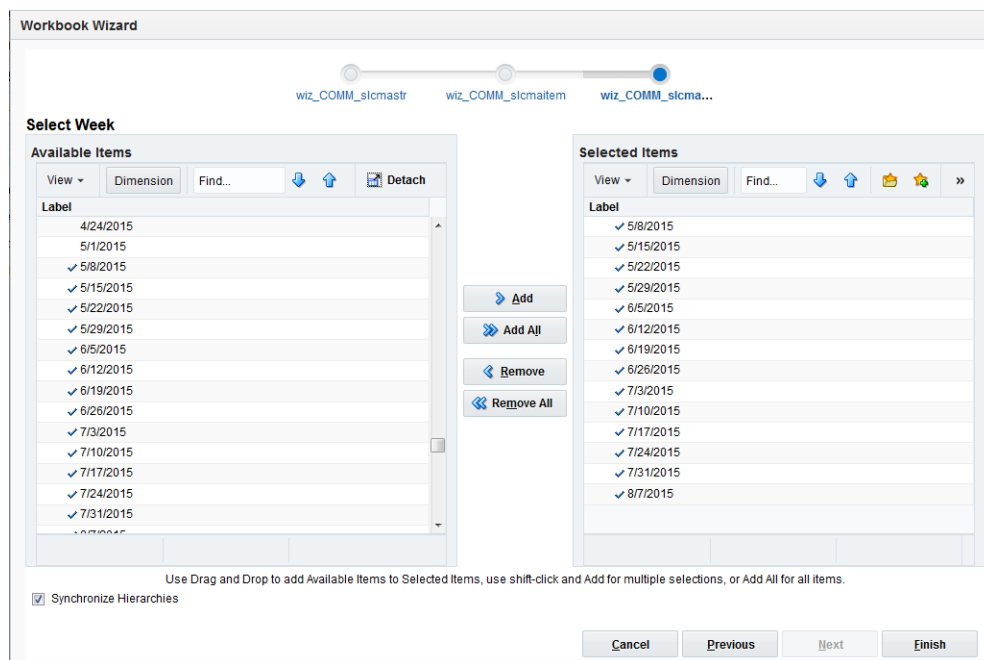
- ✓ 5 pocket capri - Bandblasted 1
- ✓ 5 pocket capri - Bandblasted 8
- ✓ 5 pocket capri - Black 8 Ankle
- ✓ 5 pocket capri - Black 10 Ankle
- ✓ 5 pocket capri - Black 12 Ankle
- ✓ 5 pocket capri - Blasted 8 Ank
- ✓ 5 pocket capri - Blasted 10 An
- ✓ 5 pocket capri - Blasted 12 An
- ✓ 70010098 Maxi Skirt Stripe
- ✓ 70010099 Pencil Skirt Black
- ✓ 70010100 Pencil Skirt Grey
- ✓ 70010101 Pencil Skirt Peach
- ✓ 70010102 Pencil Skirt Navy
- ✓ 70010103 Pencil Skirt Striped
- ✓ 70010104 Pencil Skirt Floral
- ✓ 70010105 Pencil Skirt Sun Flowers

Use Drag and Drop to add Available Items to Selected Items, use shift-click and Add for multiple selections, or Add All for all items.

☒ Synchronize Hierarchies

Cancel Previous Next Finish

4. Select the dates you want to work with and click **Finish**

Figure 17–4 Workbook Wizard: Short Life Cycle Maintenance Dates

The Bayesian Plan Maintenance workbook is built.

Bayesian Plan Final Level 01 View

The Bayesian Plan Final Level 01 view displays the Bayesian plan at the final forecast level, where baseline forecast is generated.

Figure 17–5 Bayesian Plan Final Level 01 View

Bayesian Plan Final Level 01

Product

Measure

70010037 A-Line Skirt Grey

Bayesian Plan 01 - Final Level

Calendar

Location

Find...

10/9/201510/16/201510/23/201510/30/201511/6/201511/13/201511/20/201511/27/201512/4/2015

6 Glendale	23	43	12	23	11	39	22	17
1111 Charlotte	35	17	15	12	18	38	47	65
1121 Atlanta	61	42	31	56	22	23	17	28
1131 Jacksonville	35	46	60	51	76	83	71	69
1141 Nashville	60	28	37	23	39	41	22	50
1151 Texas	17	37	46	64	60	41	30	55
3111 Montreal*	71	22	93	11	32	21	34	32
3112 Quebec	24	16	15	31	64	37	24	62

Measure: Bayesian Plan Final Level 01 View

The following describes the measure found in the Bayesian Plan Final Level 01 View:

Bayesian Plan 01 - Final Level

This measure displays the Bayesian plan at the final forecast level. The measure is either interfaced into RDF Cloud Service, or you can key in values and commit to the

database. It can also be automatically populated, by editing the Bayesian plan measure corresponding to the source level of a certain item / location. .

For example, if the default source level is set to 04 in the Forecast Administration workbook, you can edit the Bayesian Plan 04 measure, and then click **Calculate**. The values are evenly spread to all item/locations that roll up to the default source level. For item / locations that already had the plan populated, the values are preserved.

This works also for item / locations that do not roll up to the default source level. In the previous scenario, you can have the Summer t-shirts style roll up to source level 06. You can edit the Bayesian Plan 05 measure, and then click **Calculate** so that the values are evenly spread to all t-shirts in that style and existing values are not overwritten.

Note: This measure can also be used as the data plan for the [LoadPlan Forecasting Method](#).

Bayesian Plan Final Level 02 View

The Bayesian Plan Final Level 02 view displays the Bayesian plan at the source level.

Figure 17–6 Bayesian Plan Final Level 02 View

The screenshot shows a software interface titled "Bayesian Plan Source Level 02". It includes a toolbar with icons for grid, chart, bar, and other data visualization tools. Below the toolbar is a table with the following data:

	10/9/2015	10/16/2015	10/23/2015	10/30/2015	11/6/2015	11/13/2015	11/20/2015	11/27/2015	12
6 Glendale	24	16	15	31	64	37	34	62	
1111 Charlotte	71	22	93	11	31	21	34	32	
1121 Atlanta	55	30	41	60	64	46	37	17	
1131 Jacksonville	23	22	41	39	23	37	28	60	
1141 Nashville	32	34	21	32	11	96	22	71	
1151 Texas	65	47	12	15	31	60	37	46	
3111 Montreal*	93	23	34	61	35	60	17	83	
3112 Quebec	37	21	41	41	23	83	39	11	

Measure: Bayesian Plan Final Level 02 View

The following describes the measure found in the Bayesian Plan Source Level 02 View:

Bayesian Plan 02 - Final Level

This measure displays the Bayesian plan at the source level intersection. The measure is either interfaced into RDF Cloud Service, or you can key in values and commit to the database.

Note: This measure can also be used as the data plan for the [LoadPlan Forecasting Method](#).

Bayesian Plan Final Level 03 View

The Bayesian Plan Final Level 03 view displays the Bayesian plan at the source level.

Figure 17–7 Bayesian Plan Final Level 03 View

	10/9/2015	10/16/2015	10/23/2015	10/30/2015	11/6/2015	11/13/2015	11/20/2015	11/27/2015	12/4/2015
Bayesian Plan 03 - Source Level	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Measure: Bayesian Plan Final Level 03 View

The following describes the measure found in the Bayesian Plan Source Level 03 View:

Bayesian Plan 03 - Final Level

This measure displays the Bayesian plan at the source level intersection. The measure is either interfaced into RDF Cloud Service, or you can key in values and commit to the database.

Note: This measure can also be used as the data plan for the [LoadPlan Forecasting Method](#).

Bayesian Plan Final Level 04 View

The Bayesian Plan Final Level 04 view displays the Bayesian plan at the source level.

Figure 17–8 Bayesian Plan Final Level 04 View

	10/9/2015	10/16/2015	10/23/2015	10/30/2015	11/6/2015	11/13/2015	11/20/2015	11/27/2015
11 Southeastern US	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 Midwest US	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31 Eastern Canada	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Measure: Bayesian Plan Final Level 04 View

The following describes the measure found in the Bayesian Plan Source Level 04 View:

Bayesian Plan 04 - Final Level

This measure displays the Bayesian plan at the source level intersection. The measure is either interfaced into RDF Cloud Service, or you can key in values and commit to the database.

Note: This measure can also be used as the data plan for the [LoadPlan Forecasting Method](#).

Bayesian Plan Final Level 05 View

The Bayesian Plan Final Level 05 view displays the Bayesian plan at the source level.

Figure 17–9 Bayesian Plan Final Level 05 View

The screenshot shows a software interface titled "Bayesian Plan Source Level 05". It includes a toolbar with various icons and a data table. The table has columns for dates from 10/9/2015 to 12/4/2015, and a final column labeled "1". The row for "7012 Women's Casuals" contains the following values: 23, 43, 15, 17, 37, 46, 11, 15, 24.

	10/9/2015	10/16/2015	10/23/2015	10/30/2015	11/6/2015	11/13/2015	11/20/2015	11/27/2015	12/4/2015	1
7012 Women's Casuals	23	43	15	17	37	46	11	15	24	

Measure: Bayesian Plan Final Level 05 View

The following describes the measure found in the Bayesian Plan Source Level 05 View:

Bayesian Plan 05 - Final Level

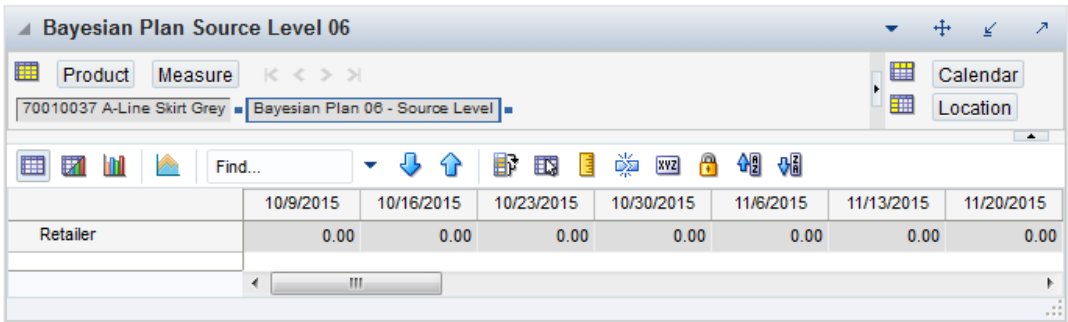
This measure displays the Bayesian plan at the source level intersection. The measure is either interfaced into RDF Cloud Service, or you can key in values and commit to the database.

Note: This measure can also be used as the data plan for the [LoadPlan Forecasting Method](#).

Bayesian Plan Final Level 06 View

The Bayesian Plan Final Level 06 view displays the Bayesian plan at the source level.

Figure 17–10 Bayesian Plan Final Level 06 View



Measure: Bayesian Plan Final Level 06 View

The following describes the measure found in the Bayesian Plan Source Level 06 View:

Bayesian Plan 06 - Final Level

This measure displays the Bayesian plan at the source level intersection. The measure is either interfaced into RDF Cloud Service, or you can key in values and commit to the database.

Note: This measure can also be used as the data plan for the [LoadPlan Forecasting Method](#).

Appendix: Preprocessing

Preprocessing is a filtering module that automatically adjusts historical data to correct data points that do not represent general demand pattern. Essentially, it smoothes out spikes and dips in historical sales data, replacing stock-out data and data from short term events, such as promotions and temporary price changes, with data points that more accurately represent typical sales for that period. By adjusting the historical sales, Preprocessing can provide smarter data to the RDF Cloud Service Causal Engine, thus creating a smarter baseline forecast.

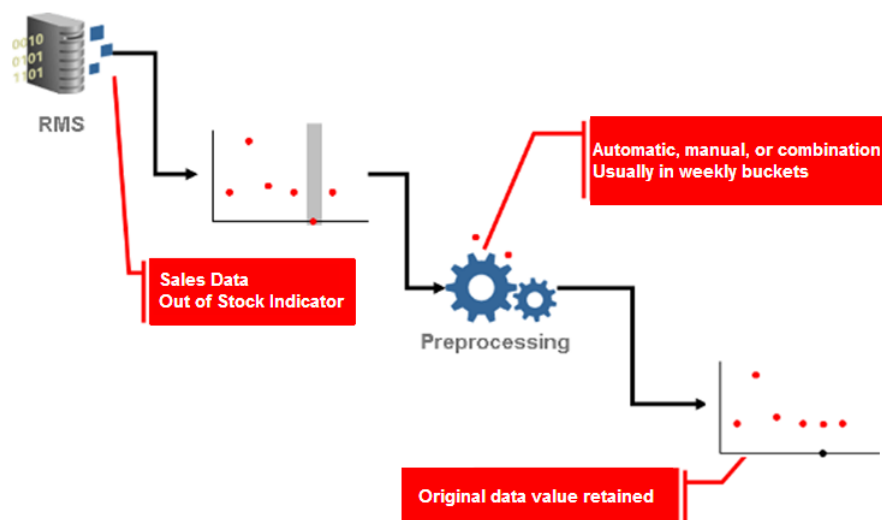
Note: There are no workbooks associated with Preprocessing - it is available as a configuration option.

Common Preprocessing corrections are:

- Out of stock - Interfaced from RMS, weekly or daily
- Outliers - Indicator not required, depends on method
- Short term events - Promotions, temporary price changes

For example, [Figure A-1](#) illustrates how Preprocessing adjusts for stock-outs.

Figure A-1 *Preprocessing for Stock-outs*



In [Figure A-1](#), RMS sends historical sales data to the Preprocessing module of RDF Cloud Service. In that sales data, RMS has flagged out-of-stock instances with

indicators (the gray portion of the first data set). Preprocessing takes note of that out-of-stock indicator and adjusts the sales for that time period to reflect a more typical sales quantity, taking into account trending and seasonality. Note in [Figure A-1](#) that Preprocessing has removed the dip in sales in the second data set and has replaced it with a new data point.

Preprocessing Methods

Preprocessing uses several methods to massage historical data. The following sections detail these methods:

- [Standard Median](#)
- [Retail Median](#)
- [Standard Exponential Smoothing](#)
- [Lost Sales Standard Exponential Smoothing](#)
- [Override](#)
- [Increment](#)
- [Forecast Sigma](#)
- [Forecast Sigma Event](#)
- [DePrice](#)
- [Clear](#)
- [No Filtering](#)

Standard Median

Standard Median calculates baselines on long time ranges.

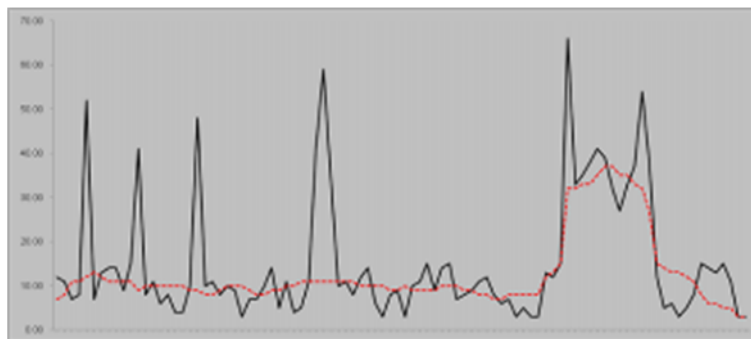
Input: None

Optional parameter: Window length

Figure A-2 *Standard Median Formula*

$$LSOVER(t) = \text{median value over} \left(t - \frac{\text{window}}{2}, t + \frac{\text{window}}{2} \right)$$

Figure A-3 *Standard Median Example*



When data points for the full window are not available, Preprocessing pads the beginning and end of the time series with the first and the last data points, respectively, so that there are values for the full window.

Retail Median

Retail Median calculates baselines on long time ranges and improves side effects by making five standard median filter passes.

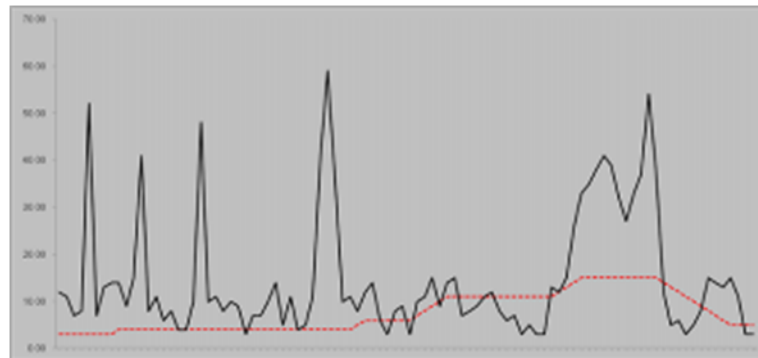
Input: none

Optional parameter: window length

Figure A–4 Retail Median Formula

$$\begin{aligned} \text{Median1} &= \text{StdMedian}(\text{Src}) \\ \text{Median2} &= \text{StdMedian}(\text{Median1}) \\ \text{Diff1}(t) &= \text{Median2}(t) - \text{Median2}(t-1) \\ \text{Median_Diff1} &= \text{StdMedian}(\text{Diff1}) \\ \text{Smooth1}(t) &= \text{Smooth1}(t-1) + \text{Median_Diff1}(t) \\ \text{Diff2}(t) &= \text{Smooth1}(t) - \text{Smooth1}(t-1) \\ \text{Avg_Diff2} &= \text{StdMedian}(\text{Diff2}) \\ \text{Smooth2}(t) &= \text{Smooth2}(t-1) + \text{Avg_Diff2}(t) \end{aligned}$$

Figure A–5 Retail Median Example



Standard Exponential Smoothing

Standard Exponential Smoothing removes spikes (such as promotional promo, temporary price changes, and so on), as well as filling the gaps (out of stock, unusual events such as a fire or hurricane).

Input: An Event Indicator that indicates which periods should be preprocessed.

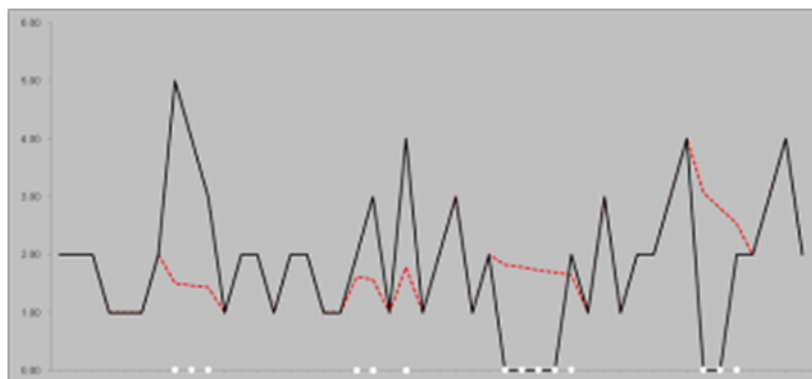
Optional Parameters:

The following table details the optional parameters for Standard Exponential Smoothing.

Optional Parameters	Description
ES (Exponential Smoothing)	The alpha parameter that determines the weight put on observations of periods included in the calculations.
Number of future periods (nfut)	The number of periods after an outage periods that are considered in the calculation of the future velocity. Note that if during these periods an event flag or a event indicator is on, the particular period is excluded from the calculation.
Number of past periods (npast)	The number of periods before an outage periods that are considered in the calculation of the past velocity. Note that if during these periods an event flag or a event indicator is on, the particular period is excluded from the calculation.
Event flag	This parameter indicates if a period should be excluded from the calculation of past/future velocities.
Stop at event flag	This parameter determines which periods are included in the calculation of past/future velocities. If the flag is set to True, then the algorithm only includes periods before the first event flag or event indicator. If the flag is False, then all available, non-flagged periods, within the windows defined by nfut and npast, are used in the calculation of the past and future velocities. The default setting for the flag is False.

Figure A–6 Standard Exponential Smoothing Formula

$$\begin{aligned}
 \text{past velocity} &= \frac{\sum_{i=1}^{np} (1-\alpha)^{i-1} * src(t_f - i)}{\sum_{i=1}^{np} (1-\alpha)^{i-1}} \\
 \text{future velocity} &= \frac{\sum_{i=1}^{nf} (1-\alpha)^{i-1} * src(t_l + i)}{\sum_{i=1}^{nf} (1-\alpha)^{i-1}} \\
 LSOVER(t) &= \text{past velocity} + \frac{\text{future velocity} - \text{past velocity}}{t_l - t_f + 2} * (t - t_f + 1), \text{ where } t \in [t_f, t_l]
 \end{aligned}$$

Figure A-7 Standard Exponential Smoothing Example

When event flags exist within the future and past velocity windows, rather than consider the entire window, Preprocessing only considers unflagged data points after the last event flag in the history window to compute the past velocity. It does a similar process for the future window by using the unflagged data points prior to the first event flag in the future window to compute the future velocity. Consecutive events are smoothed using the same velocities. A data point becomes flagged, and hence not part of the future/past velocity calculation, if either the event indicator or the optional event flag are on.

If future velocities cannot be calculated, then the past velocities, if they exist, are used as future and past velocities, and vice versa. When neither of the velocities can be calculated, there is no adjustment.

If the velocity window contains all zero values, then the calculated velocity is zero. A velocity of zero is a legitimate value if it occurs within the selling window. A velocity of zero is not acceptable if it is calculated based on values outside of the selling window.

Lost Sales Standard Exponential Smoothing

Lost Sales Standard Exponential Smoothing calculates baselines on long time ranges. Lost Sales Standard Exponential Smoothing makes positive adjustments to the flagged periods and to the period immediately following the flagged period.

Input: An Out-of-stock indicator that indicates which periods should be preprocessed.

Optional parameters:

The following table details the optional parameters for Lost Sales Standard Exponential Smoothing.

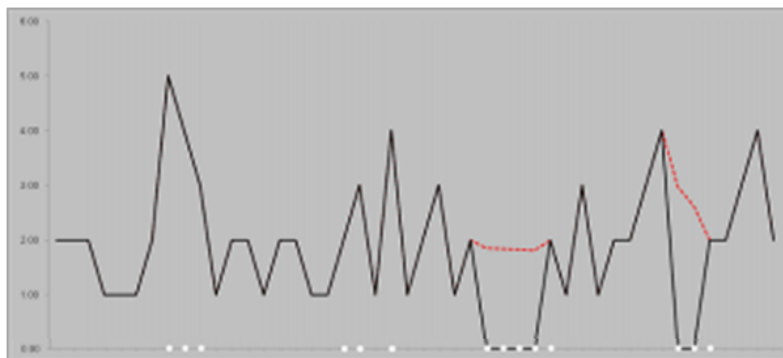
Optional Parameters	Description
ES (Exponential Smoothing)	The alpha parameter that determines the weight put on observations of periods included in the calculations.
Number of future periods (nfut)	The number of periods after an outage periods that are considered in the calculation of the future velocity. Note that if during these periods an event flag or a event indicator is on, the particular period is excluded from the calculation.

Optional Parameters	Description
Number of past periods (npast)	The number of periods before an outage periods that are considered in the calculation of the past velocity. Note that if during these periods an event flag or a event indicator is on, the particular period is excluded from the calculation.
Event flag	This parameter indicates if a period should be excluded from the calculation of past/future velocities.
Partial outage flag	A scalar parameter indicating if the period immediately following an out-of-stock period should be adjusted. The default behavior is for the flag to be True.
Stop at event flag	This parameter determines which periods are included in the calculation of past/future velocities. If the flag is set to True, then the algorithm only includes periods before the first event flag or event indicator. If the flag is False, then all available, non-flagged periods, within the windows defined by nfut and npast, are used in the calculation of the past and future velocities. The default setting for the flag is False.

Figure A–8 Lost Sales Standard Exponential Smoothing Formula

$$\begin{aligned}
 \text{past velocity} &= \frac{\sum_{i=1}^{np} (1-\alpha)^{i-1} * src(t_f - i)}{\sum_{i=1}^{np} (1-\alpha)^{i-1}} \\
 \text{future velocity} &= \frac{\sum_{i=1}^{nf} (1-\alpha)^{i-1} * src(t_l + i)}{\sum_{i=1}^{nf} (1-\alpha)^{i-1}} \\
 LSOVER(t) &= \max \{src(t), \text{past velocity} + \frac{\text{future velocity} - \text{past velocity}}{t_l - t_f + 2} * (t - t_f + 1)\}, \text{ where } t \in [t_f, t_l]
 \end{aligned}$$

Figure A–9 Lost Sales Standard Exponential Smoothing Example



When event flags exist within the future and past velocity windows, rather than consider the entire window, Preprocessing only considers unflagged data points after

the last event flag in the history window to compute the past velocity. It does a similar process for the future window by using the unflagged data points prior to the first event flag in the future window to compute the future velocity. Consecutive events are smoothed using the same velocities. A data point becomes flagged, and hence not part of the future/past velocity calculation, if either the event indicator or the optional event flag is on.

If future velocities cannot be calculated, then the past velocities, if they exist, are used as future and past velocities, and vice versa. When neither of the velocities can be calculated, there is no adjustment.

If the velocity window contains all zero values, then the calculated velocity is zero. A velocity of zero is a legitimate value if it occurs within the selling window. A velocity of zero is not acceptable if it is calculated based on values outside of the selling window. Note that by default, the periods being adjusted are the periods flagged by an out-of-stock indicator and the period immediately following any such period. If the optional scalar parameter POA (Partial Outage Allowed) is set to *False*, then this extra period will not be adjusted, and only the out-of-stock periods will be adjusted.

Override

Override fills gaps in data when a reference measure exists.

Input: reference measure ($R(t)$) to copy data from

Optional parameter: outage/mask ($M(i)$), adjustment ratio (a)

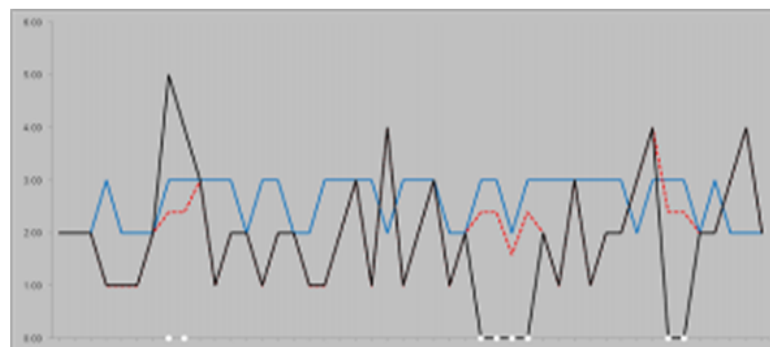
Formula: Overrides $LSOVER$ with the Src adjusted by the adjustment ratio according to the mask:

Figure A-10 Override Formula

$$LSOVER(t) = a * R(t) \quad \text{if } M(i) \text{ is true}$$

$$LSOVER(t) = Src(t) \quad \text{if } M(i) \text{ is false}$$

Figure A-11 Override Example



Increment

Increment updates gaps or outliers in data when a reference measure exists.

Input: reference measure ($R(t)$) to copy data from

Optional parameter: outage/mask ($M(i)$), adjustment ratio (a)

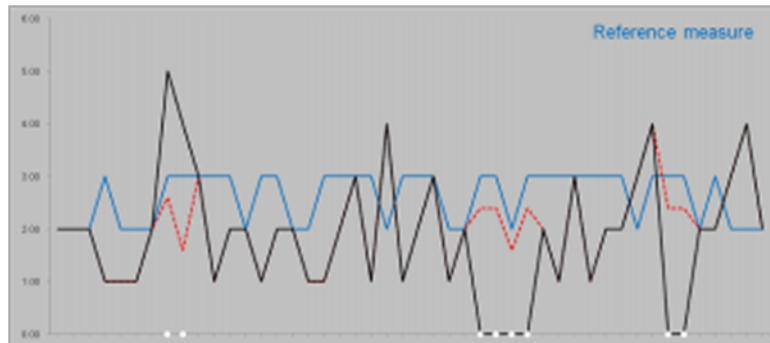
Increments the Src with the reference adjusted by the adjustment ratio according to the mask:

Figure A–12 Increment Formula

$$LSOVER(t) = SRC(t) + a * R(t) \quad \text{if } M(i) \text{ is true}$$

$$LSOVER(t) = Src(t) \quad \text{if } M(i) \text{ is false}$$

Figure A–13 Increment Example



Forecast Sigma

Forecast Sigma removes spikes in recent data when no indicators are available.

Inputs: forecast and confidence intervals

Optional parameters:

- number of stddev for upper bound
- number of stddev for lower bound
- forecast lower bound
- minimum history required for filtering

Formula: If the difference in the sales and forecast is larger than a threshold, the override value is brought within some bounds of the forecast.

Forecast Sigma Event

Like Forecast Sigma, Forecast Sigma Event removes spikes in recent data when no indicators are available but also takes outage as input.

Inputs: outage, forecast, confidence intervals

Optional parameters:

- number of stddev for upper bound
- number of stddev for lower bound
- forecast lower bound
- minimum history required for filtering

Formula:

If outage is on:

$LSOVER = forecast$

Otherwise, if the difference in the sales and forecast is larger than a threshold, the override value is brought within some bounds of the forecast.

DePrice

DePrice removes the pricing effects.

Inputs: price, maximum price

Optional parameters: none

Formula:

$Smoothed = original * (price/maxprice) ^2$

Clear

This Preprocessing method clears the Preprocessing adjustments from previous runs.

No Filtering

This Preprocessing method does not filter the source data.

Preprocessing for Stock-outs

When using Preprocessing to correct for stock-outs, the system expects out-of-stock indicators from a merchandising system like RMS. The system can be set up for automatic adjustment of sales history to correct for stock-outs as well as for manual user overrides under exception cases.

When set to automatically adjust sales history to correct stock-outs, Preprocessing takes into account trending and seasonality and adjusts the sales that were flagged by the out-of-stock indicator to reflect a more typical sales quantity.

Preprocessing for Outliers

When using Preprocessing to correct for outliers, the system expects outlier indicators. These are typically loaded.

Preprocessing for Promotional Forecasting

Preprocessing adjusts promotional data in a similar way that it does stock-outs. Typically, historical data shows a higher rate of sales during promotional periods. Were these spikes in sales to be left in historical sales data and loaded in the RDF Cloud Service Causal Engine, the baseline forecast created from this data would reflect similar spikes in future sales.

Glossary

Note: With a few exceptions, this glossary contains definitions of terms specific to RDF Cloud Service. For further definitions of terms and concepts relating to the RPAS user interface, refer to the *Oracle Retail Predictive Application Server Online Help* or *Oracle Retail Predictive Application Server User Guide*.

Additive Seasonal Method

Also referred to as Additive Winters Model, this model is similar to the Multiplicative Winters model but it is used when zeros are present in the data. This model adjusts the un-seasonalized values by adding the seasonal index for the forecast horizon.

Alert

A notice displayed to system users that a forecast value is above or below user-defined limits (an exception).

Alert Manager Window

A window that displays the alerts assigned to you. This dialog provides a list of all identified instances in which a monitored measure's values fall outside a set of defined limits. You may pick an alert from this list and have RCS automatically build a workbook containing the measure values that triggered the alert.

AutoES Method or Automatic Exponential Smoothing Method

RDF Cloud Service fits the sales data to a variety of exponential smoothing (time series) models of forecasting, and the best model is chosen for the final forecast. The candidate methods considered by AutoES are:

- SimpleES
- IntermittentES
- TrendES
- Multiplicative Seasonal
- Additive Seasonal and SeasonalES

The final selection between the models is made according to a performance criterion (Bayesian Information Criterion) that involves a trade-off between the model's fit over the historic data and its complexity.

Bayesian Method

Useful for short lifecycle forecasting and for new products with little or no historic sales data. The Bayesian method requires a product's known sales plan (created externally to RDF Cloud Service) and considers a plan's shape (the selling profile or lifecycle) and scale (magnitude of sales based on Actuals). The initial forecast is equal to the sales plan, but as sales information comes in, the model generates a forecast by merging the sales plan with the sales data. The forecast is adjusted so that the sales magnitude is a weighted average between the original plan's scale and the scale reflected by known history.

Causal Method

Causal is a forecasting method used for promotional forecasting and can only be selected if Promote is implemented. Typically, the Causal method is used at the Final Levels (that is, item/week/week). Causal uses a Stepwise Regression sub-routine to determine the promotional variables that are relevant to the time series and their lift effect on the series. AutoES utilizes the time series data and the future promotional calendar to generate future baseline forecasts. By combining the future baseline forecast and each promotion's effect on sales (lift), a final promotional forecast is computed.

Croston's Model of Exponential Smoothing

See [IntermittentES](#) or [Intermittent Exponential Smoothing](#).

Curve

An optional automated predictive solution that transforms organization-level assortment plans into base-level weekly sales forecasts.

Exception

A forecast value that is greater than or less than a user-defined limit.

Exponential Smoothing

A form of a weighted moving average. Its weight declines in data exponentially. Most recent data is weighted more heavily. It requires the smoothing constant. It ranges from 0 to 1 and is subjectively chosen.

Final Forecast Level

A low level in a hierarchy from which a forecast is generated and at which approvals and data exports can be performed. Often, data from forecasts at a low level is insufficient to generate reliable forecasts without first aggregating the data to a higher level and then spreading the data back to the low level.

Forecast

In RDF Cloud Service, Forecast refers to RDF Cloud Service's statistical forecasting capabilities.

Forecast-Driven Planning

Planning that keys off of forecasts fed directly into a planning system. Connection to RDF Cloud Service is built directly into the business process supported by Oracle Retail Predictive Planning through an automatic approval of a forecast that is fed directly in the planning system. This allows you to accept all or part of Sales Value forecast. Once that decision is made, the balance of business measures are planned within Oracle Retail Predictive Planning.

Halo

Used to explain the bias shown by customers towards certain products because of a favorable experience with other products.

Holt's Model of Exponential Smoothing

See [Trend Exponential Smoothing](#) or [TrendES](#).

Interactive Forecasting

A workbook in RDF Cloud Service that is used to simulate forecast by modifying parameters such as Forecast Method and History Start Date.

IntermittentES or Intermittent Exponential Smoothing

RDF Cloud Service fits the data to the Croston's model of exponential smoothing. This method should be used when the input series contains a large number of zero data points (that is, intermittent demand data). The original time series is split into a Magnitude and Frequency series, and then the SimpleES model is applied to determine level of both series. The ratio of the magnitude estimate over the frequency estimate is the forecast level reported for the original series.

Like-item or Like SKU

An item that is used as a model to forecast a new item introduction.

Lost Sales

Periods in sales data in which there was no inventory to meet consumer demand.

Measure

Any item of data that can be represented on a grid in a view.

Measure Description

The description of the measure that can be viewed in a workbook. This description may contain relationships and calculations.

Measure Function

Internal functions that can be used to simplify building calculations for a measure.

Measure Identifier

The combination of role, version, metric, and units that uniquely specifies a single measure.

Metric

A measure definition with the role, version, and units omitted.

Moving Average

For each period t , the moving average method takes the average of the periods from $t-2$ to $t+2$ as the smoothed baseline.

Multiplicative Seasonal

Also referred to as Multiplicative Winters Model, this model extracts seasonal indices that are assumed to have multiplicative effects on the un-seasonalized series.

Preprocessing

In RDF Cloud Service, Preprocessing refers to a module that processes data before forecasts are generated to adjust for situations, such as lost sales and unusually high demand.

Profile

Spreading ratios that are used in the Curve process. Typical profiles can include store participation, size distribution, and time (phase-to-week) profiles, as well as other information. Profiles are generated using historical data and phase definitions based on your system configuration.

Profile Based

RDF Cloud Service generates a forecast based on a seasonal profile that can be created in Curve or a legacy system. Profiles can also be copied from another profile and adjusted. Using historic data and the profile, the data is de-seasonalized and then fed to the SimpleES method. The Simple forecast is then re-seasonalized using the profiles.

Profile Spread

Used at the final-level to utilize a profile (either generated externally or with Curve) to determine the spreading ratios from the Source-level forecast down to the Final-level forecast.

Promote

Promote is an optional add-on automated predictive solution that allows you to incorporate the effects of promotional and causal events, such as radio advertisements and holiday occurrences, into your time series forecasts. The promotional forecasting process uses both past sales data and promotional information to forecast future demand.

Promotion Planning

A workbook and simulation process used within the context of promotional forecasting. Promotion planning involves specifying whether the event status for a particular promotional variable is active (on) or inactive (off) for a specific product/location/calendar combination. When past promotional events are represented as accurately as possible, the modeling routine can more precisely detect correlation between event occurrences and changes in sales values.

Promotional Effectiveness

A workbook used in the context of promotional forecasting. This workbook allows you to analyze the effects of promotions on items at both the micro and the macro level. What-if analysis can also be performed on the results of promotional forecasts, as you can modify future and past promotional inputs, the system-estimated effects of promotions, and the promotional forecasts themselves.

Promotional Forecasting

Promote's forecasting technique (also referred to as Causal forecasting) uses promotional factors and events to predict future demand. Promotion events are events, such as advertisements, holidays, competitor information, and other factors that affect the normal selling cycle for a business.

Promotion Group

A set of products or locations that are believed to exhibit similar effects during common causal events. Promotion groups should be established to maximize the number of time series for each group (so each promotional event can be evaluated

from as many different observations as possible), while ensuring that each time series is affected by causal events to the same degree.

SeasonalES Method

A combination of several Seasonal methods. This method is generally used for known seasonal items or forecasting for long horizons. This method applies the Multiplicative Seasonal model unless zeros are present in the data, in which case the Additive Winters model of exponential smoothing is used. If less than two years of data is available, a Seasonal Regression model is used. If there is too little data to create a seasonal forecast (in general, less than 52 weeks), the system selects from the SimpleES, TrendES, and IntermittentES methods.

Seasonal Regression

Seasonal Regression cannot be selected as a forecasting method, but it is a candidate model used when the SeasonalES method is selected. This model requires a minimum of 52 weeks of history to determine seasonality. Simple Linear Regression is used to estimate the future values of the series based on a past series. The independent variable is the series history one-year or one cycle length prior to the desired forecast period, and the dependent variable is the forecast. This model assumes that the future is a linear combination of itself one period before plus a scalar constant.

Simple/IntermittentES Method

A combination of the SimpleES and IntermittentES methods. This method applies the SimpleES model unless a large number of zero data points are present. In this case, the Croston's model is applied.

SimpleES or Simple Exponential Smoothing Method

RDF Cloud Service uses a simple exponential smoothing model to generate forecasts. SimpleES ignores seasonality and trend features in the demand data, and it is the simplest model of the exponential smoothing family. This method can be used when less than one year of historic demand data is available.

Simple Moving Average

See [Moving Average](#).

Sister Store

A store that is used as a model to forecast a new store.

Source Level Forecast

The level at which the aggregate, more robust forecast is run.

Time Series

Set of evenly spaced numerical data obtained by observing response variable at regular time periods. This data is used to forecast based only on past values. It assumes that factors influencing past and present continues influence in future.

Training Window

The number of weeks of historical sales data to use in generating a forecast.

Trend Exponential Smoothing or TrendES

Also referred to as Holt's Model, RDF Cloud Service fits the data to the Holt model of exponential smoothing. The Holt model is useful when data exhibits a definite trend. This method separates out base demand from trend and then provides forecast point

estimates by combining an estimated trend and the smoothed level at the end of the series.

Wizard

A set of windows that guide you through the process of creating a new workbook or performing other actions in a solution by asking you various questions and having you select values.

Workbook

The framework used for displaying data and user functions. Workbooks are task-specific and may contain one or more views. Users define the format of their workbooks. Also see [Workbook Template](#), [View](#).

Workbook Template

The framework for creating a workbook. You build each new workbook from an existing workbook template, such as Pre-Season Financial Plan or Forecasting Administration. Several workbook templates are supplied with the Oracle Retail Predictive Solutions and are available for selection when you choose **File - New** to create a new workbook.

View

A multidimensional spreadsheet used to display workbook-specific information. View data can also be displayed in chart format.