

Oracle® Retail Demand Forecasting Cloud Service

Implementation Guide

Release 22.2.302.0

F59488-01

August 2022

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Preface

This document provides critical information about the processing and operating details of Oracle Retail Demand Forecasting Cloud Service.

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This document is for:

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- Systems analysts
- Integrators and implementors
- Business analysts who need information about Oracle Retail Demand Forecasting Cloud Service processes and interfaces

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Related Documents

For more information, see the following documents in the Oracle Retail Demand Forecasting Cloud Service 22.2.302.0 documentation set:

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

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Convention	Meaning
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Convention	Meaning
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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 CS) provides accurate forecasts that enable retailers to coordinate demand-driven outcomes that deliver connected customer interactions. With a single view of demand, RDF CS provides pervasive value across retail processes, including driving optimal strategies in planning, increasing inventory productivity in supply chains, decreasing operational costs and driving customer satisfaction from engagement to sale to fulfillment. RDF CS is a comprehensive solution that maximizes the forecast accuracy for the entire product lifecycle, the ability to adapt to recent trends, seasonality, out-of-stocks and promotions, and reflect the unique demand drivers of each retailer.

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.

Forecasting Challenges and RDF CS Solutions

A number of challenges affect the ability of forecast demand accurately including:

- [Selecting the Best Forecasting Method](#)
- [Overcoming Data Sparsity Through Escalation and Pooling Levels](#)
- [Forecasting Demand for New Products and Locations](#)
- [Managing Forecasting Results Through Automated Exception Reporting](#)
- [Incorporating the Effects of Promotions and Other Event-Based Challenges on Demand](#)
- [53 Week Calendar](#)

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 automatic evaluation of

several methods eliminates this complexity. The automated approach can pick the best fit method among a large selection, like Simple Exponential Smoothing, Holt Exponential Smoothing, Additive and Multiplicative Winters Exponential Smoothing, Croston's Intermittent Demand Model, and Seasonal Regression forecasting.

Another approach is to combine the output of the competing methods to create a more robust forecast and minimize the risk of overfitting.

Overcoming Data Sparsity Through Escalation and Pooling Levels

Demand at low levels, such as item/store, is usually too noisy to identify clear selling patterns, both for baseline and promotional sales. In such cases, generating a reliable forecast requires analyzing historical data at a higher level (escalation or pooling levels) in the hierarchy in which demand patterns can be consistently detected. The forecasting components estimated at these high levels, like seasonality curves and promotion effects, are combined with low level information, like base demand and trend, to create the low level forecast that is needed to drive the supply chain.

Forecasting Demand for New Products and Locations

RDF CS also forecasts demand for new products and locations for which no sales history exists. There are several options for new products. First, there is the option to go on auto mode, and the user does not have to do anything. Another option is model the new product's demand based on that of an existing similar product for which you do have a history. The existing item selection can be automatically done by matching item attributes. There is also the option to manually select the item. Forecasts for the new products are copied from one item or can be a combination of multiple items. The level for the new products are copied from Like Item, the seasonal curve, and the promotional effects are from escalation.

Managing Forecasting Results Through Automated Exception Reporting

The RDF CS end user is typically 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 Cloud Edition (RPAS CE) platform provides users with an automated exception reporting process 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. The framework for exception management is implemented using multiple features.

First, there are the approval exceptions, where the forecasts are run through business rules to determine if forecasts need review. For the forecasts that need review, a second layer of exceptions is available, to determine the priority in which the review should happen. This is implemented using the rules in the Business Rules Engine. In the exception dashboard profile, a user can filter down to different levels of merchandise/locations to view a hit count and the variance from the desired value of the forecast. She can then go to the Navigation exceptions tiles and launch in a workspace where she can review the exceptions sorted in order of priority as defined by business rules.

In the exception dashboard profile, the user can filter down to different levels of merchandise/locations to view a hit count and the variance from the desired value of the forecast. The user then goes to the Navigation exceptions tiles and launches in a workspace to review the exceptions sorted in order of priority as defined by business rules.

Once in the workspace, the user navigates to flagged positions using the workspace alerts which are synchronized with the exception dashboards. When an exception is resolved, the result is committed to the domain, and the dashboard exception count—upon refresh—reflects the change.

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.

The causal forecasting functionality estimates the effects that such events have on demand. The results are used to predict future sales when conditions in the selling environment are 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.

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 forecasting. RDF CS creates a measure **Week 53 indicator** with the base intersection that is entered by the user in the RDF plug-in. This measure has to be loaded by the user.

There is also the **Week 53 options** measure, that indicates how to calculate the forecast value for a week that was flagged as 53rd, or extra week. This measure can be accessed in the Forecast Setup Workbook.

Forecasting Process

The forecasting process represents a next generation approach engineered to provide transparency, responsiveness and accuracy through the application of retail sciences using the scale of our modern Retail Cloud Platform.

- *Transparency* enables analytical processes and end-users to understand and engage with the forecast. This is accomplished by representing the demand model as the decomposition of intuitive components that include base rate of demand, seasonality and causal effects. The forecasting process provides transparency to

the final results, individual model components and underlying decisions by the system and end-user.

- **Responsiveness** enables the coordination and simulation of demand-driven outcomes using forecasts that adapt immediately to new information and without a dependency on batch processes. This is accomplished by separating the calculation of the forecast from the analytical processes that determine components within the forecasting model.
- **Accuracy** enables retailers to deliver connected customer interactions while driving efficiencies to increase profits. Maximizing forecast accuracy is paramount to RDF CS. This is accomplished through the application of best-fit sciences throughout the forecasting process.

The forecast engine powering RDF CS is the same that powers all solutions in the Retail Science Platform. The separation of the workflow in RDF CS and the forecast engine, allows much more flexibility in evolving the two pieces separately.

Process Summary

Following is a summary of the forecasting process:

1. Prepare Reference Data

The purpose of this step is to prepare reference data for subsequent estimation, pruning and escalation processes. The emphasis in the preparation processes is to treat anomalies in historical data, such as out-of-stock, outliers and promotions, where the objective is to increase reliability of the reference data.

2. Estimated Demand Parameters

The purpose of this step is to estimate all demand parameters and at all possible escalation levels. An escalation level represents a grouping of items and locations for robust parameter estimation to overcome sparsity and sensitivity. Escalation levels can be tied to explicit hierarchy levels (for example, subclass/region) or flexible item/location groupings (for example, optimized analytical clusters). As each demand parameter is estimated, multiple machine learning methods are applied, individually optimized and evaluated for accuracy. The final model can represent the best-fit method or a robust method calculated as an intelligent blending of multiple methods weighted by accuracy.

3. Prune

The purpose of this step is to prune escalation levels that do not pass analytical quality checks. These include data, estimation and correlation quality checks. The result is a candidate pool of high quality parameter estimates for the escalation process.

4. Escalate

The purpose of this step is to select the demand parameter estimate for each component of the forecast model using the candidate pool of escalation levels. The escalation process reflects the optimal balance of richness and reliability.

5. Forecast

The purpose of this step is to calculate the forecast through the application of demand parameter estimates from the analytical processes in conjunction with the known demand drivers and user-overrides. The demand model is completely responsive to changes in demand drivers and updates to the demand model itself (for example, user-defined override). This step also includes support for

responsive new-item forecasting, with tailored approaches for new-item scenarios, such as dynamic, repeatable and similar assortments.

User Experience and Workflow

The user experience is delivered on our experience-inspired RPAS Cloud Edition (RPAS CE) user interface (UI). RPAS CE provides end-users with a next generation cloud-native UI that is purpose-built to accelerate intent into action for planners and forecasters. This includes interactive and visual dashboards to assess priorities, responsive and flexible workspaces to implement decisions and a coordinated exceptions framework that ties business process all the way from dashboard to cell.

The business process is engineered to maximize the productivity of end-users through exception-driven processes and emphasis on workflow simplification. The day-in-the-life processes begin with dashboard views that enable the end-user to assess the effectiveness and quality of their forecasts and prioritize exceptions. From the dashboards, the end-user is able to contextually launch into the appropriate workspace. For exception-driven processes, the end-user is guided to the point-of-resolution, with visibility to progress and the ability to iteratively work through forecasting priorities throughout the day.

Dashboard Views and Workspaces

The dashboard views and workspaces that support day-in-the-life forecasting workflows are summarized as follows:

- **Forecast Overview Dashboard**

This dashboard leads with Key Performance Indicators (KPIs) that provide macro-level insight into forecasting priorities and the effectiveness of the forecasts in driving demand-driven outcomes. This enables end-users to assess forecasting complexity drivers, such as frequent promotions, and forecasting performance towards business objectives, such as fill rates.

- **Forecast Scorecard Dashboard**

This dashboard provides insight to forecast accuracy (for example, MAPE, Bias) along with clear visibility to system performance and the impact of end-user contributions to the forecasting process. This enables forecast analysts and managers to identify forecast process improvement priorities.

- **Exception Dashboards**

The exception dashboards represent the primary starting point for day-in-the-life processes. The approval and navigation exceptions each have a dedicated dashboards that enables end-users to efficiently drive decisions through focused exception-driven processes. From here, end-users can define the scope of exceptions to be managed through dashboard filters and launch directly to workspace views tailored for resolution. As exceptions are resolved, the dashboard is updated to enable end-users to iteratively work through forecasting priorities.

- **Forecast Review Workspaces**

The forecast approval workspaces represent the primary point of interaction with the demand forecasts. The navigation exceptions and their workspace counterparts allow you to review forecast information guided by priorities that are dynamically implemented in the Business Rule Engine. This is supported by a rich

set of decision support metrics and the ability to responsively simulate forecast updates.

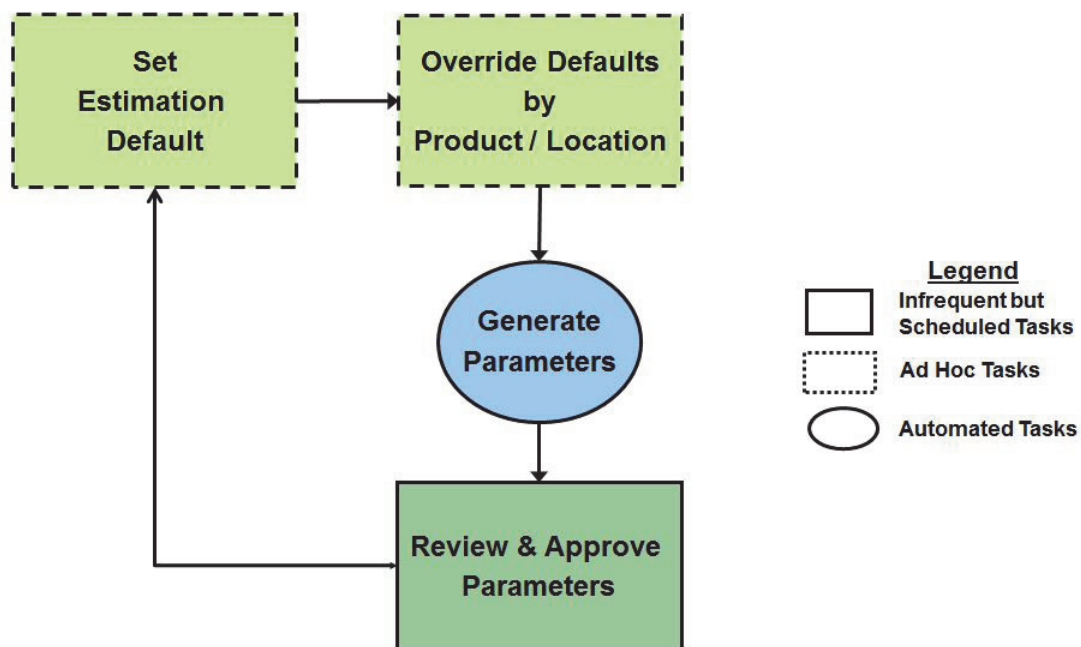
Forecast Engine

Not visible to the end user is the forecast engine, and all the tasks happening behind the scenes. The forecast engine produces a single version of forecast that is used in RDF CS, all Retail Science Platform solutions, as well as planning and merchandising. The batch is split between estimation and forecasting. Estimation consists of the heavy data mining of historical demand to generate the necessary forecast parameters like seasonality, price and promo effects. Following are tasks which comprise the estimation workflow within the Retail Science Platform.

Refer to the *Oracle Retail Science Cloud Services User Guide* for details on the methodology used for forecast generation.

Figure 1–1 RDF CS Estimation

RDF CS: Estimation

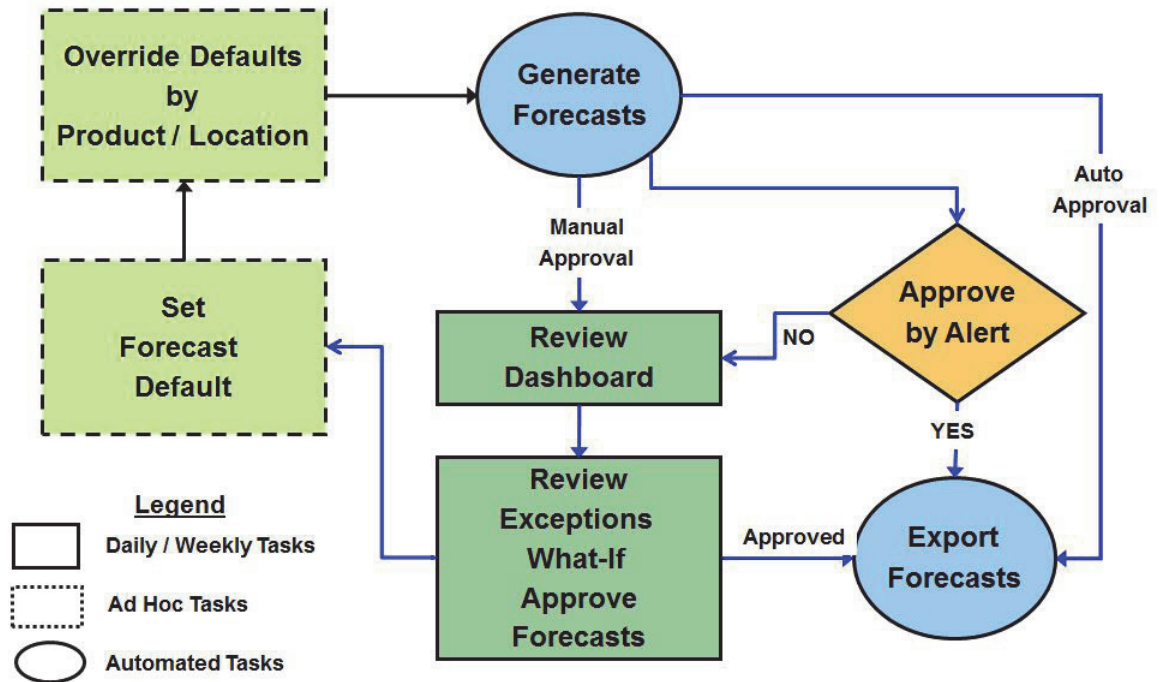


After estimation is run, the forecast parameters are computed, and everything is available to generate the forecast.

The forecast generation is happening in the forecast engine, while all the workflow-related activities are happening in the RDF CS solution.

Figure 1-2 RDF CS Forecasting

RDF CS: Forecasting



Implementation Considerations

RDF is part of the Retail Analytics Platform (RAP) and imports the forecast generated by the Retail Science Engine (RSE). The RDF application is tailored towards the workflow of a Forecast Analyst. Whereas the data scientist would interact with the RSE UI to set low level forecast tuning parameters. The following sections describe the overall implementation flow and whether it is configured on the RDF side or RSE side.

The following information must be considered before configuring Demand Forecasting Cloud Service:

- [Configuration Considerations](#)
- [RDF Cloud Service Hierarchies](#)
- [RDF Cloud Service Input Data](#)
- [Integration](#)
- [User Roles and Securities](#)
- [Internationalization](#)

Configuration Considerations

Before implementing RDF Cloud Service, an implementor should first answer the following questions listed in [Table 2-1](#)

Table 2-1 Configuration Considerations and Applications

Consideration	Applications
Is my forecasted item Long Lifecycle (LLC) or Short Lifecycle (SLC)?	RSE
What is the purpose of my forecast? To drive replenishment, allocation, or others?	
Are there any promotions that impact my forecast? If yes, how can I define the promotions?	RSE
Based on the purpose of my forecasting, which level should the forecast be generated on (sku/stor/week)? How many escalation levels are needed for the forecasting? Which level should the forecast be exported to?	RDF, RSE
What data is available to use for forecasting: rsal, psal, csal, Promotions, or Price?	
What kind of preprocessing is needed: Outage, Outlier, Depromote, or Deseasonalize Smooth?	RSE
How do I want to handle New Items? Is there any product attribute information?	RDF
Do I want to integrate RDF Cloud Service with other Applications?	RDF, RSE

Table 2–1 (Cont.) Configuration Considerations and Applications

Consideration	Applications
If I want to use grouping in my escalation levels, how do I group my item/stores?	RDF, RSE
Do I need to generate daily forecast, and/or both weekly and daily forecasts?	RDF, RSE
Do I have a foundation system to provide foundation (hierarchy) data?	

Depending on the answers to the previous questions, the implementor can use the RDF Cloud Service plug-in to generate RDF Cloud Service configurations. For details about how to generate RDF Cloud Service configuration, refer to [Chapter 3, "RDF CS Configuration"](#). The generated RDF Cloud Service configuration can be customized to satisfy client specific requirement. For details about how to customize RDF Cloud Service configuration, refer to [Chapter 4, "RDF Cloud Service Extensibility"](#).

Note: In order to implement planning applications on RAP, you should ensure their foundation data such as Product and Organization hierarchies, align with RMF CS (Merchandising Systems) so that the foundation and transactional data can be used by all applications in RAP. They can have additional alternate dimensions than available in RMF CS (Merchandising Systems), if it is needed for their planning solution.

Customers can use the flex fields available in RAP Foundation files to interface this additional data. Also, if multiple planning applications like MFP, APCS, or RDF reside in the same PDS, then the common hierarchies should have the same dimension names to share the data interfaced from RAP. However additional non-shared dimensions can be present in each applications.

RDF Cloud Service Hierarchies

There are four type of hierarchies in RDF Cloud Service:

- [Standard RPAS Hierarchies Files](#)
- [User Managed RDF Cloud Service Hierarchies](#)
- [Plug-in Generated RDF Cloud Service Hierarchies](#)
- [RHS Hierarchies](#)

Standard RPAS Hierarchies Files

This is the foundation data to build any RPAS solution. Demand Forecasting Cloud Service requires the standard three hierarchy files, Calendar, Product, and Location. Additional sets of hierarchy files specific to different solutions may also be needed. The standard hierarchy files for Calendar, Product, Location and Product Attributes need to be loaded into the RI interface. Refer to the *Data Requirements* section in the *Oracle Retail Analytics Platform Implementation Guide*.

Note: The following format only shows the hierarchy structure used by RDF. The file to be loaded needs to conform to the RI interface. The user provides standard RPAS hierarchy files.

For information on the hierarchy files, see the following sections:

- [Calendar Hierarchy File \(CLND\)](#)
- [Product Hierarchy File \(PROD\)](#)
- [Location Hierarchy File \(LOC\)](#)
- [Products Attributes Hierarchy File \(PATR\)](#)

Calendar Hierarchy File (CLND)

Name	Label	Hierarchy Type	Parent
DAY	Day	Main	None
WEEK	Week	Main	DAY
MNTH	Month	Main	WEEK
QRTR	Quarter	Main	MNTH
HALF	Half	Main	QRTR
YEAR	Year	Main	HALF
DOW	DAY OF WEEK	Alternate	DAY
WOYR	Week of Year	Alternate	WEEK
STDB	STD/BTA	UDA	WEEK

Product Hierarchy File (PROD)

Name	Label	Hierarchy Type	Parent
SKU	Item	Main	None
SKUP	Style/Color	Main	SKU
SKUG	Style	Main	SKUP
SCLS	Sub-Category	Main	SKUG
CLSS	Category	Main	SCLS
DEPT	Department	Main	CLSS
PGRP	Group	Main	DEPT
DVSN	Division	Main	PGRP
CMPP	Company	Main	DVSN
VNDR	Vendor	ALT	SKU
PAT1	Prod Attribute 1	UDA	SKU
PAT2	Prod Attribute 2	UDA	SKU
STA1	Style UDA 1	UDA	SKUG

Location Hierarchy File (LOC)

Name	Label	Hierarchy Type	Parent
STOR	Location	Main	None

Name	Label	Hierarchy Type	Parent
DSTR	District	Main	STOR
REGN	Region	Main	DSTR
CHNL	Channel	Main	REGN
CHAN	Chain	Main	CHNL
COMP	Company	Main	CHAN
SFMT	Store Format	Alternate	STOR
STCL	Store Class	Alternate	STOR
SAT1	Store Attribute 1	UDA	SAT1
SAT2	Store Attribute 2	UDA	SAT2

Products Attributes Hierarchy File (PATR)

The product attributes hierarchy represents attributes associated with products. These attributes are used to group products within categories.

This hierarchy is intended to capture all product attributes for all product types. The attributes are then assigned to individual products. This assignment is used to calculate similarity scores between items.

The retailer needs to load the Product Attributes into the RI interface. Refer to the *Attribute Files* section of the *Oracle Retail Analytics Platform Implementation Guide*.

In RDF, the Product Attribute hierarchy structure is described in this section.

Name	Label	Hierarchy Type	Aggs
PATV	Prod Attribute Value	Main	None
PATT	Prod Attribute	Main	PATV

The following table describes the fields in this file.

Field	Description
Prod Attribute Value	The various values that an attribute might have. For example, the package type attribute might take the values bag, box, or convenience.
Prod Attribute	The name of a product attribute, such as brand, family type, flavor, grain, package type, size, or temperature.

User Managed RDF Cloud Service Hierarchies

The implementor or retailer can update these RDF Cloud Service hierarchy files. The GA RDF Cloud Service package contains these hierarchy files.

For information on the hierarchy files, see the following sections:

These hierarchies can be classified into two categories:

- Hierarchies that are configured in Retail Science and RDF:
 - [Group Level Hierarchy \(GLVH\)](#)
 - [Group Hierarchy File \(GRPH\)](#)
 - [Offer Hierarchy \(OFFH\)](#)

- [Reward Type Hierarchy \(RDTH\)](#)
- Hierarchies that are configured only in RDF:
 - [Business Rule Attribute Hierarchy File \(ATTH\)](#)
 - [Business Rule Hierarchy File \(RULH\)](#)
 - [Condition Hierarchy File \(CONH\)](#)

Group Hierarchy File (GRPH)

The group hierarchy is an internal application-specific hierarchy to divide item/stores into different grouping to use during parameter estimation and forecasting. You can customize this hierarchy during implementation and use the GA dataset hierarchy as a reference. Users can add or change how many groups are allowed in the domain through modifying the group hierarchy data file.

File name: grph.csv.dat

File format: comma-separated values file

The following table describes the fields in this file.

Name	Description
GRPD	This is the grouping to use during estimation and forecast.

Example:

```
111,Time Series Group 111 112,Time Series Group 112 113,Time Series Group 113
114,Time Series Group 114 115,Time Series Group 115
```

Business Rule Attribute Hierarchy File (ATTH)

This is attribute hierarchy used in the Business Rule Engine functionality. Note that this is different from the PATR (Product Attribute) hierarchy. This hierarchy file is a hybrid between user-loaded attributes and RDF GA calculated attributes generated by the plug-in. Refer to the [Appendix: RDF CS Business Rule Engine](#) for detailed information on Business Rule Engine.

File name: atth.hdr.csv.dat

File format: comma-separated values file

The following table describes the fields in this file.

Name	Label	Hierarchy Type	Parent
ATTD	Attribute	Main	None
ATDT	Attribute Data Type	Alternate	ATTD
ATSC	Attribute Source	Main	ATTD
ATST	Attribute Source Type	Main	ATSC
ATTP	Attribute Type	Alternate	ATTD

Example:

```
attd,attd_label,atdt,atdt_label,atsc,atsc_label,atst,atst_label,attp,attp_label
brand,Brand,3,String,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
regn,Region,3,String,regn,region of location Hierarchy,hier,Hierarchy
```

Attribute, loc, Location Attribute

Business Rule Hierarchy File (RULH)

This hierarchy structure is used to associate Business Rules within a Business Rule Group in the Business Rule Engine functionality. The GA hierarchy file loads five placeholder Business Rules per Rule Group. The implementor can customize this file, based on the maximum number of rules the retailer would like to define per Business Rule Group. Refer to the [Appendix: RDF CS Business Rule Engine](#) for detailed information on Business Rule Engine.

File name: rulh.hdr.csv.dat

File format: comma-separated values file

The following table describes the fields in this file.

Name	Label	Hierarchy Type	Parent
RULD	Business Rule	Main	None
RULG	Business Rule Group	Main	RULD

Example:

```
ruld,ruld_label,rulg,rulg_label
r001,Rule 1,g001,Rule Group 1
r002,Rule 2,g001,Rule Group 1
r003,Rule 3,g001,Rule Group 1
r004,Rule 4,g001,Rule Group 1
r005,Rule 5,g001,Rule Group 1
```

Condition Hierarchy File (CONH)

This is the Condition hierarchy used to organize the strategies (conditions) in defining a business rule. Refer to the [Appendix: RDF CS Business Rule Engine](#) for detailed information on Business Rule Engine.

File name: conh.hdr.csv.dat

File format: comma-separated values file

The following table describes the fields in this file.

Name	Label	Hierarchy Type	Parent
COND	Rule Condition	Main	None

Example:

```
cond,cond_label
cond01, condition 01
cond02, condition 02
cond03, condition 03
cond04, condition 04
```

Group Level Hierarchy (GLVH)

This hierarchy contains the Group Sets used for the Grouping functionality. It is configured in RSE and needs to be imported from Retail Science.

The following table describes the fields in this file.

Name	Label	Hierarchy Type	Parent
GLVL	Group Level	Main	None

Example:

```
glvl,glvl_label
srate01,clss/regn/week for Rate of Sales level 1
ptier01,scls/chnl/week for Price Tier level
```

Offer Hierarchy (OFFH)

This hierarchy represents the offer/promo fields. If promo has been enabled in Retail Science this hierarchy will be imported during the batch. Refer to the [Chapter 5, "RAP Integration"](#) for detailed information. If promo is not enabled in Retail Science, then the retailer can upload the GA offer hierarchy file. Note that the offer hierarchy needs to be populated for the Forecast Review workbook to build.

File name: offh.hdr.csv.dat

File format: comma-separated values file

The following table describes the fields in this file.

Name	Label	Hierarchy Type	Parent
offd	Offer	Main	None
prmd	Promo	Main	offd
camd	Campaign	Main	prmd
offa	Offer Alias	ALT	offd
cama	Campaign Alias	ALT	camd

Reward Type Hierarchy (RDTH)

This hierarchy represents the reward type that can be associated per offer. If promo has been enabled in Retail Science this hierarchy will be imported during the batch. Refer to the [Chapter 5, "RAP Integration"](#) for detailed information. This hierarchy is needed to build the Offer Analysis workbook. This workbook is useful only if promo is enabled.

File name: rdth.hdr.csv.dat

File format: comma-separated values file

The following table describes the fields in this file.

Name	Label	Hierarchy Type	Parent
rdtp	Reward Type	Main	None

Plug-in Generated RDF Cloud Service Hierarchies

The RDF Cloud Service plug-in generates this hierarchy files based on the RDF Cloud Service configuration:

- [Final Level Hierarchy File](#)

Final Level Hierarchy File

This hierarchy file defines the Business Rule Group Types associated with a Final Level. Please refer to the RDF Business Rule Engine Appendix of this guide for detailed information on Business Rule Engine.

File name: flvh.hdr.csv.dat

File format: comma-separated values file

The following table describes the fields in this file.

Name	Label	Hierarchy Type	Parent
RGTP	Business Rule Group Type	Main	None
FLVL	Final Level	Main	RGTP

Example:

```
rgtp,rgtp_label,flvl,flvl_label
apr01,approve 01,01,01 Weekly Units Forecast
navi01,navigation 01,01,01 Weekly Units Forecast
```

RHS Hierarchies

The PROR and LOCR internal hierarchies are mirrored hierarchies of the PROD and LOC hierarchies. They are also referred as PROD RHS and LOC RHS. In the RPAS Cloud Edition versions 19.0 and later, PROR and LOCR are considered as virtual hierarchies. Refer to the Oracle Retail Predictive Application Server Cloud Edition Configuration Tools User Guide for information on Virtual Hierarchies.

Since these hierarchies are virtual, you do not have to load the hierarchy files. All of the other operations remain the same. You can register measures on PROR and LOCR and include them in workbooks.

Notes about these virtual hierarchies:

- PROR and LOCR hierarchies have been marked as virtual in the GA configuration.
- We cannot define security dimension on a virtual hierarchy or make them translatable.
- Virtual hierarchies cannot have user defined dimensions.
- If a retailer is upgrading from a pre-19.0 RDF version, then RDF will automatically mark them as virtual and conform to the virtual hierarchy requirements.

RDF Cloud Service Input Data

A detailed data set is required to use the capabilities of RDF Cloud Service to its fullest. Some of the data required is relatively easy to obtain, for example, information about sales. To simplify the data integration, all measure files are configured to be loaded as one measure per file. Each measure's data must be present in a separate file and the file name must be the same as the measure name with the `.csv.ovr` extension. All files must be in csv format. During the initial domain build, all data files marked as required are needed with historical data to build the domain.

Measure Name and Intersections

Because many RPAS measure names and intersections are dynamically generated by RDF Cloud Service plug-in. Tokens will be used to represent the RDF Cloud Service level names. The labeled intersection were also listed for measure intersection

Table 2–2 lists the Token names.

Table 2–2 Token Names

Token Name	Description
CF	Forecast Final Level Name, such as 07
#LLC_frcst_L_#	Forecast final level intersection generated by plug-in based on user specified plug-in input parameters
#LLC_frcstTS_L_#	Forecast final level timeseries intersection = LLC final level intersection – clnd dim generated by plug-in based on user specified plug-in input parameters
#LLC_seascurve_L_#	Forecast level intersection – clnddim + woyr generated by plug-in based on user specified plug-in input parameters
#SLS_INTX#	Sales History intersection. This labeled intersection is user defined
#SLSNC_INTX#	Sales History intersection -clnd dim This labeled intersection is user defined
#NIT_ATT_WGT#	Attribute weight intersection, generated by plug-in based on user specified plug-in input parameters
#NIT_SKU_ATT#	Product attribute intersection, generated by plug-in based on user specified plug-in input parameters
#NIT_SKUSTR_INTX#	New Item assignment intersection, generated by plug-in based on user specified plug-in input parameters
#PRESLS_INTX#	Forecast Preprocessing data source input intersection

Measure Names and Descriptions

Table 2–3 lists the measure names and descriptions. The measure field descriptions include:

Module Used

This field explains which solution is using the file. The possible values can be: All, New Item, and Forecast.

Required or Optional Required

This field means the data is necessary. Optional means that during data load and, if not loaded, certain functionality which uses those measures cannot be used. All administration measures are marked as Optional for data load, since those can be directly set in the Admin workbooks as well.

Load Frequency

This specifies the suggested frequency for the data load. It uses the following values:

- W - Weekly
- A - Anytime as needed or when the values change in source system; it can be weekly, monthly, quarterly, or yearly

Data Source

This specifies the typical data source to get that measure data:

- RI - Oracle Retail Insights or equivalent Data Warehouse solutions
- Admin - Data can be set by Administrator based on customer data referencing sample data in GA domain.
- MFP, IPCS - Oracle Retail Planning Cloud Service or equivalent. Can be readily loaded from RMS or derived from data loaded from RMS.
- ORASE - Oracle Retail Advanced Science. Those are the derived measure files extracted from ORASE integration files.
- RMS - Oracle Retail Merchandising System or equivalent. Can be readily loaded from RMS or derived from data loaded from RMS.
- 3P - Third-party data aggregator such as Nielsen or Symphony IRI.

Load Intersection

Most of the time, the load intersection of the measure is the same as the base intersection of the measure. When the field is empty, the load intersection is the same as base intersection.

Table 2-3 RPAS Measure Names and Intersections

Measure Name	Measure Description	Base Intersection	Measure Type	Module Used	Required or Optional	Load Frequency	Data Source	Load Intersection
rsal	Regular Sales	#SLS_INTX#	Real	all	Required	Weekly	RMS/RI	#DAYSLS_INTX#
psal	Promotion Sales	#SLS_INTX#	Real	all	Required	Weekly	RMS/RI	#DAYSLS_INTX#
csal	Clearance Sales	#SLS_INTX#	Real	all	Required	Weekly	RMS/RI	#DAYSLS_INTX#
ldactivefcstitem	Active Forecast Item Indicator	#SLSNC_INTX#	Boolean	all	Optional	Weekly		
outlierind_CF_	Loaded OutLier Indicator	#PRESLS_INTX#	Boolean	Preprocess	Optional	Weekly		
outageind_CF_	Loaded Outage Indicator	#PRESLS_INTX#	Boolean	Preprocess	Optional	Weekly		
prdattT	Product Attribute	#NIT_SKU_ATT#	String	New Item	Optional	Weekly	RMS/RI	
nitdattwgt	Attribute Weight	#NIT_ATT_WGT#	Real	New Item	Optional	Weekly		
nitfcststovr	New Item Forecast Start Date	#NIT_SKUSTR_INTX#	Date	New Item	Optional	Weekly		
nisros	New Item Base Rate of Sales	#NIT_SKUSTR_INTX#	Real	New Item	Optional	Weekly		
likeitemexmask	Like Item Exclusion Mask	#NIT_SKUSTR_INTX#	Boolean	New Item	Optional	Weekly		
promoaggprof_CF_	Promotion Aggregation profile for Forecast	User provided during configuration time (Promo Aggprof Intx)	Real	LLC	Optional	Weekly/ Anytime		

Table 2-3 (Cont.) RPAS Measure Names and Intersections

Measure Name	Measure Description	Base Intersection	Measure Type	Module Used	Required or Optional	Load Frequency	Data Source	Load Intersection
basespreadprof_CF_	Profile to spread forecast from week to day	User provided during configuration time (Baseline Spread Prof Intx)	Real	LLC	Optional	Weekly/ Anytime		
The following measure can be edited in RDF Cloud Service workbooks. It can also be loaded if a data file is provided.								
grpassignpos_CF_	TimeSeries Grouping membership for LLC. It shall contain group dimension position names.	#llc_frctTS_L_#	String	LLC	Optional	Weekly/ Anytime		

Historical Data

It is recommended that you have at least two full years of historical data for long life cycle forecasting and one full year of historical data for short life cycle forecasting.

Loading and Extracting Data

Data is loaded into RDF Cloud Service using the Online Administration Tools, which in turn use standard RPAS utilities. For more information on loading and extracting data using Online Administration Tools, see the *Oracle Retail Demand Forecasting Cloud Service Administration Guide*

Loading Image Based Data

RDF Cloud Service is pre-configured to support the display of images for items and product attributes in the Forecast Review and New Item workbooks. [Table 2-4](#) lists the dimension attribute measures used to load images.

Table 2-4 Labeled Intersections

Measure	Hierarchy	Dimension
skuimage	PROD	sku
skupimage	PROD	skup
skugimage	PROD	skug
skurimage	PROR	skur
skprimimage	PROR	skpr
skgrimage	PROR	skgr
patvimage	PATR	patv
pattimage	PATR	patt

The Content Server exposes the client's image files placed into a particular directory as HTTP URLs. The images must be defined in the load file in an xml format. The images are available at:

```
http://{content server url}/imgfetch/{sub directory if defined}
```

Sample File for skuimage.csv.ovr

The first field represents the SKU ID followed by the required image location. At a minimum, a thumb size image file must be loaded to show in the pivot table. However, both the thumb and full size images can be loaded.

```
10000010,"<image id=""main"" label=""Front View"">\
<url size=""thumb"">http://msp00alq.us.oracle.com:9001/contentserver/imgfetch/sku_
10000010_main_thumb.jpg</url></image>"
```

Example File for skuimage.csv.ovr

```
10000010,"<image id=""main"" label=""Front View"">\
<url size=""thumb"">http://msp00alq.us.oracle.com:9001/contentserver/imgfetch/sku_
10000010_main_thumb.jpg</url>
<url size=""full"">http://msp00alq.us.oracle.com:9001/contentserver/imgfetch/ sku_
10000010_main_full.jpg</url></image>"
```

Integration

RDF Cloud Service is part of the Retail Analytics Platform (RAP). The foundation data needs to be loaded into the RI data interface. Any hierarchy or data specific for RDF can be loaded via the File Transfer Service (FTS).

User Roles and Securities

To define workbook template security, the system administrator grants individual users, or user groups, access to specific workbook templates. Granting access to workbook templates provides users the ability to create, modify, save, and commit workbooks for the assigned workbook templates. Users are typically assigned to groups based on their user application (or solution) role. Users in the same group can be given access to workbook templates that belong to that group alone. Users can be assigned to more than one group and granted workbook template access without belonging to the user group that typically uses a specific workbook template. Workbook access is either denied, read-only, or full access. Read-only access allows a user to create a workbook for the template, but the user cannot edit any values or commit the workbook. The read-only workbook can be refreshed.

For more information on security, see the *Oracle Retail Predictive Application Server Cloud Edition Administration Guide*. For more information on data security in a cloud environment, see the Hosting Policy documents for the cloud solution.

Internationalization

Internationalization is the process of creating software that can be translated more easily. Changes to the code are not specific to any particular market.

Oracle Retail applications have been internationalized to support multiple languages.

The RPAS platform supports associated solution extensions and solution templates.

- A solution extension includes a collection of code and generally available configurations. Typically, solution extensions are implemented by a retailer with minimal configuration.
- A solution template does not include code. A solution template is most typically implemented as a retailer configuration.

Oracle Retail releases the translations of the RPAS server and client, as well as strings from the solution extensions.

Translations of the solution templates are released. All templates have the ability to support multi-byte characters.

For more information on internationalization, see the *Oracle Retail Predictive Application Server Cloud Edition Administration Guide*.

Translations are available for RDF Cloud Service for the following languages:

- English (United States, Great Britain, Canada, Australia)
- Chinese (Simplified)
- Chinese (Traditional)
- Croatian
- Dutch
- French

- German
- Greek
- Hungarian
- Italian
- Japanese
- Korean
- Polish
- Portuguese (Brazilian)
- Russian
- Spanish
- Swedish
- Turkish

Note: For information about adding languages for the first time or for translation information in general, see the *Oracle Retail Predictive Application Server Cloud Edition Administration*.

RDF CS Configuration

RDF CS is a forecasting solution that uses state-of-the-art modeling techniques to produce high quality forecasts with minimal human intervention.

RDF CS supports pre-processing, new item/store processing and forecast generation. To obtain good forecast results, the above features need to be configured to work together. RDF CS is highly configurable and extremely flexible. The preprocessing and forecast generation was handled on the science engine side. The new item, forecast adjustment and forecast approval was implemented on the RPAS side. To streamline RDF CS implementation and shorten implementation time on RPAS, several plug-ins are provided to work together with RPAS Configuration Tools. These plug-ins let users input configuration options through the GUI and automatically generate configuration solutions based on the RDF CS GA master template and user inputs. The configuration solutions generated by the plug-ins are New Item and RDF CS. The plug-ins auto-generate the hierarchies, measures, rules, workbook templates, taskflow and the Dashboard configuration file that are required by RDF CS to support the forecasting configuration entered in through the plug-in interface:

Table 3-1 Autogenerated Items from Plug-ins

Autogenerated Entity	Description
Hierarchies	The internal hierarchies required by the solution will be generated by the plug-in. Labeled Intersections are autogenerated.
Measures	All measures necessary to support the base solution will be created.
RPAS Rules	All Rule Sets, Rule Groups, and Rules to support the base solution will be created.
Workbook Templates	All pre-defined workbook templates to support the base solution will be created.
Taskflow	The taskflow will be auto generated based on the RDF CS template and the levels entered in the plug-in.
Dashboard Configuration file	The Dashboard configuration file is auto generated based on the dashboard levels and custom exceptions enter using the plug-in.
Batch Control file	The Batch Control file is auto generated.

RDF CS Batch Flow Process

Understanding the RDF CS batch flow process is important before starting RDF CS Configuration:

RDF CS has two major batch process:

- [RDF CS Pre-forecast Batch](#)
- [RDF CS Post-forecast Batch](#)

RDF CS Pre-forecast Batch

This batch process should run before running forecast generation in the science engine.

This batch process involves the following steps:

1. Import Hierarchy from RDX
2. Load RDF CS Internal Hierarchy
3. Import data from RDX
4. Load RDF CS specific data
5. Running New Item batch
6. Merge Forecasting parameters
7. Export Forecasting Parameters to RDX

RDF CS Post-forecast Batch

This batch process should run after running forecast generation in the science engine.

Note: RDF CS provides a mechanism to extend the GA batch process. Refer to [Customizing the RDF Batch Process](#).

This batch process include the following steps:

1. Import system forecast from RDX tables
2. Adjust system forecast to generate adjusted forecast
3. Calculate attributes needed for Approval business rule-group
4. Generate approval business rule membership
5. Assign parameter values to sku/store based on approval rule membership
6. Run the approve exceptions.
7. Approval forecast and calculate the mask for unapproved item/store..

Forecasts can be approved in three ways:

- **Manual** - Nothing is approved in the batch process and you must go to the forecast review workbook to approve forecasts.
- **Automatic** - All forecasts are approved by the system. RDF CS has defined several GA approval alerts that are available for the approval process.
- **Approval by Exception** - Approves forecasts based on the user specified approve exception. With no exception, the forecast is approved. With an exception, the forecast is not approved. RDF CS provides four GA approve

exceptions: forecast versus recent sales, forecast versus approved forecast, forecast versus last year sales, causal peak. Implementors can choose to disable these approval exceptions.

Implementors can also define custom approval exceptions through the RDF CS plug-in to create additional approval exceptions. These exceptions are also produced before approval

8. Calculate eligibility for navigation tier. All item/store with valid forecast and unapproved will participate in navigation grouping.
9. Calculate attributes needed for navigation business rule group
10. Generate navigation business rule membership.
11. Assign navigation tier based on navigation business rule membership.
12. Calculate dashboard statistics
13. Export approved forecast to RDX

Implementation Process

The RDF CS GA configuration can be used out of the box to build the RDF CS domain. The GA configuration has RDF CS's point of view on how to configure a final level and how to configure business rule engine for approval and navigation.

RDF CS implementors can modify the RDF CS GA configuration to meet the retailer's business needs. RDF CS supports two means to achieve this:

- Configuring the solutions using the plug-ins
- Extensibility of the configuration

This chapter explains how to configure the various solutions using the plug-ins. Extensibility of the configuration is described in [Chapter 4, "RDF Cloud Service Extensibility"](#). Although there is a separate plug-in for New Item and RDF CS solutions, from the Config Tools UI, we only see two plug-in dialogs – Forecast Common and RDF CS. This simplifies the configuration process for the implementor.

Set Up Common Configuration Details

From the Configuration Tools toolbar, select the Automation menu and then from the Forecast Common option, select **Specify Configuration Details**.

Figure 3–1 Configuration Tools: Forecast Common

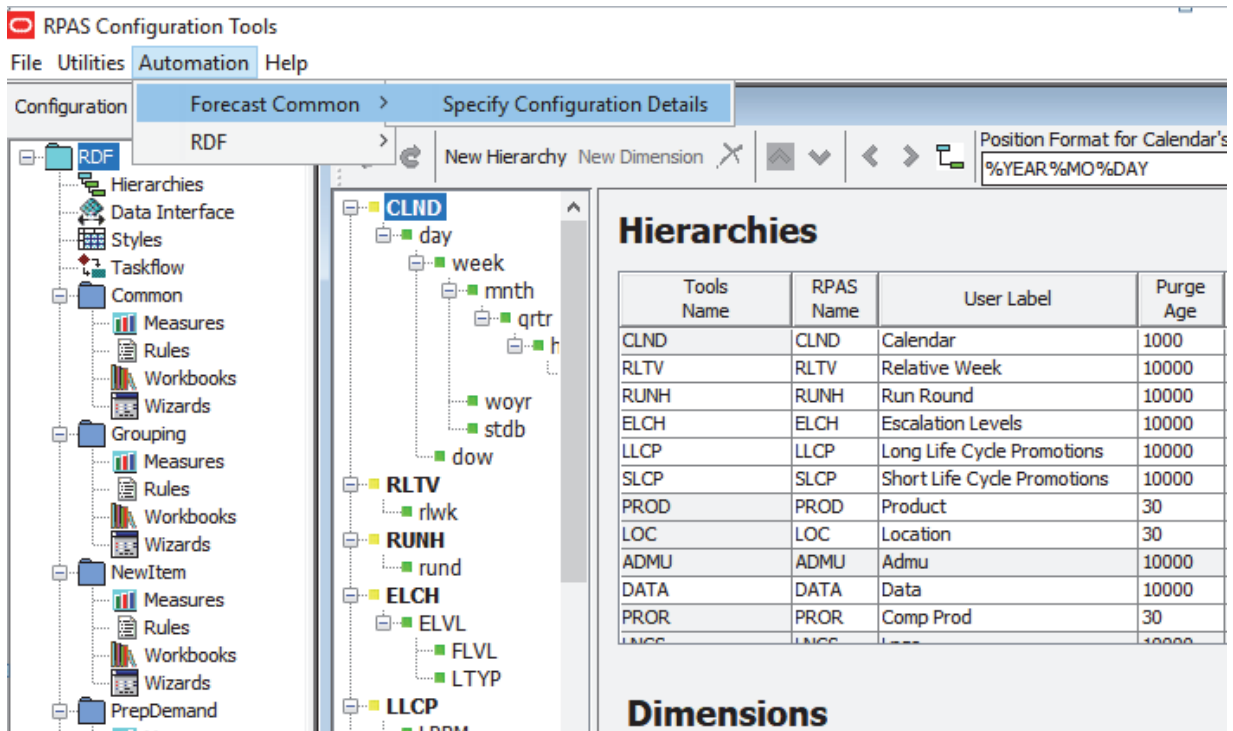
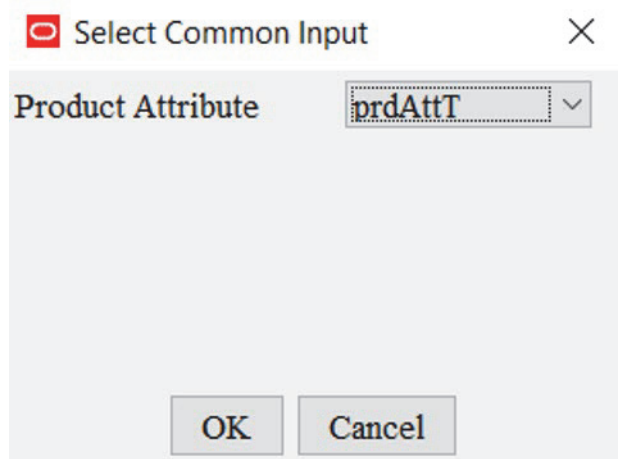


Figure 3–2 Select Common Input



In this step we specify the common input to both New Item and RDF CS.

The product attribute measure to be used in the RDF CS and New Item solutions has to be specified in the Common Plug-in. The product attribute measure stores the attribute position name and not the attribute label.

Labeled Intersections

The labeled intersections listed in Table 3–2 must be defined before running the RDF CS plug-ins. The plug-in validation will ensure that the required labeled intersections are defined.

Table 3–2 Labeled Intersections

Labeled Intersection	Definition	Description	Measures Defined
SLS_INTX	sku/stor/week	Sales intersection	pos, rsal, psal, csal
DAYSLS_INTX	sku/stor/day	Sales intersection at day (load intersection)	Can be used as load intersection for sales coming in at day level
SLSNC_INTX	sku/stor	Sales intersection without calendar	ldactivefcstitem, flagllc
SKUSTOROFFR_INTX	sku/stor/offd	Offer sales intersection	Offersls
SKUSTORWEEK_INTX	sku/stor/week	Event calendar	Eventclnd, prcdiscclnd
Condmeasvalintx1	Clss	Condition value measure	Condmeasvalnum1, Condmeasvalstr1, Cconmeasvaldat1
Condmeasvalintx2	Dept/regn	Condition value measure	Condmeasvalnum2, Condmeasvalstr2, Condmeasvaldat2
Condmeasvalintx3	Clss/regn	Condition value measure	Condmeasvalnum3
Condmeasvalintx4	Dept/regn	Condition value measure	Condmeasvalnum4
Condmeasvalintx5	Dept	Condition value measure	Condmeasvalnum5
Condmeasvalintx6	Regn	Condition value measure	Condmeasvalnum6

Labeled Intersection Use Cases

Labeled intersections listed in [Table 3–2](#) can be defined based on the retailers business needs. SLS_INTX is the labeled intersection for the incoming sales measures (pos, rsal, psal, csal).

Common Solutions

Open an RDF CS GA configuration to see the common modules. This solution should not be modified by the implementor and are considered as non-touch solutions. This solution defines input/output measures for the whole RDF CS project. The content created in this module will not be modified by the plug-ins. The measures created in these modules are external measures for the plug-ins, and they will serve as inputs to plug-ins. Although this module are not generated by plug-in, It will be overridden in RDF CS Configuration Automation Script. Any modification by the implementor will be ignored.

Common Solution

In RDF CS GA, the common solution is used to register measures related to sales, offers and product attribute inputs/outputs to:

- New Item
- RDF CS Solutions

Note: For the common solution, an implementor can only modify the labeled intersection definition that changes the measure intersection in common.

Set up the New Item Solution

The New Item module is designed to support the forecast for new item/store. RDF CS provides three approaches to forecast new item/store:

Forecast Approach	Description
Like Item	<p>The forecast is created based on the forecast of Like Items. The Like Items can be selected manually, and the choices are entered in the User Selected Like Items measure. The task can also be automated if attributes are available. RDF CS then suggests one Like Item in the system recommended Like Item measure.</p> <p>The forecast for the New Item is given by:</p> <p>Base demand new item = base demand like item * Adjustment Factor</p> <p>The forecast for the New Item is calculated as:</p> <p>Forecast at time t = base demand new item * seasonality at time t (coming from escalation level) * promo and price effects (coming from pooling level)</p>
Base Rate of Demand	<p>RDF CS calculates the escalated base rate of demand. The forecast for the new item is given by:</p> <p>Forecast at time t = base rate of demand (coming from escalation level) * seasonality at time t (coming from escalation level) * promo and price effects (coming from pooling level)</p>
User Input	<p>This method is very similar to Base Rate of Demand, with the difference that you have to manually specify a base rate of demand. The forecast is then generated using the same formula as for Base Rate of Demand.</p> <p>Forecast at time t = base demand new item * seasonality at time t (coming from escalation level) * promo and price effects (coming from pooling level)</p>

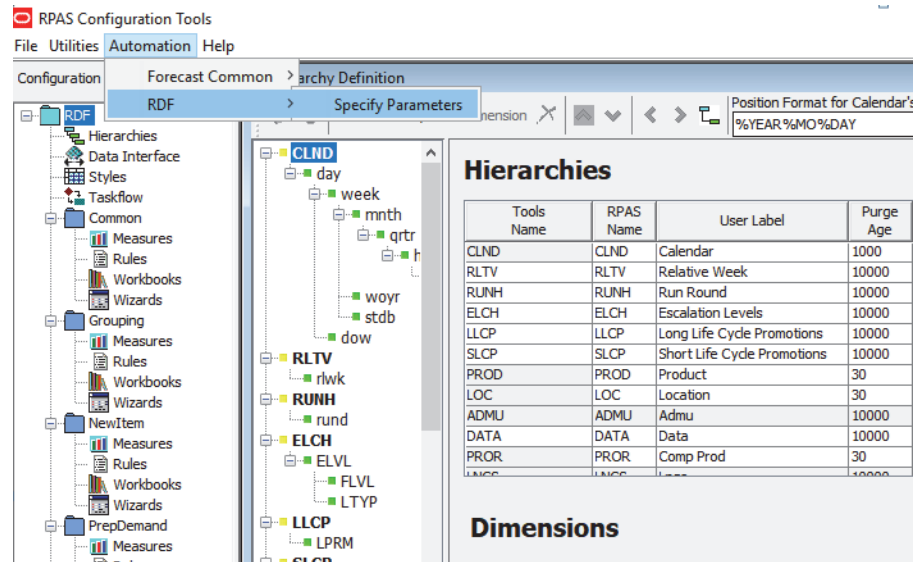
The New Item module provides tools to support the automatic and manual assignment of like item/store to new item/store. If the user can provide product attribute information, the new item can be automatically identified and provided a like item recommendation. If no product attribute information is available, the user has to assign like items manually. New store mapping is always done manually.

Configure New Item Solution

Perform the following steps to generate a New Item solution:

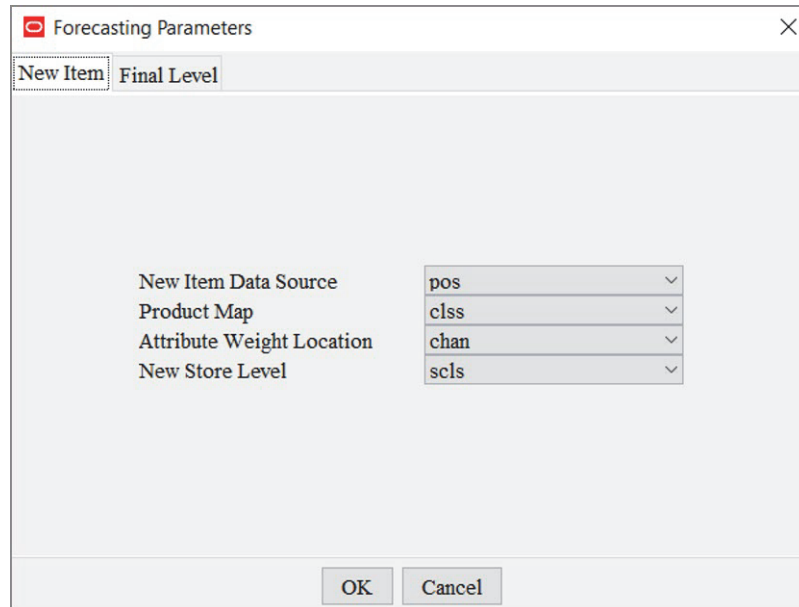
1. From the Configuration Tools toolbar, select the Automation menu and then, from the RDF CS option, select **Specify Parameters**.

Figure 3–3 Configuration Tools: New Item



- From the Like Item Parameters utility, specify the properties for the New Item plug-in. Refer to [Editing New Item Parameters](#) for details.

Figure 3–4 Like Item Parameters



- Click **OK** once editing is finished.

Editing New Item Parameters

Table 3–3 lists the New Item parameters available for editing.

Table 3–3 New Item Parameters

Parameter	Description
New Item Data Source	Sales data used to generate forecast for New item/store.
Product Map	This field specifies the range of the like item available to a new item. If the field is populated with <i>clss</i> , it means that only existing items under the same class as the new item are available as like item candidate. The Similarity Score calculation should only be performed between the new item and existing items with in the class.
Attribute Weight Location	Allows you to specify which location level that the attribute weight used in similarity score calculation will be based on. The attribute weight measure intersection is to be on product Map/attribute-weight-loc/patt. In GA, it is <i>clss/chan/patt</i> .
New Store Level	This field specifies the product level on which like store is assigned to new store. If the field is selected as <i>scls</i> , it means that the like store assignment can be different per subclass.

Configuring the RDF CS Solution

In RDF CS, the Demand Model to generate the forecast is:

$$\text{Demand} = \text{Base Demand} * \text{Seasonality} * \text{Promo Effects} * \text{Price Effects}$$

This is the basic model used to forecast short lifecycle and long lifecycle items. However the approach to calculate each of these components might differ.

Forecast information is often required for items at the lowest levels in a hierarchy. Problems can arise when historic sales data for these items is too sparse and too noisy to identify clear selling patterns. In such cases, calculating the seasonality curves and effects at a higher level in the hierarchy based on an escalation path, would generate a reliable forecast. The science UI provides a mechanism to define the final levels and escalation levels; and the associated parameters for each level. The default escalation path is the order in which the escalation levels are used also defined in the science UI. Users can also edit default escalation path, override the escalation path at the final level intersection from the science UI. In RDF CS plug-in, implementor need to define the final levels. The final levels specified in RDF CS plug-in must match the final levels defined in the science UI.

The RDF CS solution can be configured using the final level tab in the RDF CS plug-in UI:

Table 3–4 RDF CS Plug-in UI Tabs

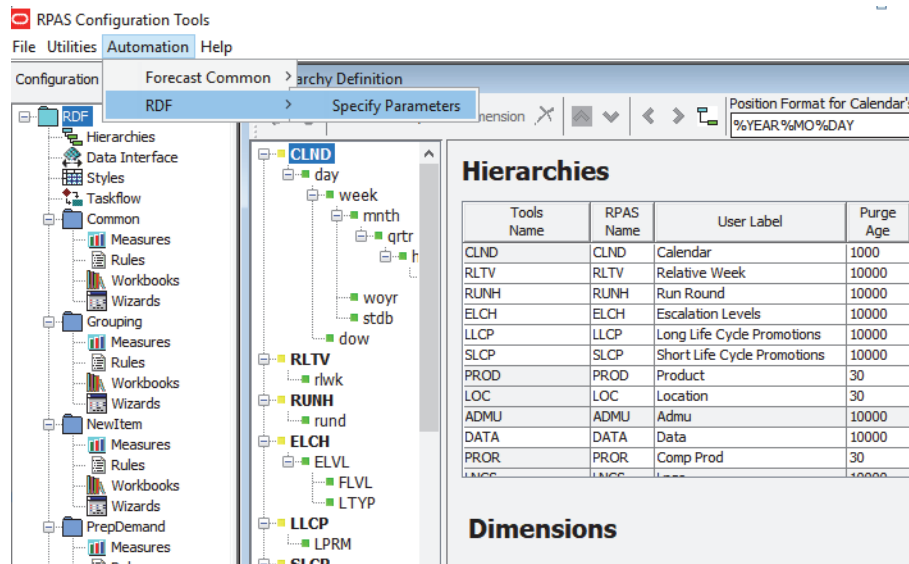
Tabs	Description
Final Level	Define and configure final levels

Generate RDF CS Solutions

Perform the following steps to generate an RDF CS solution:

1. From the Configuration Tools toolbar, select the Automation menu and then, from the RDF CS option, select **Specify Parameters**. The following steps outline the process for configuring RDF CS forecast levels.

Figure 3–5 Configuration Tools: RDF CS

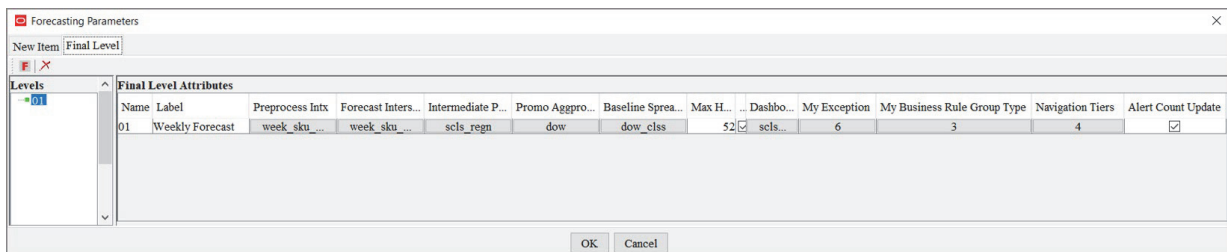


2. 1. Select the final level tab to configure the various parameters for Final Levels.
3. Configure a final forecast level:

From the Forecasting Parameters utility, click the **F** icon. A new final level is added, and it is assigned the next available level number. Specify the properties for the final level. See Editing Forecast Level Parameters for details.

Note: To remove a final level, select the forecast level and then click the **X** icon. Deleting a final level removes all of its associated parameters.

Figure 3–6 Final Forecast Level



Edit Final Level Forecast Level Parameters

Table 3–5 lists all of the Final Level Forecast Level parameters.

Table 3–5 Final Level Forecast Level Parameters

Final Level Parameters	Description
Level Name	The level name is the system-assigned level number when a forecast level is created. This is a read-only parameter.

Table 3–5 (Cont.) Final Level Forecast Level Parameters

Final Level Parameters	Description
Level Label	The level label is the level description that will be viewed by the user once the domain is created. Level labels may not exceed 40 characters. The level labels must be the same as the external name used for forecast level for science UI
Preprocess Intx	The intersection that sales will be preprocessed. If a final level's forecast intersection is sku/str/week. Its preprocessing intx is also at sku/stor/week. If a final level's forecast intersection is at sku/stor/day, Its preprocessing intx is also at sku/stor/week. Sales history at day is usually too sparse to perform efficient preprocessing.
Forecast Intersection	This defines the level at which forecast will be generated. Usually the final level forecast intersection will be at week. In case of daily causal final level, the effects will be calculated at week level and the forecast will be spread from week to day.
Intermediate Parameter Intx	This define the level at which forecast parameter can be setup. RDF CS allows parameters to be set up at three level, at default (scalar measure), at intermediate (measure at intermediate parameter intx specified here), at final (measure at forecast intersectuin without calendar).
Dashboard Intersection	This define the lowest level at which forecast and sales statistics can be reviewed in dashboard. implementor need to be very careful with the selection of intersection. If it is too low, dashboard workbook will run into performance issue. If it is too high, user loss visibility to details.
Alert Count Update	This field indicates if the navigation alert in forecast approved should be wiped out if an alerted sku/store 's forecast is approved. Default is true. That means the navigation alerted item/store numbers will be reduced as user reviewed the forecast and approved it.
Promo Agg Profile Intersection	This defines the intersection of the Promo Aggregation Profile measure. It is used only for Daily Promotions, to aggregate promotions defined at day up to the week.
Baseline Spread Profile	This defines the intersection of the Baseline Spread profile measure. It is used only for Daily Causal to spread the baseline forecast from week to day level.
Max Horizon	Defines the maximum number of weeks of forecast length.
My Exception	This parameter provides a mechanism for the implementor to configure custom approval exceptions and enable/disable GA provided approval exceptions. These exceptions will be used during the batch for Forecast approvals and is also seen in the dashboard exception profile as a separate tile. The implementor can enter the labels for the exception and the secondary measure such as variance measure. Note that the implementor is responsible to configure the rule/rule group (based on the exception definition) to populate the boolean measure (and variance measure) for the My Exception.

Configure My Exception

This parameter provides a mechanism for the implementor to configure custom approval exceptions and enable or disable GA provided approval exceptions. These exceptions are used during the batch for Forecast approvals and are also seen in the

dashboard exception profile as a separate tile. The implementor can enter the labels for the exception and the secondary measure such as variance measure.

Note that the implementor is responsible to configure the rule or rule group (based on the exception definition) to populate the boolean measure (and variance measure) for **My Exception**.

To add or remove custom exception, perform the following steps.

1. Click within a cell of the My Exception table to open a dialog as shown in [Figure 3-7](#). The dialog displays a table with the columns:
 - Label - Displays the exception label name (read only)
 - Exception Metric Label - Displays the exception metric label name (read only)
 - Enable - Allows you to enable or disable GA provided exceptions
2. Click **P** to create additional rows for custom approval exceptions. implementors can enter labels and exception metric labels in the new custom exception. Click **X** to delete the custom exception.

Figure 3-7 Add New Custom Exceptions

Label	Exception Metric Label	Enable
Recent Sales vs Forecast	Recent Sales vs Forecast Variance	<input checked="" type="checkbox"/>
Last Year Sales vs Forecast	Last Year Sales vs Forecast Variance	<input checked="" type="checkbox"/>
Approved Forecast vs Forecast	Approved Forecast vs Forecast Varia...	<input checked="" type="checkbox"/>
Max Sales Peak vs Frcsted Peak	Max Sales Peak vs Frcsted Peak Factor	<input type="checkbox"/>
My Exception1	My Exception Var1	<input checked="" type="checkbox"/>
My exception 2	My Exception Var2	<input checked="" type="checkbox"/>

Configure My Business Rule Group Type

Click within a My Business Rule Group Type cell to configure the business rule group types. Business Rule Group Type is a RDF CS internal dimension that is part of the Final Level Hierarchy. The Final Level hierarchy file is generated by an RDF CS plug-in. There are two dimensions: rulegroup-type and final level. The dimension, rulegroup-type rolls up to the final level dimension. There are two GA rulegroup types per final level, Approve and Navigation.

You can specify additional custom rulegroup types using the RDF CS plug-in. Each final level can have its own custom rulegroup type. The Final Level hierarchy data file is generated at domain build/patch time.

The business rule group type table is created with two default rows. The Name and Build-in Parameters are read only. Aprv01 is for approval. It is a rule group type designed for approval process.

The built-in Parameters are:

- Approve method at final
- Alert window at final
- Alert error threshold at final

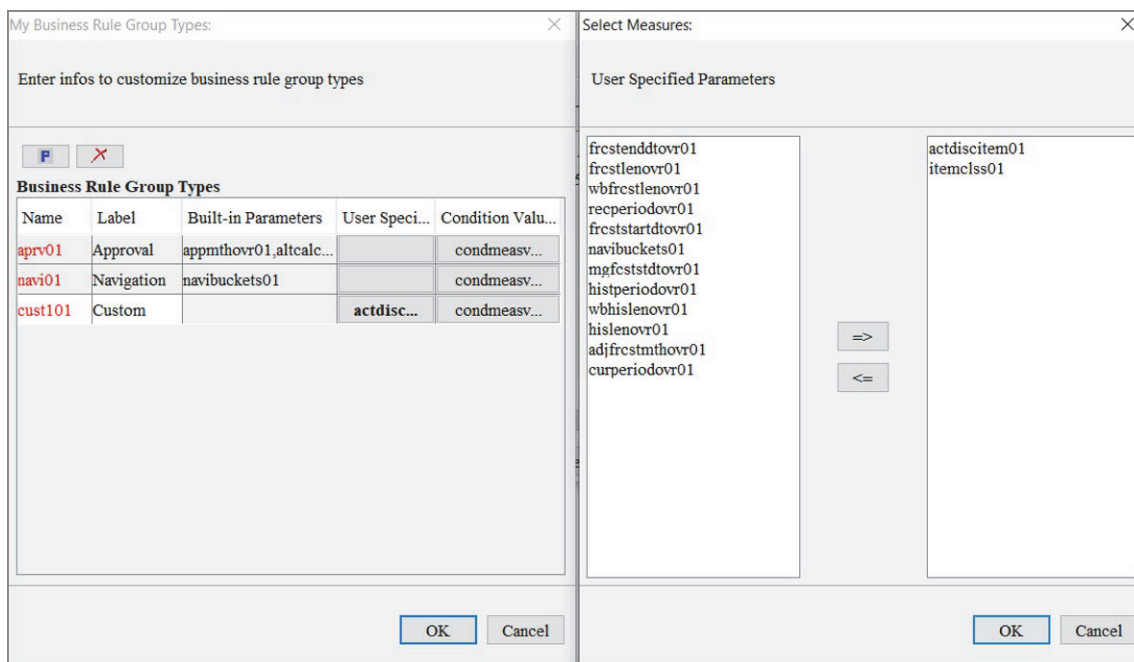
The rule group type, navi01, is designed for tiered navigation in Forecast Review workbook.

Click **P** to add more custom rule group types. The name need to be unique across all final levels and thus it is good practice to append level number at the end. Click **X** to remove custom rule group types.

User specified Parameters per rule group type can be specified by an implementor if additional parameters need to be included. The parameters are associated with business rule group type so that the values for a certain sku/store can be assigned to a set of value for a business rule which the sku/store belongs.

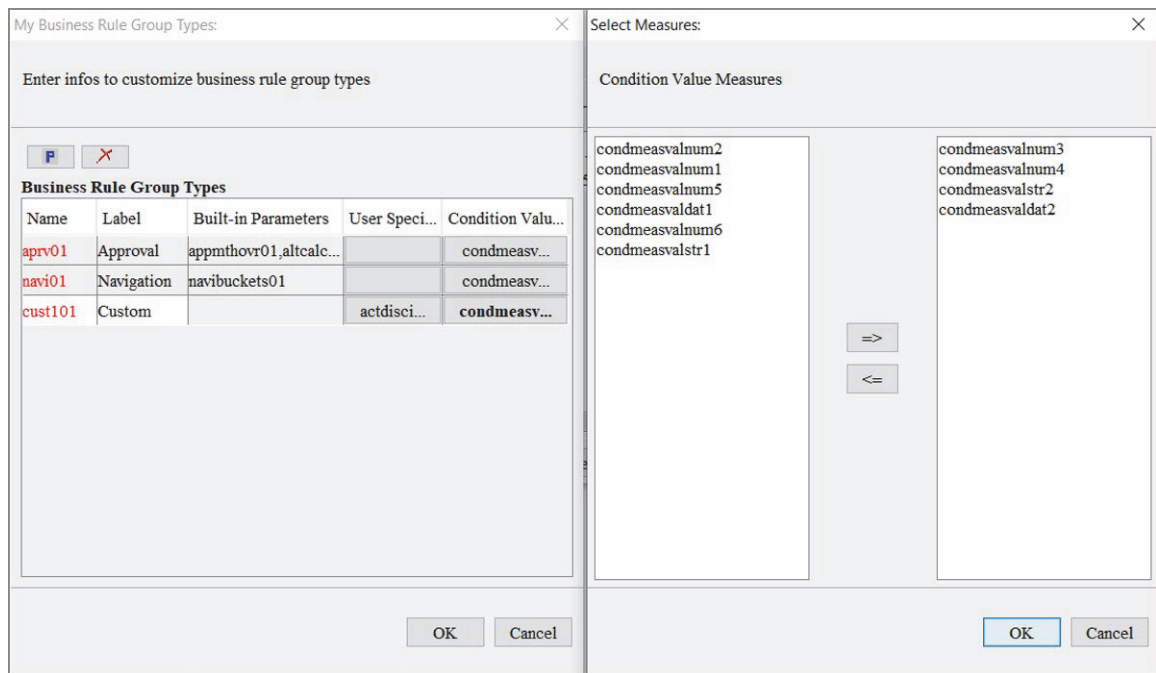
Click within the cell of user specified parameters to open the dialog that allows you to add or remove parameters. The Select Measures box in [Figure 3-8](#) displays all GA parameter measures. Most of these measures are forecasting parameter at final. Any custom measures with intersection = forecast intersection without the **c1nd** dimension and have a valid **db** will be available for selection too. For each selected measure, a measure at business rule is created and added to the parameter for <rule group type> worksheet for user input.

Figure 3-8 Select User Specified Parameters



Click within the condition value cell to open the dialog that allows you to select the condition value measures to be used. The measures available for selection are the ten condition measures GA provides and any custom non-boolean measure that have an intersection higher than forecast intersection without the **clnd** dimension and have a valid **db**. The selected measure are used to construct the picklist for condition value (measure) in the Rule Setup workbook.

Figure 3–9 Select Condition Value Measures



Configure Navigation Tiers

Navigation in the Forecast Review workbook is now tiered. You can decide how many tiers and what is the rule to associate a sku/stores to a tier. There is a corresponding workbook alert associated with each tier. By switching between workbook alerts, you can jump between sku/stores with a different priority to be approved.

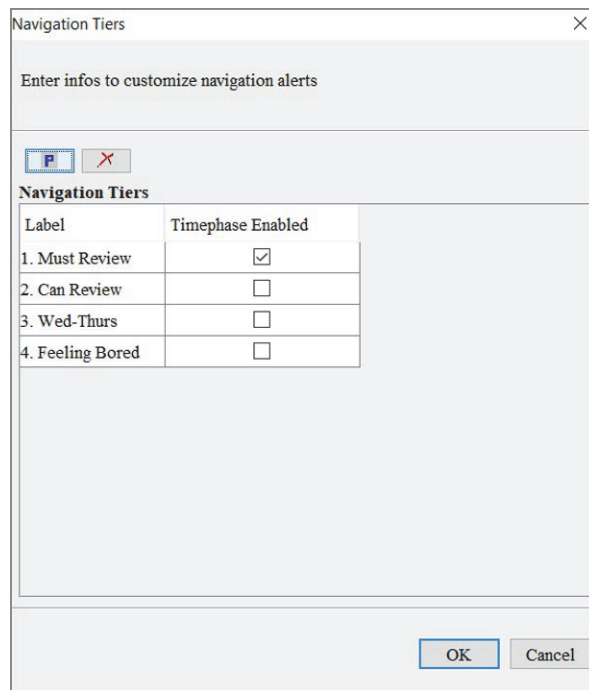
Click within the navigation-tier cell to display the dialog that allows you to add or delete a tier.

Click **P** to add more tiers. implementors can enter the label of the tier and indicate if a time-phase workbook alert is enabled or disabled.

Click **X** to remove tiers.

For each tier, a workbook alert at prod/loc is created in the Forecast Review workbook. If time-phased is enabled, an additional workbook alert at prod/loc/clnd is created in the Forecast Review workbook.

Figure 3–10 Select Navigation Tiers

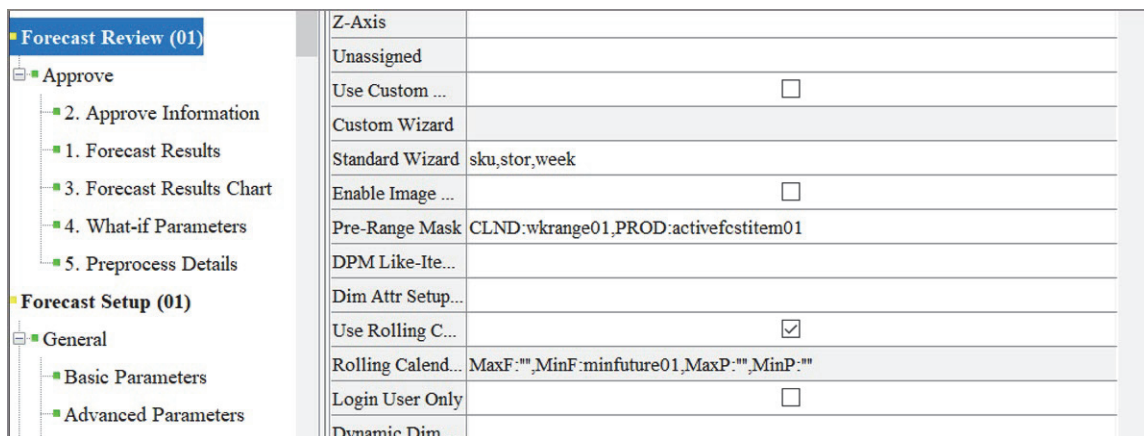


RPAS Rolling Calendar

RDF CS has enabled an RPAS Rolling Calendar feature for Forecast Review workbook templates. Refer to the *Oracle Retail Predictive Application Server Cloud Edition Configuration Tools User Guide* for more details.

In essence this allows us to define a calendar window based on RPAS_TODAY. The main use case for this feature is for auto workbook builds, where in the calendar window advances based on RPAS_TODAY.

Figure 3–11 Rolling Calendar



Out of the four rolling calendar range measures, only the Minimum Future has been set to the Alert Calculation window. This is set during the forecast batch.

The Minimum Past defaults to 0, which means it is not required to pull in any week prior to TODAY.

The Maximum Past and Maximum Future are also not set and will default to the current Calendar pre-range.

Note: The rolling calendar feature is not extensible and implementors cannot edit the rolling calendar range measures.

Translation Process in RDF CS

As part of the domain build or patch process, RDF CS loads the GA translation files (which includes RPAS and taskflow files).

RDF CS then loads any custom translations that you may have placed on the OBJECT STORAGE in the INCOMING_FTP_PATH/translation directory.

During the patch, RDF CS also loads previously uploaded translation files.

For details, refer to the *Internationalization* chapter in the *Oracle Retail Predictive Application Server Cloud Edition Administration Guide*.

Note: As part of configuration or extensibility, if the implementor changes the labels of the RDF CS level in the plug-in, RDF CS generates the corresponding English (and non-english_us) translations in the `r_msglabel` measure and loads it.

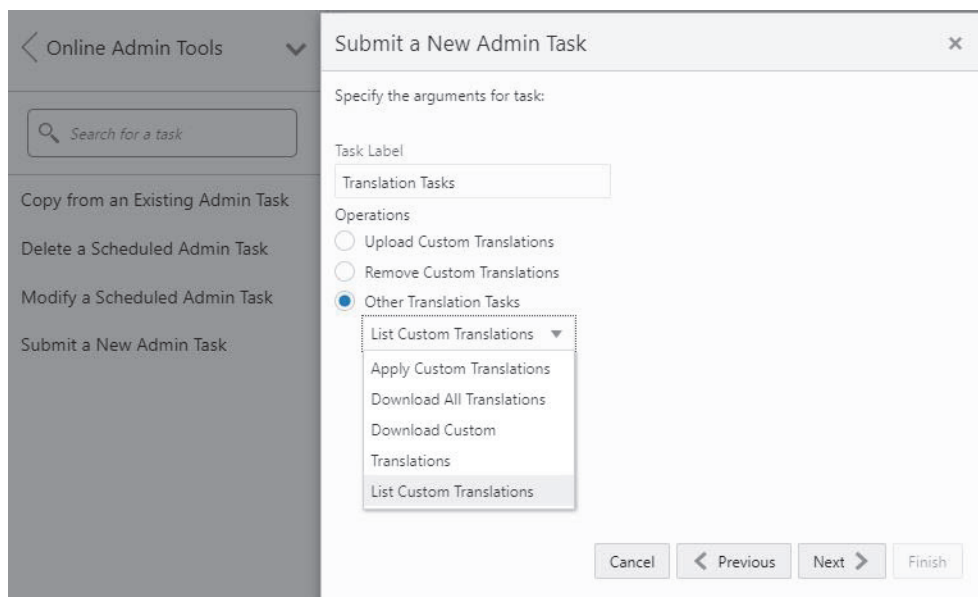
For locale specific translations, it is the implementor's responsibility to upload the correct translation files.

Since the RDF CS level labels are appended to the worksheet labels, the implementor should upload the new labels.

Perform the following steps to access the position names to create the locale specific file:

1. Make sure the browser locale is English - United States
2. From the OAT configure batch task, go to the **Translation Task** and then, **Download All Translations**.
3. The `r_msglabel.csv.ovr` file contains the English labels as updated by the implementor in the RDF CS plug-in.
4. This file can serve as an example to create the locale specific `r_msglabel` file.
5. The locale specific file can contain only the records with the updated labels.
6. Revert the browser language to the original locale.
7. Upload the locale specific `r_msglabel.csv.ovr` file using the **Translation Task**.

Figure 3–12 Translation Tasks



RDF Cloud Service Extensibility

As mentioned in [Chapter 3, "RDF CS Configuration,"](#) apart from configuring the RDF application through the plug-ins, RDF also supports extensibility of the GA configuration. This chapter describes the rules and restrictions enforced to extend the RDF GA configuration, so as to preserve the customizations in future patch and upgrades.

RDF also provides a mechanism for implementors to extend the RDF Batch process, where in custom rule groups can be executed during the batch process. RDF also supports Dashboard extensibility.

The solutions within the RDF GA configuration can be categorized into:

- Solutions that are extensible.
- Solutions that are not extensible.

The Solutions that cannot be customized are the ones not generated by the plug-in. The non extensible solution is:

- Common

Generally the solutions generated by the plug-in can be customized; however they should follow the rules for extending a solution. The extensible solutions are New Item, and RDF.

Supported Customization of RDF Configuration

The following sections list the customizations that are allowed to the RDF configuration. These configuration components can be customized:

- Solution
- Measures
- Rules and Rule groups
- Workbooks and worksheets
- Hierarchy
- Taskflow
- Styles

All the names of custom realized measure, rule set, rule group, rule, workbook, worksheet, and styles should begin with the prefix `c_` or `C_`.

Custom worksheets can only be added into existing RDFCS GA workbook tabs for the plug-in generated solutions.

Rules for Customizing Hierarchy

The following hierarchy customizations are allowed to the RDF configuration:

- Clients are allowed to add new hierarchy or add new dimension into the existing hierarchy. No dimension can be added to calendar hierarchy that is lower than day. No change can be made to the RDF internal hierarchies.
- Clients are allowed to change the label of existing hierarchies or dimensions.
- All the dimension and roll-up order in the product, RHS product, location and RHS location hierarchy must be preserved in the custom configuration.

Rules for Adding Measures

The following rules apply when adding measures to the RDF configuration:

- Clients are allowed to add new custom measures into the custom solution and reference them as an external measure in the extensible solutions.
- Clients can also add new custom metric as a major component in the extensible solutions. It is strongly recommended not to mix custom metrics with the RDF metrics.
- Custom measures should follow the naming convention and should begin with a 'C_' or 'c_' prefix.
- Only the published GA measures can be used in custom rules and custom workbooks. Only writable GA measures can be used on the left hand side of an rule expression. The read only GA measures can only be used on the right hand side of the rule expression.

Publishing Measures

The published GA measures can be divided into these categories:

- **Read only**—can only be used on the right hand side of the expression
- **Writable**—can be used on both the left hand side and right hand side of the expression
- **RuleGroupOnlyWritable**—a specific measure that can be read/write in the specified rule group
- **Loadable**—measures that can be loaded using OAT and can be present in the custom load batch control file.
- **WorkbookMeasureOverride**—measures whose property can be overridden in the associated workbook
- **ReadableExecutionSet**—list of GA batch control exec set names that can be called from within custom batch control exec file.

The list of published measures can change based on forecast levels in a particular configuration. Therefore it is dynamically generated at each RDF configuration regeneration.

The contents of the list are saved in a file named: **publishedRdfMeasures.properties**.

The file is located under **[config]/plugins**. Before writing custom rules, regenerate your RDF configuration and then open the file to search for published RDF measures.

Custom Measure Characteristics:

- Each line of the file has multiple fields that are | separated.

- The first field is one of the category names previously listed.
- The second field is name of the measure or exec set.
- The third field is the measure label.
- For RuleGroupOnlyWritable, the fourth field is the rule group name.
- For WorkbookMeasureOverride, the fourth field is the name of the workbook in which this measure is allowed to be overridden.

Example 4–1 Sample Custom Measure

```
ReadOnly|PreSeaProf|Seasonal Profile
ReadOnly|activefcstitem01|Active Forecast Items
ReadOnly|activefcstitem07|Active Forecast Items
```

Generally, forecasting parameter overrides such as Forecast Method Override, Custom Exception, Custom Exception Metric, auxiliary inputs to RDF such as Promotion Aggregation Profile, and Grouping Membership were writable because an implementor may set them up through customized rules.

Rules for Adding Custom Rules

The following rules apply when adding custom rules to the RDF configuration:

- Custom rule sets, rule groups and rule names should begin with the 'C_' or 'c_' prefix.
- Custom rule groups should not include any GA rules.
- Custom rules can use the published readonly GA measures listed in the `publishedRdfMeasures.properties` file. However, the custom rules cannot modify the value of the readonly GA measure. Hence the readonly GA measure cannot appear on the LHS of a custom rule.
- Custom Rules can be added to custom rule group. It can also be added to the plug-in generated GA workbook rulegroups such as load rule group, calc rule group, refresh rule group, commit rule group and custom menu rule. However Custom Rules can not be added to plug-in generated batch rule group.

Rules for Workbooks and Worksheets Extensibility

The following rules apply when adding custom rules to the RDF workbooks and worksheets extensibility:

- New Custom workbook and worksheets names should begin with the 'C_' or 'c_' prefix.
- Apart from the Custom Solution, custom workbooks can also be added to the extensible RDF GA solutions.

Workbook Measure Override Extensibility

RDF supports certain GA measures to be overridden in the GA workbook. These measures are listed in the WorkbookMeasureOverride section of the `publishedRdfMeasures.properties` file.

For example:

```
WorkbookMeasureOverride|ppsstdesadjustp01|Std ES Adjustment Flag|PpsAdminP01
```

This indicates that the measure `ppsstdesadjustp01` can be overridden in the PpsAdminP01 workbook.

The following rules apply to override measure properties:

- Base State and Agg State can be overridden.
- Range property of static picklists can be overridden. Note that options can only be removed; new options cannot be added.

Elapsed Lock Override

RDF supports the RPAS platform feature of Elapsed Lock Override in the following scenarios:

- Custom measures in a workbook can have the Elapsed Lock Override set to true.
- Custom workbooks can have this field set to true for GA measures that are in the Writable list of the published measures.

Note: If a GA measure has not been enabled as Elapsed Lock Override, the following steps can achieve the same behavior:

1. Make sure the GA measure is writable.
 2. Register a custom measure and load it from the GA measure.
 3. Set the custom measure as Elapsed Lock Override.
 4. Edit the custom measure in the workbook.
 5. Commit the custom measure back into the GA measure.
-
-

Rules for Adding Custom Real Time Alerts into Existing Workbooks

Perform the following steps when adding custom real time alerts into existing workbooks.

Note: These steps have to be performed using RPAS Configuration Tools. Copying, pasting or direct editing of xml files is prohibited.

1. To add custom real time alert into existing workbooks, all measures related to the custom real time alert need to be added to the workbook.
2. Create a style for the custom real time alert in the configuration.
3. Create a custom real time alert in an RDF workbook using the measures and style created from the previous steps.
4. If a real time alert defined in custom solution will be used in a GA workbook, the real time alert measure should be imported as an external measure in the corresponding GA solution.
5. We must ensure that the rule group consistency is maintained while adding any custom rules that might be needed to calculate an alert measure.

The RDF plug-in will preserve a custom real time alert during regeneration

Adding a Custom Solution

A custom solution is a separate solution within the RDF configuration. It can be used to accommodate custom workbooks, rules, alerts to do custom reporting, custom logic

and threshold alerts by using GA measures (based on the extensible GA measures in [Table 4–1](#)). In addition, measures and alerts defined in the custom solution can be plugged into existing workbooks in GA solution based on the contexts defined. Clients are allowed to create their own custom solutions by following the rules mentioned above. To use a GA measure in custom workbooks, the GA measure should be imported as an external measure in custom solution.

Adding Custom Styles

New styles can be added in the Style Definition window of Configuration Tools. The custom style name should be prefixed with either `c_` or `C_`. Style names that do not adhere to the naming convention will be caught during the configuration validation. Any new style added will be retained during upgrades and patches.

Validating the Customized Configuration

A script, `ra_config_validation.sh`, has been provided to allow the customer or implementor to validate that the customizations conform to the rules outlined above. For details of the script, refer to Configuration Validation.

This script can be run on Windows with the RDF Starter Kit. To do this, the implementor will need to make sure that they have a pristine copy of the GA configuration as well as the custom configuration.

For example, if the GA configuration has been copied to `C:\Oracle\configurations\GA\RDF` and the custom configuration is in `C:\Oracle\configurations\RDF`, then the script can be called from a Cygwin `zsh` shell:

```
$RPAS_HOME/bin/ra_config_validation.sh -n RDF -d
/cygdrive/c/Oracle/configurations -c
/cygdrive/c/Oracle/configurations/GA/RDF/RDF.xml
```

Successful Run of the Validation Script

If all the validations pass, it will output the following message:

Example 4–2 Message for Successful Run of Validation Script

```
09:04:47 : INFORMATION : ra_config_validation.sh[0] - ra_config_validation.sh
completed.
09:04:47 : INFORMATION : ra_config_validation.sh[0] - Program completed
successfully.
09:04:47 : INFORMATION : ra_config_validation.sh[0] - Exiting script with code: 0
```

Unsuccessful Run of the Validation Script

If all the validations do not pass, it will output the following message:

Note: The bold line shows where the details of the validation failure are in the log. (In the actual log, this line is not bold.)

Example 4-3 Message for Unsuccessful Run of Validation Script

```

09:15:12 : INFORMATION : ra_config_validation.sh[0] - For details of validation,
look in '/cygdrive/d/retek/logs/2017-07-18/rdf_config_validation.091506.1/rdf_
config_validation.log'.
09:15:12 : INFORMATION : ra_config_validation.sh[0] - _call executing command
'execplug-inTask.sh
RDF:com.retek.labs.rdf.plugin.installer.RDFConfigurationValidation
/cygdrive/c/Oracle/configurations/GA/RDF/RDF.xml /cygdrive/c/Oracle/configurations
RDF'
09:15:17 : INFORMATION : ra_config_validation.sh[0] - _call of command
'execplug-inTask.sh
RDF:com.retek.labs.rdf.plugin.installer.RDFConfigurationValidation
/cygdrive/c/Oracle/configurations/GA/RDF/RDF.xml /cygdrive/c/Oracle/configurations
RDF' complete
09:15:17 : ERROR : ra_config_validation.sh[0] - Nonzero exit status code.
09:15:17 : INFORMATION : ra_config_validation.sh[0] - Exiting script with code: 9

```

Taskflow Extensibility

The RDF Taskflow is extensible. The implementor can customize the taskflow in Configuration tools to add custom taskflow components like activities, tasks, steps, tabs and worksheets. Any custom taskflow component added to GA taskflow component will be retained after plug-in automation. As part of extensibility, RDF provides a mechanism where in, the implementor can hide certain components of the GA configuration and taskflow by editing a property file. The property file is a simple text file named **extend_rdf.properties** and is located inside the plug-in directory of the configuration. A sample file is included in the plug-ins directory of the GA configuration for reference.

For example, **RDF\plug-ins\ extend_rdf.properties**

The format of the file is shown as:

Stage|Component|Action|Value

An example entry is:

Customization | Worksheet | Hide | activity_ni.task_niattmaint.NITREVSht1

Each line consists of four fields separated by the `|` character. The value field can contain a comma separated list of values. Note that the value field should specify the fully qualified name of the taskflow component. Refer to the sample file. Any line that begins with a `#` character is considered a comment line and is ignored.

The names of the Taskflow entities can be found in the **taskflow.xml** file located in the configuration directory.

The various GA configuration components that can be hidden are listed in the following table:

Component	Description
Activity	Hides the specified Taskflow activity. The value field is the taskflow activity name.
Task	Hides the specified Taskflow task. The value field is the taskflow task name.
Step	Hides the specified Taskflow step. The value field is the taskflow step name.
Tab	Hides the specified Taskflow tab. The value field is the taskflow tab name.

Component	Description
Worksheet	Hides the specified worksheet. The value field is the worksheet name.
Realtime Alert	Hides the specified Real Time Alert. The value field is the real time alert name.

Customizing the RDF Batch Process

This section describes how to customize the RDF GA batch process to meet the business needs of the retailer. Details on the RDF GA batch process are described in the *Oracle Retail Demand Forecasting Administration Guide*. The Configured Batch tasks have the following tasks related to batch control:

- Retrieve Batch Control File – allows the current batch control files to be retrieved for inspection and modification.
- Update Batch Control File – After inspecting the current batch control files, the implementor can edit the batch control files to customize the batch process.

Details on the previous two tasks are described in the *Oracle Retail Demand Forecasting Administration Guide*.

The RDF Batch process is based on the RPAS Enterprise Edition Batch Framework, which makes use of a set of control files. [Table 4–1](#) lists the RDF Batch control files that can be customized. For detailed information on the RPAS Batch Framework, refer to the *Oracle Retail Predictive Application Server Implementation Guide*.

Table 4–1 Customizable RDF Batch Control Files

Control File	Description
batch_exec_list.txt	This is the controller and entry point for all the other services, specifying groups of services to be run in a specific order.
batch_calc_list.txt	This control file groups all the calc services that need to run using mace.
batch_refresh_list.txt	This control file groups all Workbook refresh rule groups
batch_loadmeas_list.txt	This control file groups measures that need to be loaded into domain using the measure load service
batch_exportmeas_list.txt	This control file groups measures that need to be exported out of the domain using export measure service.
batch_xform_list.txt	This control file handles the transform file service to perform file transformations to support simple integration capabilities.
batch_oat_list.txt	This file lists the configured batch tasks that appear in the OAT drop down list.

Custom Hooks and Boolean Scalar Measures for Flow Control

There are two ways to customize the batch control files:

- [Custom Hooks](#)
- [Boolean Scalar Measures for Flow Control](#)

The custom hooks are an optional batch set executed by GA batch control files. The implementor can define the contents of these batch set in the customized batch control files that can be uploaded. If these hooks are not defined, the batch process skips these hooks, If they are defined, its contents are executed.

RDF also defines a list of Boolean Scalar Measures in the domain to control if certain GA defined batch sets can be skipped or not. The following tables list the hooks and Boolean Scalar Measures.

Custom Hooks

Table 4–2 Custom Hooks

Hook	Description
hook_calc_atlb_CF_	This hook is executed right after GA attributes exception navifin_CF_ is calculated and before approval business rule group are calculated. If any custom calculated attributes have been set up to be used in approval by implementor. This is the place to insert custom attributes calculations. _CF_ needs to be replaced by a level number.
hook_frct_adjst_CF_	This hook is provided to add custom forecast adjustment calculations. This hook is before the business rule group related calculation, approval, and navigation logic. _CF_ needs to be replaced by a level number.
hook_frct_alrt_CF_	This hook is provided to merge the user specified parameters associated with approval business rule group before running exceptions. After merging the user specified parameters, the custom approval exceptions and exception metric should be executed. _CF_ needs to be replaced by a level number.
hook_frct_aprvl_CF_	This hook is provided to perform any post-processing to approval forecast after GA approval step. _CF_ needs to be replaced by a level number.
hook_navi_atlb_CF_	This hook is provided so that implementor can calculate the custom calculated attributes used in the navigation business rule groups. _CF_ needs to be replaced by a level number.
hook_populate_aprvrulg_eligiblemask_CF_	This hook is for populate rulgeligmask_CF measure using custom logic. This measure is the eligible mask at sku/store/rulegroup. It can be populated with custom logic to calculate eligible items for approval business rule groups. _CF_ needs to be replaced by a level number.
hook_post_export	This hook is after export.
hook_post_forecast	This hook is between forecast and export.
hook_post_preprocess	This hook is after the preprocessing phase and before generating the forecasts.
hook_pre_forecast	This hook is after New Item calculation and before the forecast generation step.
hook_pre_post_data_load	This hook is between GA measure load and post_data_load rule group run.
hook_RDF_COM_DATA_IMP_OBS_D hook_RDF_COM_DATA_IMP_OBS_W hook_RDF_COM_DATA_IMP_RDX_D hook_RDF_COM_DATA_IMP_RDX_W	This hook is for the calling steps using any import of common data interfaces.

Table 4–2 (Cont.) Custom Hooks

Hook	Description
hook_RDF_COM_HIER_IMP_OBS_D hook_RDF_COM_HIER_IMP_OBS_W hook_RDF_COM_HIER_IMP_RDX_D hook_RDF_COM_HIER_IMP_RDX_W	This hook is for the calling steps using any import of common hierarchies.
hook_RDF_HIER_IMP_OBS_D hook_RDF_HIER_IMP_OBS_W hook_RDF_HIER_IMP_RDX_D hook_RDF_HIER_IMP_RDX_W	This hook is for the calling steps using any import of application-specific hierarchies.
hook_RDF_INIT_EXP_OBS_D hook_RDF_INIT_EXP_OBS_W hook_RDF_INIT_EXP_RDX_D hook_RDF_INIT_EXP_RDX_W	This hook is for calling steps for initial batch exports.
hook_RDF_POST_BATCH_D hook_RDF_POST_BATCH_W	This hook is for calling steps after the batch has run.
hook_RDF_POST_DATA_IMP_OBS_D hook_RDF_POST_DATA_IMP_OBS_W hook_RDF_POST_DATA_IMP_RDX_D hook_RDF_POST_DATA_IMP_RDX_W	This hook is for the calling steps using any import of application-specific data interfaces after the calc steps.
hook_RDF_POST_EXP_OBS_D hook_RDF_POST_EXP_OBS_W hook_RDF_POST_EXP_RDX_D hook_RDF_POST_EXP_RDX_W	This hook is for the calling steps using any exports after the batch aggregations.
hook_RDF_PRE_BATCH_D hook_RDF_PRE_BATCH_W	This hook is for calling steps prior to the batch being run.
hook_RDF_PRE_DATA_IMP_OBS_D hook_RDF_PRE_DATA_IMP_OBS_W hook_RDF_PRE_DATA_IMP_RDX_D hook_RDF_PRE_DATA_IMP_RDX_W	This hook is for the calling steps using any import of application-specific data interfaces.
hook_RDF_PRE_EXP_OBS_D hook_RDF_PRE_EXP_OBS_W hook_RDF_PRE_EXP_RDX_D hook_RDF_PRE_EXP_RDX_W	This hook is for calling steps prior to exports.
hook_RDF_WB_BUILD_D hook_RDF_WB_BUILD_W	This hook is for the calling steps specific to workbook refresh or build.

Boolean Scalar Measures for Flow Control

Table 4–3 lists the Boolean Scalar Measures.

Table 4–3 Boolean Scalar Measures

Boolean Scalar Measure	Description
appfalrton_CF_	This measure is set by the plug-in only. _CF_ needs to be replaced by level number.
cslpeakalrton_CF_	This measure is set by the plug-in only. _CF_ needs to be replaced by level number.
flysarlton_CF_	This measure is set by the plug-in only. _CF_ needs to be replaced by level number.
fralrton_CF_	This measure is set by the plug-in only. _CF_ needs to be replaced by level number.
runnewitembatch	This measure is defaulted to true. Set it to false if new item is not configured or user would like to skip new item batch for pre-forecast batch.
runfrctst_CF_	This measure is defaulted to true. Set it to false if customer would like to avoid running forecast on certain final level. _CF_ needs to be replaced by level number.
runnewitem_CF_	This measure is defaulted to true. Set it to false if customer would like to avoid incorporate new item forecast on certain final level. _CF_ needs to be replaced by level number.
runrulgeligga_CF_	This measure is defaulted to false. If enabled, this makes sure that the only forecastable items are handled by the business rule engine. _CF_ needs to be replaced by level number.

RDF Batch Control File Customization Guidelines

Follow these guidelines for RDF Batch Control File Customization:

- The file, **batch_oat_list.txt**, is the only batch control file in which customers can overwrite the label for GA set names listed in OAT.
- For all other batch control files, avoid overwriting GA set names. GA batch control files have provided various hooks for the batch process. For additional custom steps, try to put them into the hooks.
- GA batch control files have provided a mechanism to skip certain GA steps using boolean scalar measure that can be set in the domain.
- For a GA hierarchy that is unused in your implementation such as attribute hierarchy, just provide empty hierarchy file. For unused GA measures, no need to provide the data file. RPAS would be able to skip it if no files were provided.
- Do not remove any GA clnd hierarchy reorder step, this step is very important for proper functioning of RDF.
- For ease of maintenance, all custom batch set name or step names should be prefixed with **c_**

Examples

The following is an example of custom batch_exec_list.txt, batch_calc_list.txt, batch_loadmeas_list.txt and batch_exportmeas_list.txt.

In this example, the following modification were added to batch _weekly process.

- Hierarchy and measure data file were unpacked.
- Custom measures were loaded after GA measure load.
- Outlier indicator for preprocessing were calculated use custom rules
- Custom approval alerts were run after GA alerts and before approval
- Promotion effects were exported after GA exports

Batch Control Samples

The following sections list samples of batch control processes.

batch_exec_list.txt

Example 4-4 # unpack data file before data load

```
hook_pre_load | unpack      | rdf_hier.tar.gz
hook_pre_load | unpack      | rdf_meas.tar.gz
```

Example 4-5 # load custom measures after GA hier and measure load

```
hook_pre_post_data_load | measload      | c_weeklyLoad
```

Example 4-6 # calculate outlier indicator used in preprocess using custom rules

```
hook_ppsindicator | calc | c_outlier_calc
```

Example 4-7 # calculate custom approval alerts after GA approval alerts

```
hook_frcst_alert07 | exec | c_calc_cust_alerts
```

Example 4-8 # custom export

```
hook_post_export | measexport | c_export_promoeffects
c_calc_cust_alerts | calc |c_custalert1
c_calc_cust_alerts | calc |c_custalert2
```

batch_calc_list.txt

Example 4-9 #outlier calculation

```
c_outlier_calc | G | GROUP | c_HBICalcTodayIdx
c_outlier_calc | G | GROUP | c_dataprocess
c_outlier_calc | G | GROUP | c_calc_outlier
```

Example 4-10 #custom approval alerts calculation

```
c_custalert1 | G | GROUP | c_custalert1
c_custalert2 | G | GROUP | c_custalert2
```

batch_loadmeas_list.txt

Example 4-11 # load custom measure

```
c_weeklyLoad | M | c_ActiveItem
c_weeklyLoad | M | c_DisContinue
```

batch_exportmeas_list.txt**Example 4–12 # export custom measure**

```

c_export_promoeffects|O|promoeffects.csv.dat
c_export_promoeffects|X|storsku_lprm
c_export_promoeffects|F|c_ExportMask
c_export_promoeffects|S|ftp
c_export_promoeffects|M|prmbldf07

```

Custom Batch Control Validation

The extensible / custom batch control files need to follow the guidelines previously listed so as to future proof the retailer. That means the retailer should receive software updates without breaking the existing customizations. To ensure that the batch control file guidelines are adhered to, a batch control validation module has been added.

The `ra_config_validation.sh` script has an optional parameter `-b <parent directory of batch control files>` which will validate the batch control files.

Batch control validation rules:

- Apart from the `batch_oat_list.txt`, none of the set names in the other batch control files can be overridden. That is, GA set names cannot be used in custom batch control files.
- None of the custom batch control files can call the GA set names.
- The `batch_calc_list.txt` can only specify custom rule group names. Cannot specify expressions and GA rule group names.
- The `batch_loadmeas_list.txt` can specify measures that are listed in the Loadable or Writable list of the published measures in the `publishedRdfMeasures.properties` file
- The `batch_exportmeas_list.txt` can specify measures that are listed in the ReadOnly or Writable list of the published measures in the `publishedRdfMeasures.properties` file.
- All custom set names should have a prefix of `c_`.

Note that the batch control validation is called automatically during domain build or patch. It is also called when the batch control files are uploaded using the Upload Batch Control files from OAT.

Dashboard Extensibility

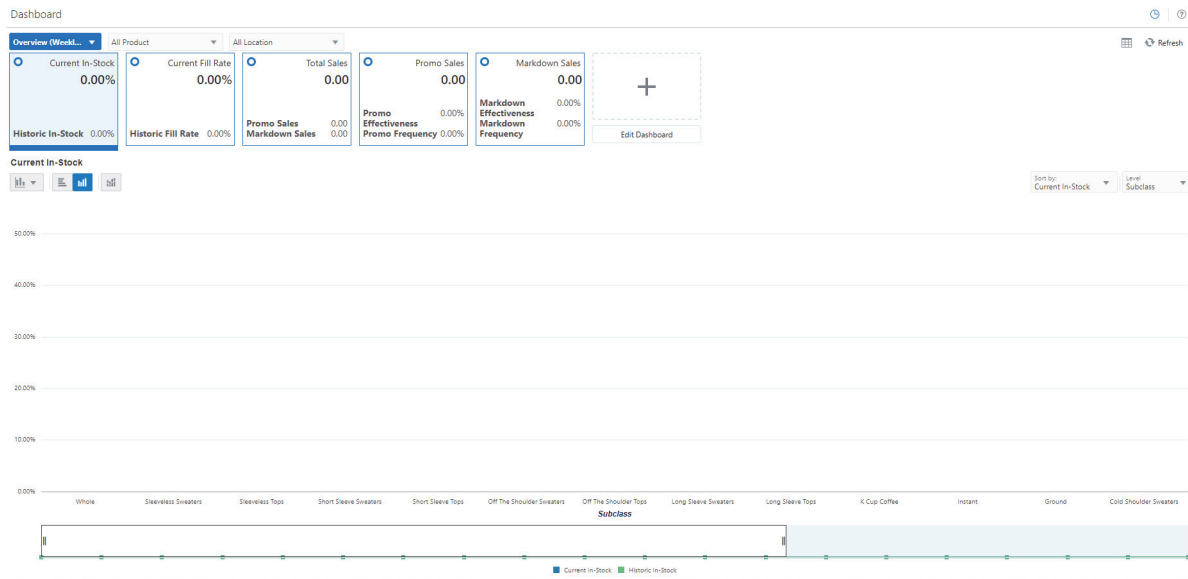
RDF supports Dashboard Extensibility by allowing the Dashboard Settings configuration file to be customized. Refer to the chapter, “Configuring Dashboards in RPASCE EE” in the *Oracle Retail Predictive Application Server Cloud Edition (RPASCE) Configuration Tools User Guide* for detailed information on Dashboard components.

As part of extensible dashboard, the following are supported:

- Adding custom Metric and Exception profiles.
- Adding a custom tile to GA Metric and Exception profiles.
- Removing GA tiles and profiles.

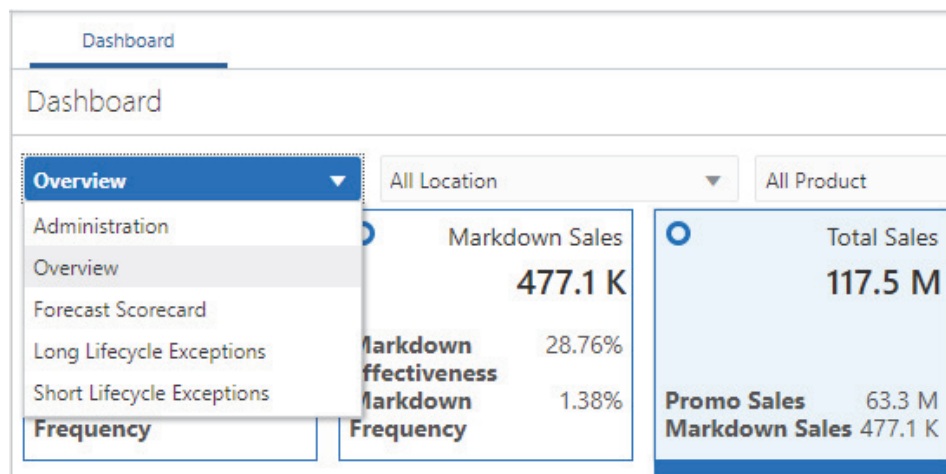
Figure 4–1 shows the RDF Dashboard as seen in the UI. It consists of two Metric profiles and two Exception profiles.

Figure 4–1 RDF CS Dashboard



In Figure 4–2, the Overview Metric profile is selected and the Total Sales tile is highlighted with two sub-measures: Promo Sales and Markdown Sales.

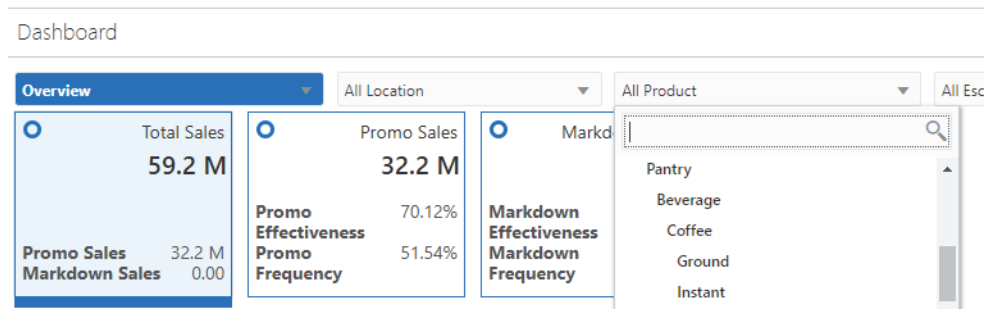
Figure 4–2 RDF CS Dashboard Selection



Note that the Exception profiles consist of Exception Tiles, and the Metric Profile consists of metric tiles of the type Comparison Tile. Currently RDF does not support the Variance Metric tile.

Dashboard Intersection

The RDF GA Dashboard workbook is built at the Sub-class, District level which is controlled by the Dashboard Intersection specified in the Common plug-in. Refer to "Configuring the RDF CS Solution." The Dashboard intersection also defines the level to which we can drill down the Product and Location filters in the Dashboard.

Figure 4–3 Product / Location Filters in the Dashboard

Process to Customize the Dashboard

Dashboard profiles correspond to a worksheet in the Dashboard workbook template in the configuration; and the measures displayed in the tiles are measures present in the worksheet corresponding to that profile. So customizing the dashboard is a three-step process:

1. In the Configuration, add the worksheet, measures, and rules to the Dashboard workbook template.
2. Regenerate the configuration by running the plug-in automation and then validate the configuration by running the `ra_config_validation.sh` script. Refer to the section, "Validating the Customized Configuration," for more information.
3. Customize the GA Dashboard Settings file in the Deployment Tool.

Note that the Deployment Tool is a utility within the Configuration Tools. Refer to the section, *Deployment Tool – Dashboard Settings Resource in the Oracle Retail Predictive Application Server Cloud Edition (RPASCE) Configuration Tools User Guide*.

The RDF GA Dashboard Settings configuration file is located in the configuration:
RDF\plugins\dashboardSettings.json

Steps to add a custom profile:

1. In the Configuration Tool, add custom worksheet and measures to the worksheet in the dashboard workbook template in the configuration. Also add load/calc rules for the measures.
2. In the Deployment Tool, open the GA Dashboard Settings configuration file.
3. Add the custom profile (Exception or Metric) to the Dashboard Settings configuration file.
4. Save the file in the Deployment Tool.

Steps to add a custom tile:

1. Identify the profile and worksheet to which the custom tiles need to be added.
2. In the Configuration Tool, add the custom measures to the corresponding worksheet. Also add load/calc rules for the measures.
3. In the Deployment Tool, open the GA Dashboard Settings configuration file.
4. Based on whether Exception or Metric profile, add the Exception tile or Comparison Metric Tile.
5. Save the file in the Deployment Tool.

Steps to remove GA tiles and profiles:

Note: Do not remove the GA measures or worksheet from the Dashboard workbook template in the configuration.

1. In the Deployment Tool, open the GA Dashboard Settings configuration file.
2. Delete the GA profile or tile.
3. Save the file in the Deployment Tool.

Save the Dashboard Settings Configuration file in the same location in the configuration, that is: **RDF\plugins\dashboardSettings.json**. Since this file is stored inside the configuration, whenever the customer uploads the configuration to the **Object Store**, the customized Dashboard Configuration file will be used by the application during the domain build or patch process.

Once the domain is built or patched, if minor changes need to be done to the Dashboard that do not require a configuration change, then RPASCE provides a mechanism to Upload and Retrieve JSON files from the application.

This is supported through the **Configured Batch OAT task -> Manage JSON Files**. Refer to the *Oracle Retail Predictive Application Server Cloud Edition (RPASCE) Administration Guide* for detailed information on the OAT tasks.

Steps to Retrieve/Upload the Dashboard Configuration File:

1. Go to the **Configured Batch OAT task -> Manage JSON Files -> Retrieve option**.
2. The dashboard settings file will be downloaded into the **Object Store** as **RDF_json.tar.gz**
3. Un-tar the file and open it in the Deployment Tools.
4. Edit the file. Note that only minor updates that do not require a configuration change can be made at this time.
5. Save the file and zip it up as **RDF_json.tar.gz** and then upload it to the **Object Store**
6. Then go to the **Configured Batch OAT task -> Manage JSON Files -> Upload option**.
7. Log out and log in to the client.
8. The Dashboard should be updated with the changes

Applying Changes to the Cloud Environment

To implement these changes in the cloud environment, it is necessary to either build a new domain or patch the domain. Refer to the *Install/Patch Domain* chapter in the *Oracle Retail Demand Forecasting Cloud Service Administration Guide*.

Customizing the **interface.cfg** File to Change Interfaces

Follow these general guidelines for customizing **interface.cfg** to change interfaces:

- You can only add or modify published interfaces present in the *Oracle Retail Predictive Application Server Cloud Edition Implementation Guide*.
- You can only add new custom measures configured within the application, if the respective data is available in the source interface tables in RDX.

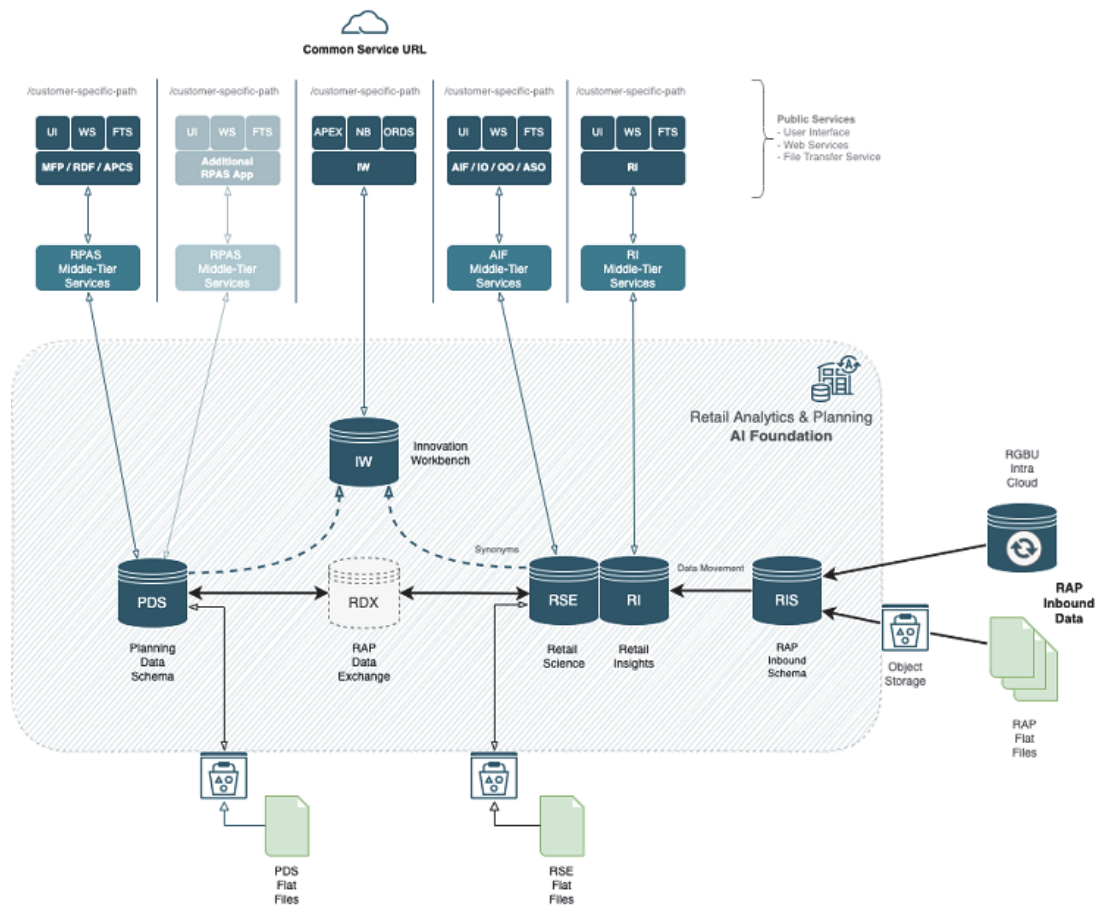
- You can use the Load Interface Mappings OAT task to load changed interface mappings into the **interface.cfg** file, which will validate for any errors. If no validation errors, it will upload those details

Note: For details about changes to **interface.cfg**, refer to the *Oracle Retail Predictive Application Server Cloud Edition Implementation Guide*.

RAP Integration

The Retail Demand Forecasting (RDF) solution is built on top of the Planning Data Store (PDS) and is integrated with Retail Science (RSP) and Retail Insights (RI) within the Retail Analytical Platform (RAP). All three solutions (RSP, RI, PDS) within RAP can share data using RAP Data Exchange (RDX) using RAP interfaces. RDF gets the foundation data from RI and forecast from RSP through RDX. RDF being an extensible solution, retailers can customize the interface using the `interface.cfg` file to map dimensions and facts from the RAP interface tables. For additional information refer to the *Retail Predictive Application Server Cloud Edition Implementation Guide*.

Figure 5–1 Retail Analytical Platform (RAP) Integration



Interfaces Available in the RDF Template

Following is the pre-defined grouping of interfaces available in the RDF template version within RAP integration:

- Product Hierarchy from RMF CS using Retail Insights (RI)
- Organization Hierarchy from RMF CS using Retail Insights (RI)
- Calendar Hierarchy from RMF CS using Retail Insights (RI)
- Product Attribute Hierarchy from RMF CS using Retail Insights (RI)
- Item Attributes from Retail Insights (RI)
- Sales Data from Retail Insights (RI)
- Offer Hierarchy from Science (RSP)
- Offer Details from Science (RSP)
- Reward Type Hierarchy from Science (RSP)
- Group Hierarchy from Science (RSP)
- Group Level Hierarchy from Science (RSP)
- Product Attribute Weight from Science (RSP)
- Forecast Import from Science (RSP)
- Base Demand Import from Science (RSP)
- Approved Base Demand Import from Science (RSP)
- Preprocessed Sales Import from Science (RSP)
- Flex Group Import from Science (RSP)
- Export Run Type Batch Setting
- Approved Forecast Export
- Forecast Parameters Export
- Agg/Spread Profile Export
- Flex Group Assignment Export
- New Item Parameters Export

Product Hierarchy from RMF CS using Retail Insights (RI)

Table 5–1 lists the interface grouping for Product Hierarchy from RMF CS using Retail Insights (RI).

Table 5–1 Product Hierarchy from RMF CS using Retail Insights (RI)

RDX Table	RDX Field Name	PDS Field Mapping
W_PDS_PRODUCT_D	ITEM	SKU
	ITEM_PARENT_DIFF	SKUP
	ITEM_PARENT	SKUG
	SUBCLASS_ID	SCLS
	CLASS_ID	CLSS
	DEPT	DEPT
	GROUP_NO	PGRP
	DIVISION	DVSN
	COMPANY	CMPP
	SUPPLIER	VNDR
	ITEM_DESC	
	ITEM_PARENT_DIFF_DESC	
	ITEM_PARENT_DESC	
	SUB_NAME	
	CLASS_NAME	
	DEPT_NAME	
	GROUP_NAME	
	DIV_NAME	
	CO_NAME	
	SUP_NAME	

Organization Hierarchy from RMF CS using Retail Insights (RI)

Table 5–2 lists the interface grouping for Organization Hierarchy from RMF CS using Retail Insights (RI).

Table 5–2 Organization Hierarchy from RMF CS using Retail Insights (RI)

RDX Table	RDX Field Name	PDS Field Mapping
W_PDS_ORGANIZATION_D	LOCATION	STOR
	DISTRICT	DSTR
	REGION	REGN
	AREA	CHNL
	CHAIN	CHAN
	COMPANY	COMP
	STORE_FORMAT	SFMT
	STORE_CLASS	STCL
	LOC_NAME	
	DISTRICT_NAME	
	REGION_NAME	
	AREA_NAME	
	CHAIN_NAME	
	CO_NAME	
	STORE_FORMAT_NAME	
	STORE_CLASS_DESCRIPTION	

Calendar Hierarchy from RMF CS using Retail Insights (RI)

Table 5–3 lists the interface grouping for Calendar Hierarchy from RMF CS using Retail Insights (RI).

Table 5–3 Calendar Hierarchy from RMF CS using Retail Insights (RI)

RDX Table	RDX Field Name	PDS Field Mapping
W_PDS_CALENDAR_D	DAY	DAY
	WEEK	WEEK
	MNTH	MNTH
	QRTR	QRTR
	HALF	HALF
	YEAR	YEAR
	WOYR	WOYR
	DOW	DOW
	DAY_LABEL	
	WEEK_LABEL	
	MNTH_LABEL	
	QRTR_LABEL	
	HALF_LABEL	
	YEAR_LABEL	
	WOYR_LABEL	
DOW_LABEL		

Product Attribute Hierarchy from RMF CS using Retail Insights (RI)

Table 5–4 lists the interface grouping for Product Attribute Hierarchy from RMF CS using Retail Insights (RI).

Table 5–4 Product Attribute Hierarchy from RMF CS using Retail Insights (RI)

RDX Table	RDX Field Name	PDS Field Mapping
W_PDS_UDA_D	PROD_ATTR_VALUE	PATV
	PROD_ATTR	PATT
	PROD_ATTR_VALUE_DESC	
	PROD_ATTR_DESC	

Item Attributes from Retail Insights (RI)

Table 5–5 lists the interface grouping for Item Attributes from Retail Insights (RI).

Table 5–5 Item Attributes from Retail Insights (RI)

RDX Table	RDX Field Name	PDS Field Mapping
W_PDS_PRODUCT_ATTR_D	ITEM	SKU
	PROD_ATTR	PATT
	PROD_ATTR_VALUE	RDF_PRDATTT

Sales Data from Retail Insights (RI)

Table 5–6 lists the interface grouping for Sales Data from Retail Insights (RI)

Table 5–6 Sales Data from Retail Insights (RI)

RDX Table	RDX Field Name	PDS Field Mapping
W_PDS_GRS_SLS_IT_LC_WK_A	EOW_DATE	WEEK
	ITEM	SKU
	LOCATION	STOR
	SALES_UNITS	RDF_RSAL
	SLS_TYPE (FILTER)	R
	EOW_DATE	WEEK
	ITEM	SKU
	LOCATION	STOR
	SALES_UNITS	RDF_PSAL
	SLS_TYPE (FILTER)	P
	EOW_DATE	WEEK
	ITEM	SKU
	LOCATION	STOR
	SALES_UNITS	RDF_CSAL
SLS_TYPE (FILTER)	C	

Offer Hierarchy from Science (RSP)

Table 5–7 lists the interface grouping for Offer Hierarchy from Science (RSP).

Table 5–7 Offer Hierarchy from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_OFFER_HIER_EXP	OFFER_ID	OFFD
	PROMO_ID	PRMD
	CAMPAIGN_ID	CAMD
	OFFER_ID	OFFA
	CAMPAIGN_ID	CAMA
	OFFER_LABEL	
	PROMO_LABEL	
	CAMPAIGN_LABEL	
	OFFER_ALIAS	
	CAMPAIGN_ALIAS	

Offer Details from Science (RSP)

Table 5–8 lists the interface grouping for Offer Details from Science (RSP).

Table 5–8 Offer Details from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_OFFER_DTL_EXP	OFFER_ID	OFFD
	OFFER_START_DT	OFFSTARTDT
	OFFER_END_DT	OFFENDDT
	REWARD_TYPE_ID	REWARDTYPE

Offer Sales Details from Science (RSP)

Table 5–9 lists the interface grouping for Offer Sales Details from Science (RSP).

Table 5–9 Offer Sales Details from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_OFFER_SALES_EXP	PROD_EXT_KEY	SKU
	LOC_EXT_KEY	STOR
	OFFER_ID	OFFD
	OFFER_SALES_QTY	OFFERSLS
	EFFECTIVE_DISCOUNT_PCT	EFFDISCOUNT

Reward Type Hierarchy from Science (RSP)

Table 5–10 lists the interface grouping for Reward Type Hierarchy from Science (RSP).

Table 5–10 Reward Type Hierarchy from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_REWARD_TYPE_HIER_EXP	REWARD_TYPE_ID	RDTP
	REWARD_TYPE_LABEL	

Group Hierarchy from Science (RSP)

Table 5–11 lists the interface grouping for Group Hierarchy from Science (RSP).

Table 5–11 Group Hierarchy from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
VW_GRP_HIER	NAME	GRPD
	NAME	

Group Level Hierarchy from Science (RSP)

Table 5–12 lists the interface grouping for Group Level Hierarchy from Science (RSP).

Table 5–12 Group Level Hierarchy from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
VW_GLVH_HIER	GLVL	GLVL
	GLVL_LABEL	

Product Attribute Weight from Science (RSP)

Table 5–13 lists the interface grouping for Product Attribute Weight from Science (RSP).

Table 5–13 Product Attribute Weight from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_ATTR_WGT_EXP	PROD_EXT_KEY	CLSS
	LOC_EXT_KEY	CHNL
	PROD_ATTR_GRP_EXT_KEY	PATT
	ATTR_WGT	PATTWGT
	CUSTSEG_EXT_KEY	
	CLS	
	AREA	

Forecast Import from Science (RSP)

Table 5–14 lists the interface grouping for Forecast Import from Science (RSP).

Table 5–14 Forecast Import from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_FCST_DEMAND_DTL_CAL_EXP	FCST_DATE_FROM	llc_frctst_CF_:CLND
	PROD_EXT_KEY	llc_frctst_CF_:PROD
	LOC_EXT_KEY	llc_frctst_CF_:LOC
	BASELINE_FCST_QTY	rdf_sysbaseline_CF_
	DEMAND_FCST_QTY	rdf_sysfrctst_CF_
	EVENT_PEAK_QTY	rdf_syspeak_CF_
	EVENT_CLND	rdf_eventfut_CF_
	PRICE_DISC_PERCENT	rdf_prctdiscfut_CF_
	rdf_rserunid_CF_ (Filter)	RUN_ID
BASELINE_FCST_QTY (Filter)		

Note:

- **llc_frcst_CF_:CLND** —refers to Calendar dimension of the corresponding forecast level
- **llc_frcst_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **llc_frcst_CF_:LOC** —refers to Location dimension of the corresponding forecast level

Base Demand Import from Science (RSP)

Table 5–15 lists the interface grouping for Base Demand Import from Science (RSP)

Table 5–15 Base Demand Import from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_FCST_DEMAND_DTL_EXP	PROD_EXT_KEY	llc_frcstTS_CF_:PROD
	LOC_EXT_KEY	llc_frcstTS_CF_:LOC
	BASE_DEMAND_QTY	rdf_basedemand_CF_
	PRICE_ELASTICITY	rdf_priceelas_CF_
	rdf_rserunid_CF_ (Filter)	RUN_ID
	BASE_DEMAND_QTY (Filter)	

Note:

- **llc_frcstTS_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **llc_frcstTS_CF_:LOC** —refers to Location dimension of the corresponding forecast level

Approved Base Demand Import from Science (RSP)

Table 5–16 lists the interface grouping for Approved Base Demand Import from Science (RSP).

Table 5–16 Approved Base Demand Import from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_FCST_APPR_BASE_DMD_EXP	PROD_EXT_KEY	llc_frcstTS_CF_:PROD
	LOC_EXT_KEY	llc_frcstTS_CF_:LOC
	APPR_BASE_DEMAND_QTY	rdf_appchosenlevel_CF_
	rdf_rserunid_CF_ (Filter)	RUN_ID
	APPR_BASE_DEMAND_QTY (Filter)	

Note:

- **llc_frcstTS_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **llc_frcstTS_CF_:LOC** —refers to Location dimension of the corresponding forecast level

Preprocessed Sales Import from Science (RSP)

Table 5–17 lists the interface grouping for Preprocessed Sales Import from Science (RSP).

Table 5–17 Preprocessed Sales Import from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_FCST_DEMAND_SRC_EXP	DATE_FROM	llc_frcst_CF_:CLND
	PROD_EXT_KEY	llc_frcst_CF_:PROD
	LOC_EXT_KEY	llc_frcst_CF_:LOC
	STOCKOUT_IND	rdf_outageind_CF_
	LOST_SLS_QTY	rdf_outageadj_CF_
	OUTLIER_IND	rdf_outlierind_CF_
	OUTLIER_SLS_QTY	rdf_outlieradj_CF_
	PROMO_SLS_QTY	rdf_depromoadj_CF_
	CLR_SLS_QTY	rdf_deprice_CF_
	PREPROCESSED_SLS_QTY	rdf_totadjsls_CF_
	rdf_rserunid_CF_ (Filter)	RUN_ID
	PREPROCESSED_SLS_QTY (Filter)	

Note:

- **llc_frcst_CF_:CLND** —refers to Calendar dimension of the corresponding forecast level
- **llc_frcst_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **llc_frcst_CF_:LOC** —refers to Location dimension of the corresponding forecast level

Flex Group Import from Science (RSP)

Table 5–18 lists the interface grouping for Flex Group Import from Science (RSP).

Table 5–18 Flex Group Import from Science (RSP)

RDX Table	RDX Field Name	PDS Field Mapping
RSE_FLEX_GROUP_SET_EXP	NAME	GLVL
	RUN_TYPE_KEY	rdf_glv12flvl
	DESCR	rdf_glvldesc
	DESCR (Filter)	
VW_GRP_LABELTXT	NAME	GRPD
	FLEX_GROUP_SET_NAME	GLVL
	DESCR	rdf_grplabeltxt_CF_
	DESCR (Filter)	
VW_GRP_POSASSIGN	PROD_EXT_KEY	llc_frcst_CF_:PROD
	LOC_EXT_KEY	llc_frcst_CF_:LOC
	FLEX_GROUP_SET_NAME	GLVL
	FLEX_GROUP_NAME	rdf_grpassignpos_CF_
	FLEX_GROUP_NAME (Filter)	

Note:

- llc_frcst_CF_:PROD —refers to Product dimension of the corresponding forecast level
 - llc_frcst_CF_:LOC —refers to Location dimension of the corresponding forecast level
-
-

Export Run Type Batch Setting

Table 5–19 lists the interface grouping for Export Run Type Batch Setting.

Table 5–19 Export Run Type Batch Setting

RDX Table	RDX Field Name	PDS Field Mapping
RDF_RUN_TYPE_PARM_EXP	RDF_RUN_TYPE_KEY	v
	ENABLE_NEW_ITEM	rdf_runnewitem_CF
	ENABLE_FORECAST	rdf_runfrcst_CF_

Approved Forecast Export

Table 5–20 lists the interface grouping for Approved Forecast Export.

Table 5–20 Approved Forecast Export

RDX Table	RDX Field Name	PDS Field Mapping
RDF_APPR_FCST_CAL_EXP		llc_frcst_CF_:CLND
	PROD_EXT_KEY	llc_frcst_CF_:PROD
	LOC_EXT_KEY	llc_frcst_CF_:LOC
	BOP_DATE	rdf_bopdate_CF_
	APPR_BASELINE_FCST	rdf_appbaseline_CF_
	APPR_DEMAND_FCST	rdf_appfrcst_CF_
	APPR_CUMINT	rdf_appcumint_CF_
		rdf_exportmask_CF_ (Filter)

Note:

- **llc_frcst_CF_:CLND** —refers to Calendar dimension of the corresponding forecast level
- **llc_frcst_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **llc_frcst_CF_:LOC** —refers to Location dimension of the corresponding forecast level

Forecast Parameters Export

Table 5–21 exports the basic forecast parameters like Forecast Start Date, Forecast End Date and History length (used to calculate base demand) at the RUN TYPE intersection.

Table 5–21 Forecast Parameters Export: Basic Forecast Parameters

RDX Table	RDX Field Name	PDS Field Mapping
RDF_FCST_PARM_EXP	PROD_EXT_KEY	llc_frcstTS_CF_:PROD
	LOC_EXT_KEY	llc_frcstTS_CF_:LOC
	FCST_HIST_LENGTH	rdf_hislen_CF_
	FCST_START_DATE	rdf_frcststartdt_CF_
	FCST_END_DATE	rdf_frcstenddt_CF_
		rdf_expfcstmaskts_CF_ (Filter)

Note:

- **llc_frcstTS_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **llc_frcstTS_CF_:LOC** —refers to Location dimension of the corresponding forecast level

Table 5–22 exports the preprocess indicators that could be loaded or calculated through extensibility.

Table 5–22 Forecast Parameters Export: Preprocess Indicators

RDX Table	RDX Field Name	PDS Field Mapping
RDF_FCST_PARM_CAL_EXP		llc_frcst_CF_:CLND
	PROD_EXT_KEY	llc_frcst_CF_:PROD
	LOC_EXT_KEY	llc_frcst_CF_:LOC
	BOP_DATE	rdf_bopdate_CF_
	USER_OVERRIDE	rdf_totadjslsovr_CF_
	PPS_OUTAGE_IND	rdf_outageind_CF_
	PPS_OUTLIER_IND	rdf_outlierind_CF_
		rdf_expparmask_CF_ (Filter)

Note:

- llc_frcst_CF_:CLND —refers to Calendar dimension of the corresponding forecast level
- llc_frcst_CF_:PROD —refers to Product dimension of the corresponding forecast level
- llc_frcst_CF_:LOC —refers to Location dimension of the corresponding forecast level

Agg/Spread Profile Export

Table 5–23 exports the promo aggregation profile per RUN TYPE. The intersect of this measure is defined in the RDF plug-in and also in the RSE_FCST_RUN_TYPE_CONFIG table.

Table 5–23 Agg/Spread Profile Export: Promo Aggregation Profile

RDX Table	RDX Field Name	PDS Field Mapping
RDF_PROMO_AGG_PROF_EXP	DOW_KEY	csl_aggprof_CF_:CLND
	PROD_EXT_KEY	csl_aggprof_CF_:PROD
	LOC_EXT_KEY	csl_aggprof_CF_:LOC
	PROMO_AGG_PROFILE	rdf_promoaggprof_CF_
	BOP_DATE	rdf_promoaggdate_CF_

Note:

- **csl_aggprof_CF_:CLND** —refers to Calendar dimension of the corresponding forecast level
- **csl_aggprof_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **csl_aggprof_CF_:LOC** —refers to Location dimension of the corresponding forecast level

Table 5–24 exports the forecast spread profile per RUN TYPE. The intersection of this measure is defined in the RDF plug-in and also in the RSE_FCST_RUN_TYPE_CONFIG table.

Table 5–24 Agg/Spread Profile Export: Forecast Spread Profile

RDX Table	RDX Field Name	PDS Field Mapping
RDF_FCST_SPD_PROF_EXP	DOW_KEY	llc_sprdprof_CF_:CLND
	PROD_EXT_KEY	llc_sprdprof_CF_:PROD
	LOC_EXT_KEY	llc_sprdprof_CF_:LOC
	FCST_SPREAD_PROFILE	rdf_basespreadprof_CF_
	BOP_DATE	rdf_basespreaddate_CF_
		rdf_basespreadprof_CF_ (Filter)

Note:

- **llc_sprdprof_CF_:CLND** —refers to Calendar dimension of the corresponding forecast level
- **llc_sprdprof_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **llc_sprdprof_CF_:LOC** —refers to Location dimension of the corresponding forecast level

Flex Group Assignment Export

Table 5–25 exports the groups for a group set.

Table 5–25 Flex Group Assignment Export: Group Set

RDX Table	RDX Field Name	PDS Field Mapping
RDF_FLEX_GROUP_EXP	NAME	GRPD
	FLEX_GROUP_SET_NAME	GLVL
	RDF_FLEX_GROUP_EXP	rdf_grplabeltxt_CF_
		rdf_grplabeltxt_CF_ (Filter)

Table 5–26 exports the actual PROD/LOC group assignments.

Table 5–26 Flex Group Assignment Export: Group Assignments

RDX Table	RDX Field Name	PDS Field Mapping
RDF_FLEX_GROUP_PROD_ LOC_EXP	PROD_EXT_KEY	llc_frcstTS_CF_:PROD
	LOC_EXT_KEY	llc_frcstTS_CF_:LOC
	FLEX_GROUP_SET_NAME	GLVL
	FLEX_GROUP_NAME	rdf_grpassignpos_CF_
		rdf_grpassignpos_CF_ (Filter)

Note:

- **llc_frcstTS_CF_:PROD** —refers to Product dimension of the corresponding forecast level
- **llc_frcstTS_CF_:LOC** —refers to Location dimension of the corresponding forecast level

New Item Parameters Export

Table 5–27 exports the strategy to be applied to generate forecast for new items and new stores. These parameters are applicable for all Run Types that have ENABLE_NEW_ITEM field set to TRUE in the RDF_RUN_TYPE_PARM_EXP table.

Table 5–27 New Item Parameters Export

RDX Table	RDX Field Name	PDS Field Mapping
RDF_NIT_PARM_EXP	PROD_EXT_KEY	NIT_SKUSTR_INTX:PROD
	LOC_EXT_KEY	NIT_SKUSTR_INTX:LOC
	NIT_SKUSTR_INTX:PROD	PROD_HIER_LEVEL
	NIT_SKUSTR_INTX:LOC	LOC_HIER_LEVEL
	NIT_SUB_METHOD	rdf_fcsubm
	NIT_ROS_USER_IN	rdf_fcpros
	NIT_LIKE_ITEM	rdf_nitapplkitm1
	NIT_LIKE_STOR	rdf_nstapplkstr1
	ADJUSTMENT_FACTOR	rdf_fcpadj
		rdf_fcsubm (Filter)

Appendix: New Item Configuration Guide

This appendix describes how RDF Cloud Service performs the batch process for New Items and alternative implementation approaches for the New Item module.

New Item Batch Tasks

New Item batch performs the following tasks:

1. Identify the current New Item/stores that will turn into existing items. This identification is based on the approved substitution method, sales history start date and time series duration. If a New Item/store is going to turn into an existing item/store, its approved Like Item/like stores, approved substitution method, and other settings will be automatically wiped out.
2. Automatically identify New Item/stores in the system based on the user loaded New Item forecast start date
3. Calculate eligible Like Items for the auto-identified New Item/store. The eligible criteria is based on the previous approved base demand, existing items's sales history pattern, active forecast item, and if the existing item is under the same user specified level as the New Item. The Like Item eligibility criteria also includes a Like item exclusion mask that can be customized based on business needs. The user specified level is an input in New Item plug-in. The sale history used in the eligible like item calculation can also be specified in New Item plug-in.
4. Calculates the similarity score between the New Item and eligible Like Items based on product attribute information and provides three Like Item recommendations per the New Item/store that is based on the similarity score rankings.
5. Automatically approves system recommended Like Items, substitution methods, and parameters if user specified.

For details about New Item substitution methods and settings, refer to the *Oracle Retail Demand Forecasting Cloud Service User Guide*.

New Item Forecast Approaches

In RDF Cloud Service, New Item forecasting is implemented differently from previous versions. A baseline forecast for the New Item is generated based on the seasonal curve level. The seasonal curve for the New Item is produced through seasonality escalation like other existing items. The level for the New Item can be produced based on settings in new item module.

Implementation Options

In a normal RDF Cloud Service implementation, there are four possible approaches to setting up the New Item module.

First Approach

Ignore

The customer does not plan to use it and chooses to simply ignore the New Item. For this approach New Items need to be set up for the RDF plug-ins to run successfully. Do the following to ignore using the New Item:

1. Leave all the GA New Item plug-in inputs unchanged.
2. Use the GA prod attribute hierarchy file for the domain build.
3. After the domain build, open the Batch Flow Management workbook and set up the boolean switches related to the New Item as follows:
 - a. Set `runnewitembatch` to false
 - b. Set `runnewitem_CF_` to false
 - c. Commit the workbook changes

Second Approach

Use New Item to Manually Set Up New Item Forecasting Parameters

The customer does not have any attribute information, but would like to use New Item to manually set up New Item Forecast Parameters such as Like Item, Like Store, Substitute Method, user provided Base Demand, and so on. The New Item batch is still necessary to run in this case, because the first step of New Item batch is necessary to automatically turn off New Item/New Store functionality once a New Item/Store matures. However, the Attribute Maintenance workbook will not be able to be created because there is no valid attribute information.

For this approach, the implementor need to set up the New Item using the following steps:

1. Go over the following New Item plug-in inputs one by one:
 - New Item data source
The intersection of the specified measure decides the level where the New Item and New Store will be set up. The sales history from this measure will be used to decide if a new item/store is matured.
 - Product Map
Allows the user to specify which level that the New Item and eligible Like Item should be under. A Like Item can only be selected from the items that roll up to the same level.
 - New Store level
Allows users to specify Like Stores for the whole level
2. Use the GA attribute hierarchy file for the domain build.
3. After the domain build, open the Batch Flow Management workbook and set up the boolean switches related to New Item as follows:

Note: New Item forecasting will generate unpredictable results if the final level intersection's prod and loc dimensions do not match what is configured in the New Item module.

- a. Set `runnewitembatch` to true.
 - b. Set `runnewitem_CF_` to true if the level needs to enable New Item forecasting. The final level forecast intersection must have the same product and location level as the New Item data source measure.
 - c. Set `runnewitem_CF_` to false if the level needs to disable New Item forecasting or the final level intersection 's product and location level were different from the New Item data source measure.
 - d. Commit the workbook changes.
4. Use New Item Maintenance workbook and the New Store Maintenance workbook to set up New Item and New Store settings in the New Item Basic Parameters worksheet of New Item Maintenance Workbook and make sure `nitautoapp` is set to false.
 5. This will turn off `autoapprove` in the New Item batch process. Set `nitdtsdur` (time series duration) to the user desired value. This control how many sales periods a New Item/store needs to mature. Within the New Item Maintenance Workbook, you can also play with the New Item forecast parameters to review the What-if New Item Forecast.

Third Approach

With Attribute Information, Use New Item to Get Recommended Like Items and Manually Set Up Like Item and Like Stores

The customer has attribute information and would like to use New Item to get recommended like items and manually set up like item and like stores. Full fledged New Item functionality is enabled in this case and data preparation is very important. In this case, the implementor needs to set up the New Item using the following steps:

1. Go over the following New Item plug-in inputs one by one:
 - New Item data source

The intersection of the specified measure decides the level where the New Item and New Store will be set up. The sales history from this measure will be used to calculate eligible like item and decide if a new item/store is matured.
 - Product Map

Allows the user to specify which level that the New Item and eligible Like Item should be under. A Like Item can only be selected from the items that roll up to the same level.
 - Attribute Weight Location

Allows the user to specify which location level that the attribute weight used in similarity score calculation is based on. The attribute weight measure intersection is to be on product Map/attribute-weight-loc/patt. In GA, it is `class/chan/patt`.
 - New Store level

Allows users to specify Like Stores for the whole level

2. Prepare the following data files for the RDF environment build and ongoing data load in the future. Product Attribute hierarchy (PATR), product attribute measure (prdattT) and attribute measure (nitdattwgt) should all come from RI. If they are not available from RI for some reason. They need to be in the following files:
 - **PATR.csv.dat**—attribute hierarchy file
 - **prdattT.csv.ovr**—product attribute value data file
 - **nitdattwgt.csv.ovr**—attribute weight data file (without this data file, there is no similarity score and Like Item recommendation)

The New Item Forecast start date override (nitfcststovr) and user provided New Item Base Rate of Sales (nisros) should be provided by implementor. The following file should be provided if possible:

- **nitfcststovr.csv.ovr**—New Item forecast start date data file (without this data file, there is no New Item identification)
- **nisros.csv.ovr**—user provided New Item base rate of sales data file.

Without proper data, the Attribute Maintenance workbook can not be created in the future.

3. After the RDF environment build, open the Batch Flow Management workbook and set up the boolean switches related to New Item as follows:

Note: New Item forecasting will generate unpredictable results if the final level intersection's prod and loc dimensions do not match what is configured in the New Item module.

- a. Set `runnewitembatch` to true
 - b. Set `runnewitem_CF_` to true if the level needs to enable New Item forecasting. The final level forecast intersection must have the same product and location level as the New Item data source measure.
 - c. Set `runnewitem_CF_` to false if the level needs to disable New Item forecasting or the final level intersection 's product and location level were different from the New Item data source measure
 - d. Commit the workbook changes.
4. Use New Item Maintenance/Management workbook and New Store Maintenance workbook to set up New Item and New Store settings. In the New Item Basic Parameters worksheet of New Item Maintenance workbook, set up `nitautoapp` to the user desired value. This will enable or disable `autoapprove` in the New Item batch process. Set `nitdtsdur` (time series duration) to the user desired value. This control how many sales periods a New Item needs to mature
 5. If the loaded New Item forecast start date and New Item base rate of sales were not available, the following business flow must be performed:
 - a. Load the New Item base rate of sales by loading the customer provided **nisros.csv.ovr** file
 - b. Open the New Item Maintenance workbook to input `nitfcststovr` without running any approve custom menu and then commit the change.
 - c. Run `newitem_batch` to automatically identify New Items and generate system recommended like SKU.

- d. New Items can be approved automatically in Step c. The user can also create the New Item Maintenance workbook again to manually approve the New Item settings.

Fourth Approach

Bypass New Item Workbooks and Set Up New Item Forecasting through Direct Measure Loading and Calculation

Use this approach when you want to use New Item Forecast, but do not have any attribute information and you do not want to populate New Item parameters manually. You can load information into the New Item Parameter measures directly and avoid using any New Item workbook. It is still necessary to run the New Item batch because the first step of New Item batch automatically turns off New Item functionality once a New Item matures.

For this approach, the implementor needs to set up the New Item using the following steps:

1. Verify the following New Item plug-in inputs one by one:
 - **New Item data source**—the intersection of the specified measure decides the level where the New Item and New Store will be set up.
 - **Product Map**—allows the user to specify which level that the New Item and eligible Like Item should be under. A Like Item can only be selected from the items that roll up to the same level.
 - **New Store level**—allows users to specify Like Stores for the whole level
2. Build the domain using the GA attribute hierarchy file.
3. After the domain build, open the Batch Flow Management workbook and set up the boolean switches related to New Item as follows:

Note: New Item Forecasting generates unpredictable results if the final level intersection's `prod` and `loc` dimensions do not match with what is configured in the New Item module.

- a. Set `runnewitembatch` to true.
- b. Set `runnewitem_CF_` to true if the level needs to enable New Item forecasting. The final level forecast intersection must have the same product and location level as the New Item data source measure.
- c. Set `runnewitem_CF_` to false if the level needs to `_disable` the New Item forecasting or the final level intersection 's product and location level were different from the New Item data source measure.
- d. Commit the workbook changes
4. In the New Item Maintenance Workbook, ensure that `nitautoapp` is set to false to turn off auto approve in the New Item batch process. Set `nitdtsdur` (time series duration) to the user desired value. This controls how many sales periods a New Item needs to mature.
5. Prepare the custom batch control file that loads settings into measures such as `nisros` (user provided base demand), `nitdtsdur` (time series duration), `nitappsubm` (substitution method), `nitapplkitm1` (like item), `nitappadj` (like Item adjust percentage).

Note: In the weekly forecast batch, the New Item batch is run before the RDF batch forecast. The initial step in New Item batch identifies matured New Items and clears out its substitute method. RDF batch checks the substitution method to decide if an item goes through a normal forecasting process or New Item forecasting.

If an implementor wants to load a substitute method or other new item parameters, it is important to decide when it should be loaded, either before or after the New Item batch runs. If a substitute method is loaded before the New Item batch runs, it may be automatically wiped out depending on how long its sales history is. If a substitute method is loaded after the New Item batch, then the item will be subject to New Item forecasting forever.

Troubleshooting Tips for Common New Item Issues

The following tips will provide troubleshooting solutions to common issues for New Items in RDF CS.

Issue 1

Issue: The New Item Maintenance Attribute Maintenance Workbook Cannot be Opened Due to an Empty Pre-range Solution

Solution

If you are running into this issue you have by-passed Oracle's new item batch or data loading process.

The New Item Maintenance workbook is pre-ranged by these measures:

- `nitwkrange`
- `nititm2clsr`

The `nitwkrange` measure ranges the CLND hierarchy. The `nititm2clsr` measure ranges the pror hierarchy. The `nitwkrange` measure is calculated in the new item batch, where as the `nititm2clsr` measures are calculated as a post-process after the data load. The Calendar has been pre-ranged to bring in weeks > (TODAY - TS duration). The `nititm2clsr` measure is calculated based on `nititm2itr`. The `nititm2itr` data file is generated by RDF data load process based on product hierarchy and loaded automatically. These logics were implemented through batch control file and OAT.

Users should not encounter any issue if the standard RDF process is followed.

If you encounter this issue after by-passing your domain, make sure that `nititm2itr` and `nititm2clsr` are populated in your domain.

Issue 2

Issue: The New Item Attribute Management Workbook Can Not be Opened Due to an Empty Prerange

Solution

Follow the same solution as for [Issue 1](#).

Issue 4

Issue: You Can Not Generate a Forecast for a New Item Even If There are Valid Like Item and Substitute Method Settings

Solution

The New Item forecast is produced by looking up the seasonal curve through escalation and getting a base rate of sales from the like item/user input/base rate of sales escalation.

If it is not populated, that means there is no seasonal curve for all of the escalation intersections at this particular item/store. An implementor should consider adding a new catch-all escalation level. The other possibility is base demand is zero. You can further looking into the reason by base rate of sales cannot be generated.

Issue 5

Issue: The New Item Forecast is Setup in the New Item Maintenance Workbook, but No Forecast is Generated for the New Item and Base Demand Measures have a Zero Value

Solution

Check the `runnewitem_CF_` measure which is visible in the Batch Flow Management workbook. If the measure is false, set it back to true, commit and rerun the forecast.

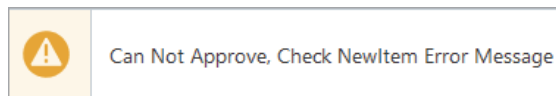
If `runnewitem_CF_` is true, then check the `nitappsubm` substitution method.

If <code>nitappsubm</code> is set to:	Then:
None	No New Item forecast will be generated.
Like Item	At least one valid existing item must be assigned as the Like Item. The Like Item itself must have a forecast. The Like Item assignment measure is: <ul style="list-style-type: none"> ▪ <code>nitapplkitm1</code> The <code>nitappadj</code> (total adjustment percentage) can not be zero.
User Input	The user must provide the base rate of sales for the New Item. The value will be stored in <code>nitappros</code> after the New Item approval process. When the substitute method is user input, then <code>nitappros</code> can not be zero.

Issue 6

Issue: When Trying to Approve Like Item Recommendations, Received this Approve Error Message: *Can Not Approve, Check New Item Error Message*

Figure A-1 Error Message



Solution

This error is due to a problem in your New Item set up. On the worksheet, display show /hide for *select and approve*. For the New Item error message measure, ensure that measure is visible on the worksheet. It will provide additional clues for the issue.

Appendix: RDF CS Business Rule Engine

Oracle Retail has designed the Business Rule Engine (BRE) to help RDF CS users set up business strategies to manage parameters used in the forecast approval and navigation processes. Parameters include alert thresholds, alert calculation window, as well as navigation criteria. These parameters can be set up manually in the Forecast Setup workbook at the global, intermediate and final levels (override). With the Business Rule Engine, the parameter values at final level can be dynamically adjusted based on business strategy. No patching of the environment is required.

For example, a business strategy can be to set the alert error threshold to 10% for all item/store combos with average sales larger than 10 units per week. For item/store with average sales less than 10 units per week, the threshold can be relaxed to 20%. This way high sellers have a tighter error threshold because they are more important for the business. RDF CS users may want to review their forecasts more rigorously. In this approach, the parameter values were assigned to item/stores based on business strategy regardless of their hierarchy positions.

In this appendix, several components of the RDF CS Business Rule Engine are introduced:

- [Hierarchies and Hierarchy Orders](#)
- [Business Rule Attribute](#)
- [How to Set Up Business Strategy for Approval](#)
- [How to Set Up Business Strategy for Navigation](#)
- [How to Use BRE Beyond What Is Available in GA](#)
- [Special Expressions](#)

Hierarchies and Hierarchy Orders

There are several RDF CS internal hierarchies involved in the RDF CS BRE:

- Business Rule Attribute
- Rule-Condition
- Business-Rule
- Final-levels

These hierarchies are required to be configured from innermost to outermost in the order previously listed. In RDF CS GA config, the hierarchy order is configured properly. Implementors can start from RDF CS GA config so that they do not have to configure the hierarchy order themselves. But if they start from other configurations, they need to make sure the hierarchy order is correct.

Business Rule Attribute

The Business Rule Attribute hierarchy in BRE is different from current product attribute or location attribute hierarchy in RDF CS/MFP CS. It is a combination of product attribute, location attribute and prod/loc attribute. These attributes will be used in BRE to associate different prod/locs to different business strategy. The attribute data types can be string, numeric or date. The attribute values can come from 11 different sources:

1. Attribute from product hierarchy, such as scls, class, dept.
2. Attribute from location hierarchy, such as region, store format
3. Loaded product attribute, such as fabric, color. (This may be a subset of the product attribute hierarchy. implementor should only include product attributes that are to be used in business rule groups)
4. Loaded location attribute, such as store open date. (This may be a subset of the location attribute hierarchy. implementor should only include location attributes that are to be used in business rule groups)
5. Loaded prod/loc attribute, such as lead time
6. Calculated GA product attribute, such as number of stores carrying a sku
7. Calculated GA location attribute, such as number of skus sold in a store.
8. Calculated GA prod/loc attribute, such as historical average sales, historical relative standard deviation of sales.
9. Calculated custom product attribute, defined by implementor
10. Calculated custom location attribute, defined by implementor
11. Calculated custom prod/loc attribute, defined by implementor

Because the attribute value could come from such a diverse sources, it will be very inefficient to keep a centralized measure to store the attribute values. RDF CS takes a distributed approach on storing the attribute values. The attribute value in 1 and 2 are part of hierarchy and no separate storage is needed.

For each final level, the loaded attributes can be stored in nine measures:

- All measures based on sku/attd (string, numeric, date)
- All measures based on stor/attd (string, numeric, date)
- All measures based on sku/stor/attd (string, numeric, date)

For each final level, the GA calculated attributes can also be stored in the same nine measures as loaded. The GA calculated attributes were stored in different measures from the loaded attributes for performance reason.

RDF CS batch is responsible for populating the GA calculated attributes. If additional calculated attributes are needed, the implementor can write custom rules to calculate them and populate the nine measures per final level that are reserved for custom calculated attributes. In total, 27 measures per final level will be created by RDF CS for attribute value storage as shown in [Table B-1](#).

These measures can be divided based on data type, measure intersections and how they are populated. RDF CS special expressions have built in logic to perform attribute value lookup based on business rule attribute hierarchy info and the previously listed measures. (`_CF_` in the table is a token of the final level name)

Table B-1 Measures per Final Level

Measure Name	Data Type	Intersection	Stored Attribute Type
Ldprdattstr_CF_	String	Prod/attribute	loaded
Ldlocattstr_CF_	String	Loc/attribute	loaded
Ldprdlocattstr_CF_	String	Prod/loc/attribute	loaded
Ldprdattnum_CF_	Real	Prod/attribute	loaded
Ldlocattnum_CF_	Real	Loc/attribute	loaded
Ldprdlocattnum_CF_	Real	Prod/loc/attribute	loaded
Ldprdattdat_CF_	Date	Prod/attribute	loaded
Ldlocattdat_CF_	Date	Loc/attribute	loaded
Ldprdlocattdat_CF_	Date	Prod/loc/attribute	loaded
clcpdattstr_CF_	String	Prod/attribute	GA calculated
clclocattstr_CF	String	Loc/attribute	GA calculated
clcpdlocattstr_CF_	String	Prod/loc/attribute	GA calculated
clcpdattnum_CF_	Real	Prod/attribute	GA calculated
clclocattnum_CF_	Real	Loc/attribute	GA calculated
clcpdlocattnum_CF_	Real	Prod/loc/attribute	GA calculated
clcpdattdat_CF_	Date	Prod/attribute	GA calculated
clclocattdat_CF_	Date	Loc/attribute	GA calculated
clcpdlocattdat_CF_	Date	Prod/loc/attribute	GA calculated
cscclpdattstr_CF_	String	Prod/attribute	Custom Calculated
cscclclocattstr_CF_	String	Loc/attribute	Custom Calculated
cscclcpdlocattstr_CF_	String	Prod/loc/attribute	Custom Calculated
cscclcpdattnum_CF_	Real	Prod/attribute	Custom Calculated
cscclclocattnum_CF_	Real	Loc/attribute	Custom Calculated
cscclcpdlocattnum_CF_	Real	Prod/loc/attribute	Custom Calculated
cscclcpdattdat_CF_	Date	Prod/attribute	Custom Calculated
cscclclocattdat_CF_	Date	Loc/attribute	Custom Calculated
cscclcpdlocattdat_CF_	Date	Prod/loc/attribute	Custom Calculated

All attributes from 1 to 5 and from 9 to 11 can be defined by implementor. An implementor can decided what prod/loc dimension and prod/loc attribute to be included in the attribute dimension. The GA calculated attribute are automatically appended to the business rule attribute hierarchy.

Right now, RDF CS supports the GA calculated attributes listed in:

Table B-2 GA Calculated Attributes

GA calculate Attribute	Label	Intersection	Data Type	Stored Measure	Notes
locs4prod_CF_	Number of Locations Carrying Current Product _CF_	Loc/Attribute	numeric	cllocattnum_CF_	
prods4loc_CF_	Number of Products Carried in Current Location _CF_	Prod/Attribute	numeric	clprdattnum_CF_	
recentavgsls_CF_	Recent Average Sales _CF_	Prod/loc/Attribute	numeric	clprdlocattnum_CF_	
histavgsls_CF_	Historic Average Sales _CF_	Prod/loc/Attribute	numeric	clprdlocattnum_CF_	
navifin_CF_	Navigation Variance _CF_	Prod/loc/Attribute	numeric	clprdlocattnum_CF_	Used in navigation tier
histr1std_CF_	Historic Sales Coefficient Of Variation _CF_	Prod/loc/Attribute	numeric	clprdlocattnum_CF_	

Other than GA attributes, the implementor is responsible for creating and maintaining all custom attributes no matter if loaded or calculated.

RDF CS designed the attribute hierarchy to capture this complex information. There are five dimensions: attribute, attribute source, attribute data type, attribute type and attribute category. [Figure B-1](#) displays the dimensions in the attribute hierarchy.

Attribute dimension: Examples are: scl, clss, dstr, regn, brand, color, size, planned life length, store assortment, recentavgsls01, recentavgsls02.

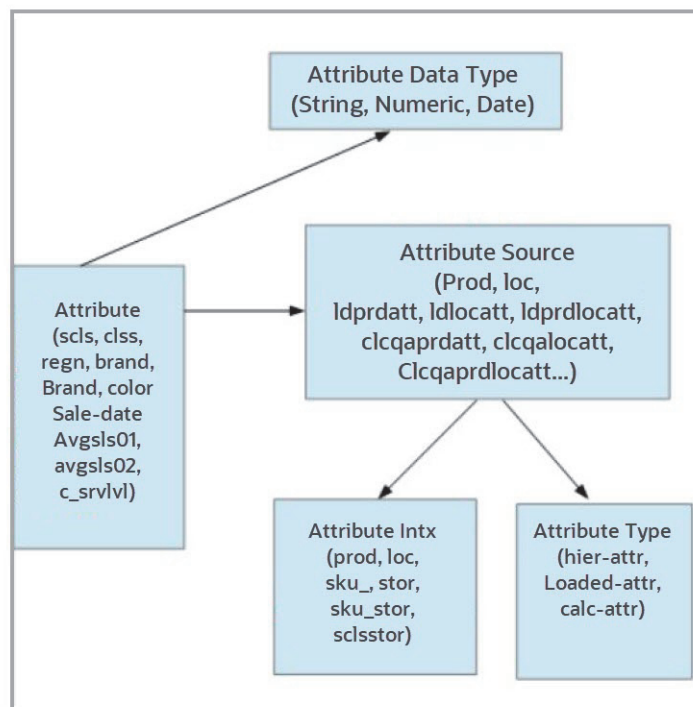
Attribute source dimension: Indicates the source of the attribute values. This can be either from a dimension in the prod hierarchy, a dimension in the location hierarchy, or measures. The position name along this dimensions is either a dimension name or a measure name.

Attribute data type dimension: Indicates the type of values for an attribute. It can be string, numeric or date. Use the value of RPAS Measure data type.

Attribute type dimension: Indicates if an attribute is a hierarchy attribute, loaded attribute or calculated attribute.

Attribute intx dimension: Indicates the hierarchies/dimensions involved in obtaining the attribute value. These can be prod, loc, or prod/loc.

Figure B-1 Business Rule Attribute Hierarchy



Business Rule Attribute Hierarchy File Example

During domain build/patch, RDF CS automatically generates a business rule attribute hierarchy file with GA attributes positions appended to the end of the [Business Rule Attribute Hierarchy File](#).

Example B-1 is an example of the Business Rule Attribute Hierarchy file.

Example B-1 Business Rule Attribute Hierarchy File

```

attd,attd_label,atdt,atdt_label,atsc,atsc_label,atst,atst_label,attp,attp_label
scls,subclass,3,string,scls,subclass of product Hierarchy,hier,Hierarchy
Attribute,prod,Product Attribute
class,class,3,string,class,class of product Hierarchy,hier,Hierarchy
Attribute,prod,Product Attribute
dept,Department,3,string,dept,department of product Hierarchy,hier,Hierarchy
Attributes,prod,Product Attribute
vndr,Vendor,3,string,vndr,vendor of product Hierarchy,hier,Hierarchy
Attribute,prod,Product Attribute
regn,region,3,string,regn,region of location Hierarchy,hier,Hierarchy
Attribute,loc,Location Attribute
chnl,Channel,3,string,chnl,channel of location Hierarchy,hier,Hierarchy
Attribute,loc,Location Attribute
sfmt,Store Format,3,string,sfmt,store format of location Hierarchy,hier,Hierarchy
Attribute,loc,Location Attribute
brand,Brand,3,string,ldprdtattstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
itemstatus,Item Status,3,string,ldprdtattstr01,loaded Product Attribute
01,load,Loaded Attribute,prod,Product Attribute
collar,Collar,3,string,ldprdtattstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
color,Color,3,string,ldprdtattstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
  
```

```

fabric,Fabric,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
neckline,Neckline,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
pattern,Pattern,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
storopendt,Store Open Date,4,date,ldlocattdat01,loaded Location Attribute
01,load,Loaded Attribute,loc,Location Attribute
leadtime,Lead time,2,real,ldprdlocattnum01,Loaded Product/Location Attribute
01,load,Loaded Attribute,prod/loc,Product/Location Attribute

```

If there are two final levels in the RDF CS configuration, the business rule attribute hierarchy file will look like [Example B-2](#):

Example B-2 Business Rule Attribute Hierarchy File with Two Final Levels in the RDF CS Configuration

```

attd,attd_label,atdt,atdt_label,atsc,atsc_label,atst,atst_label,attp,attp_label
scls,subclass,3,string,scls,subclass of product Hierarchy,hier,Hierarchy
Attribute,prod,Product Attribute
class,class,3,string,class,class of product Hierarchy,hier,Hierarchy
Attribute,prod,Product Attribute
dept,Department,3,string,dept,department of product Hierarchy,hier,Hierarchy
Attributes,prod,Product Attribute
vndr,Vendor,3,string,vndr,vendor of product Hierarchy,hier,Hierarchy
Attribute,prod,Product Attribute
regn,region,3,string,regn,region of location Hierarchy,hier,Hierarchy
Attribute,loc,Location Attribute
chnl,Channel,3,string,chnl,channel of location Hierarchy,hier,Hierarchy
Attribute,loc,Location Attribute
sfmt,Store Format,3,string,sfmt,store format of location Hierarchy,hier,Hierarchy
Attribute,loc,Location Attribute
brand,Brand,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
itemstatus,Item Status,3,string,ldprdatstr01,loaded Product Attribute
01,load,Loaded Attribute,prod,Product Attribute
collar,Collar,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
color,Color,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
fabric,Fabric,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
neckline,Neckline,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
pattern,Pattern,3,string,ldprdatstr01,loaded Product Attribute 01,load,Loaded
Attribute,prod,Product Attribute
storopendt,Store Open Date,4,date,ldlocattdat01,loaded Location Attribute
01,load,Loaded Attribute,loc,Location Attribute
leadtime,Lead time,2,real,ldprdlocattnum01,Loaded Product/Location Attribute
01,load,Loaded Attribute,prod/loc,Product/Location Attribute
locs4prod01,Number of Locations Carrying Current Product
01,2,Real,clcprdattnum01,Calculated GA Prod Numeric Attribute 01,gacalc,GA
Calculated Attribute,prod,Product Attribute
prods4loc01,Number of Products Carried in Current Location
01,2,Real,clclocattnum01,Calculated GA Location Numeric Attribute 01,gacalc,GA
Calculated Attribute,loc,Location Attribute
recentavgsls01,Recent Average Sales 01,2,Real,clcprdlocattnum01,Calculated GA
Prod/loc Numeric Attribute 01,gacalc,GA Calculated
Attribute,prod/loc,Product/Location Attribute
histavgsls01,Historic Average Sales 01,2,Real,clcprdlocattnum01,Calculated GA

```

```

Prod/loc Numeric Attribute 01,gacalc,GA Calculated
Attribute,prod/loc,Product/Location Attribute
navifin01,Navigation Variance 01,2,Real,clcprdlocattnum01,Calculated GA Prod/loc
Numeric Attribute 01,gacalc,GA Calculated Attribute,prod/loc,Product/Location
Attribute
histr1std01,Historic Sales Coefficient Of Variation
01,2,Real,clcprdlocattnum01,Calculated GA Prod/loc Numeric Attribute 01,gacalc,GA
Calculated Attribute,prod/loc,Product/Location Attribute
locs4prod02,Number of Locations Carrying Current Product
02,2,Real,clcprdattnum02,Calculated GA Prod Numeric Attribute 02,gacalc,GA
Calculated Attribute,prod,Product Attribute
prods4loc02,Number of Products Carried in Current Location
02,2,Real,clclocattnum02,Calculated GA Location Numeric Attribute 02,gacalc,GA
Calculated Attribute,loc,Location Attribute
recentavgs1s02,Recent Average Sales 02,2,Real,clcprdlocattnum02,Calculated GA
Prod/loc Numeric Attribute 02,gacalc,GA Calculated
Attribute,prod/loc,Product/Location Attribute
histavgs1s02,Historic Average Sales 02,2,Real,clcprdlocattnum02,Calculated GA
Prod/loc Numeric Attribute 02,gacalc,GA Calculated
Attribute,prod/loc,Product/Location Attribute
navifin02,Navigation Variance 02,2,Real,clcprdlocattnum02,Calculated GA Prod/loc
Numeric Attribute 02,gacalc,GA Calculated Attribute,prod/loc,Product/Location
Attribute
histr1std02,Historic Sales Coefficient Of Variation
02,2,Real,clcprdlocattnum02,Calculated GA Prod/loc Numeric Attribute 02,gacalc,GA
Calculated Attribute,prod/loc,Product/Location Attribute

```

Condition Hierarchy

This hierarchy only has one dimension: condition. It is used to organize the strategies used in defining a business rule. In the RDF CS GA configuration, there are four available conditions. The implementor can modify the number of positions they want along the condition dimension by changing the condition hierarchy load file.

[Example B-3](#) is an example of the Condition Hierarchy file.

Example B-3 Condition Hierarchy File

```

cond,cond_label,
cond01, condition 01
cond02, condition 02
cond03, condition 03
cond04, condition 04

```

Business Rule Hierarchy

There are two dimensions: rule and rule-group. Rule rolls up to rule group. This hierarchy should have an order that is after the condition hierarchy but before Prod/loc.

[Example B-4](#) is an example of the Business Rule Hierarchy.

Example B-4 Business Rule Hierarchy

```

ruld,ruld_label,rulg,rulg_label
r001,Rule 1,g001,Rule Group 1
r002,Rule 2,g001,Rule Group 1
r003,Rule 3,g001,Rule Group 1
r004,Rule 4,g001,Rule Group 1
r005,Rule 5,g001,Rule Group 1

```

```

r006,Rule 6,g002,Rule Group 2
r007,Rule 7,g002,Rule Group 2
r008,Rule 8,g002,Rule Group 2
r009,Rule 9,g002,Rule Group 2

```

Final Level Hierarchy

This hierarchy file is generated by the RDF CS plug-in instead of being user provided. There are two dimensions: rule group-type and final level. rule group-type rolls up to final level. There are two GA rule group types per final level, approve and navigation. The implementor can specify additional custom rule groups type through the RDF CS plug-in. Each final level can have its own custom rule group type. The Rule Group-type hierarchy data file will be generated at domain build/patch time.

An example of rule group type hierarchy file generated from a RDF CS configuration with two final levels:

[Example B-4](#) is an example of the Business Rule Hierarchy.

Example B-5 Rule Group Type Hierarchy File Generated from a RDF CS Configuration with Two Final Levels

```

rgtp,rgtp_label,flvl,flvl_label
aprv01,approve 01,01,01 Weekly Units Forecast
navi01,navigation 01,01,01 Weekly Units Forecast
cust101,cust rule group,01,01 Weekly Units Forecast
aprv02,approve 02,02,02 Daily Units Forecast
navi02,navigation 02,02,02 Daily Units Forecast

```

How to Set Up Business Strategy for Approval

The rule/rule group dimensions together with condition dimension and rule group type are used to implement business strategies. It is extremely flexible and powerful. The following describes how to set it up using the current RDF CS GA configuration as an example.

For example: RDF CS GA configuration has one final level and thus two GA rule group type:

- **Approval**—Approval is a rule group type for business strategy related to exception parameters used to approve the forecasts.
- **Navigation**—Navigation is a rule group type for business strategy related to navigation in the Forecast Review workbook. These two rule group types are built in the RDF CS rule group types per final level.

To set up the business strategy for approval, the implementor need to set up rule group and rules using the following steps.

1. Set up rule group to rule group type association.

Open the Business Rule Group Administration workbook. In the [Rule Group Info View](#), the implementor can assign:

- A rule group type for a generic rule group and enter a rule group description.
In the example, each department, Beverage, men's shoes and Missy have its own rule group for approval and navigation.
- Priority for a rule group.

Priority lower bound and upper bound is meant to assign a range of priority for rules within a rule group. An implementor can assign several rule groups to approval but only set up rules for one of them. In that case, only enable the one rule group that is needed. This helps with performance.

Figure B-2 Rule Group Info View

Measure	Rule Group Type	Rule Group Description	Priority Lowerbound	Priority Upperbound...	Enable Rule Group
Business Rule					
Beverage - Approval	Approval	Beverage - Approval	1.00	100.00	<input checked="" type="checkbox"/>
Beverage - Navigation	Navigation	Beverage - Navigation	1.00	100.00	<input checked="" type="checkbox"/>
Men's shoes - Approval	Approval	Men's shoes - Approval	201.00	300.00	<input checked="" type="checkbox"/>
Men's shoes - Navigation	Navigation	Men's shoes - Navigation	201.00	300.00	<input checked="" type="checkbox"/>
Missy - Approval	Approval	Missy - Approval	301.00	400.00	<input checked="" type="checkbox"/>
Missy - Navigation	Navigation	Missy - Navigation	301.00	400.00	<input checked="" type="checkbox"/>
Rule Group 5	Approval		0.00	0.00	<input type="checkbox"/>
Rule Group 6	Approval		0.00	0.00	<input type="checkbox"/>

2. Set up active attributes per rule group.

In the [2.Rule Group Active Attribute View](#), enable active attributes per rule group. In the example, class, high priority item, historic average sales, historic sales coefficient of variance (relative standard deviation) and recent average sales were enabled for the approval rule groups.

Brand was only enabled for Men’s shoes and Missy. Brand may be an important attribute for fashion items. High Priority item is used to flag key items in the business. The rest of enabled attributes is more related to sales pattern.

During rule setup and later calculation, only the value of active attributes will be looked up. RDF CS limits or selects active attributes for certain merchandise to ease the manual selection when you are setting up the rule. Also, having only relevant attributes helps performance.

Figure B–3 2.Rule Group Active Attribute View

Business Rule	Beverage - Approval	Men's shoes - Approval	Missy - Approval	Women's shoes - ...
Attribute				
Brand	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Class	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HighPriority Item 01	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Historic Average Sales 01	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Historic Sales Coefficient Of	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Recent Average Sales 01	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Set up rule group scope.

There is one Rule Group Scope view per final level. Since a rule group is assigned to a rule group type in STEP 1 and a rule group type rolls up to a final level, there is a position query on the worksheet to display only the related rule group per worksheet. In the [Rule Group Scope Worksheet](#), an implementor can set up the prod/location that a particular rule group is associated with. The rule group scope can be set up at the intermediate parameter intersection of the final level. In this example, each rule group is only enabled for the department it is associated with. The worksheet base intersection is on **scls/region/rule-group**. It is rolled up to **dept/all-location/rule-group**.

Figure B–4 Rule Group Scope Worksheet

Business Rule	Beverage - Appro...	Beverage - Naviga...	Men's shoes - App...	Men's shoes - Navi...	Missy - Approval	Missy - Navigation	Women's shoes - ...
Product							
1310Footwear Women's*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1320Footwear Men's*	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beverage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Missy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

4. Create the Business Rule Setup workbook.

There is one Business Rule Setup workbook per final level. During the wizard of the Business Rule Setup, a user is limited to select only one rule group type. A user can only set up business rules for one rule group type within one workbook. Remember the options are Approval and Navigation, as well as any of the custom types that were set up.

Suppose you select the approval in the rule group type wizard which builds the Build Rule Setup workbook for approval. Implementors can set up rule description, rule priority and enable rules on the [1.Rule Enable View](#).

In this example, three business rules are set up for each approval rule group. Each rule corresponds to one business strategy.

The rules are:

- Key item
- High volume
- Low volume

You can define the criteria that associate different item/stores to each rule later. If an item/store is associated with multiple business rules, the rule priority is used to establish the precedence. The rules with lower priority will have higher precedence. The assigned rule priority must be within the range of priority upper bound and priority lower bound set up in the Rule Group Administration workbook.

Figure B-5 1.Rule Enable View

Measure	Enable	Priority	Start Date	End Date	Rule Description	Rule On/Off
Business Rule						
▲ Beverage - Approval	<input checked="" type="checkbox"/>	?			?	<input checked="" type="checkbox"/>
high volume	<input checked="" type="checkbox"/>	2.00			high volume	<input checked="" type="checkbox"/>
key item	<input checked="" type="checkbox"/>	1.00			key item	<input checked="" type="checkbox"/>
low volume	<input checked="" type="checkbox"/>	3.00			low volume	<input checked="" type="checkbox"/>
▲ Missy - Approval	<input checked="" type="checkbox"/>				?	<input checked="" type="checkbox"/>
high volume	<input checked="" type="checkbox"/>	302.00			high volume	<input checked="" type="checkbox"/>
key item	<input checked="" type="checkbox"/>	301.00			key item	<input checked="" type="checkbox"/>
low volume	<input checked="" type="checkbox"/>	303.00			low volume	<input checked="" type="checkbox"/>

5. Set up the Business Rule Condition in the Rule Condition Set up View.

The rule criteria is set up in a measure based on business rule/condition. RDF CS GA’s condition dimension has four positions. It allows four conditions to be specified for a business rule. Implementors can modify the condition hierarchy file to allow more or less conditions per business rule.

Example 1

In this example, Beverage’s Approval rule group has three rules:

- Key item
- High volume
- Low volume

The key item are the item/store with HighPriority Item 01 ==1.

The high volume items are item/store combos satisfying (recent average sales 01>=200) && (historic average sales 01 >=100). If an item/store satisfying both key item condition and high volume items conditions, it will be associated with both Rules.

The low volume items are (recent average sales 01 <20)

Example 2

The Men’s shoes –Approval rule group also has three rules:

- Key item
- High volume
- Low volume

The key items are the item/store combos with (HighPriority Item 01 ==1 && class match 1312Casual).

The high volume items are the item/stores with recent average sales 01 >= condition Measure Value numeric 1

Note how the recent average sales 01 are not compared to a static value to decide high sellers. For maximum flexibility, the values to be compared to are stored in a measure, which can have multiple values.

The low volume items are the item/stores with recent average sales 01 <2

Differences

Beverage and Shoes were items with different sales pattern (grocery versus fashion). They would have different criteria. Condition measure value numeric 1 is RDF CS GA provided numeric measure based on class.

Implementors can set the values either through data load or rules. It allows the same condition to be used with different parameter values for items in different class. This conceptually similar to [Example 2](#) regarding high sellers in Men’s Shoes.

Condition Value Measures

RDF CS GA provides 10 condition value measures like Condition measure value numeric 1 out of the box. Six numeric measures, two string measures and two date measures. The implementor can specify which condition value measures can be available for selection per rule group type in the Rule Setup workbook through the RDF CS plug-in. The intersection of these 10 measures can be modified through changing labeled intersection in the configuration. These measures are listed in [Table B-3](#).

Table B-3 Condition Value Measures

Measure Name	Measure Label	Measure Type	Intersection
condmeasvalnum1	Condition Measure Value numeric 1	real	#condmeasvalintx1#
condmeasvalnum2	Condition Measure Value numeric 3	real	#condmeasvalintx2#
condmeasvalnum3	Condition Measure Value numeric 3	real	#condmeasvalintx3#
condmeasvalnum4	Condition Measure Value numeric 4	real	#condmeasvalintx4#
condmeasvalnum5	Condition Measure Value numeric 5	real	#condmeasvalintx5#
condmeasvalnum6	Condition Measure Value numeric 6	real	#condmeasvalintx6#
condmeasvalstr1	Condition Measure Value String 1	string	#condmeasvalintx1#
condmeasvalstr2	Condition Measure Value String 2	string	#condmeasvalintx2#
condmeasvaldat1	Condition Measure Value Date 1	date	#condmeasvalintx1#
condmeasvaldat2	Condition Measure Value Date 2	date	#condmeasvalintx2#

Figure B-6 Rule Condition Set up View

2. Rule Condition Setup						
Measure (unsaved)						
Business Rule		Rule Condition				
Business Rule	Rule Condition	Measure	Between Condition ...	Attribute Selected	Condition ...	Condition Value...
Beverage - Approval	condition 01		?	??i&??	match	?
	condition 02			??i&??	match	?
high volume	condition 01		AND	Recent Average Sales 01	>=	200.00
	condition 02			Historic Average Sales 01	>=	100.00
key item	condition 01			HighPriority Item 01	==	1.00
	condition 02					0.00
low volume	condition 01			Recent Average Sales 01	<	20.00
	condition 02					0.00
Men's shoes - Approval	condition 01			??i&??	match	?
	condition 02					0.00
high volume	condition 01			Recent Average Sales 01	>=	0.00
	condition 02					0.00
key item	condition 01			HighPriority Item 01	==	1.00
	condition 02					0.00
low volume	condition 01			Recent Average Sales 01	<	2.00
	condition 02					0.00

6. Run the custom menu of validate Rule Setup and Assign Membership.

These actions will assign each item/store to business rules according to the conditions and rule group scope. Tune the conditions until the rule membership results are satisfying.

7. Set up the parameters associated with each business rule.

RDF CS GA has five parameters associated with the approval rule groups: the approve method and all the GA alert parameters. The GA alert parameters were average sales threshold. Calculation periods, error threshold and causal peak factor. In this example, approval method and error threshold were different by business rule.

The default approval method (defappmth01) can be **Recent Sales versus Forecast**. This is a commonly used approve alert. It is useful for both grocery and fashion.

The manual approve method can be assigned to key items in all approval rule groups. That means user would like to review all key item forecasts before approving them.

For high volume grocery item like beverage, last year sales versus forecast is selected as the approve alert.

For high volume items, lower error threshold is used in the approval alert calculation because higher forecast accuracy is expected from higher volume.

For parameters like approve method, RDF CS has a three-tier to allow user to specify its value. Default, Intermediate and Final. The default is a scalar measure. The intermediate is specified at subclass/region in RDF CS GA. The final is at **sku_stor**. For approval method, the default can be set as Recent Sales versus Forecast. The intermediate level can be left as no override. For item/stores that are associated with key item, will have the approval method at final (appmthovr01) automatically populated with Manual. For beverage item/stores that are associated with high volume, will have the approval method at final (appmthovr01) automatically populated with last year sale versus forecast.

The same applies to error threshold. The error threshold for item/store associated with High volume and low volume rules will be populated automatically with what is set for these parameter in the rule. When running RDF CS batch, default,

intermediate and final parameters are merged to obtain the parameters fed into approval logic. If an item/store satisfying both key item condition and high volume items conditions, it will be associated with both Rules. When assigning parameters to the item/store, the rule with lowest priority number will take precedence.

Figure B-7 4. Parameters for Approval View

Measure	Alert - Average Sales Threshold	Alert - Calculation Periods at R...	Alert - Error Threshold at Rule	Approval Method at Rule	Alert - Caus...
Business Rule					
Beverage -	-1.00	-1	?	? ▾	-1.00
low volume	-1.00	-1	0.35	No Override ▾	-1.00
high volume	-1.00	-1	0.25	Last Year Sales vs Forecast ▾	-1.00
key item	-1.00	-1	-1.00	Manual ▾	-1.00
Men's shoes -	-1.00	-1	?	? ▾	-1.00
high volume	-1.00	-1	0.25	No Override ▾	-1.00
low volume	-1.00	-1	0.35	No Override ▾	-1.00
key item	-1.00	-1	-1.00	Manual ▾	-1.00
Missy - Approval	-1.00	-1	?	? ▾	-1.00
high volume	-1.00	-1	0.25	No Override ▾	-1.00
low volume	-1.00	-1	0.35	No Override ▾	-1.00
key item	-1.00	-1	-1.00	Manual ▾	-1.00

How to Set Up Business Strategy for Navigation

In the current RDF CS batch flow, **frfst_post** consists of the following steps:

1. The system forecast is imported from RDX tables,
2. Adjust the system forecast to generate adjusted forecast.
3. Calculate attributes needed for Approval rule-group
4. Generate approval rule membership
5. Assign parameter values to sku/store based on rule membership
6. Run the approve alerts
7. Approval forecast and calculate the mask for unapproved item/store.
8. Calculate eligibility for navigation tier. All item/store with valid forecast and unapproved will participate in navigation grouping.
9. Calculate attributes needed for navigation rule groups
10. Generate navigation rule membership.
11. Assign navigation tier based on navigation rule membership.

From the previous flow, there are two important differences between approval and navigation.

Eligibility

First the item/stores that are eligible to be assigned to approval and navigation rules are very different. All item/stores that have a forecast are eligible to be assigned to approval rules. However, only the unapproved item/stores that have a forecast are eligible to be assigned to navigation rules.

An item/store can be unapproved for two reasons:

- Its approval method is Manual.
- Its approval method is an approve alert and the alert was triggered.

Attributes

Second the attributes used for approval and navigation rule groups are different. In RDF CS GA, the most important attribute used in the navigation rule group is the navigation variance.

The navigation variance is a GA calculated attribute. When calculating the approval alerts, we flag item/stores that were violated the approval business rule. For instance, an item/store is set to be approved using the forecast versus recent sales rule.

The threshold is 10%, meaning that a deviation of less than 10% is acceptable and the item/store is approved. However, the deviation is 15% - which becomes the navigation variance, so the item/store will go into the calculation of the navigation tiers. A navigation variance is calculated for every GA alert except for the max Sales Peak versus Frcsted Peak Factor. The reason is that all but this alert has variance calculated as percentage, while this one compares units.

A custom approve exception's variance is also included in the calculation.

To set up business rules for navigation perform the following steps.

Note: Steps 1-3 are the same as in [How to Set Up Business Strategy for Approval](#) and different for Steps 4-7.

1. Same as [How to Set Up Business Strategy for Approval](#) Step 1.
2. Same as [How to Set Up Business Strategy for Approval](#) Step 2.
3. Same as [How to Set Up Business Strategy for Approval](#) Step 3.
4. Create the Business Rule Setup workbook.

Select navigation in the rule group type wizard to build the Rule Setup workbook for navigation. Implementors can set up rule description, rule priority and enable rules on the [1.Rule Enable View](#).

In this example, four business rules are set up for each navigation rule group. Each rule corresponds to one navigation tier. The number of navigation tier is defined in RDF CS plug-in input.

The rules are:

- Urgent
- Required
- Optional
- Informational

You can define the criteria that associate different item/stores to each rule later. If an item/store is associated with multiple business rules, the rule priority is used to establish the precedence. The rules with lower priority number will have higher precedence. The assigned rule priority must be within the range of priority upper bound and priority lower bound set up in the Rule Group Administration workbook.

Figure B–8 1.Rule Enable View

1. Rule Enable						
Measure	Enable	Priority	Start Date	End Date	Rule Description	Rule On/Off
Business Rule						
▲ Beverage - Navigation	<input checked="" type="checkbox"/>	?			?	<input checked="" type="checkbox"/>
1. Urgent	<input checked="" type="checkbox"/>	1.00			1. Urgent	<input checked="" type="checkbox"/>
2. Required	<input checked="" type="checkbox"/>	2.00			2. Required	<input checked="" type="checkbox"/>
3. Optional	<input checked="" type="checkbox"/>	3.00			3. Optional	<input checked="" type="checkbox"/>
4. Informational	<input checked="" type="checkbox"/>	4.00			4. Informational	<input checked="" type="checkbox"/>
Rule 45	<input type="checkbox"/>	0.00				<input type="checkbox"/>
▲ Men's shoes - Navigation	<input checked="" type="checkbox"/>	?			?	<input checked="" type="checkbox"/>
1. Urgent	<input checked="" type="checkbox"/>	201.00			1. Urgent	<input checked="" type="checkbox"/>
2. Required	<input checked="" type="checkbox"/>	202.00			2. Required	<input checked="" type="checkbox"/>
3. Optional	<input checked="" type="checkbox"/>	203.00			3. Optional	<input checked="" type="checkbox"/>
4. Informational	<input checked="" type="checkbox"/>	204.00			4. Informational	<input checked="" type="checkbox"/>
Rule 55	<input type="checkbox"/>	0.00				<input type="checkbox"/>

- Set up the business rule condition in the [2 Rule Condition Set up Worksheet](#).

The rule criteria is set up in a measure based on business rule/condition. RDF CS implementors can define the number of navigation tier and their labels through the RDF CS plug-in.

Figure B–9 2 Rule Condition Set up Worksheet

2. Rule Condition Setup						
Measure	Between Conditio...	Attribute Selected	Condition Operator	Condition Value (n...	Co	
Business Rule						
▲ Beverage - Navigation	condition 01	??!&??	match	?		
1. Urgent	condition 01	HighPriority Item 01	==	1.00		
2. Required	condition 01	Navigation Variance 01	>=	0.45		
3. Optional	condition 01	Navigation Variance 01	>=	0.35		
4. Informational	condition 01	Navigation Variance 01	>	0.00		
▲ Men's shoes - Navigation	condition 01	??!&??	match	?		
1. Urgent	condition 01	HighPriority Item 01	==	1.00		
2. Required	condition 01	Navigation Variance 01	>=	0.45		
3. Optional	condition 01	Navigation Variance 01	>=	0.35		
4. Informational	condition 01	Navigation Variance 01	>	0.00		

Example

In this example, Beverage’s navigation rule group has four rules.

- Urgent** is defined as HighPriority Item 01 ==1

Urgent is for the most important item/store. Their approval method is manual, they must be reviewed and manually approved.

- Required** is defined as Navigation Variance 01>=0.45

Required is for the item/stores with highest variance between forecast and recent sales. They are more important to be reviewed than the ones with lower variance.

c. Optional is defined as Navigation Variance $0.45 > \text{Variance} > 0.35$

Required is for the item/stores with variance between 0.45 and 0.35. They are less urgent to be reviewed than Required

d. Informational is defined as Navigation Variance $0.35 > \text{Variance} > 0$

Informational is for all the item/stores with variance between 0.35 and 0. They have lowest priority to be reviewed.

6. Run custom menus to validate Rule Setup and Assign Membership. These actions will assign each item/store to every business rule according to the conditions and rule group scope. Tune the conditions until the rule membership results are satisfying.

7. Set up the parameters associated with each business rule. RDF CS GA has **Navigation Bucket** as the only one parameter associated with the navigation rule groups.

The pick list for Navigation Bucket measure is created by RDF CS plug-in based on user inputted number of navigation tier and tier labels. Just assign the right navigation tier to the right rule. Commit the workbook.

Figure B-10 4. Parameters for Navigation

Business Rule	Navigation Bucket...
Beverage - Navigation	? ▼
1. Urgent	1. Urgent ▼
2. Required	2. Required ▼
3. Optional	3. Optional ▼
4. Informational	4. Informational ▼
Men's shoes - Navigation	? ▼

During RDF CS batch, the Navigation Bucket's value will be assigned to the item/stores based on navigation rule membership and rule priority. The navigation buckets at sku/store are stored in a measure named **navibuckets01**.

The Forecast Review workbook has built in logic to create workbook alerts using navibuckets01. One workbook alert is created for each navigation tier. These workbook alerts are guiding users to review and approve item/stores in order of their importance, as well as by how much they have violated the approval business rules.

How to Use BRE Beyond What Is Available in GA

So far we have described about what RDF CS GA provides with the rule engine. It is fairly straightforward for implementors to add new business rule attributes and add their own business rule definitions for approval or navigation.

Suppose an implementor is perfectly happy with using RDF CS's default, intermediate and final setting of approve method and alert parameters and would want to totally bypass the rule based assignment for all or most of their items. The following needs to be set up:

1. Set `runrulgeligga_CF_` to false. This will disable the GA generation of eligible mask for approve rule memberships (`rulgeligmask_CF_`).
2. Implement `hook_populate_aprvrulg_eligiblemask_CF_` as a custom batch step to set `rulgeligmask_CF_` to what the implementor desired.

Suppose an implementor would like to configure different navigation rules using custom calculation of navigation variance and custom attributes. The implementor can implement the `hook_navi_attb_CF_` as a custom batch step.

Custom Rule Group Type

Implementors should perform the following steps to add a custom rule group type.

1. In the RDF CS plug-in, from the final level attributes table, click within the business rule group type cell. A dialog displays a business rule group type table.

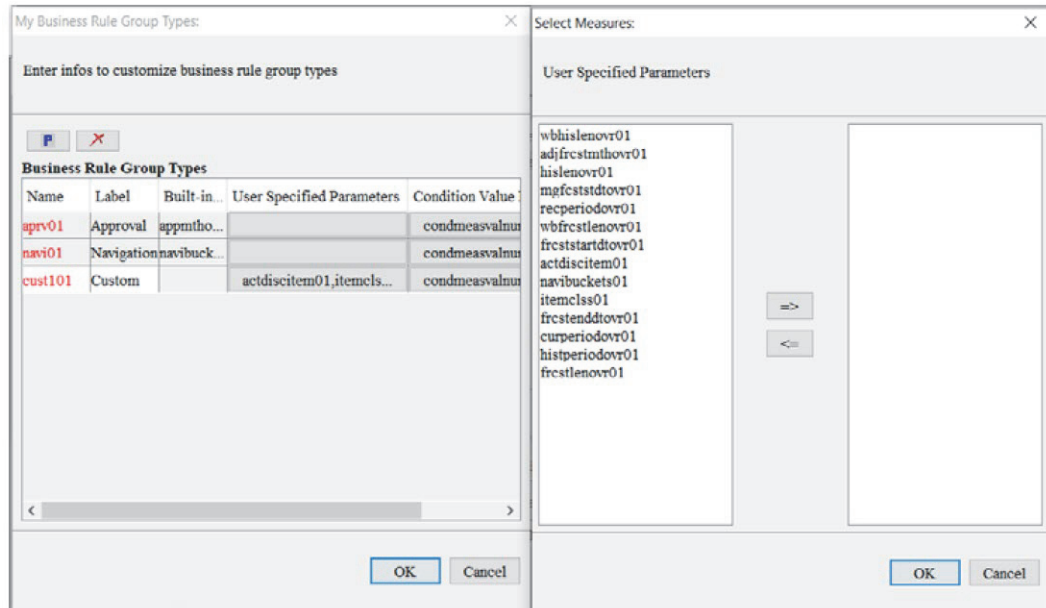
Click **P** to add a new Business Rule Group Type.

Type in a Rule Group Type Name and Label. The name is used as position name along Rule Group Type dimension so make sure it satisfies RPAS requirement for position names. The name need to be unique among all rule group type position names.

2. Assign parameters associated with the rule group type by clicking on the cell of user specified parameters. Another dialog allows implementors to add or remove parameters.

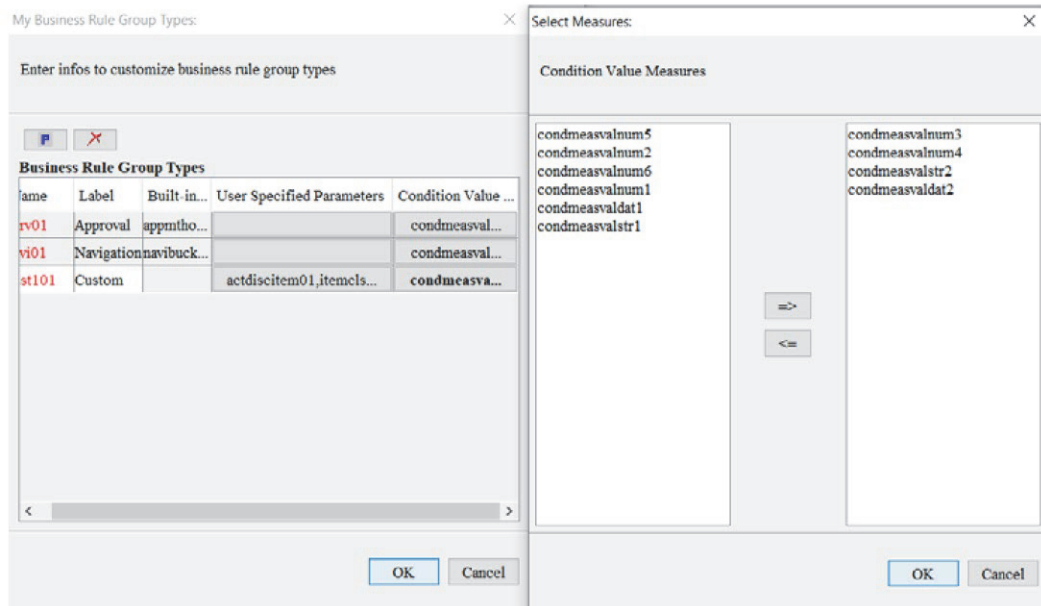
The Select Measures box in the [My Business Rule Group Type View](#) displays all GA parameter measures. Most of these measures were forecasting parameter at final. Any custom measure with intersection = forecast intersection without `clnd` dimension and have a valid `db` is available for selection too. For each selected measure, a measure at the business rule is created and added to the parameter for `<rule group type>` worksheet for user input.

Figure B–11 My Business Rule Group Type View



3. Click within the condition value cell to open the dialog that lets you select the condition value measures to be used. The measures available for selection are the ten condition measures GA provides and any custom non-boolean measure that have intersection higher than forecast intersection without **clnd** dimension and have a valid **db**. The selected measures are used to construct the picklist for condition value (measure) in the Rule Setup workbook.

Figure B–12 Condition Value Measures



Special Expressions

After the RDF CS configuration is regenerated, a parameter for **<rule group type>** worksheet is added to the Rule Setup workbook for that final level. You can set up rule groups and rules following the same process as approval and navigation.

Note: These steps also need a customized batch control file.

1. Write custom rules to populate **eligmask_RGT_** measure. **_RGT_** is a token for the position name of the custom rule group type. **Eligmask_RGT_** is a GA created Boolean measure that is based on forecast intersection without **clnd** dimension. It should be true for **prod/loc** that is eligible to assign to the business rules belong to the **_RGT_** rule group type.
2. Write custom rules to populate **rulgeligmask_CF_**. **rulgeligmask_CF_** is a boolean measure based on **prod/loc/rule-group**. The expression can be like the following:

```
rulgeligmask_CF_ = if (RgrpMask_CF_, if (rgrptype == "_RGT_", eligmask_RGT_, false), false)
```
3. Run **pregenrulemem** and **genrulemem_CF_** rule group
4. Call **pmlookup_RGT_** rule group to assign parameter values based on business rule membership.

Appendix: Rules to Populate Out-of-stock and Outlier Indicator Measures

This appendix describes how to create rules to populate an Out-of-stock (OOS) and Outlier Indicator measures.

Rules Overview

In most RDF CS implementations, the out-of-stock and outlier flags are interfaced into RDF. However, not all retailers keep track of outages and outliers, or they are not very exact.

The following are some rules that populate these indicators. Note that they are a point of view, and you are encouraged to further refine them to fit your business needs.

OOS Rules Logic

If we call OOS the out-of-stock indicator and outliers the outlier flag, the logic to populate the flags can be:

If the rate of sales of an item is below a threshold, OOS is false.

Otherwise, make sure the item has been selling for a while and also does not have extensive periods with zero sales. If it is a new item, I do not want to start correcting the demand until the patterns become stable/predictable. Also, if the sales history has many zeroes, this may be an indication of a bigger issue, and the user may want to correct/take action in the Source Measure Maintenance workspace.

If these conditions are fulfilled, and the sales are still considered low, then mark the week as out-of-stock.

OOS Pseudocode

The pseudocode can look like:

```
If threshold 1a < rate of sales < threshold 1b
If minimum number of sales periods > threshold 2a
    &&
    number of periods with zero sales < threshold 3a
    &&
    sales < percent 1a * rate of sales
then OOS = TRUE
else if rate of sales > threshold 1b
    If minimum number of sales periods > threshold 2b
        &&
        number of periods with zero sales < threshold 3b
        &&
        sales < percent 1b * rate of sales
    then OOS = TRUE
```

Outlier Flag Rules Logic

For weeks with regular demand (no event, discount, and so on, is active), if the sales are deemed to be too high then mark the period as an outlier.

Outlier Flag Pseudocode

The pseudocode can look like:

```
If sales > rate of sales * multiplier
    &&
    Period is not promoted
Then outliers = TRUE
```