

Oracle® Retail Clearance Optimization Engine

Operations Guide

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Oracle® Retail Clearance Optimization Engine Operations Guide, Release 14.0

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Preface

Clearance Optimization Engine (COE) is an application that provides markdown recommendations and forecasts that allow customers to make informed markdown decisions. In this way, customers can maximize gross margins on seasonal merchandise while clearing inventory to specified levels by defined dates.

Audience

This document is intended for system administrators who configure and manage COE.

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Related Documents

For more information, see the following documents in the Oracle Retail Clearance Optimization documentation set:

- *Oracle Retail Clearance Optimization Engine Release Notes*
- *Oracle Retail Clearance Optimization Engine Administration Guide*
- *Oracle Retail Clearance Optimization Engine Installation Guide*

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When you install the application for the first time, you install either a base release (for example, 14.0) or a later patch release (for example, 14.0.2). If you are installing the base release and additional patch releases, read the documentation for all releases that have occurred since the base release before you begin installation. Documentation for patch releases can contain critical information related to the base release, as well as information about code changes since the base release.

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To more quickly address critical corrections to Oracle Retail documentation content, Oracle Retail documentation may be republished whenever a critical correction is needed. For critical corrections, the republication of an Oracle Retail document may at times not be attached to a numbered software release; instead, the Oracle Retail document will simply be replaced on the Oracle Technology Network Web site, or, in the case of Data Models, to the applicable My Oracle Support Documentation container where they reside.

This process will prevent delays in making critical corrections available to customers. For the customer, it means that before you begin installation, you must verify that you have the most recent version of the Oracle Retail documentation set. Oracle Retail documentation is available on the Oracle Technology Network at the following URL:

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

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

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Oracle Retail Documentation on the Oracle Technology Network

Documentation is packaged with each Oracle Retail product release. Oracle Retail product documentation is also available on the following Web site:

http://www.oracle.com/technology/documentation/oracle_retail.html

(Data Model documents are not available through Oracle Technology Network. These documents are packaged with released code, or you can obtain them through My Oracle Support.)

Documentation should be available on this Web site within a month after a product release.

Conventions

The following text conventions are used in this document:

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

Introduction

The chapter contains the following:

- [Clearance Optimization Engine](#)
- [About the COE Operations Guide](#)

Clearance Optimization Engine

The Clearance Optimization Engine (COE) provides remote access to the What If RMI interface that Item Planning Configured for COE accesses using the RPAS special expression. This allows the IP application to produce in-season price recommendations and forecasts that account for planned promotions and future markdowns in the product life cycle. The forecast includes a sales plan and an optimal price plan.

COE produces its recommendations during the weekly model run. The results of the model run are stored in the database. These results can be extracted using the sendback files. They are then available for use by IP.

Users have the ability to perform real-time What-If scenarios from within Item Planning and alter plans in order to see the results of those changes. The changes include planning a markdown, changing future prices, changing an order, changing the exit date, changing the salvage value, and changing the sell-through target.

Business rules can also be imported from Item Planning into COE from Item Planning in a format that follows the COE standard interface. This load occurs weekly. The following business rules listed in [Table 1-1, "Business Rule Mapping Between COE and Item Planning"](#), can be imported.

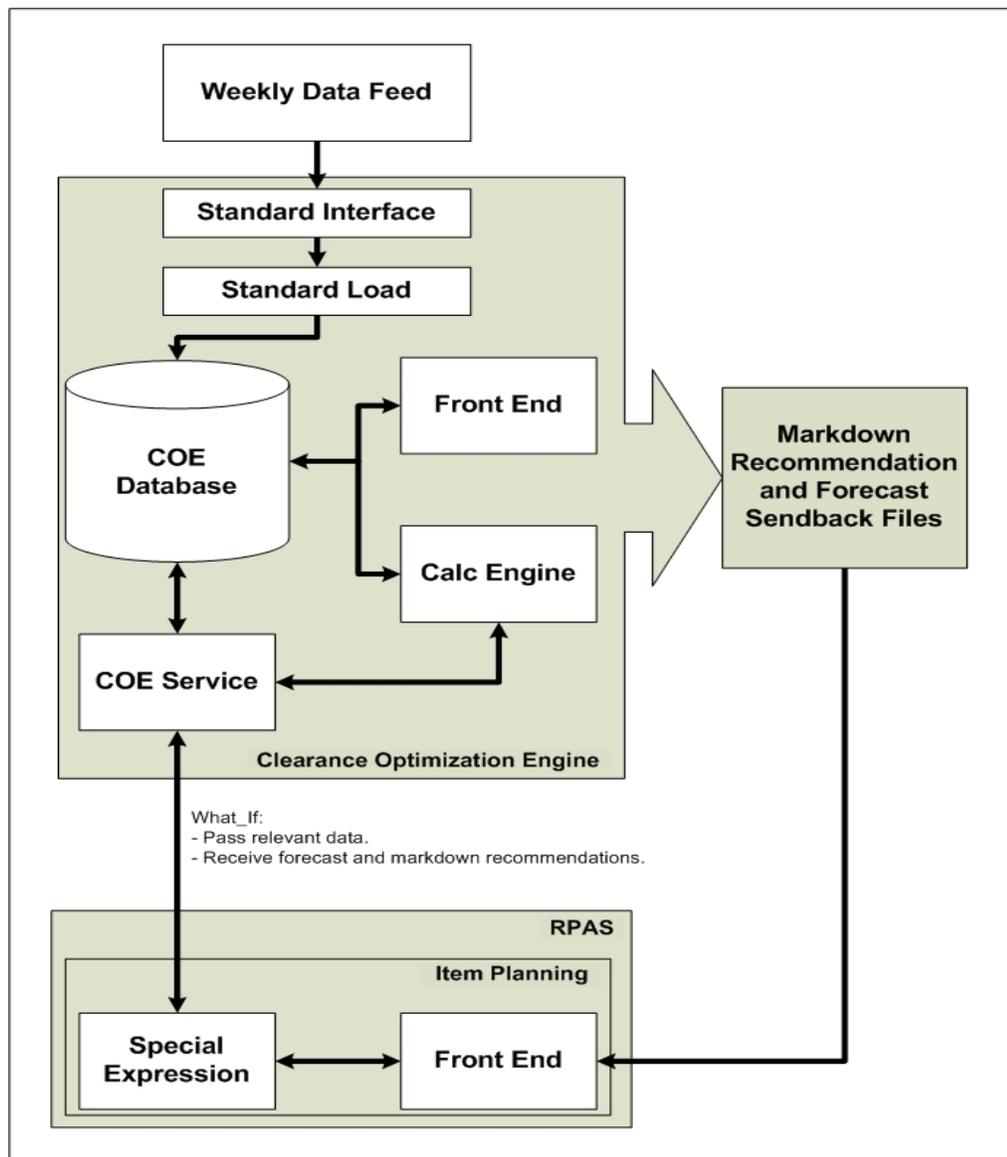
Table 1-1 Business Rule Mapping Between COE and Item Planning

COE Business Rule	RPAS Business Rule
Outdate	Exit Date
Planned Start Date	Start Sell Date
Sell Through Target	Sell Thru %

COE provides a sendback functionality that makes the model run results available to the Item Planning application.

The relationship between COE and Item Planning is shown in [Figure 1-1, "Relationship between COE and Item Planning"](#).

Figure 1-1 Relationship between COE and Item Planning



About the COE Operations Guide

The *Clearance Optimization Engine Operations Guide* provides details about the essential tasks involved in using this service: the staging and loading of data that is provided by the retailer in specified formats and the weekly processes that produce markdown recommendations and forecasts.

Standard Interface

This chapter contains the following:

- Business Rule Instances Standard Interface
- Calendar Standard Interface
- Cluster Mapping Standard Interface
- Demand Parameters Standard Interface
- Distribution Center Allocation Standard Interface
- Distribution Center Inventory Standard Interface
- Items Standard Interface
- Location Hierarchy Standard Interface
- Location Hierarchy Rename Standard Interface
- Markdowns Taken Standard Interface
- Merchandise Hierarchy Standard Interface
- Location Hierarchy Rename Standard Interface
- Price Ladders Standard Interface
- Promotions Standard Interface
- Sales/Inventory/Orders Standard Interface
- Seasonalities Standard Interface
- Business Rule Instances Specification (ASH_BRM_INSTANCE_TBL)
- Calendar Specification (ASH_CAL_TBL)
- Cluster Mapping Specification (ASH_CLUSTER_MAPPING_TBL)
- Demand Parameters Specification (ASH_PARAMETER_VALUES_TBL)
- DC Allocation Specification (ASH_DC_ALLOCATION_TBL)
- DC Inventory Specification (ASH_DCI_TBL)
- Items Specification (ASH_ITEMS_TBL)
- Location Hierarchy Specification (ASH_LH_TBL)
- LH Rename Specification (ASH_LHRENAME_TBL)
- Markdowns Taken Specification (ASH_MDTAKEN_TBL)
- Merchandise Hierarchy Specification (ASH_MH_TBL)

- MH Rename Specification (ASH_MHRENAME_TBL)
- Price Ladders Specification (ASH_PRICE_LADDERS_TBL)
- Promotions Specification (ASH_PROMO_TBL)
- Sales Specification (ASH_SALES_TBL)
- Seasonalities Specification (ASH_SEASONALITY_MAPS_TBL and ASH_SEASONALITY_VALUES_TBL)

Clearance Optimization Engine Standard Interface Descriptions

This section details the data interface to the service. The service requires that retailer data be provided in flat files containing pipe-delimited data organized so that the data can be loaded into the service database tables that follow the formats specified here.

The following special characters are not allowed: colon, semi-colon, comma, forward slash, backward slash, any type of quote, any type of apostrophe, <, or >.

Three interfaces (Merchandise Hierarchy Levels, Location Hierarchy Levels, and Cross Product Information) that are required by the service are only loaded once. The information contained in these three files is collected during discussions with specific retailers; however, the files themselves are not provided by retailers but are created and loaded as part of the initial COE configuration.

Note: RPAS stores hierarchy position names in lower case. The hierarchy load files in RPAS for IP-COE can be in mixed case; however, they are stored in lower case internally. The conversion on the IP side is handled by the convertDomain utility, and no manual loads need to be performed.

COE, on the other hand, supports mixed case position names (that is, merchandise_key and location_key), both in load files and in database storage. Moreover, COE uses case-sensitive comparisons for position names (ids). As a result, customers must load lower case position names (that is, merchandise-key and location_key) in COE.

The standard interface includes the following:

Table 2–1 Interface Specifications

Interface Specification	Required/Optional
Business Rule Instances	Optional
Calendar	Required
Cluster Mapping	Optional
Demand Parameters	Required
Distribution Center Allocation	Optional
Distribution Center Inventory	Optional
Items	Required
Location Hierarchy	Required
Location Hierarchy Rename	Optional
Markdowns Taken	Required

Table 2–1 (Cont.) Interface Specifications

Interface Specification	Required/Optional
Merchandise Hierarchy	Required
Merchandise Hierarchy Rename	Optional
Price Ladders	Required
Promotions	Optional
Sales/Inventory/Orders	Required
Seasonalities	Required

Business Rule Instances Standard Interface

The data to be loaded by the Business Rule Property Manager bulk loader utility must conform to the following standard interface specification. For more information on the Business Rule Property Manager, see the *Oracle Retail Clearance Optimization Engine Configuration Guide*.

Technical Notes

The following list provides details to consider regarding the business rule instance data.

- The merchandise and location keys map to the CLIENT_LOAD_ID.
- The merchandise and location levels map to LEVEL_DESC.
- The rule name is the name of the business rule as specified in the business rule definition.
- The rule value is the value assigned to the business rule instance.
- The attribute values are the specific values for the custom variables, which have been derived from columns in the permitted source tables.
- The delete flag defines whether the instance is to be deleted (a value of 1) or added/updated (a value of 0 – the default).

Calendar Standard Interface

The calendar interface describes a retailer's fiscal calendar. Each record in the file corresponds to a single fiscal week.

How COE Uses the Calendar Data

COE uses the calendar data in a variety of ways, such as:

- To construct the markdown calendar that defines the valid markdown effective dates.
- To determine in what month the markdown effective date falls.

Data Fields

Seven fields describe each calendar record, which represents a fiscal week:

- EOP_CALENDAR_DT – the last day of the fiscal week, which is usually Saturday.
- FISCAL_YR – the number of the fiscal year for the record.
- FISCAL_QTR – the number of the fiscal quarter for the record.

- FISCAL_MO – the number of the fiscal month for the record.
- FISCAL_WK – the number of the fiscal week for the record.
- CALENDAR_WK – an alternative number for the calendar week for the record.
- SEASON – the number identifying the season associated with the calendar week.

An Example

The following table shows sample data for five weeks of a fiscal calendar.

Table 2–2 Sample Calendar Data

EOP Calendar Date	Fiscal Year	Fiscal Quarter	Fiscal Month	Fiscal Week	Calendar Week	Season
2004-02-07	2004	1	1	1	1	1
2004-02-14	2004	1	1	2	2	1
2004-02-21	2004	1	1	3	3	1
2004-02-28	2004	1	1	4	4	1
2004-03-06	2004	1	2	5	1	1

Technical Notes

The following list provides details to consider regarding the calendar data.

- The calendar must include all weeks, beginning with the earliest historical sales record and extending to a minimum of five years and a maximum of nine years into the future.
- Each year included in the data must contain 52 – 53 weeks.
- The calendar file can be sent weekly or loaded all at once during the initial configuration of COE. If provided all at once, it should contain all the historic data and extend to a minimum of five years and a maximum of nine years into the future.
- Retailers can use the SEASON field to designate different seasons within the fiscal year. For example, a retailer might divide the fiscal year into two seasons.

Cluster Mapping Standard Interface

The cluster mapping standard interface, part of Flexible Store Clustering, associates a cluster set with a pre-defined level in the merchandise hierarchy. Cluster sets are assigned to the merchandise hierarchy at the level specified by a system-wide configuration flag during the optimization process.

How COE Uses the Cluster Mapping Data

The cluster sets are assigned to the merchandise hierarchy. The clusters and cluster sets are stored in the location hierarchy. If a store cluster set is already assigned to a specified entry in the merchandise hierarchy, it will be replaced by the entry specified in the assignment element. Store clusters should not be linked to the merchandise hierarchy, but can be used in the creation of items.

The merchandise key in the cluster mapping table must be at the merchandise level that is specified by the entry in ASH_CP_TBL for CLUSTER (INTERSECT_NAME).

Data Fields

Two fields describe cluster mapping:

- CLUSTER_SET_CLIENT_ID – retailer ID of the cluster set, which is provided by the retailer.
- MERCHANDISE_CLIENT_ID – retailer ID from the Merchandise Hierarchy table.

An Example

The following table shows the assignment of cluster sets to the merchandise hierarchy:

Table 2–3 Cluster Mapping Sample Data

Cluster Set Client ID	Merchandise Client ID
CL1	1
CL1	2
CL2	3
CL2	99
MSA1	4
MSA1	6

Demand Parameters Standard Interface

The demand parameters standard interface describes the mapping between the analytical parameter values generated by Analytical Services and a specific merchandise/location/attribute.

How COE Uses the Parameters Data

COE uses the parameters data in a variety of ways, including:

- to provide a centralized list for the parameters and their values
 - AS_PARAMETER_ID and AS_VERSION_NUMER are used only by Analytical Services; they are not used by the service.

Data Fields

Nine fields describe each parameter record:

- MERCHANDISE_LEVEL – the external merchandise level.
- MERCHANDISE_KEY – the key from the merchandise hierarchy for the item.
- LOCATION_LEVEL – the external location level.
- LOCATION_KEY – the key from the location hierarchy for the item.
- ITEM_ATTRIBUTE – the item attribute for the parameter (set to % by default).
- PARAMETER_NAME – the name of the parameter. The names can be DEFAULT_GAMMA, DEFAULT_ALPHA, CRITICAL_INVENTORY, or ZERO_INVENTORY.
- PARAMETER_VALUE – the value assigned to the parameter.
- AS_PARAMETER_ID – a number that uniquely identifies the record across all output tables and can be used to trace issues. It is not an analytical value.

- AS_VERSION – the version number for the current run of the output, which is set by APC-MDO and can be used to track versions.

Distribution Center Allocation Standard Interface

The distribution center allocation interface describes how merchandise is to be allocated to the locations supplied by a warehouse. DC inventory allocation information can be supplied at any level of the merchandise hierarchy.

Technical Notes

The following list provides details to consider regarding the dc allocation data.

- The data includes the proportion (fraction) of merchandise that should be allocated to each location.
- Fractional units are truncated.
- Fractions can be specified at any level of the merchandise hierarchy.
- Fractions can only be specified at the location hierarchy optimization level.
- A fraction at a lower level always takes precedence over a fraction at a higher level.

Distribution Center Inventory Standard Interface

The distribution center inventory interface describes inventory and merchandise on order for a given distribution center.

Items Standard Interface

The items interface describes valid combinations of merchandise and location that specify an item. All items in the system are defined at a single level of the merchandise hierarchy (typically the lowest level) and a single level in the location hierarchy. For the merchandise and location hierarchy examples provided, items might be defined as combinations of Style in the merchandise hierarchy and Region in the location hierarchy.

How COE Uses the Items Data

COE uses the items data in a variety of ways, such as:

- to define the total set of valid items for optimization. (Some items are typically excluded each week, based on their eligibility.)
- to define key fields that affect the determination by the service of the item's seasonality and model start date. (The model start date defines the date when sales are included in the calculation of forecasts and markdowns.)

Data Fields

Nine fields describe an item:

- MERCHANDISE_KEY – the key from the merchandise hierarchy for the item. (All items must be at the same level in the merchandise hierarchy.)
- LOCATION_KEY – the key from the location hierarchy for the item. (All items must be at the same level in the location hierarchy.)

- **FIRST_RECEIPT_DATE** – the date of the first receipt of this merchandise at this location. This date, if available, defines the beginning of life in the service for an item.
- **LAST_RECEIPT_DATE** – the date of the most recent receipt of this item at the item’s location.
- **VENDOR** – the supplier for the item.
- **VENDOR_DESC** – a description of the supplier.
- **UNIT_COST** – the average unit cost of the item. This data is used by the service for margin calculations only. These calculations do not affect the forecast and markdown recommendations made by the service.
- **SEASON_CODE** – a retailer-specific code that can be used to help determine an item’s seasonality. For example, a retailer may have four season codes (Spring, Summer, Fall, and Winter), and the seasonality assignment may be based on merchandise class and season code. Alternatively, some retailers may supply a Floor Set or Store Layout code in this field if such data exists. This may be more relevant for determining seasonality.
- **FULL_PRICE** – the original retail price of the merchandise.

An Example

The following table shows sample items, based on the sample data provided in the Merchandise Hierarchy and Location Hierarchy sections.

Table 2–4 *Items Sample Data*

Merch. Key	Location Key	First Receipt Date	Last Receipt Date	Vendor	Vendor Desc.	Unit Cost	Season Code	Full Price
101234509	FL1	2004-11-07	2004-11-21			9.53	Fall3	14.99
101234509	FL2	2004-10-31	2004-11-07			9.98	Fall2	15.99
101234512	O1	2005-01-24	2005-01-24			17.40	Spring1	24.99
101234512	O2	2005-01-31	2005-01-31			17.40	Spring1	24.99

The items in the example are defined at the Color-Region level. For example, the first item is color 101234509 and region FL1. It is possible for items with the same product key to have different values for other fields. The same piece of merchandise may have different cost, vendor, receipt date, or season code values for different locations. In addition, a single piece of merchandise may not be defined as a valid item for all locations.

Technical Notes

The following list provides details to consider regarding the items data.

- All items must be defined at the same level of the merchandise hierarchy and location hierarchy. Because of this, it may not be possible, for example, to define some items at the Chain level of the location hierarchy and to define other items at the Region level.
- COE loads, aggregates (if necessary), and persists sales and distribution center inventory data only at the item level.
- Retailers may start sending weekly data to the service for items that are not initially available for optimization (if, for example, a retailer only turns on

optimization for a subset of the business). The service accumulates the sales history for items that may then be made available for optimization in the future.

- The lowest level for an item in the service merchandise hierarchy may not correspond to the lowest level in a retailer's merchandise hierarchy. A retailer may need to aggregate some of the data provided in the items interface. For example, if the lowest level in the service merchandise hierarchy is color, but the retailer has size beneath color, then the retailer will need to aggregate the items data fields as follows:
 - FIRST_RECEIPT_DATE – minimum aggregation
 - LAST_RECEIPT_DATE – maximum aggregation
 - UNIT_COST – average or weighted average, based on the total inventory aggregation

Location Hierarchy Standard Interface

The location hierarchy interface describes how a retailer categorizes locations. The location hierarchy begins with the highest level, such as company or chain, and typically extends to the lowest level, the store. For example, a three-level location hierarchy might consist of Company, Region, and Store. Each entry (row) in the location hierarchy standard interface describes a specific location. In the example of a location hierarchy shown in "[Location Hierarchy Sample Data](#)" on page 2-9, each record describes the region and company of a specific store.

How COE Uses the Location Hierarchy Data

COE uses the location hierarchy data in a variety of ways, such as:

- to allow business rules to be assigned at higher levels than the item
- to aggregate sales data to the item level (for example, sales are at store level; items are at region level)

Data Fields

The location hierarchy can have up to twelve levels. Each level in the location hierarchy, just like the merchandise hierarchy, is described by three fields:

- HIERARCHY_ID – an identifier or value for the hierarchy level. It does not have to be unique.
- HIERARCHY_KEY – a key used to identify the location level that is unique across the chain for that level. It is used to reference the location in other data files.
- HIERARCHY_DESC – a description for the level that describes that level in the location hierarchy.

These three fields are required for each level of the location hierarchy that is used. For example, if a retailer's location hierarchy contains three levels, then the location hierarchy file will contain nine required fields. Any unused fields in the location hierarchy file should be present in the file as NULL (that is, consecutive delimiters) when the file is sent in delimited file format.

An Example

The following table shows sample data for a three-level location hierarchy that consists of Company, Region, and Store.

Table 2–5 Location Hierarchy Sample Data

Hierarchy 1 (Company)			Hierarchy 2 (Region)			Hierarchy 3 (Store)		
ID	Key	Desc	ID	Key	Desc	ID	Key	Desc
1	1	Full Line	1	FL1	Northeast	1000	1000	New York
1	1	Full Line	2	FL2	Southeast	1001	1001	Atlanta
1	1	Full Line	2	FL2	Southeast	1010	1010	Charlotte
1	1	Full Line	3	FL3	Resort	1002	1002	Puerto Rico
2	2	Outlet	1	O1	Northeast	2000	2000	Philadelphia
2	2	Outlet	2	O2	Southeast	1003	1003	Atlanta

Technical Notes

The following list provides details to consider regarding the location hierarchy data.

- The best way to create a unique Key for each level in the location hierarchy depends on the retailer’s hierarchy data. Whenever possible, the hierarchy Keys should not be dependent on higher levels in the hierarchy. In this way, the service can automatically detect and handle hierarchy moves without additional data. For more information on how the service manages location hierarchy changes, see [“Location Hierarchy Rename Standard Interface” on page 2-9](#).
- The location hierarchy file must contain a record for each location that is referenced in any of a given week’s data files.
- The location hierarchy must be described consistently throughout the data file: each hierarchy node must have the same hierarchy ancestors for all records in the file that describes the hierarchy node. In the example shown in [“Location Hierarchy Sample Data” on page 2-9](#), the two records describing the hierarchy above Region FL2 are identical. Note that this consistency requirement applies to all three of the hierarchy fields (Key, ID, and Desc). Inconsistent values for hierarchy descriptions are a common reason why some location hierarchy records fail to load.
- Each node in a hierarchy can only have one parent node.
- The lowest level in the location hierarchy should be the level at which sales data is provided.
- The lowest level does not have to be the level at which the optimization (called the “item level”) occurs. The lowest level in the location hierarchy is typically the store level. The item level is often higher.
- The historical location hierarchy should contain a record for each location that is referenced in any historical sales records, even if the location is now closed. It is recommended that retailers provide a single location hierarchy file for all the historical data, rather than one file for each historical week.

Location Hierarchy Rename Standard Interface

The location hierarchy rename interface facilitates moving locations within the location hierarchy. You can rename any node in the hierarchy by supplying the old node name, the new node name, and the level in the hierarchy. You cannot do this through the Location Hierarchy Standard Interface.

Markdowns Taken Standard Interface

The markdowns taken interface describes permanent markdowns, past, present, or future, that have been entered into a retailer's price change execution system. COE supports one markdown for a given fiscal week.

The markdowns-taken records must be at the item level (the level used for optimization). For example, if the markdown recommendations are at the color-region level, then the markdowns-taken records must be at the color-region level.

How COE Uses the Markdowns Taken Data

COE uses the markdowns taken data in a variety of ways, such as:

- to determine the markdowns that have already been executed in the store and the markdowns that are pending execution in the future. The `CURRENT_RETAIL` field in the Sales data feed does not reflect pending markdowns; however, the service builds the information about pending markdowns into its forecast. COE will not recommend new markdowns prior to any pending markdowns, but will recommend additional markdowns after pending markdowns if additional markdowns are needed and do not violate business rules.
- to determine the validity of future markdowns based on the number of previous markdowns and the date of the most recent markdown.

Data Fields

Eight fields describe each entry in the markdowns taken data.

- `MERCHANDISE_KEY` – in combination with the location key, identifies the item being marked down.
- `LOCATION_KEY` – in combination with the merchandise key, identifies the item being marked down.
- `EFFECTIVE_DATE` – the expected store execution date of the markdown.
- `PRICE_VALUE_TYPE` – Prices are expressed as either Percentage Off Original Retail Price (PO), Percentage Off Ticketed Price (PT), Amount Off Original Retail Price (AO), Amount Off Ticket Price (AT), or Price Point (PP).
- `ACCOUNTING_TYPE` – The accounting type for the markdown can be either Permanent (PERM) or Temporary (TEMP). This attribute is used only by the service.
- `PRICE_POINT` – If `PRICE_VALUE_TYPE` is PP, then this contains the price point values. Either `PRICE_POINT` or `PRICE_PCT_OFF` must be not null, depending on the value in `PRICE_VALUE_TYPE`.
- `PRICE_PCT_OFF` – If `PRICE_VALUE_TYPE` is PO, then this contains the percentage off (a value between 0 and 1). Either `PRICE_POINT` or `PRICE_PCT_OFF` must be not null, depending on the value in `PRICE_VALUE_TYPE`.
- `CLIENT_LADDER_ID` – Unique identifier for the price ladder (i.e., unique per price ladder string)

An Example

The following table shows two sample markdowns taken records for the items from the previous examples.

Table 2–6 Sample Markdowns Taken Data

	Location Key	Effective Date	Old Ticket Price	New Ticket Price
101234509	FL1	2005-02-07	24.99	19.99
101234509	FL2	2005-02-07	19.99	16.99

The first row in the table describes an item that is marked down from \$24.99 to \$19.99 in the service on Wednesday, February 2, 2005. The markdown will take effect in the stores on Monday, February 7, 2005. When the sales data feed is transmitted on Sunday, February 6, 2005, the item's CURRENT_RETAIL price in the sales file should still be \$24.99, because that is the retail price as of the end of the week for the sales data feed. However, the item also has a record in the markdowns taken data feed that indicates that the item will be permanently marked down to \$19.99 on Monday.

Technical Notes

The following list provides details to consider regarding the markdowns taken data.

- The markdowns taken data must be at the item level (the level of optimization). Retailers typically must aggregate markdowns taken data from lower levels. The markdowns taken aggregation should be consistent with the CURRENT_RETAIL aggregation described for the sales interface. Because of this, the retailer should generate a markdown taken record whenever there is a change in the most frequently occurring value of CURRENT_RETAIL.
- The new ticket price must be less than the old ticket price (the interface does not support markups). The effective date must be a day. No two records are allowed to have the same merchandise, location, and effective date values.
- COE is not the system of record for price changes. It is therefore strongly recommended that all retailers provide this data, even if the markdowns taken in the service are being automatically transmitted to the retailer's price execution system. In this way, the service is aware of any markdowns taken, either through the service itself or by some other means.

Merchandise Hierarchy Standard Interface

The merchandise hierarchy interface describes how a retailer categorizes merchandise. The merchandise hierarchy begins with the highest level, such as company or division, and typically extends to the style-color level. For example, a five-level merchandise hierarchy might consist of Division, Department, Class, Style, and Color. Each entry (row) in the merchandise hierarchy standard interface describes the hierarchy for a specific piece of merchandise. In the example of a merchandise hierarchy shown in "[Merchandise Hierarchy Sample Data](#)" on page 2-12, the merchandise is an item of a specific color, and each row in the file describes the Division, Department, Class, and Style to which the specific color belongs.

How COE Uses the Merchandise Hierarchy Data

COE uses the merchandise hierarchy data to allow business rules to be assigned at higher levels than the item level.

Data Fields

The merchandise hierarchy can have up to fifteen levels. Each level in the merchandise hierarchy is described by three fields:

- **HIERARCHY_ID** – an identifier or value for the hierarchy level. It does not have to be unique.
- **HIERARCHY_KEY** – a key used to identify the merchandise level that is unique across the chain for that level. It is used to reference the merchandise in other data files.
- **HIERARCHY_DESC** – a description for the level that describes that level in the merchandise hierarchy.

These three fields are required for each level of the merchandise hierarchy that is used. For example, if a retailer's merchandise hierarchy contains five levels, then the merchandise hierarchy file will contain fifteen required fields. Any unused fields in the merchandise hierarchy file should be present in the file as NULL (that is, consecutive delimiters) when the file is sent in delimited file format.

In addition, the following two attributes are provided:

- **TXN_ID** – the unique transaction identifier for the current node that specifies the order of transactions to process.
- **TXN_FLAG** – status of the transaction, where 'M' indicates Update or Add and 'D' indicates Delete.

An Example

The following table shows sample data for a five-level hierarchy that consists of Division, Department, Class, Style, and Color. (The hierarchy descriptions are not included here):

Table 2–7 Merchandise Hierarchy Sample Data

Hierarchy 1 (Division)		Hierarchy 2 (Dept.)		Hierarchy 3 (Class)		Hierarchy 4 (Style)		Hierarchy 5 (Color)	
ID	Key	ID	Key	ID	Key	ID	Key	ID	Key
1	1	10	10	20	1020	1234	101234	9	101234509
1	1	10	10	20	1020	1234	101234	12	101234512
6	6	60	60	20	6020	1234	601234	12	601234512

In this example, the class, style, and color levels all have ID values that are not unique across the chain. Because of this, the Key values for these three levels cannot be the same as the ID values. The unique Key values for these three levels were created by combining values from higher levels in the hierarchy. The Key for the Class level was created by appending the Class ID to the Department Key. The Key for the Style level was created by appending the Style ID to the Department Key.

Technical Notes

The following list provides details to consider regarding the merchandise hierarchy data.

- The best way to create a unique Key for each level in the merchandise hierarchy depends on the retailer's hierarchy data. Whenever possible, the hierarchy Keys should not be dependent on higher levels in the hierarchy. In this way, the service can automatically detect and handle hierarchy moves without additional data. For more information on how the service manages merchandise hierarchy changes, see "[Merchandise Hierarchy Rename Standard Interface](#)" on page 2-13.

- The merchandise hierarchy file must contain a record for each product that is referenced in any other of a given week's data files.
- The merchandise hierarchy must be described consistently throughout the data file: each hierarchy node must have the same hierarchy ancestors for all records in the file that describes the hierarchy node. In the example shown in "[Merchandise Hierarchy Sample Data](#)" on page 2-12, the first two records describe the hierarchy above Style 101234 in an identical way. Note that this consistency requirement applies to all three of the hierarchy fields (Key, ID, and Desc). Inconsistent values for hierarchy descriptions are a common reason why some merchandise hierarchy records fail to load.
- Each node in a hierarchy can only have one parent node.
- The lowest level in the merchandise hierarchy must be the level at which sales and distribution data are provided.
- The lowest level does not have to be the level at which the optimization (called the "item level") occurs; however, the lowest level typically is the optimization level.
- The historical data files should include a record for each product that is referenced in any historical sales records, even if the product is inactive. It is recommended that retailers provide a single merchandise hierarchy file for all the historical data, rather than one file for each historical week.

Merchandise Hierarchy Rename Standard Interface

The merchandise hierarchy rename interface facilitates reclassifying and moving merchandise within the merchandise hierarchy. Any node in the hierarchy can be renamed by supplying the old node name, the new node name, and the level in the hierarchy. This cannot be done through the Merchandise Hierarchy Standard Interface.

Technical Notes

Note that this information pertains to both the Merchandise Hierarchy Rename Standard Interface and the Location Hierarchy Rename Standard Interface.

The service database associates other information with a node in the merchandise (or location) hierarchy through an internally generated key. Each node of the hierarchy has one of these internal keys in addition to the key that is sent by a retailer. Information like historical sales records, analytical parameters, and business rules is stored according to these internal keys. The relation between the internal keys and the retailer keys must be preserved when hierarchies are changed.

The rename interface is used to update the association between the retailer key and an internal key after a reclass occurs. The association between the retailer key and the internal key is updated by specifying the old key, the new key, and the level. The rename interface always needs to be combined with a merchandise hierarchy reflecting the changes that have been made. In the most general case, both of these files are required to fully specify a hierarchy change.

It is recommended that the keys at each level of the hierarchy should be unique without depending on parent levels so that hierarchy changes can be made without sending a rename file. In that case, when a node is moved, the changed hierarchy is sent. Since the keys for the nodes that move are unchanged, the internal keys will retain the correct association and nothing else needs to happen. The new parent-child relationships are simply defined by the latest hierarchy.

It may not be practical to provide keys at all levels that are independent of the keys at the parent level. For example, the CLASS key concatenates the DEPT and CO keys

above it. This implies that the rename interface is needed for certain types of hierarchy changes, as discussed below.

Another important concept is that the rename interface can be used for a "move" in the merchandise hierarchy, but does not directly describe a "merge". So, for example, there is no direct way to specify (assuming Dept 42 already exists):

"Move Department 44 to Department 42"

However, the desired result can be accomplished by:

"Move all classes in Department 44 into Department 42"

The types of moves specified below fall into the following categories:

- Move all departments in one division into another division.
- Move all classes in one department to another department.
- Move some classes from one department to another department.

The way to accomplish these moves depends on how the keys, at and below the levels in question, will be affected.

Case 1 When departments are moved to another division, the keys at and below department will not change, since division is not incorporated in the key. (The exception would be if a division were moved into another company.) Since the keys do not change at department or below, this move can be accomplished by sending the new merchandise hierarchy, with departments that were in the old division having the new division as their parent.

Cases 2 and 3 When classes are moved to another department, the keys at and below class for the affected nodes will all change (since class keys and below are all constructed by concatenating the class into the key). In these cases, a rename file must be sent in addition to the updated merchandise hierarchy. This file will contain a record for the affected class and for each of its descendents.

For example, in order to move CLASS 0263 from DEP 0059 to DEP 0086 (the class has STYLES 0001 and 0002, each with HALF-SIZES 0 and 1, each with COLORS 0001 and 0002), the following records in the rename file must be sent:

```
TOO00590263|TOO00860263|CLASS
TOO005902630001|TOO008602630001|STYLE
TOO005902630002|TOO008602630002|STYLE
TOO0059026300010|TOO0086026300010|HALF-SIZE
TOO0059026300011|TOO0086026300011|HALF-SIZE
TOO0059026300020|TOO0086026300020|HALF-SIZE
TOO0059026300021|TOO0086026300021|HALF-SIZE
TOO00590263000100001|TOO00860263000100001|COLOR
TOO00590263000110001|TOO00860263000110001|COLOR
TOO00590263000200001|TOO00860263000200001|COLOR
TOO00590263000210001|TOO00860263000210001|COLOR
TOO00590263000100002|TOO00860263000100002|COLOR
TOO00590263000110002|TOO00860263000110002|COLOR
TOO00590263000200002|TOO00860263000200002|COLOR
TOO00590263000210002|TOO00860263000210002|COLOR
```

These records tell the service how to associate the internal keys at each node with the new keys. (The new merchandise hierarchy file should also reflect the result of the moves.)

Price Ladders Standard Interface

The price ladders standard interface describes the price ladders used by the service.

Note that the Price Ladders data feed will not load if the data contains a colon or a semi-colon.

How COE Uses the Price Ladder Data

Price ladders define a retailer-specific set of markdown prices that can be selected in the service. Prices in the price ladder are expressed either as a price point (PP), as a percentage off the original retail price (PO), or as a percentage off the ticket price (PT). Each of these three types of price ladder can be permanent or temporary.

Note: After loading the ladders, you must restart the application as the ladders are cached in the application server. If the application server is not restarted, the cache will not display the loaded updates.

Data Fields

Twelve fields describe each price ladder:

- CLIENT_LADDER_ID – an externally generated sequential number that identifies the price ladder.
- MERCHANDISE_KEY – the key for this level of the merchandise hierarchy.
- MERCHANDISE_LEVEL – the level of the merchandise hierarchy.
- LOCATION_KEY – the key for this level of the location hierarchy.
- LOCATION_LEVEL – the level of the location hierarchy.
- PRICE_VALUE_TYPE – price ladders are expressed as either percentage off original retail price (PO), percentage off ticketed price (PT), or price point (PP).
- PRICE_LADDER_DESC – The price ladder name.
- MODEL_FLAG – a model run indicator. “R” indicates that the price ladder is used for the optimization.
- ITEM_PRG_FLAG – indicates if the price ladder is used for the optimization of individual items only (ITEM), pricing groups only (PRG), or both (BOTH).
- ACCOUNTING_TYPE – the accounting type can be either permanent (PERM) or temporary (TEMP).
- PRICE_POINT – if the price ladder type is PP, then this contains the price point values. Either PRICE_POINT or PRICE_PCT_OFF must be Not Null, depending on the value of the PRICE_VALUE_TYPE column.
- PRICE_PCT_OFF – if the price ladder type is PO, then this contains the percentage off (a value between 0 and 1). Either PRICE_POINT or PRICE_PCT_OFF must be Not Null, depending on the value of the PRICE_VALUE_TYPE column.

Technical Notes

The following list provides details to consider regarding price ladder data:

- The price ladder data is generally loaded after the merchandise/location hierarchy information, since price ladders are tied to levels. And, at least one price ladder must be loaded before the first model run.

- The inference rules, at a minimum, assign a default price ladder to each item or pricing group. In the service, ITEMS maps each ITEM_ID to a price ladder via the function getPriceLadderID. Each item can have only one price ladder for processing by the model.
- Percent off (PO) price ladders are discounts that are applied to the original price.
- Price point (PP) price ladders are actual prices that must be expressed as \$x.99.

Price ladders define a retailer-specific set of markdown prices that can be selected in the service. Prices in the price ladder are expressed either as a price point (PP), as a percentage off the original retail price (PO), or as a percentage off the ticket price (PT). Each of these three types of price ladder can be permanent or temporary.

The price ladder information collected from a retailer should include the name of the price ladder, the type of ladder, a list of price points or percentages (the rungs), and the hierarchy/location level.

The price ladder data is generally loaded after the merchandise/location hierarchy information, since price ladders are tied to levels. And, at least one price ladder must be loaded before the first model run.

The inference rules, at a minimum, assign a default price ladder to each item or pricing group. In the service, ITEMS maps each ITEM_ID to a price ladder via the function getPriceLadderID. Each item can have only one price ladder for processing by the model.

Promotions Standard Interface

The promotions interface describes planned promotions or temporary markdowns. The service uses this information to adjust forecasting and markdown recommendations.

How COE Uses the Promotions Data

COE uses the promotions data in a variety of ways, such as:

- to determine the item level forecast, which can affect markdown recommendations. For example, a permanent markdown may be delayed or may not be necessary because of a planned promotion.
- to restrict markdown recommendations. For example, a retailer can specify that a markdown should be taken only if it is deeper or more shallow than a certain type of planned promotion.

Data Fields

Here is some information about the key fields that specify the promotions data.

- PROMO_PRICE – the price during the promotion (a value must be provided for either PROMO_PRICE or PROMO_PERC_OFF)
- PROMO_PERC_OFF – the price is calculated as a percentage of the forecasted retail price at the time of the promotion. This must be a value between 0 and 1.
- PROMO_TYPE – the promotion type, or interpretation, is either ceiling (candidate prices can be no higher than the promotion price), floor (candidate prices can be no less than the promotion), or unrestricted.
- PROMO_EXCL_FG – included (1) or excluded (-1) from a promotional event.

Technical Notes

The following list provides details to consider regarding the promotion data.

- The promotion is specified as either a price (PROMO_PRICE) or as a percentage off (PROMO_PERC_OFF) the current retail price, so one of the two fields is always blank.
- If a promotion is specified as a percentage off, it must be expressed as a value between 0 and 1. (For example, 30% off is expressed as 0.3.)
- The promotions records must be at or above the item level (the level of optimization). For example, if the markdown recommendations are at the region level, then the promotions records must be at the region level. If a promotion is above the item level, then the load will automatically explode the promotion down to the item level.
- The current week's promotion data should include all promotions that have an end date that occurs after the last date in the sales history, regardless of when the promotion started.
- The promotion type column (PROMO_TYPE) is mandatory.
- A point-of-sale (POS) promotion is always unrestricted.
- The service does not combine the price effects of simultaneous promotions on the same item. For example, if three promotions are in effect for an item on a given day, the service looks, in order, at the promotion's interpretation, priority, and price and determines the price. (The interpretation, or promotion type, and the priority, an assigned value, are both defined in IR_PLANNED_PROMOS, which is described in the *Clearance Optimization Configuration Guide*.)
- If the price has already been marked down below the level of the promotion, then the current price does not change.
- When a promotion is defined and loaded, the promotion is applied (exploded) from the level at which it is defined down to the lower levels. The exclusion flag identifies merchandise within the defined promotion that is not to be included in the promotion.

The following table shows the use of the exclusion flag.

Table 2–8 Sample Promotion Data

Merch. Key	Merch. Level	Loc. Key	Loc. Level	Promo. Key	Start Date	End Date	Promo. Price	Promo. % Off	Promo. Desc.	Ex. Flag
10	DEPT	North	REGION	P1	01/01/04	02/01/04	null	0.2	Apromo	1
0	CHAIN	NE	DISTRICT	P1	01/01/04	02/01/04	null	0.2	Apromo	-1
1001	STYLE	North	REGION	P1	01/01/04	01/01/04	null	0.2	Apromo	-1
0	CHAIN	0	CHAIN	P2	02/14/04	02/15/04	null	null	PresDay	1
1002	STYLE	North	REGION	P3	01/01/04	02/01/04	null	0.2		1
1003	STYLE		CHAIN	*			null			-1

Notes on the table entries:

- Row 1 shows a month-long 20 percent off P1 promotion.
- Row 2 excludes all merchandise in the NE from the P1 promotion.

- Row 3 excludes the 1001 Style from the P1 promotion from the entire North Region. (Row 2 simply excluded all merchandise from the NE.)
- Row 4 shows a non-price promotion over President's Day for the entire company.
- Row 5 shows a month-long 20 percent off P3 promotion.
- Row 6 excludes Style 1003 from every promotion.

Sales/Inventory/Orders Standard Interface

The sales interface describes weekly sales, inventory, and order data at the lowest level of the merchandise and location hierarchy. If items are defined at higher levels in either hierarchy, then COE aggregates the data in the sales file to the level required by the items.

For the weekly data, the sales file should always contain the sales records for the most recent week of sales that have not yet been sent to the service. The same weekly sales file can also contain the complete sales records for one or more previous weeks of sales (for example, in order to correct previous weekly sales data because of subsequent adjustments). When the sales file contains data for previous weeks, it must contain the complete sales data for those weeks, not just the changes. The load procedure replaces the data already loaded with the new data.

How COE Uses the Sales Data

COE uses the sales data in a variety of ways, such as:

- to define the current selling price for an item in the absence of any promotions.
- to determine, in combination with analytical parameters, the base demand for an item.
- to help define the total inventory to clear through optimization (inventory on-hand is always part of the total inventory to clear and units on-order are typically part of the total inventory to clear provided by the model).

Data Fields

Sixteen fields describe each sales record:

- **MERCHANDISE_KEY** – the key for the lowest level in the merchandise hierarchy associated with this sale.
- **LOCATION_KEY** – the key for the lowest level in the location hierarchy associated with this sale.
- **FISCAL_YEAR** – the fiscal year of the sales record.
- **FISCAL_WEEK** – the fiscal week of the sales record.
- **NET_SALES_UNITS** – the number of units sold minus the number of units returned for the merchandise at the location.
- **NET_SALES_DOLLARS** – the dollars received at the register for all new sales minus the return dollars.
- **GROSS_SALES_UNITS** – the number of units sold, excluding returns, for the merchandise at the location. Gross sales units are used, in conjunction with **GROSS_SALES_DOLLARS**, to calculate the sales price that is passed to the model and used to calculate demand.
- **GROSS_SALES_DOLLARS** – the dollars received at the register for all new sales, excluding returns. Gross sales dollars are used, in conjunction with **GROSS_**

SALES_UNITS, to calculate the sales price that is passed to the model and used to calculate demand.

- POS_SALES_UNITS – the number of units sold at a promotional price (temporary markdown taken at the register) for the merchandise at the location.
- POS_SALES_DOLLARS – the dollars received at the register for the POS_SALES_UNITS.
- EOP_INVENTORY_UNITS – the number of units of the merchandise on hand at the location at the end of the fiscal week.
- EOP_ON_ORDER_UNITS – the number of units of the merchandise on order for or in transit to the location at the end of the fiscal week.
- CURRENT_RETAIL – the retail sales price of the merchandise at the location at the end of the week in the absence of any promotional discounts. Current Retail is used as the starting price for forecasts and optimizations. CURRENT_RETAIL should not reflect planned changes to the retail sales price in the coming week or weeks. (Such pending changes are specified in the Markdowns Taken interface, which is described in "Markdowns Taken Standard Interface" on page 2-10.)
- CURRENT_INV_PRICE – the inventory price of the merchandise at the location at the end of the fiscal week. This price is used as the basis for calculating markdown dollars, using the retail accounting method. Some retailers may use a retail accounting method in which the inventory price of an item is not always the same as the retail sales price.
- STORE_NUM_WITH_INV – the number of locations that have positive inventory (EOP_INVENTORY_UNITS) at the end of the fiscal week. Assuming the sales records are at the store level in the location hierarchy, this value will be equal to one when EOP_INVENTORY_UNITS is greater than zero, and it will be equal to zero when EOP_INVENTORY_UNITS is less than or equal to zero.
- STORE_NUM_WITH_OO – the number of locations that have positive units on order, but zero units on hand, at the end of the fiscal week. Assuming the sales records are at the store level in the location hierarchy, this value will be equal to one when EOP_ON_ORDER_UNITS is greater than zero and EOP_INVENTORY_UNITS is less than or equal to zero, and it will be equal to zero in all other cases.

An Example

The following table shows sample data, using previously defined items.

Table 2–9 Sample Sales Data

Merch. Key/Loc. Key	Fisc. Yr.	Fisc. Wk.	Net Sales Units	Net Sales \$	Gross Sales Units	Gross Sales \$	POS Sales Units	POS Sales \$	EOP Inv. Units	EOP OO Units	Store # Inv.	Store # OO	Curr. Rtl. Price	Curr. Inv. Price
101234509 /1000	2004	52	3	69.97	3	69.97	0	0.00	41	0	1	0	24.99	24.99
101234509 /1001	2004	52	4	74.96	5	99.95	0	0.00	60	0	1	0	19.99	19.99
101234509 /1010	2004	52	1	19.99	1	19.99	0	0.00	0	20	0	1	19.99	19.99
101234512 /2000	2004	52	2	84.98	2	84.98	1	39.99	28	0	1	0	49.99	49.99

Notes on Table:

- Row 1: The Net Sales Dollars are the actual sales dollars captured at the register and can thus be less than the Net Sales Units multiplied by the Current Retail Price (even if there are no POS Sales Units).
- Row 2: The Gross Sales Dollars are not the same as the Net Sales Units, because of one unit being returned.
- Row 3: This location has zero EOP Inventory Units and non-zero EOP On Order Units. Because of this, the value in the Store # OO is 1.
- Row 4: Two units were sold this week, one during a promotion and one outside a promotion.

Technical Notes

The following list provides details to consider regarding the sales data.

- The service only persists the sales data at the item level in the database. If a retailer requires a copy of the weekly sales data, she or he should implement a process to archive the weekly data.
- The gross and net sales fields are required by the interface. The POS sales fields can be NULL if not available. If a retailer cannot provide the gross sales fields, then those fields must be populated with the corresponding value for net sales.
- The CURRENT_INV_PRICE field is required by the interface. Retailers who do not have an inventory price that is distinct from the retail price should populate this field with the value in the CURRENT_RETAIL field.
- The service expects a single record in the sales feed to summarize the sales for a given merchandise/location/week. For example, if a retailer is sending sales to the service at the color-store level, they should send a single record for each color-store-week. The retailer is responsible for aggregating the transactions for the color-store-week to create this record.
- A retailer may have even lower levels in her or his merchandise hierarchy that are not known by the service; therefore, the retailer may need to aggregate some of the data provided in the sales interface. For example, if the lowest level in the merchandise hierarchy is color, but the retailer's hierarchy has size beneath color and the retailer's data source for sales is at the size level, then the retailer will need to aggregate the sales data fields as follows:
 - All UNITS and DOLLARS fields should be aggregated by summing the lower level records.
 - CURRENT_RETAIL and CURRENT_INV_PRICE should be aggregated by choosing the most frequently occurring value for the field. For example, if there are six sizes for an item (color), and five of the sizes have a current retail price of \$19.99, and one of the sizes has a current retail price of \$21.99, then the current retail sent to the service should be \$19.99.
 - If the records in the sales file are at a lower level than the item level in Price, then the service will aggregate the sales data following the same aggregation rules just described.

Seasonalities Standard Interface

The seasonalities standard interface describes the seasonality values (effects related to the time of year) provided by Analytical Services that are used by the service to calculate markdowns and forecasts.

How COE Uses the Seasonalities Data

COE uses the seasonalities data in a variety of ways, including:

- To support seasonality searches across the merchandise and location hierarchies.
- The following inference rules are involved in seasonalities:
 - IR_SEASONALITIES – provides the seasonality values to the model from start date to out date.
 - IR_SEASONALITY_ATTRIBUTE – defines the attributes value(s) used for seasonality matching.
 - IR_ITEM_IDS – maps item IDs to seasonality IDs

Data Fields

Eight fields describe a seasonality map record:

- PRIORITY – the search priority for the seasonality.
- SEASONALITY_ID – the ID for the seasonality.
- MERCHANDISE_LEVEL – description of the level of the merchandise hierarchy.
- MERCHANDISE_KEY – key for the merchandise hierarchy level.
- LOCATION_LEVEL – description of the level of the location hierarchy.
- LOCATION_KEY – key for the location hierarchy level.
- ATTRIBUTE_MASK – the search mask that specifies the season code and, optionally, the item attributes of the seasonality curves.
- AS_VERSION – the version number for the current run. Set by Analytic Parameter Calculator for Markdown Optimization (APC-MDO) and used to track run versions.

Six fields describe a seasonality values record:

- SEASONALITY_ID – the ID for the seasonality.
- CALENDAR_DT – the date for the seasonality.
- SEAS_INDX – the value for the seasonality for the date.
- SEAS_ERR – for future use. Set to 0.
- AS_PARAMETER_ID – a number that uniquely identifies the current record and that is used for tracking.
- AS_VERSION – the version number for the current run. Set by APC-MDO and used to track run versions.

Clearance Optimization Engine Interface Specifications

The following tables provide ordered lists of the contents of each of the COE interface specifications.

Business Rule Instances Specification (ASH_BRM_INSTANCE_TBL)

Table 2–10 Business Rule Instances Standard Interface Specification

Attribute	Attribute Description	Data Type	Maximum Length	Nullable Y/N
MERCHANDISE_KEY	Key for this level of the hierarchy	String	50	N
MERCHANDISE_LEVEL	ID for this level of the hierarchy	String	50	N
LOCATION_KEY	Key for this level of the hierarchy	String	50	N
LOCATION_LEVEL	ID for this level of the hierarchy	String	50	N
RULE_NAME	The name of the business rule associated with the item.	String	64	N
RULE_VALUE	The business rule value assigned to the item.	String Note: Values < 1 should be expressed as 0.n.	100	N
ATTRIB1_VALUE	The specific value associated with the item for custom attribute 1.	String	100	Y
ATTRIB2_VALUE	The specific value associated with the item for custom attribute 2.	String	100	Y
DELETE_FLAG	A flag to indicate whether the instance is to be deleted or inserted. 0 = insert (the default). 1 = delete.	Integer	1	Y

Calendar Specification (ASH_CAL_TBL)

Table 2–11 Calendar Standard Interface Specification

Attribute	Attribute Description	Data Type	Maximum Length	Nullable Y/N
EOP_CALENDAR_DT	Ending calendar date of the fiscal week (which is usually a Saturday)	Date in format YYYY-MM-DD	10	N
FISCAL_YR	Number of the fiscal year	Integer	4	N
FISCAL_QTR	Number of fiscal quarter	Integer	1	N
FISCAL_MO	Number of the fiscal month	Integer	2	N

Table 2–11 (Cont.) Calendar Standard Interface Specification

Attribute	Attribute Description	Data Type	Maximum Length	Nullable Y/N
FISCAL_WK	Number of the fiscal week	Integer	2	N
CALENDAR_WK	An alternative number for the calendar week (optional)	Integer	2	Y
SEASON	Season number associated with the week	Integer	2	N

Cluster Mapping Specification (ASH_CLUSTER_MAPPING_TBL)

Table 2–12 Cluster Mapping Standard Interface Specification

Attribute	Attribute Description	Data Type	Maximum Length	Nullable Y/N
CLUSTER_SET_CLIENT_ID	Retailer ID of the cluster set	String	25	Y
MERCHANDISE_CLIENT_ID	Retailer ID from the Merchandise Hierarchy table	String	25	Y

Demand Parameters Specification (ASH_PARAMETER_VALUES_TBL)

Table 2–13 Demand Parameters Standard Interface Specification

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
MERCHANDISE_LEVEL	The external merchandise level.	String	50	N
MERCHANDISE_KEY	In combination with the location key, identifies the item being marked down.	String	25	
LOCATION_LEVEL	The external location level.	String	50	N
LOCATION_KEY	In combination with the merchandise key, identifies the item being marked down.	String	25	N
ITEM_ATTRIBUTE	The item attribute for the parameter (set to % by default).	String	100	N
PARAMETER_NAME	The name of the parameter. The names can be DEFAULT_GAMMA, DEFAULT_ALPHA, CRITICAL_INVENTORY, or ZERO_INVENTORY.	String	50	N

Table 2–13 (Cont.) Demand Parameters Standard Interface Specification

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
PARAMETER_VALUE	The value assigned to the parameter.	String	25	Y
AS_PARAMETER_ID	A number that uniquely identifies the record across all output tables and can be used to trace issues. It is not an analytical value.	Integer	32	Y
AS_VERSION	The version number for the current run of the output, which is set by APC-MDO and can be used to track versions.	String	20	Y

DC Allocation Specification (ASH_DC_ALLOCATION_TBL)

Table 2–14 Distribution Center Allocation Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
WAREHOUSE_KEY	Unique identifier for a warehouse	String	25	N
MERCHANDISE_KEY	Key for the item level in the merchandise hierarchy	String	25	N
MERCHANDISE_LEVEL	The level of the merchandise key. Must be at the level of sales optimization in order to be inserted into WAREHOUSE_INV_TBL.	String	32	N

Table 2–14 (Cont.) Distribution Center Allocation Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
LOCATION_KEY	Key for the item level in the location hierarchy	String	25	N
FRACTION	Percentage of inventory, expressed as a value 0 - 1	Decimal	8,6	N

¹ For Decimal, the requirement is a number of a certain defined length and with a certain number of decimal places. For example, (22,2) is a number that can be up to 22 digits long and that can have two digits after the decimal point.

DC Inventory Specification (ASH_DCI_TBL)

Table 2–15 Distribution Center Inventory Standard Interface Specification

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
MERCHANDISE_KEY	Key for the lowest level in the merchandise hierarchy	String	25	N
WAREHOUSE_KEY	Unique identifier for a warehouse	String	25	N
FISCAL_YEAR	Fiscal year ID	Integer	4	N
FISCAL_WEEK	Fiscal week ID	Integer	2	N
EOP_INVENTORY_UNITS	Describes the total DC EOP inventory units	Integer	22	Y
EOP_ON_ORDER_UNITS	Describes the total DC EOP on order units	Integer	22	Y

Items Specification (ASH_ITEMS_TBL)

Table 2–16 Items Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
MERCHANDISE_KEY	Key for the item level in the merchandise hierarchy	String	25	N
LOCATION_KEY	Key for the item level in the location hierarchy	String	25	N
FIRST_RECEIPT_DATE	Receipt date is the date that an item first appears in a store or a distribution center (DC)	Date in format YYYY-MM-DD	10	Y
LAST_RECEIPT_DATE	Most recent date that an item was received in a store or a distribution center	Date in format YYYY-MM-DD	10	Y

Table 2–16 (Cont.) Items Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
VENDOR	Vendor that supplies merchandise to this location	String	25	Y
VENDOR_DESC	Vendor description	String	50	Y
UNIT_COST	Describes the merchandise's average unit cost (cost of inventory)	Decimal	22,2	N
SEASON_CODE	Retailer-specific season code, used to help determine seasonality	String	25	Y
FULL_PRICE	Original retail price of the merchandise	Decimal	22,2	Y

¹ For Decimal, the requirement is a number of a certain defined length and with a certain number of decimal places. For example, (22,2) is a number that can be up to 22 digits long and that can have two digits after the decimal point.

Location Hierarchy Specification (ASH_LH_TBL)

Table 2–17 Location Hierarchy Standard Interface Specification

Attribute Name	Attribute Description	Data Type	Maximum Length	Nullable Y/N
HIERARCHY1_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY1_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY1_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY2_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY2_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY2_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY3_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY3_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY3_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY4_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY4_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY4_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY5_ID	ID for this level of the hierarchy	String	25	Y

Table 2–17 (Cont.) Location Hierarchy Standard Interface Specification

Attribute Name	Attribute Description	Data Type	Maximum Length	Nullable Y/N
HIERARCHY5_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY5_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY6_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY6_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY6_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY7_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY7_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY7_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY8_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY8_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY8_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY9_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY9_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY9_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY10_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY10_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY10_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY11_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY11_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY11_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY12_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY12_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY12_DESC	Description of this level of the hierarchy	String	50	Y

LH Rename Specification (ASH_LHRENAME_TBL)

Table 2–18 Location Hierarchy Rename Standard Interface Specification

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
OLD_LOCATION_KEY	Old unique identifier for location hierarchy	String	25	N
NEW_LOCATION_KEY	New unique identifier for location hierarchy	String	25	N
LOCATION_LEVEL	Level within the location hierarchy	String	50	N

Markdowns Taken Specification (ASH_MDTAKEN_TBL)

Table 2–19 Markdowns Taken Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
MERCHANDISE_KEY	In combination with the location key, identifies the item being marked down.	String	25	N
LOCATION_KEY	In combination with the merchandise key, identifies the item being marked down. This attribute is required only for COE.	String	25	Y
EFFECTIVE_DATE	Effective date of the retail price change.	Date in format YYYY-MM-DD	10	N
PRICE_VALUE_TYPE	Percentage Off Original Retail Price (PO), Percentage Off Ticketed Price (PT), Amount Off Original Retail Price (AO), Amount Off Ticket Price (AT), or Price Point (PP).	String	2	N
ACCOUNTING_TYPE	The accounting type for the markdown can be either Permanent (PERM) or Temporary (TEMP). This attribute is required only for COE.	String	4	N

Table 2–19 (Cont.) Markdowns Taken Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
PRICE_POINT	If PRICE_VALUE_TYPE is PP, then this contains the price point values. A value must be provided for either PRICE_POINT or PRICE_PCT_OFF.	Decimal	7,2	Y
PRICE_PCT_OFF	If PRICE_VALUE_TYPE is PO, then this contains the percentage off (a value between 0 and 1). A value must be provided for either PRICE_POINT or PRICE_PCT_OFF	Decimal	3,2	Y
CLIENT_LADDER_ID	Unique identifier for the price ladder (i.e., unique per price ladder string)	Integer	22	Y

¹ For Decimal, the requirement is a number of a certain defined length and with a certain number of decimal places. For example, (22,2) is a number that can be up to 22 digits long and that can have two digits after the decimal point.

Merchandise Hierarchy Specification (ASH_MH_TBL)

Table 2–20 Merchandise Hierarchy Standard Interface Specification

Attribute Name	Attribute Description	Data Type	Maximum Length	Nullable Y/N
TXN_ID	The unique transaction identifier for the current node that specifies the order of transactions to process.	Integer	32	N
TXN_FLAG	Status of the transaction, where 'M' indicates an Update or Add action and 'D' indicates a Delete action.	String	1	N
HIERARCHY1_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY1_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY1_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY2_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY2_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY2_DESC	Description of this level of the hierarchy	String	50	Y

Table 2–20 (Cont.) Merchandise Hierarchy Standard Interface Specification

Attribute Name	Attribute Description	Data Type	Maximum Length	Nullable Y/N
HIERARCHY3_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY3_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY3_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY4_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY4_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY4_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY5_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY5_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY5_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY6_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY6_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY6_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY7_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY7_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY7_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY8_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY8_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY8_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY9_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY9_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY9_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY10_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY10_KEY	Key for this level of the hierarchy	String	25	Y

Table 2–20 (Cont.) Merchandise Hierarchy Standard Interface Specification

Attribute Name	Attribute Description	Data Type	Maximum Length	Nullable Y/N
HIERARCHY10_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY11_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY11_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY11_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY12_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY12_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY12_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY13_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY13_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY13_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY14_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY14_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY14_DESC	Description of this level of the hierarchy	String	50	Y
HIERARCHY15_ID	ID for this level of the hierarchy	String	25	Y
HIERARCHY15_KEY	Key for this level of the hierarchy	String	25	Y
HIERARCHY15_DESC	Description of this level of the hierarchy	String	50	Y

MH Rename Specification (ASH_MHRENAME_TBL)**Table 2–21 Merchandise Hierarchy Rename Standard Interface Specification**

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
OLD_MERCHANDISE_KEY	Old unique identifier for merchandise hierarchy	String	25	N
NEW_MERCHANDISE_KEY	New unique identifier for merchandise hierarchy	String	25	N
MERCHANDISE_LEVEL	Level within the merchandise hierarchy	String	50	N

Price Ladders Specification (ASH_PRICE_LADDERS_TBL)

Table 2–22 Price Ladders Standard Interface Specification¹

Attribute	Attribute Description	Data Type	Maximum Length	Nullable Y/N
CLIENT_LADDER_ID	Unique identifier for the price ladder (i.e., unique per price ladder string)	Integer		N
MERCHANDISE_KEY	Key for this level of the merchandise hierarchy	String	25	N
MERCHANDISE_LEVEL	Description of this level of the merchandise hierarchy	String	50	N
LOCATION_KEY	Key for this level of the location hierarchy	String	25	N
LOCATION_LEVEL	Description of this level of the location hierarchy	String	50	N
PRICE_VALUE_TYPE	Percentage Off Original Retail Price (PO), Percentage Off Ticketed Price (PT), or Price Point (PP)	String	2	N
PRICE_LADDER_DESC	Price ladder name.	String	50	N
MODEL_FLAG	A model run indicator. R = price ladder used for optimization.	String	2	N
ITEM_PRG_FLAG	Indicates if price ladder is used for the optimization of individual items only (ITEM), Pricing Groups only (PRG), or both (BOTH).	String	4	N

Table 2–22 (Cont.) Price Ladders Standard Interface Specification¹

Attribute	Attribute Description	Data Type	Maximum Length	Nullable Y/N
ACCOUNTING_TYPE	The accounting type can be either Permanent (PERM) or Temporary (TEMP).	String	4	N
PRICE_POINT	If price ladder type is PP, then this contains price point values. Note: Either PRICE_POINT or PRICE_PCT_OFF must be Not Null, depending on the value of the PRICE_VALUE_TYPE column.	Decimal	7,2	Y
PRICE_PCT_OFF	If price value type is PO, then this contains the percentage off (a value between 0 and 1). Note: Either PRICE_POINT or PRICE_PCT_OFF must be Not Null, depending on the value of the PRICE_VALUE_TYPE column.	Decimal	3,2	Y

¹ For Decimal, the requirement is a number of a certain defined length and with a certain number of decimal places. For example, (22,2) is a number that can be up to 22 digits long and that can have two digits after the decimal point.

Promotions Specification (ASH_PROMO_TBL)

Table 2–23 Promotions Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
MERCHANDISE_KEY	Key for this level in the merchandise hierarchy	String	25	N
MERCHANDISE_LEVEL	The level in the merchandise hierarchy under promotion	String	50	N
LOCATION_KEY	Key for this level in the location hierarchy	String	25	N
LOCATION_LEVEL	The level in the location hierarchy under promotion	String	50	N
PROMOTION_KEY	Some name that identifies the promotion under consideration	String	50	Y
PROMO_START_DATE	Start date of the promotion	Date in format YYYY-MM-DD	10	N
PROMO_END_DATE	End date of the promotion	Date in format YYYY-MM-DD	10	N

Table 2–23 (Cont.) Promotions Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
PROMO_PRICE	Price during the promotion (a value must be provided for either PROMO_PRICE or PROMO_PERC_OFF)	Decimal	22,2	Y
PROMO_PERC_OFF	Percent off current retail price (a value must be provided for either PROMO_PRICE or PROMO_PERC_OFF). Expressed as a value between 0 and 1.	Decimal	22,3	Y
PROMO_DESC	Description of the promotion	String	100	Y
PROMO_TYPE	Type of the promotion (floor, ceiling, or unrestricted). This column is mandatory.	String	50	N
PROMO_EXCL_FG	Included (1) or excluded (-1) from a promotional event.	Integer	2	Y
PROMO_NUMBER	Number of the promotion	Integer	4	Y
ATTRIBUTE1		String	50	Y
ATTRIBUTE2		String	50	Y
ATTRIBUTE3		String	50	Y
ATTRIBUTE4		String	50	Y
ATTRIBUTE5		String	50	Y

¹ For Decimal, the requirement is a number of a certain defined length and with a certain number of decimal places. For example, (22,2) is a number that can be up to 22 digits long and that can have two digits after the decimal point.

Sales Specification (ASH_SALES_TBL)

Table 2–24 Sales/Inventory/Orders Standard Interface Specification¹

Attribute Name	Attribute Description	Data Type	Maximum Length	Nullable Y/N
MERCHANDISE_KEY	Key for the lowest level in the merchandise hierarchy.	String	25	N
LOCATION_KEY	Key for the lowest level in the location hierarchy.	String	25	N
FISCAL_YEAR	Number of the fiscal year.	Integer	4	N
FISCAL_WEEK	Number of the fiscal week.	Integer	2	N

Table 2–24 (Cont.) Sales/Inventory/Orders Standard Interface Specification¹

Attribute Name	Attribute Description	Data Type	Maximum Length	Nullable Y/N
NET_SALES_UNITS	Describes the net number of units sold of the Merchandise at the Location.	Integer	22	N
NET_SALES_DOLLARS	Describes the net dollar amount of sales for the Merchandise/ Location during the fiscal week.	Decimal	22,3	N
GROSS_SALES_UNITS	Describes the gross number of new units sold of the Merchandise at the Location.	Integer	22	N
GROSS_SALES_DOLLARS	Describes the gross dollar amount of new sales for the Merchandise/ Location during the fiscal week.	Decimal	22,3	N
POS_SALES_UNITS	Describes the number of units of the Merchandise at the Location sold at a temporary markdown taken at the register.	Integer	22	Y
POS_SALES_DOLLARS	Describes the dollar amount of sales with a temporary markdown taken at the register for the Merchandise/ Location during the fiscal week.	Decimal	22,3	Y
EOP_INVENTORY_UNITS	Describes the number of units on hand inventory at the end of the fiscal week.	Integer	22	N
EOP_ON_ORDER_UNITS	Describes the number of units on order at the end of the period (in transit to the store)	Integer	22	N
STORE_NUM_WITH_INV	Describes the number of locations that have inventory at the end of the fiscal week.	Integer	22	N

Table 2–24 (Cont.) Sales/Inventory/Orders Standard Interface Specification¹

Attribute Name	Attribute Description	Data Type	Maximum Length	Nullable Y/N
STORE_NUM_WITH_OO	Describes the number of locations that have units on order (but not on hand) at the end of the fiscal week.	Integer	22	N
CURRENT_RETAIL	Describes the merchandise's retail price.	Decimal	22,2	N
CURRENT_INV_PRICE	Describes the merchandise's inventory price.	Decimal	22,2	N

¹ For Decimal, the requirement is a number of a certain defined length and with a certain number of decimal places. For example, (22,2) is a number that can be up to 22 digits long and that can have two digits after the decimal point.

Seasonalities Specification (ASH_SEASONALITY_MAPS_TBL and ASH_SEASONALITY_VALUES_TBL)

The seasonalities interface populates two tables in COE.

Table 2–25 Seasonalities (Maps) Standard Interface Specification

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
PRIORITY	The search priority for the seasonality.	Integer		N
SEASONALITY_ID	The ID for the seasonality.	Integer		N
MERCHANDISE_LEVEL	Description of this level of the merchandise hierarchy.	String	50	N
MERCHANDISE_KEY	Key for this level of the merchandise hierarchy.	String	25	N
LOCATION_LEVEL	Description of this level of the location hierarchy.	String	50	N
LOCATION_KEY	Key for this level of the location hierarchy.	String	25	N
ATTRIBUTE_MASK	The search mask that specifies the season code and, optionally, the item attributes of the seasonality curves.	String	50	Y
AS_VERSION	The version number for the current run. Set by APC-MDO and used to track run versions.	String	20	Y

Table 2–26 Seasonalities (Values) Standard Interface Specification¹

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
SEASONALITY_ID	The ID for the seasonality.	Integer		N
CALENDAR_DT	The date for the seasonality	Date in format YYYY-MM-DD	10	N
SEAS_INDX	The value of the seasonality for the date.	Decimal	11,4	Y
SEAS_ERR	For future use. Set to 0.	Decimal	11,4	Y
AS_PARAMETER_ID	A number that uniquely identifies the current record and that is used for tracking.	Integer		Y
AS_VERSION	The version number for the current run. Set by APC-MDO and used to track run versions.	String	20	Y

¹ For Decimal, the requirement is a number of a certain defined length and with a certain number of decimal places. For example, (22,2) is a number that can be up to 22 digits long and that can have two digits after the decimal point.

Standard Load

This chapter contains the following:

- Introduction
- Standard Load Process
- Standard Load Error Handling
- Standard Load Dependency Tree
- Standard Interface Specifications for One-Time Data
- Standard Dataset

Introduction

This chapter describes the process to execute the standard load procedure, which transforms and loads retail data into the target database. It also includes standard load error messages and information about one-time data loads that are not part of the standard interface.

Note: RPAS stores hierarchy position names in lower case. The hierarchy load files in RPAS for IP-COE can be in mixed case; however, they are stored in lower case internally. The conversion on the IP side is handled by the convertDomain utility, and no manual loads need to be performed.

COE, on the other hand, supports mixed case position names (that is, merchandise_key and location_key), both in load files and in database storage. Moreover, COE uses case-sensitive comparisons for position names (ids). As a result, customers must load lower case position names (that is, merchandise-key and location_key) in COE.

Standard Load Process

Clearance Optimization Engine provides two scripts that stage, transform, and load data into the target database tables in the service database. The data must be provided in flat files that meet the standard interface specifications. The variable length data in the files should be pipe-delimited. The files should be named to correspond to the names of the matching specification tables. For example, the calendar file should be named in a meaningful way (such as cal.dat or cal.datafeed) to correspond to ASH_CAL_TBL. No specific file extension is required for the input files.

Table 3–1 Example Flat Files Names

Example File Name	File Content
mh.dat	Merchandise Hierarchy
lh.dat	Location Hierarchy
cal.dat	Calendar
items.dat	Items
sales.dat	Sales
mdtaken.dat	Markdowns Taken
promo.dat	Promotions
dci.dat	Warehouse Inventory
dc_allocation.dat	Warehouse Allocation
mhrename.dat	MH Rename
lhrename.dat	LH Rename
brm_instance.dat	Business Rule Instances
parameter_values.dat	Demand Parameters
price_ladders.dat	Price ladders
seasonality_maps.dat	Seasonality Maps
seasonality_values.dat	Seasonality Values
mvhistmd.dat	MVHistMarkdowns

The two scripts are located in %INSTALLATION_DIRECTORY%/modules/tools/bin. The first script, **pl_stage_file.sh**, stages the data from the flat files into the ASH staging tables. The second script, **pl_load_data.sh**, loads the staged data into the service database. These two scripts are used if you need to customize the load dependency tree.

Each script contains options that can be customized. You can customize the options in the following ways (which are listed in order of precedence, with the command line having the highest precedence):

- Using the command line options
- Setting the customization values as environment variables in env.sh
- Setting the customization values in the user's environment

If you do not need to customize the load dependency tree, you can use the following two scripts:

- **pl_stage_client.sh** <full_path_to_product_directory> COEDataset
- **pl_load_client.sh** <full_path_to_product_directory>

The **pl_stage_client.sh** script calls **pl_stage_file.sh**. The **pl_load_client.sh** script calls **pl_load_data.sh**.

Environment Customization File

Here is an example of the environment customization file (**env.sh**):

```
#This is the environment customization file.
#Please define all customization values here.
```

```

#The mail client and address to send all messages to:
#MAIL=mailx
#REPORT_ADDRESS=error_mail@your_domain.com

#Number of parallel processes to run load procedures:
PARALLEL=2

#Directory with data control files:
#CONTROLDIR=/ASHschema/controlfiles

#Directory to store logs:
#LOGDIR=/tmp/load_logs

#Directory to move old logs to.
#If this variable is not set, the logs will be overwritten.
This folder is not required to exist and will be created at the time
#of archiving the logs.
#
#If all old logs should be preserved, it is possible to
#archive the files into a new unique folder, such as:
#LOGDIR_ARCHIVE=
#/tmp/load_logs/archived_logs_'date +%Y%m%d_%H%M%S'
#
#If only the archive of the previous run is important, then
#archive the files into the same folder, such as:
#LOGDIR=/tmp/load_logs/archived_logs

#Number of errors to allow during load
ERROR_THRESHOLD=50

```

Staging Script: `pl_stage_file.sh`

Usage: `pl_stage_file.sh [OPTION]... [FILE]...`

Loads the files into the database.

Options:

Table 3-2 *pl_stage_file.sh Options*

<code>-a DIR</code>	<code>--logdir_archive=DIR</code>	directory to archive old log files
<code>-c DIR</code>	<code>--controldir=DIR</code>	directory with data control files
<code>-e NUM</code>	<code>--errorthreshold=NUM</code>	number of errors to allow in load
<code>-l DIR</code>	<code>--logdir=DIR</code>	directory to store logs
<code>-r DIR</code>	<code>--configroot=DIR</code>	configuration root directory
<code>-h</code>	<code>--help</code>	displays help and exits

Load Script: `pl_load_data.sh`

Usage: `pl_load_data.sh [OPTION]... [LOADPROCEDURE]...`

Runs the load procedures in the database.

Options:

Table 3-3 *pl_load_data.sh Options*

<code>-a DIR</code>	<code>--logdir_archive=DIR</code>	directory to archive old log files
---------------------	-----------------------------------	------------------------------------

Table 3–3 (Cont.) pl_load_data.sh Options

-e NUM	--errorthreshold=NUM	number of errors to allow in load (overwrites the procedure's default limit)
-l DIR	--logdir=DIR	directory to store logs
-r DIR	--configroot=DIR	configuration root directory
-h	--help	displays help and exits

Load Procedures

Here is a description of each load procedure, which includes the source table and the target table.

Load Business Rule Instances

Procedure: com.profitlogic.db.birch.LoadBRInstances

Source Tables:

- ASH_BRM_INSTANCE_TBL
- BRM_VALUE_DEFINITIONS_TBL
- BRM_KEY_LEVELS_TBL
- MERCHANDISE_HIERARCHY_TBL
- LOCATION_HIERARCHY_TBL

Target Tables:

- BRM_INSTANCE_TBL
- BRM_INSTANCE_CHANGE_TBL

Description: This procedure re-loads business rule instances from ASH_BRM_INSTANCE_TBL to BRM_INSTANCE_TBL. If existing data is modified or deleted, the old data is written to BRM_INSTANCE_CHANGE_TBL to preserve the change history.

Load Calendars

Procedure: com.profitlogic.db.birch.LoadCalendars

Source Table: ASH_CAL_TBL

Target Table: PERIODS_TBL

Description: This procedure updates the PERIODS_TBL, which is seeded by the service during installation. The following columns in PERIODS_TBL are updated:

- FISCAL_YR
- FISCAL_MO
- FISCAL_WK
- FISCAL_QUARTER
- FISCAL_HALF
- CALENDAR_YR
- CALENDAR_MO
- CALENDAR_WK
- CALENDAR_QUARTER

- SEASON (the rows derived from ASH_CAL_TBL)

Load Collections Auto

Procedure: com.profitlogic.db.birch.LoadCollectionsAuto

Source Tables:

- all items from IR_ITEM_COLLECTION except those that have already been auto-collected

Target Tables:

- COLLECTIONS_TBL
- COLLECTION_MAPS_TBL

Description: This procedure determines how to group items into pricing groups.

Load Collections Sendback

Procedure: com.profitlogic.db.birch.LoadCollectionsSendback

Target Tables:

- ITEM_DATA_TBL
- COLLECTIONS_TBL
- COLLECTION_MAPS_TBL

Description: The LoadCollectionsSendback procedure executes before the LoadCollectionsAuto procedure.

Load Dc Inventory

Procedure: com.profitlogic.db.birch.LoadDcInventory

Source Tables:

- ASH_DCI_TBL
- WAREHOUSES_TBL
- ASH_CP_TBL
- ASH_MHL_TBL
- MERCHANDISE_TBL
- PERIODS_TBL

Target Table: WAREHOUSE_INV_TBL

Description: This procedure inserts new inventory data or updates existing data at the optimization level into WAREHOUSE_TBL from ASH_DCI_TBL. The data in ASH_DCI_TBL is at the merchandise level that corresponds to INTERSECT_NAME = SALES in ASH_CP_TBL.

Load Internal Promos

Procedure: com.profitlogic.db.birch.LoadInternalPromos

Load Items

Procedure: com.profitlogic.db.birch.LoadItems

Source Tables:

- ASH_ITEMS_TBL
- ASH_ITEMS_CDA_TBL
- ASH_CP_TBL

Target Tables:

- ITEMS_TBL
- ITEMS_CDA_TBL

Description: This procedure inserts new data and updates existing data in ITEMS_TBL from ASH_ITEMS_TBL, based on the optimization level specified in ASH_CP_TBL (cross products information). It also inserts new data and updates existing data in ITEMS_CDA_TBL from ASH_ITEMS_CDA_TBL.

If an entry for Items that had previously been loaded is not included in the current weekly data feed, then the load procedure assigns end_dt to that entry in ITEMS_TBL. See also [Load Merchandise Hierarchy](#), [Load Location Hierarchy](#), [Load Merchandise Table](#), and [Load Location Table](#).

Load Location Hierarchy

Procedure: com.profitlogic.db.birch.LoadLocationHierarchy

Source Tables:

- ASH_LHL_TBL
- ASH_LH_TBL
- ASH_LH_CDA_TBL

Target Tables:

- LOCATION_HIERARCHY_TBL
- LOCATION_ATTR_TBL

Description: This procedure loads the entire location hierarchy, with the exception of the node (CHAIN) that is seeded by service during installation. It updates the location hierarchy based on the most recent information in ASH_LH_TBL and the levels specified in ASH_LHL_TBL. It completely re-loads LOCATION_ATTR_TBL with the most recent data from ASH_LH_CDA_TBL. This procedure loads both non-clustered and clustered location hierarchies.

If an entry for the location hierarchy that had previously been loaded is not included in the current weekly data feed, then the load procedure assigns end_dt to that entry in LOCATION_HIERARCHY_TBL. See also [Load Merchandise Hierarchy](#), [Load Merchandise Table](#), [Load Location Table](#), and [Load Items](#).

Load Location Table

Procedure: com.profitlogic.db.birch.LoadLHTbl

Source Table: LOCATION_HIERARCHY_TBL

Target Table: LOCATION_TBL

Description: This procedure completely re-loads LOCATION_TBL from LOCATION_HIERARCHY_TBL. LOCATION_TBL is a horizontally flattened view of the location hierarchy.

If an entry for the location hierarchy that had previously been loaded is not included in the current weekly data feed, then the load procedure assigns end_dt to that entry

in LOCATION_TBL. See also [Load Merchandise Hierarchy](#), [Load Location Hierarchy](#), [Load Merchandise Table](#), [Load Items](#).

Load LTClose Table

Procedure: com.profitlogic.db.birch.LoadLTCLOSE

Source Tables:

- LOCATION_TBL
- CLIENT_HIERARCHY_LEVELS_TBL

Target Table: LTCLOSE_TBL

Description: This procedure completely re-loads LTCLOSE_TBL from LOCATION_TBL using location hierarchy levels specified in CLIENT_HIERARCHY_LEVELS_TBL. TCLOSE_TBL is a vertically flattened view of the location hierarchy, containing each location node with all its parents. This table is used to improve the performance of other load procedures.

Load LH Rename

Procedure: com.profitlogic.db.birch.LoadLHKeyRename

Source Table: ASH_LHRENAME_TBL

Target Table: LOCATION_HIERARCHY_TBL

Description: This procedure is responsible for moving locations within the location hierarchy. It updates CLIENT_LOAD_ID for a location node, based on the new LOCATION_KEY and LEVEL_DESC in ASH_LHRENAME_TBL.

Load Markdowns Taken

Procedure: com.profitlogic.db.birch.LoadMarkdownsTaken

Source Tables:

- ASH_MDTAKEN_TBL
- ITEMS_TBL
- MERCHANDISE_HIERARCHY_TBL
- LOCATION_HIERARCHY_TBL
- PERIODS_TBL

Target Tables:

- HIST_MARKDOWNS_ARCH_TBL
- HIST_MARKDOWNS_TBL

Description: The procedure loads records from ASH_MDTAKEN_TBL into HIST_MARKDOWNS_TBL. It first compares the records from the current week's ASH_MDTAKEN_TBL feed with the records in HIST_MARKDOWNS_TBL. If there are matches in HIST_MARKDOWNS_TBL, the procedure replaces them with the new records from ASH_MDTAKEN_TBL.

Note: If a distinct product / location contains more than one markdown in the file, only the most recent markdown will be loaded.

Load Materialized Views

Procedure: com.profitlogic.db.cdw.LoadMaterializedViews

Source Tables:

- ITEMS_TBL
- PERIODS_TBL
- ACTIVITIES

Target Tables:

- DB_LAST_ACTUAL_MV
- ITEM_HIST_MARKDOWNS_MV
- ITEM_METRICS_TBL

Description: This procedure refreshes DB_LAST_ACTUAL_MV and ITEM_HIST_MARKDOWNS_MV.

It re-loads ITEM_METRICS_TBL from the ACTIVITIES data. If the FIRST_RECEIPT_DT is specified in ITEMS_TBL, then only the data received after that date is loaded. If the FIRST_RECEIPT_DT is not specified, then all the data is loaded.

The ITEMS_METRICS_TBL is the source for the following views:

- FIRST_INVENTORY_DT_MV
- FIRST_SALE_DT_MV
- ITEM_ACTUALS_MV
- ITEM_AVG_COST_MV
- LAST_TICKET_PRICE_DT_MV

Load MaterializedViewsHistMarkdowns

Procedure: com.profitlogic.db.birch.LoadMaterializedViewsHistMarkdowns

Description: This procedure loads the ITEM_HIST_MARKDOWNS_MV table. This table contains the count of taken markdowns per item after the model start date. This table is used by the default product configuration but may be used in a custom configuration.

Load Merchandise Cluster

Procedure: com.profitlogic.db.birch.LoadMerchCluster

Source Tables:

- ASH_CLUSTER_MAPPING_TBL
- ASH_CP_TBL
- MERCHANDISE_HIERARCHY_TBL
- LOCATION_HIERARCHY_TBL

Target Tables: CDW_MERCH_CLUSTER_XREF_TBL

Description: This procedure maps merchandise IDs to cluster sets.

Intermediate levels between clusters and cluster sets are permitted in the Standard Load. For a CLUSTER implementation alone, this acyclic tree validation is turned OFF for the last level. However, the CLUSTER level should be the $(n-1)$, where n is the

deepest level of the hierarchy (STORE). Only the CLUSTERSET is mapped to a merchandise level and is the same for the cluster mapping interface from the retailer. The CLUSTER key (client_load_id) cannot be repeated between cluster sets.

Load Merchandise Hierarchy

Procedure: com.profitlogic.db.birch.LoadMerchandiseHierarchy

Source Tables:

- ASH_MHL_TBL
- ASH_MH_TBL
- ASH_MH_CDA_TBL

Target Tables:

- MERCHANDISE_HIERARCHY_TBL
- MERCH_ATTR_TBL
- PRODUCT_ITEMS_TBL

Description: This procedure loads the entire merchandise hierarchy, with the exception of the node (CHAIN) that is seeded by the service during installation. It updates the merchandise hierarchy based on the most recent information in ASH_MH_TBL and the levels specified in ASH_MHL_TBL. It completely re-loads MERCH_ATTR_TBL with the most recent data from ASH_MH_CDA_TBL. It also updates PRODUCT_ITEMS_TBL according to the most recent merchandise hierarchy data.

If an entry for the merchandise hierarchy that had previously been loaded is not included in the current weekly data feed, then the load procedure assigns end_dt to that entry in MERCHANDISE_HIERARCHY_TBL. See also [Load Location Hierarchy](#), [Load Merchandise Table](#), [Load Location Table](#), and [Load Items](#).

Load Merchandise Table

Procedure: com.profitlogic.db.birch.LoadMHTbl

Source Table: MERCHANDISE_HIERARCHY_TBL

Target Table: MERCHANDISE_TBL

Description: This procedure completely re-loads MERCHANDISE_TBL from MERCHANDISE_HIERARCHY_TBL. MERCHANDISE_TBL is a horizontally flattened view of the merchandise hierarchy, used to improve the performance of other load procedures.

If an entry for the merchandise hierarchy that had previously been loaded is not included in the current weekly data feed, then the load procedure assigns end_dt to that entry in MERCHANDISE_TBL. See also [Load Merchandise Hierarchy](#), [Load Location Hierarchy](#), [Load Location Table](#), and [Load Items](#).

Load TClose Table

Procedure: com.profitlogic.db.birch.LoadTCLOSE

Source Tables:

- MERCHANDISE_TBL
- CLIENT_HIERARCHY_LEVELS_TBL

Target Table: TCLOSE_TBL

Description: This procedure completely re-loads TCLOSE_TBL from MERCHANDISE_TBL using merchandise hierarchy levels specified in CLIENT_HIERARCHY_LEVELS_TBL. TCLOSE_TBL is a vertically flattened view of the merchandise hierarchy, containing each merchandise node with all its parents. This table is used to improve the performance of other load procedures.

Load MH Rename

Procedure: com.profitlogic.db.birch.LoadMHKeyRename

Source Table: ASH_MHRENAME_TBL

Target Table: MERCHANDISE_HIERARCHY_TBL

Description: This procedure is responsible for moving merchandise within the merchandise hierarchy. It updates CLIENT_LOAD_ID for a merchandise node, based on the new MERCHANDISE_KEY and LEVEL_DESC in ASH_MHRENAME_TBL.

Load Model Start Date

Procedure: com.profitlogic.db.cdw.LoadModelStartDate

The four possible model start options in the IR_MODEL_START_OPTION view are:

- inventoryRatio – the first date when $(\text{inventory} / (\text{cumulative_sales_to_date} + \text{inventory} + \text{on_order})) > \text{a defined threshold}$
- storeRatio – the first date when $((\text{stores_with_inventory}) / (\text{stores_in_region})) > \text{a defined threshold}$
- plannedStart – the date of the first sale after the planned start date (a business rule value)
- custom – a value defined in the IR_MODEL_START view
- sellThrough – the first date of the fiscal week when the sell-through threshold is greater than or equal to the total inventory (where total inventory = Store OO + Store OH + DC OO + DC OH)

Source Tables:

inventoryRatio option	ACTIVITIES
storeRatio option	ACTIVITIES ITEM_ACTUALS_MV LTCLOSE_TBL
plannedStart option	ACTIVITIES FIRST_SALE_DT_MV ITEMS view getBRValue function (which retrieves data from BRM_INSTANCE_TBL, TCLOSE_TBL, and LTCLOSE_TBL)
custom option	IR_MODEL_START view
sellThrough option	ACTIVITIES ASH_BRM_INSTANCE_TBL BRM_INSTANCE_TBL INTERNAL_BIZ_RULES_TBL

Target Table: ITEMS_TBL

Description: This procedure updates MODEL_START_DT in ITEMS_TBL, based on the model start date option specified in the IR_MODEL_START_OPTION view.

The model start date is the first date that an item is considered to be available for sale. It is always represented as the Sunday preceding the actual specified date.

Load Parameters

Procedure: com.profitlogic.db.birch.LoadParameters

Source Table: ASH_PARAMETER_VALUES_TBL

Target Table: PARAMETER_VALUES_TBL

Description: This procedure truncates and reloads PARAMETER_VALUES_TBL. It populates client_search_levels_tbl with distinct parameter names and rank ordered sequence based on location and merchandise level sequences.

Load Price Ladders

Procedure: com.profitlogic.db.birch.LoadPriceLadders

Source Table: ASH_PRICE_LADDERS_TBL

Target Tables:

- PRICE_LADDERS_TBL
- PRICE_LADDER_VALUES_TBL

Description: This procedure truncates and reloads PRICE_LADDERS_TBL and PRICE_LADDER_VALUES_TBL. It populates client_search_levels_tbl with "PRICE_LADDERS" search name and rank ordered sequence base on location and merchandise level sequences.

Load Promotions

Procedure: com.profitlogic.db.birch.LoadPromotions

Source Tables:

- ASH_PROMO_TBL
- ITEMS_TBL
- MERCHANDISE_HIERARCHY_TBL
- LOCATION_HIERARCHY_TBL
- TCLOSE_TBL
- LTCLOSE_TBL

Target Tables:

- PLANNED_PROMOS_TBL
- PLANNED_PROMOS_MAPS_TBL

Description: This procedure completely re-loads the data in PLANNED_PROMOS_TBL and PLANNED_PROMOS_MAPS_TBL from ASH_PROMO_TBL.

Load Sales

Procedure: com.profitlogic.db.birch.LoadSales

Source Tables:

- ASH_SALES_TBL
- MERCHANDISE_TBL
- LOCATION_TBL
- ITEMS_TBL
- ASH_CP_TBL
- PERIODS_TBL

Target Table: ACTIVITIES

Description: The sales data is loaded from ASH_SALES_TBL, which is populated at the sales level for merchandise. This procedure loads data that is aggregated to the optimization level. It is stored in the ACTIVITIES table at the optimization level. Any number of weeks of data can be provided in ASH_SALES_TBL. The load procedure processes one week at a time, inserting new data or updating existing data.

Load Scenarios

Procedure: com.profitlogic.db.birch.LoadScenarios

Source Table: ACTIVITIES

Target Table: SCENARIOS_TBL

Description: This procedure deletes and then inserts data from ACTIVITIES into SCENARIOS_TBL, where Scenario_ID = 1.

Load Seasonalities

Procedure: com.profitlogic.db.birch.LoadSeasonalities

Source Tables:

- ASH_SEASONALITY_MAPS_TBL
- ASH_SEASONALITY_VALUES_TBL

Target Tables:

- SEASONALITY_MAPS_TBL
- SEASONALITY_VALUES_TBL

Description: This procedure truncates and reloads SEASONALITY_MAPS_TBL and SEASONALITY_VALUES_TBL. It populates client_search_levels_tbl with distinct parameter names and rank ordered sequence based on location and merchandise level sequences.

Load Sendbacks

Procedure: com.profitlogic.db.birch.LoadMarkdownsSendback

Source Table: PL_MARKDOWN_SENDBACK view

Target Tables:

- HIST_MARKDOWNS_ARCH_TBL
- HIST_MARKDOWNS_TBL

Description: This procedure compares the records in HIST_MARKDOWNS_TBL with the records in the current week's PL_MARKDOWN_SENDBACK view and archives the matches in HIST_MARKDOWNS_ARCH_TBL. It then replaces the records in HIST_MARKDOWNS_TBL with records from the PL_MARKDOWN_SENDBACK

view that match on ITEM_ID and CALENDAR_DT/EFFECTIVE_DT. That is, all the latest information on all item markdowns recorded by the service can be found in HIST_MARKDOWNS_TBL; all information on prior markdowns recorded by the service can be found in HIST_MARKDOWNS_ARCH_TBL.

Load Warehouse Allocation

Procedure: com.profitlogic.db.birch.LoadWarehouseAllocation

Source Tables:

- ASH_DC_ALLOCATION_TBL
- WAREHOUSES_TBL
- ASH_CP_TBL
- MERCHANDISE_HIERARCHY_TBL
- LOCATION_HIERARCHY_TBL

Target Table: WAREHOUSE_ALLOCATION_TBL

Description: This procedure inserts new data or updates existing data at the optimization level from ASH_DC_ALLOCATION_TBL into WAREHOUSE_ALLOCATION_TBL, which contains data about what fraction of a particular item's inventory is stored in which warehouse.

Load Warehouses Table

Procedure: com.profitlogic.db.birch.LoadWarehouses

Source Table: ASH_DCI_TBL

Target Table: WAREHOUSES_TBL

Description: This procedure completely re-loads the data that describes warehouses (retailer key, type, description, and location) from ASH_DCI_TBL to WAREHOUSES_TBL.

Standard Load Error Handling

The Standard Load verifies the records in each staging table. Each record that fails the verification is removed from the staging table and placed in another table so that the load can continue and so that the failed records can be reviewed.

If a load procedure fails and the threshold is exceeded, you will see the message "The specified error threshold has been exceeded for this load procedure." If this occurs, you should correct the existing data problem and re-run the load procedure as well as any child load procedures (as shown in "Standard Load Dependency Tree" on page 3-29).

The table containing the failed records is assigned a name that corresponds to the associated staging table. For example:

Table 3-4 Failed Records Table Names

Staging Table	Failed Record Table
ASH_SALES_TBL	ASH_SALES_TBL_BAD
ASH_PROMO_TBL	ASH_PROMO_TBL_BAD

The “BAD” table into which the failed records are inserted has the same structure as the corresponding staging table with the addition of the following four columns:

Table 3–5 Bad Table Columns

Column Name	Description	Data Type	Maximum Length	Nullable (Y/N)
ERROR_ROWID	The row ID that corresponds to the row ID in the staging table	Row ID		N
ERROR_CODE	The code for the verification	Integer		N
ERROR_DESC	Description of the error	String	1000	
ERROR_TIME	The time the error occurred	Timestamp		N

It is possible to place a threshold on the number of failed records in any staging table that will trigger a termination of the load. The default threshold values are hard-coded into the service. In order to customize the threshold values, you must create a properties file and load it into the service.

Error Handling Properties File

You can configure the threshold values for error handling in the properties file, **dbError.properties**. The values you set in this file override the corresponding service default values. The default value for the threshold of records failed is 100%. The default value for the total record threshold is 0%. Threshold values are expressed as a percentage. Note that the percentage symbol should not be included. Once you have created this file (which should be stored in **com/profitlogic/db/common/resources/dbError.properties** and called as a argument from there), you need to load it into the database schema using the procedure described on page 3-15.

Here is a sample **dbError.properties** file:

```
#####
#This properties file contains all error customizations
#
#Note:all thresholds should be satisfied in order for the load procedure to succeed
#
#####
#LoadPromotions error customizations
#
#Total error threshold is set to 0% of all records (default is 0%):
LoadPromotions.total.threshold=0
#
#Threshold of records failed with error 1205 should not exceed 100% (default is 100%):
LoadPromotions.1205.threshold=100
#
#Threshold of records failed with error 1207 should not exceed 100% (default is 100%):
LoadPromotions.1207.threshold=100
#####
```

In the **dbError.properties** file, you can set the total error threshold as well as a separate threshold for specific verifications. When configuring the error threshold for specific verifications, you use the error message number, as shown in [Table 3–8, "Standard Load Error Messages"](#) to indicate which verification you are setting the error threshold for. The sum of all the individual thresholds cannot exceed the total threshold.

Loading the dbError.properties File

Once you have created the **dbError.properties** file, you can load it, as follows:

```
dbpropertiesinstaller.sh <config_root>
conf/com/profitlogic/db/common/resources/dbError.properties, where config_root
is the root directory of the COE configuration files.
```

The format for the file `<db_connections_properties>` is as follows:

For Oracle:

```
db.type=oracle
db.driver=oracle.jdbc.OracleDriver
db.url=jdbc:oracle:thin:@<db_host>:<db_port>:<db_SID>
db.password=<db_password>
where
```

<code><db_username></code> is	the username for the database connection
<code><db_password></code> is	the password for the database connection
<code><db_host></code> is	the host name of the database server
<code><db_port></code> is	the port number of the database server
<code><db_SID></code> is	the SID or SERVICE_NAME value for the database from the tnsnames.ora file.

Custom Errors

As part of the **dbError.properties** file, you can create custom verifications. Custom error codes have a reserved range of 50001 to 50100. You need to provide the text of the error message and a query that defines the verification. The pre-load verification (error messages 50000 and 50001 in the following sample) is run during the pre-load verification step. The post-load verification (error message 50002 in the following sample) is run during the post-load verification step. (For a list of the steps in the load procedure, see See “Standard Load Steps” on page 31.

Once you have modified the **dbError.properties** file to include custom verifications, you must load it into the database schema using the above command.

Here is a sample:

```
#####
#Define custom PRE_LOAD verification errors with code 50000 and 50001
#(list of error codes separated by white spaces)
LoadPromotions.pre-load.custom-errors=50000 50001

#Error message:
LoadPromotions.pre-load.50000=Table ASH_CP_TBL is missing OPTIMIZATION levels
#Threshold (default is 100%):
#Note: the threshold affects only INSERT statements! If the statement is defined as a
#   SELECT, then the error will be triggered only if the query returns at least one row.
#   For any other type of statement amount of rows affected is not checked.
LoadPromotions.pre-load.50000.threshold=0
#INSERT statement should populate the "bad records" table with failed rows
#Note: in cases when the threshold is less than 100%, the INSERT statement should end
#   with a non-empty WHERE clause because the statement will be appended by an
#   additional condition.
LoadPromotions.pre-load.50000.query=
SELECT 1 FROM %{YA_DUAL}%
WHERE not exists (SELECT 1 FROM ash_cp_tbl
WHERE intersect name = 'OPTIMIZATION')
```

```

#Error message:
LoadPromotions.pre-load.5000=No promotion is allowed after 01/01/2050
#Threshold (default is 100%):
#Note: the threshold affects only INSERT statements!
#   If the statement is defined as a SELECT, then the error will be
#   triggered only if the query returns at least one row.
#   For any other type of statement the number of rows is not checked.
LoadPromotions.pre-load.50001.threshold=0
#INSERT statement should populate the "bad records" table with failed rows
#Note: in cases when the threshold is less than 100%, the INSERT statement should end
#   with a non-empty WHERE clause because the statement will be appended by an
#   additional condition.
LoadPromotions.pre-load.50001.query=
INSERT INTO ash_promo_tbl_bad
    (ERROR_ROWID, ERROR_CODE, ERROR_DESC, ERROR_TIMESTAMP, merchandise_key,
    merchandise_level, location_key, location_level, promotion_key,
    promo_start_date, promo_end_date, promo_price, promo_perc_off,
    promo_desc, promo_type, prono_excl_fg, promo_number, attribute1,
    attribute2, attribute3, attribute4, attribute5)
SELECT ROWID, 50001, 'Promo after 01/01/2050', %{YA_SYSDATE_AS_TIMESTAMP}%,
    merchandise_key,merchandise_level, location_key, location_level, promotion_key,\
    promo_start_date, promo_end_date, promo_price, promo_perc_off,
    promo_desc, promo_type, prono_excl_fg, promo_number, attribute1,
    attribute2, attribute3, attribute4, attribute5)
FROM ash_promo_tbl
WHERE promo_end_date >= %{YA_TODATE/'2050-01-01'/'YYYY-MM-DD'}%

#####
# Define a custom POST_LOAD verification error with code 50002
# (list of error codes separated by spaces)
LoadPromotions.post-load.custom-errors=50002
LoadPromotions.post-load.50002=No promotion is allowed after 01/01/2050
#Note: If the statement is defined as a SELECT, then the error will be
#   triggered only if the query returns at least one row.
#   For any other type of statement the number of rows affected is not checked.
LoadPromotions.post-load.50002.query=
SELECT 1 FROM %{YA_DUAL}%
WHERE exists (SELECT 1 FROM planned_promos_tbl
    WHERE end_dt >= %{YA_TO_DATE/'2050-01-01'/'YYYY-MM-DD'}%)

```

Error Handling Report

The standard load validates the data prior to loading the data into the target tables.

A customizable view, `pl_load_status_vw`, provides a report on the status of data validations. This view has the following default attributes:

Table 3–6 *pl_load_status_vw* Default Attributes

Attribute	Description
LOAD_PROCEDURE	The specific load procedure used
SOURCE	The staging table
DATA_VALIDATION_STATUS	Success - The number of failed records is less than the threshold set or Failure - The number of failed records exceeds the threshold set

Table 3–6 (Cont.) pl_load_status_vw Default Attributes

Attribute	Description
NUM_BAD_RECORDS	The number of failed records in the failed record table

Here is a sample validation report:

Table 3–7 Sample Standard Load Data Validation Report

LOAD_PROCEDURE	SOURCE	DATA_VALIDATION_STATUS	NUM_BAD_RECORDS
LoadCHLevels	ASH_MHL_TBL	Success	0
LoadCHLevels	ASH_LHL_TBL	Success	0
LoadLocationHierarchyTbl	ASH_LH_TBL	Success	0
LoadItems	ASH_ITEMS_TBL	Success	0
LoadCalendars	ASH_CAL_TBL	Success	0
LoadDcInventory	ASH_DCI_TBL	Success	0
LoadLocationHierarchy	ASH_LH_CDA_TBL	Success	0
LoadMerchandiseHierarchy	ASH_MH_CDA_TBL	Success	0
LoadPromotions	ASH_PROMO_TBL	Success	0
LoadSales	ASH_SALES_TBL	Success	0
No transformation of data	ASH_CP_TBL	Success	0
LoadLHKeyRename	ASH_LHRENAME_TBL	Success	0
LoadMHKeyRename	ASH_MHRENAME_TBL	Success	0
LoadMDTaken	ASH_MDTAKEN_TBL	Success	20
LoadItems	ASH_ITEMS_CDA_TBL	Success	0
LoadWarehouseAllocation	ASH_DC_ALLOCATION_TBL	Failure	50
LoadBRInstances	ASH_BRM_INSTANCE_TBL	Success	0

To generate an output file that can be emailed to interested users or integrated into production scripts, use the following script. The script writes to the standard output, which can be redirected to a file. Note that the optional WHERE clause, including the WHERE keyword itself, should be enclosed in quotes.

```
bash pl_load_status.sh -r <configroot> -w <whereclause>
```

where

-r DIR	--configroot=DIR	The configuration root directory
-w WHERE	--whereclause=WHERE	An optional clause used to filter specific information in the report
-h	--help	Displays help and exits

Standard Load Error Messages

The following are the error messages that may be generated during the standard load procedure.

Table 3–8 Standard Load Error Messages

Number	Error Message
System Errors	
0	The program has completed successfully.
10	An unspecified error has occurred.
20	An SQL exception has occurred.
30	A Java exception has occurred.
40	The exception limit has been exceeded.
50	The specified error threshold has been exceeded in this load procedure.
Common Errors	
100	At least one node in the hierarchy has more than one parent.
101	The number of levels in the levels table does not match the data from the source table.
102	The CHAIN level does not exist in the target table.
104	The levels table is empty.
105	The sequence for the CHAIN level should be defined as 1 in the levels table.
106	At least one node in the hierarchy has more than one hierarchy ID or description.
JdbcHelper Errors	
150	STATOPER password was not registered in the service.
151	Failed to decrypt STATOPER password.
152	At least one table being requested for runstats does not exist.
153	RUNSTATS failed against at least one table.
Load CH Levels Errors	
200	The cross-products information table (ASH_CP_TBL) does not have all the required records.
201	In the cross-products information table (ASH_CP_TBL), at least one INTERSECT_NAME has a value of NULL. An INTERSECT_NAME cannot have a value of NULL.
202	A duplicate INTERSECT_NAME has been found in the cross-products information table (ASH_CP_TBL).
203	Invalid INTERSECT_NAME has been found in the cross-products information table (ASH_CP_TBL) or not all necessary values (OPTIMIZATION, SALES, or CLUSTER) have been supplied.
204	The cross-products information table (ASH_CP_TBL) is empty.
205	In the cross-products information table (ASH_CP_TBL), at least one merchandise level has a value of NULL. A merchandise level cannot have a value of NULL.
206	In the cross-products information table (ASH_CP_TBL), at least one location level has a value of NULL. A location level cannot have a value of NULL.
Load Calendars Errors	

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
1000	In the calendar table (ASH_CAL_TBL), at least one fiscal year does not have between 52 and 53 weeks.
1001	In the calendar table (ASH_CAL_TBL), at least one fiscal year does not include twelve fiscal months.
1002	In the calendar table (ASH_CAL_TBL), at least one fiscal week has an End of Period (EOP) that is not Saturday.
1003	In the calendar table (ASH_CAL_TBL), at least one fiscal month is not in the range 1 - 12.
1004	In the calendar table (ASH_CAL_TBL), at least one fiscal week is not in the range 1 -53.
1005	In the calendar table (ASH_CAL_TBL), at least one fiscal year has a value of NULL. A fiscal year cannot have a value of NULL.
1006	In the calendar table (ASH_CAL_TBL), at least one fiscal month has a value of NULL. A fiscal month cannot have a value of NULL.
1007	In the calendar table (ASH_CAL_TBL), at least one fiscal week has a value of NULL. A fiscal week cannot have a value of NULL.
1008	In the calendar table (ASH_CAL_TBL), at least one fiscal season has a value of NULL. A fiscal season cannot have a value of NULL.
1009	In the calendar table (ASH_CAL_TBL), at least one End of Period (EOP) has a value of NULL. A End of Period (EOP) cannot have a value of NULL.
1010	In the calendar table (ASH_CAL_TBL), at least one fiscal quarter has a value of NULL. A fiscal quarter cannot have a value of NULL.
1011	In the calendar table (ASH_CAL_TBL), at least one week end day does not match the existing week end day.
1012	Week End Day is NULL.
1013	Week Begin Day is NULL.
Load Markdowns Taken Errors	
1100	In the markdowns taken table (ASH_MDTAKEN_TBL), if price value type is 'PO' or 'PT', then the price percent off value has to be a non-negative fraction and the price point value has to be null. If the price value type is 'PP', then the price point value has to be a non-negative number and the price percent off value has to be null.
1101	In the markdowns taken table (ASH_MDTAKEN_TBL), only one markdown can be loaded for a unique combination of merchandise, location, and effective date.
1102	In the markdowns taken table (ASH_MDTAKEN_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
1103	In the markdowns taken table (ASH_MDTAKEN_TBL), at least one location key has a value of NULL. A location key cannot have a value of NULL.
1104	In the markdowns taken table (ASH_MDTAKEN_TBL), at least one effective date has a value of NULL. An effective date cannot have a value of NULL.
1105	In the markdowns taken table (ASH_MDTAKEN_TBL), at least one accounting type is either null or has a value that is not allowed. Acceptable values are TEMP or PERM.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
1106	In the markdowns taken table (ASH_MDTAKEN_TBL), at least one price value type is either null or has a value that is not allowed. Acceptable values are PT, PO, or PP.
1107	The MERCHANDISE_KEY in the markdowns taken table (ASH_MDTAKEN_TBL) is not at the optimization level.
1108	The LOCATION_KEY in the markdowns taken table (ASH_MDTAKEN_TBL) is not at the optimization level.
1109	In the markdowns taken table (ASH_MDTAKEN_TBL), at least one MARKDOWN_TYPE has a value of NULL. Markdown Type cannot have a value of NULL.
1110	The MERCHANDISE_KEY in the markdowns taken table (ASH_MDTAKEN_TBL) is not at the required level (COLOR of STYLE).
1111	In the markdowns taken table (ASH_MDTAKEN_TBL), at least one price value type is either NULL or has a value that is not allowed. Acceptable values are PP, PT, PO, AT, or AO.
1112	In the markdowns taken table (ASH_MDTAKEN_TBL), at least one merchandise level has a value of NULL. A merchandise level cannot have a value of NULL.
Load Promotions Errors	
1200	A promotion with an end date occurring prior to the last date in the sales history cannot be loaded into the promotions table (ASH_PROMO_TBL).
1201	A promotion in the promotions table (ASH_PROMO_TBL) cannot be defined in terms of both a specific price point and a percentage off.
1204	A promotion in the promotions table (ASH_PROMO_TBL) cannot be defined as a negative percent off or be a value > 1.
1205	The promotion flag in the promotions table (ASH_PROMO_TBL) can have a value of either 1 or -1.
1206	In the promotions table (ASH_PROMO_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
1207	In the promotions table (ASH_PROMO_TBL), at least one merchandise level has a value of NULL. A merchandise level cannot have a value of NULL.
1208	In the promotions table (ASH_PROMO_TBL), at least one location key has a value of NULL. A location key cannot have a value of NULL.
1209	In the promotions table (ASH_PROMO_TBL), at least one location level has a value of NULL. A location level cannot have a value of NULL.
1210	In the promotions table (ASH_PROMO_TBL), at least one promotion start date has a value of NULL. A promotion start date cannot have a value of NULL.
1211	In the promotions table (ASH_PROMO_TBL), at least one promotion end date has a value of NULL. A promotion end date cannot have a value of NULL.
1212	In the promotions table (ASH_PROMO_TBL), at least one promotion type has a value of NULL. A promotion type cannot have a value of NULL.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
1213	A record in the promotions table (ASH_PROMO_TBL) contains merchandise that is not found in the merchandise hierarchy.
1214	A record in the promotions table (ASH_PROMO_TBL) contains a location that is not found in the location hierarchy.
Load Items Errors	
1300	More than one record in the items table (ASH_ITEMS_TBL) has the same combination of merchandise and location.
1301	A record in the items table (ASH_ITEMS_TBL) contains merchandise that is not found in the merchandise hierarchy at the optimization level.
1302	A record in the items table (ASH_ITEMS_TBL) contains a location that is not found in the location hierarchy at the optimization level.
1303	In the items table (ASH_ITEMS_TBL), the number of processed rows does not match the original number of input rows.
1304	In the items table (ASH_ITEMS_TBL), the loading of the locations did not complete.
1305	In the items table (ASH_ITEMS_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
1306	In the items table (ASH_ITEMS_TBL), at least one location key has a value of NULL. A location key cannot have a value of NULL.
1307	In the items table (ASH_ITEMS_TBL), at least one unit cost has NULL value or negative value. A unit cost can only be a positive number.
1308	In the items CDA table (ASH_ITEMS_CDA_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
1309	In the items CDA table (ASH_ITEMS_CDA_TBL), at least one location key has a value of NULL. A location key cannot have a value of NULL.
1310	A record in the items CDA table (ASH_ITEMS_CDA_TBL) contains merchandise that is not found in the merchandise hierarchy on the optimization level.
1311	A record in the items CDA table (ASH_ITEMS_CDA_TBL) contains a location that is not found in the location hierarchy on the optimization level.
1312	More than one record in the items CDA table (ASH_ITEMS_CDA_TBL) has the same combination of merchandise and location.
Load DC Inventory Errors	
1400	In the DC inventory table (ASH_DCI_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
1401	In the DC inventory table (ASH_DCI_TBL), at least one warehouse key has a value of NULL. A warehouse key cannot have a value of NULL.
1402	In the DC inventory table (ASH_DCI_TBL), at least one fiscal year has a value of NULL. A fiscal year cannot have a value of NULL.
1403	In the DC inventory table (ASH_DCI_TBL), at least one fiscal week has a value of NULL. A fiscal week cannot have a value of NULL.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
1404	Cannot determine OPTIMIZATION merchandise level. Check your configuration.
1405	The MERCHANDISE_KEY in the DC inventory table (ASH_DCI_TBL) is not at the sales level.
Load Location Hierarchy Errors	
1500	In the location hierarchy CDA staging table (ASH_LH_CDA_TBL), at least one location key has a value of NULL. A location key cannot have a value of NULL.
1501	In the location hierarchy CDA staging table (ASH_LH_CDA_TBL), at least one location level has a value of NULL. A location level cannot have a value of NULL.
1502	In the location hierarchy levels table (ASH_LHL_TBL), at least one location level has a value of NULL. A location level cannot have a value of NULL.
1503	In the location hierarchy levels table (ASH_LHL_TBL), at least one level sequence level has a value of NULL. A level sequence cannot have a value of NULL.
1504	In the location hierarchy levels table (ASH_LHL_TBL) the entries in LEVEL_SQC are not sequential.
1505	The location hierarchy levels table (ASH_LHL_TBL) should have sequence starting with 1.
1506	In the location hierarchy levels table (ASH_LHL_TBL), CHAIN is not assigned a sequence value (LEVEL_SQC) of 1.
1507	In the merchandise hierarchy table (ASH_MH_TBL), null values were detected in the hierarchy stage key columns.
Load Location Hierarchy Key Rename Errors	
1600	In the location hierarchy rename table (ASH_LHRENAME_TBL), at least one old location key has a value of NULL. A location key cannot have a value of NULL.
1601	In the location hierarchy rename table (ASH_LHRENAME_TBL), at least one new location key has a value of NULL. A location key cannot have a value of NULL.
1602	In the location hierarchy rename table (ASH_LHRENAME_TBL), at least one location level has a value of NULL. A location level cannot have a value of NULL.
1603	The old location key in the location hierarchy rename table (ASH_LHRENAME_TBL) contains duplicate values.
1604	The new location key in the location hierarchy rename table (ASH_LHRENAME_TBL) contains duplicate values.
1605	The new location key in the location hierarchy rename table (ASH_LHRENAME_TBL) is already present in the location hierarchy.
Load Merchandise Hierarchy Errors	
2001	NOT NULL has already been set for the merchandise hierarchy table (ASH_MH_TBL) stage key columns.
2002	In the merchandise hierarchy table (ASH_MH_TBL), an error dropping the unique index occurred.
2501	In the merchandise hierarchy table (ASH_MH_TBL), null values were detected in the hierarchy stage key columns.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
2502	The merchandise hierarchy levels table (ASH_MHL_TBL) is empty.
2503	In the merchandise hierarchy levels table (ASH_MHL_TBL) the entries in LEVEL_SQC are not sequential.
2504	The merchandise hierarchy levels table (ASH_MHL_TBL) should contain a sequence starting with 1.
2505	In the merchandise hierarchy levels table (ASH_MHL_TBL), CHAIN is not assigned a sequence value (LEVEL_SQC) of 1.
2506	The merchandise hierarchy staging table contains duplicate values at the lowest key level.
2507	The merchandise hierarchy table (ASH_MH_TBL) contains a child node with more than one parent node.
2508	The merchandise hierarchy cda staging table (ASH_MH_CDA_TBL) contains at least one combination of MERCHANDISE_KEY and MERCHANDISE_LEVEL that is not unique.
2509	In the merchandise hierarchy CDA staging table (ASH_MH_CDA_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
2510	The merchandise hierarchy rename table (ASH_MHRENAME_TBL) contains duplicate values for OLD_MERCHANDISE_KEY.
2511	In the merchandise hierarchy levels table (ASH_MHL_TBL), at least one merchandise level has a value of NULL. A merchandise level cannot have a value of NULL.
2512	In the merchandise hierarchy levels table (ASH_MHL_TBL), at least one level sequence level has a value of NULL. a level sequence cannot have a value of NULL.
2513	In the client hierarchy actions table (Client_Hierarchy_Actions_Tbl), CHAIN is not present in ACTION_NAME for HIER1_LEVEL_SQC = 1 and HIER1_TYPE = MERCHANDISE.
2514	In the client hierarchy actions table (Client_Hierarchy_Actions_Tbl), CHAIN is not present in ACTION_NAME for HIER2_LEVEL_SQC = 1 and HIER2_TYPE = LOCATION.
2515	In the client hierarchy actions table (Client_Hierarchy_Actions_Tbl), CHAIN is not present in ACTION_NAME for HIER3_LEVEL_SQC = 1 and HIER3_TYPE = PERIOD.
2516	In the client hierarchy actions table (Client_Hierarchy_Actions_Tbl), CHAIN is not present in ACTION_NAME for HIER1_LEVEL_SQC = 1 and HIER1_TYPE = PACK.
Load MH Key Rename Errors	
2600	In the merchandise hierarchy rename table (ASH_MHRENAME_TBL), at least one old merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
2601	In the merchandise hierarchy rename table (ASH_MHRENAME_TBL), at least one new merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
2602	In the merchandise hierarchy rename table (ASH_MHRENAME_TBL), at least one merchandise level has a value of NULL. A merchandise level cannot have a value of NULL.
2603	The old merchandise key in the merchandise hierarchy rename table (ASH_MHRENAME_TBL) contains duplicate values.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
2604	The new merchandise key in the merchandise hierarchy rename table (ASH_MHRENAME_TBL) contains duplicate values.
2605	The new merchandise key in the merchandise hierarchy rename table (ASH_MHRENAME_TBL) is already present in the merchandise hierarchy.
Load DC Allocation Errors	
3601	The LOCATION_KEY in the distribution center allocation table (DC_ALLOCATION_TBL) is not at the optimization level.
3602	The MERCHANDISE_KEY values in the distribution center allocation table (ASH_DC_ALLOCATION_TBL) contain merchandise that is not found in the merchandise hierarchy.
3603	The value in WAREHOUSE_KEY in the distribution center allocation table (DC_ALLOCATION_TBL) does not exist in WAREHOUSE_TBL.
3604	The value in MERCHANDISE_KEY in the distribution center allocation table (DC_ALLOCATION_TBL) does not exist in MERCHANDISE_HIERARCHY_TBL.
3605	In the DC allocation table (ASH_DC_ALLOCATION_TBL), at least one warehouse key has a value of NULL. A warehouse key cannot have a value of NULL.
3606	In the DC allocation table (ASH_DC_ALLOCATION_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
3607	In the DC allocation table (ASH_DC_ALLOCATION_TBL), at least one location key has a value of NULL. A location key cannot have a value of NULL.
3608	In the DC allocation table (ASH_DC_ALLOCATION_TBL), at least one fraction has NULL value or negative value. A fraction can only be a positive number.
3609	The value in MERCHANDISE_LEVEL in the distribution center allocation table (ASH_DC_ALLOCATION_TBL) does not exist in CLIENT_HIERARCHY_LEVELS_TBL.
Load Sales Errors	
3701	NET_SALES_UNITS in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3702	NET_SALES_AMT in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3703	GROSS_SALES_UNITS in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3704	GROSS_SALES_AMT in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3705	EOP_INVENTORY_UNITS in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3706	EOP_ON_ORDER_UNITS in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3707	EOP_STORE_NUM_WITH_INV in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3708	EOP_STORE_NUM_WITH_OO in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
3709	CURRENT_RETAIL in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3710	CURRENT_INV_PRICE in the sales table (ASH_SALES_TBL) is mandatory and cannot have a value of null.
3713	A record in the sales table (ASH_SALES_TBL) contains merchandise that is not found in the merchandise hierarchy.
3714	A record in the sales table (ASH_SALES_TBL) contains a location that is not found in the location hierarchy.
3715	In the sales table (ASH_SALES_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
3716	In the sales table (ASH_SALES_TBL), at least one location key has a value of NULL. A location key cannot have a value of NULL.
3717	In the sales table (ASH_SALES_TBL), at least one fiscal year has a value of NULL. A fiscal year cannot have a value of NULL.
3718	In the sales table (ASH_SALES_TBL), at least one fiscal week has a value of NULL. A fiscal week cannot have a value of NULL.
3719	In the sales tables (ASH_SALES_TBL), at least one combination of merchandise_key and location_key is not found in ITEMS_TBL.
3720	The active sales weeks (ActiveSalesWeeks) specified for data archiving is invalid. The value must be a positive integer or zero.
3721	The ActiveSalesWeeks entry is not found in the P4P_PARAMS table.
3722	The ACTIVITIES table is empty.
3723	An error occurred getting a sequence for the SALES level.
3724	An error occurred getting a sequence for the OPTIMIZATION level.
Load BRM Rules Errors	
3801	The BRM_RULE_DEFINITION_TBL is empty and needs to be populated.
Load Flexible Store Clustering Errors	
3901	Cluster Definition Load has an invalid Location LOCATION_CLIENT_ID. It should match what is defined in CDW_LOC_HIERARCHY_ORIG_TBL <client_load_id>.
3902	The Cluster Mapping Load has an invalid merchandise MERCHANDISE_CLIENT_ID. It should match what is defined in MERCHANDISE_HIERARCHY_TBL <client_load_id>.
3903	The Cluster Mapping Load has an invalid cluster set CLUSTER_SET_CLIENT_ID. It should match what is defined in CDW_CLUSTER_SET_TBL <cluster_client_id>.
3904	Cluster to Location mapping warning: The following cluster set does not contain every location.
3905	Cluster to Location mapping warning: The following location is not contained in every cluster.
3906	In the cluster hierarchy levels table (ASH_CSHL_TBL), at least one cluster level has a value of NULL. A cluster level cannot have a value of NULL.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
3907	In the cluster hierarchy levels table (ASH_CSHL_TBL), at least one level sequence level has a value of NULL. A level sequence cannot have a value of NULL.
3908	In the cluster hierarchy levels table (ASH_CSHL_TBL), the entries in LEVEL_SQC are not sequential.
3909	The cluster hierarchy levels table (ASH_CSHL_TBL) should have level sequences starting with 1.
3910	In the cluster hierarchy levels table (ASH_CSHL_TBL), CHAIN is not assigned a sequence value (LEVEL_SQC) of 1.
3911	The cluster hierarchy levels table (ASH_CSHL_TBL) should have a level ending with 4.
3912	The item location to merchandise mapping in ASH_ITEM_TBL does not match the cluster mapping defined in the CDW_MERCH_CLUSTER_XREF_TBL.
3913	The ASH_LH_TBL cluster set has a duplicate location defined within it.
3917	The ASH_CLUSTER_MAPPING_TBL cluster_set_client_id is NULL.
3918	The ASH_CLUSTER_MAPPING_TBL merchandise_client_id is NULL.
3919	There is no mapping for clusters in the ASH_CP_TBL.
3920	The LOCATION_LEVEL in ASH_CP_TBL for CLUSTER is invalid.
3921	The MERCHANDISE_LEVEL in ASH_CP_TBL for CLUSTER is invalid.
3922	The following merchandise does not have a cluster mapped to it <merch_client_load_id>.
3923	The CDW_CLUSTER_SET_TBL is empty.
3924	The CDW_CLUSTER_TBL is empty.
3925	There are no level descriptions for clusters in the CLIENT_HIERARCHY_LEVELS_TBL. There must be LOCATION and either CLUSTER or CUST_LOCATION entries to load cluster information.
3926	There are no level descriptions for clusters in the CLIENT_HIERARCHY_LEVELS_TBL. There must be both LOCATION and CUST_LOCATION entries to load cluster information.
3928	In a clustered location hierarchy, the cluster key is not unique across cluster sets.
Load To Date Metrics	
4001	The activities information table (ACTIVITIES) is empty. Run the LoadSales procedure to load activities and then re-run LoadToDateMetrics.
Load BR Instances Errors	
4100	A business rule cannot have more than one value definition (BRM_VALUE_DEFINITIONS_TBL) defined. Multi-valued business rules are not supported.
4101	A business rule key (RULE_NAME, MERCHANDISE_LEVEL, LOCATION_LEVEL, ATTRIB1_VALUE, ATTRIB2_VALUE) in the business rules staging table (ASH_BRM_INSTANCE_TBL) is not legal.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
4102	A business rule value (RULE_VALUE) in the business rules staging table (ASH_BRM_INSTANCE_TBL) is not in the permissible range.
4103	A business rule value (RULE_VALUE) in the business rules staging table (ASH_BRM_INSTANCE_TBL) is not in the permissible enumeration.
4104	No business rule definitions exist in table (BRM_RULE_DEFINITION_TBL).
4105	In the business rule staging table (ASH_BRM_INSTANCE_TBL), at least one merchandise key has a value of NULL. A merchandise key cannot have a value of NULL.
4106	In the business rule staging table (ASH_BRM_INSTANCE_TBL), at least one merchandise level has a value of NULL. A merchandise level cannot have a value of NULL.
4107	In the business rule staging table (ASH_BRM_INSTANCE_TBL), at least one location key has a value of NULL. A location key cannot have a value of NULL.
4108	In the business rule staging table (ASH_BRM_INSTANCE_TBL), at least one location level has a value of NULL. A location level cannot have a value of NULL.
4109	In the business rule staging table (ASH_BRM_INSTANCE_TBL), at least one rule name has a value of NULL. A rule name cannot have a value of NULL.
4110	A record in the business rule staging table (ASH_BRM_INSTANCE_TBL) contains merchandise that is not found in the merchandise hierarchy.
4111	A record in the business rule staging table (ASH_BRM_INSTANCE_TBL) contains a location that is not found in the location hierarchy.
4112	A record in the business rule staging table (ASH_BRM_INSTANCE_TBL) contains merchandise that is not found in the merchandise hierarchy.
Partitioning Item_Data Conditions	
5010	ITEM_DATA view does not exist or could not be dropped.
5011	ITEM_DATA partition could not be dropped.
5012	ITEM_DATA table is not partitioned or does not exist.
5013	An index on the partitioned ITEM_DATA table could not be created.
5014	The ITEM_DATA table is already partitioned.
5015	The ITEM_DATA table is already non-partitioned.
Partitioning Item_Data Errors	
5100	Invalid input number for number of ITEM_DATA partitions.
5101	The ITEM_DATA table is empty.
5102	The ITEM_DATA table could not be distributed across the given number of partitions.
5103	The ITEM_DATA backup table is missing.
5105	The ITEM_DATA table's dependents were not all re-created.
5106	An error other than a missing base object error occurred when re-creating a dependent object.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
5107	An error occurred dropping dependent other than nested dependencies.
Partitioning from LoadSWID	
5108	The ITEM_DATA table is not partitioned or does not exist.
5109	The high value of the ITEM_DATA partition key is not MAXVALUE.
5110	The ITEM_DATA table was not reset to one MAXVALUE partition.
5112	The MAXVALUE partition in the ITEM_DATA table could not be dropped.
5113	The MAXVALUE partition could not be added to the ITEM_DATA table.
Load MHTbl Errors	
3541	MERCHANDISE_HIERARCHY_TBL is empty - reuse
6101	The MERCHANDISE_HIERARCHY_TBL table has no CHAIN record (where PARENT_MERCHANDISE_ID is NULL).
6102	The MERCHANDISE_HIERARCHY_TBL table has more than one record with PARENT_MERCHANDISE_ID = NULL (multiple CHAIN records).
Load Parameters Errors	
8101	The merchandise key in ASH_PARAMETER_VALUES_TBL cannot be null.
8102	The merchandise level in ASH_PARAMETER_VALUES_TBL cannot be null.
8103	The location key in ASH_PARAMETER_VALUES_TBL cannot be null.
8104	The location level in ASH_PARAMETER_VALUES_TBL cannot be null.
8105	The item attribute in ASH_PARAMETER_VALUES_TBL cannot be null.
8106	The parameter name in ASH_PARAMETER_VALUES_TBL cannot be null.
8107	Merchandise found in ASH_PARAMETER_VALUES_TBL that does not exist in MERCHANDISE_HIERARCHY_TBL.
8108	Location found in ASH_PARAMETER_VALUES_TBL that does not exist in LOCATION_HIERARCHY_TBL.
Load Price Ladders Errors	
8201	The merchandise key in ASH_PRICE_LADDERS_TBL cannot be null.
8202	The merchandise level in ASH_PRICE_LADDERS_TBL cannot be null.
8203	The location key in ASH_PRICE_LADDERS_TBL cannot be null.
8204	The location level in ASH_PRICE_LADDERS_TBL cannot be null.
8205	The price ladder ID in ASH_PRICE_LADDERS_TBL cannot be null.
8206	Merchandise found in ASH_PRICE_LADDERS_TBL that does not exist in MERCHANDISE_HIERARCHY_TBL.

Table 3–8 (Cont.) Standard Load Error Messages

Number	Error Message
8207	Location found in ASH_PRICE_LADDERS_TBL that does not exist in LOCATION_HIERARCHY_TBL.
8208	The found price ladder type is not in PT, PO, or PP.
8209	The model flag cannot be NULL.
8210	Accounting type is either NULL or has a value that is not allowed. Acceptable values are TEMP or PERM.
8211	If the price value type is PO or PT, then the price percent value must be a non-negative fraction and the price point value must be null. If the price value type is PP, then the price point value must be a non-negative number and the price percent off value must be null.
8212	Found duplicate client ladder ID in the data feed.
Load Seasonalities Error Messages	
8301	The merchandise key in ASH_SEASONALITY_MAPS_TBL cannot be null.
8302	The merchandise level in ASH_SEASONALITY_MAPS_TBL cannot be null.
8303	The location key in ASH_SEASONALITY_MAPS_TBL cannot be null.
8304	The location level in ASH_SEASONALITY_MAPS_TBL cannot be null.
8305	Merchandise found in ASH_SEASONALITY_MAPS_TBL that does not exist in MERCHANDISE_HIERARCHY_TBL.
8306	Location found in ASH_SEASONALITY_MAPS_TBL that does not exist in LOCATION_HIERARCHY_TBL.
8307	A NULL priority was found.
8308	A NULL seasonality ID in maps was found.
8309	A NULL seasonality ID in values was found.
8310	A NULL calendar date was found.
8311	Found NULL AS_VERSION in seasonality maps.
8312	Found more than one distinct AS_VERSION value in seasonality maps.
8313	Found NULL AS_VERSION in seasonality values.
8314	Found more than one distinct AS_VERSION vlaue in seasonality values.
Data Archiving Errors	
11001	Records having a null RUN_ID have been found in the ITEM_DATA table.

Standard Load Dependency Tree

The load script loads data in the order specified in Figure 3–1, “Standard Load Dependency Tree.” The load procedures that are shaded are only used with Flexible Store Clustering.

Table 3–9 (Cont.) Dependency Tree Procedures

Dependency Tree Procedure	Procedure Name
Load Location Hierarchy	LoadLocationHierarchy
Load Location Hierarchy Table	LoadLHTbl
Load LT Close	LoadLTCLOSE
Load Budget	LoadBudget
Load Items	LoadItems
Load Internal Outdates	LoadInternalOD
Load Promotions	LoadPromotions
Load Sales	LoadSales
Load Materialized Views	LoadMaterializedViews
Load Model Start Dates	LoadModelStartDate
Load Scenarios	LoadScenarios
Load Markdown Sendbacks	LoadMarkdownSendback
Load Markdowns Taken	LoadMarkdownsTaken
Load Internal Historical Markdowns	LoadInternalHM
Load Internal Promotions	LoadInternalPromo
Load Front End	LoadFrontEnd
Load Warehouses	LoadWarehouses
Load Distribution Center Inventory	LoadDcInventory
Load Warehouse Allocation	LoadWarehouseAllocation
Load Business Rule Instances	LoadBRInstances
Load Parameters	LoadParameters
Load Price Ladders	LoadPriceLadders
Load Seasonalities	LoadSeasonalities
Load Auto-Collections	LoadCollectionsAuto
Load Collections Sendback	LoadCollectionsSendback
Load Cluster Mapping	LoadClusterMerch

Standard Load Steps

Each procedure consists of the following sub-procedures:

1. Setup
2. Pre-load Verification. All n processes are run in parallel.
3. Finish Pre-load Verification.
4. Load. All n processes are run in parallel.
5. Post-load Verification. All n processes are run in parallel.
6. Finish Post-load Verification.
7. Tear-down.

Standard Interface Specifications for One-Time Data

The following three standard interface specifications are used for data that is loaded once at the beginning of a COE deployment.

Cross Products Information Standard Interface (ASH_CP_TBL)

Items are globally defined to be at a specific level of the merchandise hierarchy and the location hierarchy through the cross products interface.

Technical Notes

The following list provides details to considering regarding the cross products information data.

- The INTERSECT_NAME is the name of the Key, which defines the purpose or feature for the data, and is either OPTIMIZATION, SALES, CLUSTER, or DEFAULT LEVEL. Use the value CLUSTER to enable flexible clustering. When flexible clustering is used, the merchandise and location values must not be set to CHAIN/CHAIN. The values must match the values in the retailer Location Hierarchy Levels table. For more information on Flexible Clustering, see the *Clearance Optimization Configuration Guide*.
- For each Key, identify the defining level of the merchandise hierarchy and location hierarchy.
- The cross products information is generally loaded only once.
- Sales cannot be loaded until optimization level and the sales level are defined.

Cross Products Information Specification

Table 3–10 Cross Products Information Standard Interface Specification

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
INTERSECT_NAME	The key name (OPTIMIZATION, SALES, CLUSTER, or DEFAULT LEVEL)	String	50	N
MERCHANDISE_LEVEL	The defining level within the hierarchy	String	50	N
LOCATION_LEVEL	The defining level within the hierarchy	String	50	N

Location Hierarchy Levels Standard Interface (ASH_LHL_TBL)

The location hierarchy levels interface is used to specify the names of a retailer's location levels and their order.

Technical Notes

The following list provides details to consider regarding the lh levels data.

- The Chain level should always be defined as 1.
- The sequence of level numbers must begin with 1 and increase in increments of 1, without any gaps in the sequence.
- The location hierarchy levels information is generally loaded only once.

LH Levels Specification

Table 3–11 Location Hierarchy Levels Standard Interface Specification

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
LOCATION_LEVEL	The name of the location level	String	50	N
LEVEL_SQC	The sequence number of the level	Integer	2	N

Merchandise Hierarchy Levels Standard Interface (ASH_MHL_TBL)

The merchandise hierarchy levels interface is used to specify the names of a retailer's merchandise levels and their order.

Technical Notes

The following list provides details to consider regarding the mh levels data.

- The Chain level should always be defined as 1.
- The sequence of level numbers must begin with 1 and increase in increments of 1, without any gaps in the sequence.
- The merchandise hierarchy levels information is generally loaded only once.

MH Levels Specification

Table 3–12 Merchandise Hierarchy Levels Standard Interface Specification

Field Name	Field Description	Data Type	Maximum Length	Nullable Y/N
MERCHANDISE_LEVEL	The name of the merchandise level	String	50	N
LEVEL_SQC	The sequence number of the merchandise level	Integer	2	N

Standard Dataset

The COE standard dataset, located in <productdir>/modules/COEDataset, is a set of raw data provided as flat files with the service that

- is shipped with the service and is copied into the installation directory
- requires the front-end configuration grids in the installation directory
- contains five weeks of data
- contains only valid data, so no validation errors should occur during the standard load
- provides data that is sufficient to verify the installation and initial basic configuration of the product
- does not provide a complete set of data to explore the total functionality of the service
- provides data that can be loaded using the standard load procedures, and, once loaded, can be used to perform a model run

- provides data sufficient to permit the launching of the service without any additional configuration after the model run is complete
- does not provide any error conditions
- provides one eligibility query for all the merchandise in the dataset.
- includes the expected results of the optimization run
- supports markdowns and forecasts
- uses the default error threshold settings for data validation (procedures = 0 and specific validations = 100). This permits the dataset to fail on any validation error. All invalidated rows are store in appropriate "BAD" staged table.
- requires that an empty schema be created before the data is loaded (part of the standard installation)
- is staged and loaded using pl_stage_client.sh and pl_load_client.sh. See the beginning of this chapter for details about staging and loading data.
- is validated using published load validations
- imports the attributes such as promotions, markdowns, and business rules that are hierarchical in service of the attributes
- contains no sendback data. To test sendbacks, markdowns must be taken, which are then processed during the next weekly load.

Dataset Data

The data in the dataset consists of 3,107 items and 156 pricing groups and 4,682 items as part of pricing groups. Details about the data characteristics are shown in the following table. For information about the standard load procedure and the target table for each interface, see the beginning of this chapter.

Table 3–13 Clearance Optimization Engine Dataset Data

Data Interface Table	Data Characteristics
Merchandise Hierarchy Levels (ASH_MHL_TBL)	Eight levels: Chain Company Division Department Class Style Color Product Key
Location Hierarchy Levels (ASH_LHL_TBL)	Five levels: Chain Company Zone Price zone Store

Table 3–13 (Cont.) Clearance Optimization Engine Dataset Data

Data Interface Table	Data Characteristics
Cross Products Information (ASH_CP_TBL)	MH-LH intersections: Optimization Product key Store Sales Product key Store (location level) Cluster CHAIN CHAIN DEFAULTLEVEL CHAIN CHAIN
Merchandise Hierarchy (ASH_MH_TBL)	34,444 merchandise items at the product key level
Location Hierarchy (ASH_LH_TBL)	6 price zones 845 stores
Items (ASH_ITEMS_TBL)	7,789 items
Sales (ASH_SALES_TBL)	5 weeks of data
Markdowns Taken (ASH_MDTAKEN_TBL)	270 external markdowns
Promotions (ASH_PROMOS_TBL)	5,000 promotions (inclusions set as promo_price at the item level)
Distribution Center Inventory (ASH_DCI_TBL)	5 weeks of data
Distribution Center Allocation (ASH_DC_ALLOCATION_TBL)	8,400 allocations
Demand Parameters (ASH_PARAMETER_VALUES_TBL)	160 elasticity values
Price Ladders (ASH_PRICE_LADDERS_TBL)	178 price ladders
Seasonalities (ASH_SEASONALITY_MAPS_TBL) and (ASH_SEASONALITY_VALUES_TBL)	300 seasonality settings
Pricing Groups (No interface or staging table)	200 pricing groups
Business Rule Instances (ASH_BRM_INSTANCE_TBL)	3,023 instances of default rules: 509 OUT_DT 1,000 INVENTORY_TARGET 1,501 PLANNED_START_DT other

Modifying the Dataset

You can modify the dataset to change or add data. Here is a sample procedure for changing the unit cost for an item.

1. Load the staged files into the ASH tables.

```
cd <install_base>/modules/tools/bin
```

```
bash ./pl_stage_client.sh full_path_to_product_directory COEDataset
```

2. Identify the target table for the item you want to modify. You can trace back from the P4P_DISPLAY_ITEMS view to the ITEM_DATA table (which supplies the unit cost data) to the ITEMS_TBL table (which populates ITEM_DATA). So, the unit cost data must be changed in ASH_ITEMS_TBL.
3. Determine (from ASH_ITEMS_TBL) the merchandise key and the location key for the ITEMID whose unit cost you are changing.
4. Create a script to apply the change directly to the ASH stage table.

Here is a sample script called **pl_update_dataset.sql**.

```
UPDATE ash_items_tbl
   SET unit_cost=16.02
 WHERE merchandise_key='10000009'
    AND location_key='5';
COMMIT
```

5. Run **pl_update_dataset.sql** using sqlPlus on the target schema.
6. Load the data.
7. To verify that the change was made, view the item in P4P_DISPLAY_ITEMS or in ITEM_DATA.

Sample Model Run Results

Here is a sample of expected model run results using the sample dataset provided with the CD image in an “out-of-the-box” configuration:

```
Stoplight Summary
Yellow      3712
Green       1733
```

Message Breakdown

Stoplight	Category	Resource	Instance Count	Message
Yellow	Item Data	engine.status.didyma.noTicketPrice	146	This item has not Ticket Price
Yellow	Item Data	engine.status.didyma.noStartDate	146	This item has no Start Date
Yellow	Item Data	engine.status.agorai.noCandidatePrices	160	No candidate prices available for markdown: filtered Price Ladder is empty
Yellow	Item Data	engine.status.agorai.effectiveDateMustPrecede OutDate	9	OutDate precedes Effective Date

Yellow	Item Data	engine.status.agorai.badlastStoreCount	523	Last week of historical activity does not have a good Store Count
Yellow	Inactivity	engine.status.agorai.noUsefulSales	2135	Data too dirty to determine demand: zero useful sales found
Yellow	Error	engine.status.didyma.itemBuild	74	Item contains other errors
Yellow	Error	engine.status.didyma.collectionBuild	28	Pricing Group contains other errors
Yellow	Error	engine.status.agorai.forecasterMissing	342	Unable to locate an external forecaster or create an internal forecaster for Item 1023
Yellow	Error	engine.status.agorai.collectionItemErrors	149	Pricing Group contains items with errors
Green	Markdown Blocked	engine.status.agorai.noMarkdownPricesAtEffectiveDate	3	No markdown prices available on Effective Date
Green	Not Recommended	engine.status.agorai.sellsOutWithoutChanges	1412	Sells to target without changes; Markdown not recommended
Green	Not Recommended	engine.status.agorai.notRecommended	285	Markdown not recommended for this week
Green	Warning	engine.status.agorai.priceAboveFull	33	A relative price is higher than the full price: 1.001

The Model Run

This chapter contains the following:

- Introduction
- The Calculation Engine
- Model Run Prerequisites
- Model Run Process
- Monitoring an Model Run
- External Base Demand
- Running Reports and Diagnosing Problems
- Restarting a Run
- Performance Considerations
- Sendback Files
- Automating COE Processes

Introduction

This chapter provides an overview of the entire model run process and details the steps of the model run process.

The weekly batch process is the entire process of preparing for an model run, including loading data and customizing Clearance Optimization Engine (COE) parameters, performing the pre-model run steps, the model run, and performing the post-model run steps.

During an model run, COE analyzes business data and produces markdown recommendations and forecasts.

The Calculation Engine

The Calculation Engine component of COE computes optimizations and forecasts for the service. Functionally, and at a high level, the Calculation Engine consists of Delphi, which is responsible for all database operations, chunk management, the writing of results back to the database, and the calculation of forecast parameters; Agorai, which is responsible for forecasts and for determining optimal pricing strategy; and an RMI server, which exposes the Calculation Engine functionality for use by What If simulations.

The Calculation Engine processes are managed according to the following model. A job, which is identified by a job ID, is a logical unit of work that occurs over a defined period of time. For example, the weekly batch run process, consisting of the service model run and resultant database changes, is considered a job. Only one job can be open at a time and it remains open until it is explicitly closed using `closeCurrentJob.sh`. Keeping a job in an open state permits the debugging of the batch process.

Once a job is opened, it is assigned a job ID and a work queue is generated. A group of one or more worker processes is started to process the work in the work queue. A worker process consists of three threads: one thread obtains the work chunk (a set of items or pricing groups to be optimized) located at the top of the work queue (that is, with the highest priority), a second thread checks for an infinite loop, and a third thread acts as a heartbeat. If a process fails (for example, because of an infinite loop) its chunk returns to the work queue, but with a lower priority, since the heartbeat will not update the claim on that chunk. The thread responsible for the item processing obtains values via the inference rules, sends a function call to Agorai requesting an optimization calculation, and writes the results to the database. Once a worker process completes a chunk of work, it obtains the next chunk in the queue until all of the chunks have been processed.

Three types of errors can occur during a job: job initialization failures, worker process errors, and item optimization errors. Item-level errors are written to the database in the `rtm` tables.

Calculation Engine Configuration

The following two files, `<ConfigRoot>/Engine/delphi.properties` and `<ConfigRoot>/Price/kpi.properties`, should be configured. Note that the properties for `delphi` are loaded from files named `delphi.properties`, which are found by searching the following directories under `configroot` (in order): `Engine/client`; `Engine/environment`; and `Engine/`. If a file named `delphi.properties` is found, it is loaded. This overwrites any `delphi.properties` files that were previously loaded.

Settings for `kpi.properties`

- Database credentials
- **chunk.tryLimit** – defines the maximum number of times that the engine tries to process an item before deciding that the item cannot be processed. This value must be set to a value greater than 1. The default reflects the optimal policy according to simulations.
- **chunk.sizes** – defines a sequence of values representing the sequence of chunk sizes that should be used to group items that have had 0, 1, 2... retries. The sequence must
 - consist of a decreasing set of positive integers
 - equal in length the value of `chunk.tryLimit`
 - end with a value of 1
 - use semicolons to separate the series of values

The sequencing is used in a progressive manner, starting with a large chunk and retrying with smaller chunks, to determine which items are causing the chunk to fail. (Retries are seldom needed; they happen when processes die.)

The processing of large chunks takes up much of an model run, so the size of largest chunk has an impact on performance. The default sequence of values is recommended for good performance.

When selecting the largest chunk size, consider the following. Since larger chunks require more random access memory per worker, at some point processes will either fail or use virtual memory paging. Smaller chunks are better because they incur less overhead in database access. It is suggested that the largest chunk size be a value between 1,000 and 10,000. The smaller chunk sizes should be much smaller than the largest value in order to capture work before a failure occurs.

Default value = 10,000; 100; 1

- **worker.lifetime** – defines how long in minutes the processor is allowed to run before it is decided that it is in an infinite loop and terminates. This value must be greater than 1 minute. For large pricing groups, it is recommended that you start with a setting greater than 30 minutes.

Default value = 30

- **chunk.active** – defines the maximum time in minutes after a worker is killed that the chunk it was working on can be reclaimed. This value must be greater than 1 minute. This setting rarely needs customizing.

Default value = 3

Settings for delphi.properties

The delphi.properties file should only list values that differ from the default values. If a default value exists, it is listed here. The first two properties, for the Agorai library location and the RMI server port, are required. All others are optional.

Table 4–1 delphi.properties Settings

Property	Description
engine.agorai.lib=installer-supplied-path/libAgoraiJNI.so	The location of the Agorai library.
delphi.rmi.port=installer-supplied-port-number	The port used by the RMI server in interactive mode.
batch.write.size=100	The number of items or pricing groups contained in a batch written to the database.
optimize.status.tbl=item_status_tbl	The table the optimization status for each item or pricing group is written to.
engine.record.directory=pathname	The path of the message capture directory. In order for messages to be logged, a complete path and an existing directory are necessary.
engine.record.internals=false	Set this property to false to disable logging for all What-If recalculations. This can be overwritten in the UI for a particular What-If calculation. Set this property to true in order to log internal engine messages. (This assumes engine.record.directory has been created and enabled.)
delphi.log4j.properties=delphi.log4j.properties	The file that contains properties for controlling Delphi logging behavior. The path is relative to the path for delphi.properties.

Table 4–1 (Cont.) delphi.properties Settings

Property	Description
strategy.activitydata=list	Used for performance tuning of IR_ACTIVITY_DATA. Values are single, list, and temptable. <i>See</i> Inference Rule Access for more information on all strategy properties.
strategy.businesspolicy=list	Used for performance tuning for IR_BUSINESS_POLICY.
strategy.distribution=list	Used for performance tuning for IR_PRIOR_DISTRIBUTION.
strategy.forcedmarkdowns=list	Used for performance tuning for IR_FORCED_MARKDOWNS.
strategy.itemdates=list	Used for performance tuning for IR_ITEM_DATES.
strategy.itemparameters=list	Used for performance tuning for IR_ITEM_PARAMETERS.
strategy.itemprices=list	Used for performance tuning for IR_ITEM_PRICES.
strategy.markdowncalendar=list	Used for performance tuning for IR_MARKDOWN_CALENDAR.
strategy.modelvalues=list	Used for performance tuning for IR_MODEL_VALUES.
strategy.pastticketprices=list	Used for performance tuning for IR_PAST_TICKET_PRICES.
strategy.pendingmarkdowns=list	Used for performance tuning for IR_PENDING_MARKDOWNS.
strategy.plannedpromos=list	Used for performance tuning for IR_PLANNED_PROMOS
strategy.priceladder=list	Used for performance tuning for IR_PRICE_LADDER.

Model Run Prerequisites

Once the service is installed, the following must be configured prior to an model run. Note that \$CONFIGROOT = <install_base>/config.

- Merge any existing customized load statements with the updated **load_statements.sql**. The load statements are used for eligibility filtering and for populating the ITEM_DATA table. **Load_statements.sql** is installed under **\$CONFIGROOT/db.config**.
- Merge any existing customized inference rules (located in **ir.sql**, installed under **\$CONFIGROOT/db.config**) with the updated inference rules.
- Apply **load_statements.sql** and **ir.sql** to the database schema, using either **configdb.sh** or **plconfiguredb.sh**, as follows:
 - copy **ir.sql** and **load_statement.sql** to **\$CONFIGROOT/db.config**
 - **cd <install_base>/modules/tools/bin**
where **PL_BASE** is the location where COE is installed.
 - **bash plconfiguredb.sh \$CONFIGROOT**
- Business Rule Definitions – COE comes with default values for BRs, set at the highest level (except Outdates and planned Start Dates). Merge any customized business rule definitions with the updated version.
- Business Rule Values – load using **bradmin.sh**.
- Set the LD_LIBRARY_PATH (for Linux, HP-UX, or Solaris) or LIBPATH (for AIX) as follows:

Platform	Pathname
AIX	LIBPATH=<install_dir>/modules/Engine/lib/aix_powerpc
Linux	LD_LIBRARY_PATH=<install_dir>/modules/Engine/lib/linux_i686
Solaris	LD_LIBRARY_PATH=<install_dir>/modules/Engine/lib/sunos_sun4u
HP-UX	LD_LIBRARY_PATH=<install_dir>/modules/Engine/lib/hpux_ia64

No special maintenance of tables or indexes is required. All necessary statistics gathering and index rebuilding is handled by the service.

The performance of the model run is affected by the number of candidate prices from the price ladder (those lower than the current price) and candidate markdown calendar (which depends on how far out the out date is). Performance should be considered when choosing prices for the price ladder; if the price ladder is long, performance may be adversely impacted.

Model Run Process

The weekly model run consists of the following high-level steps. These steps are all executed by **weeklyBatch.sh**. (The details about each step are provided in subsequent sections.)

Note that since the model run and KPI share `work_queue_tbl`, you should not run KPIs and the model run at the same time.

1. **plfrontendload.sh**, which executes FELOAD
2. **plpremodelrun.sh**, which executes PRERUN
3. **runCalcEngine.sh**, which executes a series of helper scripts responsible for the batch process
4. **runMultiKPI(Item | Collection).sh**, which calculates the key performance indicator metrics
5. **plpostmodelrun.sh**, which executes POSTRUN

Model Run Scripts

This section contains details about the scripts used during an model run, listed in alphabetical order.

bashjava.sh

Usage: **bashjava.sh**

Description:

A shell script wrapper around Java that is used by the installer.

checkKPISuccess.sh

Usage: **checkKPISuccess.sh** <full_path_to_product_directory>

Description:

Checks to see if the KPI calculations have been performed for all items and all items in pricing groups. It prints the number of items not calculated. It returns a value of 0 if the KPIs have been calculated for all items. It returns a value of 1 if some calculations are missing.

checkRunSuccess.sh

Usage: **checkRunSuccess.sh** [-dh] <full_path_to_configroot>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit

Description:

Checks to see if the model run completed successfully. It returns a value of 0 if the command completes successfully; however, this exit code provides no information on the status of the model run itself.

The output of this command looks similar to the following:

```
Success: Run is complete.  
Missing: 0 out of 15578, Errors: 2
```

If the number of optimization is equal to the number of eligible items, then the command outputs “Success: Run is complete.” If the number of optimizations does not equal the number of eligible items, then the command outputs “Failure: Run is not complete.” The number indicated for Missing is the difference between the number of optimizations and the number of eligible items. The number indicated for Errors is the number of items that have a status of Red.

closeCurrentJob.sh

Usage: **closeCurrentJob.sh** [-dh] <full_path_to_configroot>

where

- d – debug mode
- h – print this message and exit

Description:

Called by **runCalcEngine.sh**. Closes the current job, if one exists. As a result, the worker processes on the batch process exit.

This command closes the job record in the job control database. All worker processes frequently check that their current job is still open, and they exit if it is not. When they exit in such a situation, the auto-restart feature does not restart the process. This command can be executed from any machine and all workers on all machines will shut down.

The commands **kill** and **killall** cannot be used to kill the worker processes, as they will restart.

enginectl.sh

Usage: **enginectl.sh** <full_path_to_configroot> (start | stop | kill | restart | status | help)

where

- start – start the interactive Calculation Engine
- stop – stop the interactive Calculation Engine
- kill – stop the interactive Calculation Engine
- restart – try to stop and then restart the Calculation Engine

- status – display the status
- help – print the usage message

Description:

Starts and stops the RMI server, which is used for What If simulations. For more information, see the *Clearance Optimization Engine Configuration Guide*.

generateErrorWorkQueue.sh

Usage: **generateErrorWorkQueue.sh** [-dh] <full_path_to_configroot>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit

Description:

Compiles a list of all items and pricing groups that have failed during the current batch job. Once the problems in this list have been corrected, the items and pricing groups that failed can be retried.

getCurrentJobID.sh

Usage: **getCurrentJobID.sh** [-dh] <full_path_to_configroot>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit

Description:

Called by **runCalcEngine.sh**. Returns the ID of the current batch job to stdout.

getCurrentJobStatus.sh

Usage: **getCurrentJobStatus.sh** [-dh] <full_path_to_configroot>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit

Description:

Called by **runCalcEngine.sh**. Returns an integer value between 0 and 100 that represents the percentage of the current batch job that has been completed.

getEngineVersion.sh

Usage: **getEngineVersion.sh**

Description:

Prints the build version of the Calculation Engine to *stdout*.

initializeJob.sh

Usage: **initializeJob.sh** [-dh] <full_path_to_configroot>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit

Description:

Called by **runCalcEngine.sh**. It initializes a new batch job and prints the job ID of the batch job to stdout. It returns a value of 0 if the initialization is successful. If the initialization fails, it prints a reason to **stdout**.

isDone.sh

Usage: **isDone.sh** [-dhv] <full_path_to_configroot>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit
- v – verbose mode

Description:

If the batch job is complete, it returns a value of 0. If the batch job is not complete, it returns a value of 1.

jobHistory.sh

Usage: **jobHistory.sh** [-dh] <mhNode> <full_path_to_configroot>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit

Description:

It provides a detailed report about the current batch job.

jobReport.sh

Usage: **jobReport.sh** <full_path_to_configroot>

Description:

Called by **runCalcEngine.sh**. It provides a summary report about the current batch job.

multiChunker.sh

Usage: **multiChunker.sh** [-dh] [-n num_threads] <full_path_to_configroot>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit
- n – number of threads to be run

Description:

It starts several batch worker processes. If any of its child processes returns a value of 0 (that is, completes successfully), the script itself returns a value of 0. In other words, if one child process completes successfully, it indicates that the entire batch process has completed successfully.

plfrontendload.sh

Usage: **plfrontendload.sh** <configroot> [*OracleItemDataPartitioning Flag*]

where

- configroot is the output directory for the configuration (suite's configroot)
- OracleItemDataPartitioningFlag specifies ITEM_DATA table partitioning rules in Oracle as follows:
 - -1 – disable partitioning

Description:

Executes FELOAD.

plpostmodelrun.sh

Usage: **plpostmodelrun.sh** <configroot> [*NumItemDataPartitions*]

where

- configroot is the output directory for the configuration
- NumItemDataPartitions specifies the ITEM_DATA table partitioning rules as follows:
 - positive integer – use this number of partitions for partitioning
 - 0 – use the default number of partitions for partitioning
 - -1 – disable partitioning
 - any other value or blank – use the default number of partitions for partitioning

Description:

If NumItemDataPartitions is specified, this command simply stores the specified value in the P4P_PARAMS table, which is used to drive the partitioning logic when it is subsequently executed. When a fresh schema is created, this parameter is initialized (that is, seeded in the P4P_PARAMS table) to -1, which means that partitioning is disabled. However, when this script is run, this parameter will be updated according to the NumItemDataPartitions options.

Note that to keep partitioning permanently disabled, you always need to specify -1 on every call to this script; otherwise, it will be reset to the default value. Schema upgrades preserve the current value of NumItemDataPartitions.

plpremodelrun.sh

Usage: **plpremodelrun.sh** <configroot>

where

- configroot is the output directory for the configuration (suite's configroot)

Description:

Executes PRERUN.

resetForKPIItem.sh

Usage: **resetForKPIItem.sh** <full_path_to_product_directory>

Description: During the model run, Job Control keeps track of which chunks have been completed. The script resets the Job Control system after the model run and

before the KPIs are calculated. It clears the Job Control database table and populates a KPI status table with the item IDs that will have KPIs calculated. This script should be run before **runMultiKPI.sh** for items.

resetForKPICollection.sh

Usage: **resetForKPICollection.sh** *<full_path_to_product_directory>*

Description: During the model run, Job Control keeps track of which chunks have been completed. The script resets the Job Control system after the model run and before the KPIs are calculated. It clears the Job Control database table and populates a KPI status table with the pricing group IDs that will have KPIs calculated. This script should be run before **runMultiKPI.sh** for pricing groups.

runCalcEngine.sh

Usage: **runCalcEngine.sh** *[-n numWorkers] <full_path_to_product_directory>*

Description:

The **runCalcEngine.sh** script calls the following scripts, which are required to complete a batch run. Running the Calculation Engine across more than one service host requires running the scripts comprising **runCalcEngine.sh** independently. Only **multiChunker.sh** should run on more than one host at a time.

- **getCurrentJobID.sh**
- **closeCurrentJob.sh** (if a previous job exists)
- **initializeJob.sh**
- **multiChunker.sh**
- **getCurrentJobStatus.sh**
- **runStatsOnBatchOutput.sh**
- **jobReport.sh**

runChunker.sh

Usage: **runChunker.sh** *[-dh] <full_path_to_configroot>*

where

- **d** – debug mode (turns on Java asserts)
- **h** – print this message and exit

Description:

Starts a single worker process in the foreground.

runInteractiveCE.sh

Usage: **runInteractiveCE.sh** *[-p] <full_path_to_configroot>*

where

- **p** – engine starts in failover mode

Description:

Called by **enginectl.sh**. It starts the RMI server and an associated watchdog process that restarts the RMI server if it crashes.

runMultiKPI.sh

Usage: **runMultiKPI.sh** [-n *numWorkers*] *item* | *collection* <*full_path_to_product_directory*>

where

- n – number of parallel processes
- *item* | *collection* – one of these arguments must be selected

Description:

The **runMultiKPI.sh** script calculates performance metrics that are based on Calculation Engine forecasts (key performance indicators). The script confirms that a job is initialized and then it runs the KPI calculations.

The KPI calculations are divided into two separate batch processes, KPI for items and KPI for pricing groups. The script takes either the **item** argument or the **pricing group** argument. The KPI for items calculation *must* be completed before the KPI for pricing groups calculation.

Before each KPI for items calculation is run, the **resetForKPIItem.sh** command must be run to reset the Job Control queues. Before each KPI for pricing group calculation is run, the **resetForKPICollection.sh** command must be run to reset the Job Control queues.

These calculations can be done in a single process or in multiple parallel processes.

The weekly batch script calls these scripts in the following order:

1. **resetForKPIItem**
2. **runMultiKPI** for items
3. **resetForKPICollection**
4. **runMultiKPI** for pricing groups

See also **resetForKPIItem.sh** and **resetForKPICollection.sh**.

runReport.sh

Usage: **runReport.sh** [-dh] <*full_path_to_configroot*>

where

- d – debug mode (turns on Java asserts)
- h – print this message and exit

Description:

It prints a report of the current batch run to *stdout*.

runStatsOnBatchOutput.sh

Usage: **runStatsOnBatchOutput.sh**

Description:

The **runStatsOnBatchOutput.sh** script is called by **runCalcEngine.sh** and is part of **weeklyBatch.sh**. The script runs an “analyze and estimate” utility call **RunStats** on *markdown_activities*, *forecast_summaries*, *forecast_activities*, *rtm_history*, *rtm_status*, and *rtm_status_arguments*.

weeklyBatch.sh

Usage:

For SSL implementation:

```
weeklyBatch.sh [-n] <full_path_to_product_directory> <Remote_URL> <PRICEADMIN_
ALIAS> <PATH_TO_TRUSTSTORE> <TRUSTSTORE_ALIAS>
```

For non-SSL implementation:

```
weeklyBatch.sh [-n] <full_path_to_product_directory> <Remote_URL> <PRICEADMIN_
ALIAS>
```

where:

- n – number of chunks
- REMOTE_URL is the additional protocol information you can use based on whether you send the request using SSL or non SSL. For example, if the server is enabled with only HTTPS, you must specify https://<host URL>:<PORT>.
- PRICEADMIN_ALIAS is the alias name set up for the user account associated with the PriceAdmin utility.
- PATH_TO_TRUSTSTORE is the location to the trust store that contains certificates a client can trust from servers. This location can point to a ".jks" Java Key Store or a ".pem" base64 encoded certificate.
- TRUSTSTORE_ALIAS is the alias name set up for the trust store. To access a client's truststore, you must provide the password of the trust store file. To maintain security, it is recommended that the truststore password is saved in the wallet file. You then specify the truststore alias name to PriceAdmin utility.

Example: **weeklyBatch.sh -n 3 /profit ps-app-l01**

Description: This script encapsulates the weekly batch process. It is best used with small datasets as a tool during the service configuration process; it is not recommended for use in a production environment.

If you do not specify the number of chunks, the Calculation Engine and the KPI calculations both use one thread.

Load_statements.sql

The following are contained in **load_statements.sql** and are part of the model run.

FELOAD

Prior to FELOAD, certain tables are cleaned up in order to improve performance. During the FELOAD portion of the model run, the ITEM_DATA table is updated with new data that has been received from the client.

Note that the Mhrename standard interface does not remove inactive cluster sets. So, items that are members of inactive cluster sets are filtered out during the population of the INTERNAL_ITEM_DATA_TBL table.

FELOAD consists of the following steps:

1. Procedures for archiving ITEM_DATA and Forecasts are loaded.
2. The SCENARIOS_TBL table is loaded.
3. The INTERNAL_PROMO table is loaded.
4. The INTERNAL_HIST_MKDNS_TBL table is loaded.

5. The INTERNAL_BIZ_RULES_TBL table is loaded.
6. The IR_WAREHOUSE_ALL_ITEMS_TBL table is loaded.
7. The ITEMS_TBL.model_start_dt is updated.
8. All invalid views are recompiled.
9. The INTERNAL_ITEM_DATA_TBL table is truncated.
10. The INTERNAL_ITEM_DATA_TBL table is populated.
11. All dropped indexes are restored on the internal ITEM_DATA table.
12. Statistics are collected on the internal ITEM_DATA table.
13. The FEDATES tag, which includes updating P4P_PARAMS, is created.
14. The COLLECTIONS tag, which truncates the P4P_COLLECTION table, is created. This step is not called by any other step in **load_statements.sql**.
15. The P4P_COLLECTION table is truncated.

Data Archiving Data in COE is archived in such a manner that data not required for the weekly model run or by the service is cleaned up regularly. Required data is preserved and performance is enhanced.

Two procedures, which are part of the FELOAD portion of **load_statements.sql**, are responsible for archiving:

- **com.profitlogic.db.birch.ArchiveForecasts**
- **com.profitlogic.db.birch.ArchiveItemData**

Archiving occurs once a week. The current data in each table is compared to the data in the archive and only the new records are selected to be appended to the archive.

The following table lists the archiving source tables and target tables.

Table 4–2 Archived Tables

Archive Source Table	Archive Target Table	Populated By	Amount of History Preserved
FORECAST_ACTIVITIES	FORECAST_ACTIVITIES_ARCH	Model Run	unlimited
FORECAST_RUNS	FORECAST_RUNS_ARCH	Model Run	unlimited
FORECAST_SUMMARIES	FORECAST_SUMMARIES_ARCH	Model Run	unlimited
MARKDOWN_ACTIVITIES	MARKDOWN_ACTIVITIES_ARCH	Model Run	unlimited
RTM_HISTORY	RTM_HISTORY_ARCH	Model Run	unlimited
RTM_STATUS	RTM_STATUS_ARCH	Model Run	unlimited
RUN_HISTORY	RUN_HISTORY_ARCH	Model Run	unlimited
ITEM_DATA	ITEM_DATA_ARCH	FELOAD, KPIs, user actions	two years

Forecast Archiving The forecast archiving process maintains a status table that is truncated at the beginning of each weekly archiving. As each step in the process is successfully completed, its completion status is logged into the status table (ARCHIVING_STATUS_TBL). The cleanup of the source database tables, which is the last step of the procedure, begins only after all required archiving steps have been completed.

ITEM_DATA Forecasting The ITEM_DATA forecasting step preserves all the columns from the ITEM_DATA table. The ITEM_DATA_ARCH table contains one additional column, CURRENT_WEEK, which is populated from the PARAM_NAME column (= CurrentWeek) in the P4P_PARAMS table. The ITEM_DATA archiving step included the truncating of the ITEM_DATA table.

PRERUN

During the PRERUN portion of the model run, the BRPM business rules are cached into ITEM_BRM_RULES at the item level. Each column in the table represents a separate business rule (in correspondence to BRM_RULE_DEFINITION TBL). Each row in the table represents a unique ITEM_ID, with its business rules exploded to the item level. The ITEMS view along with the SEASONALITY_ID are cached in ITEMS_MODELRUN_TBL, which is used as a source for most inference rules.

Note that chunking has been disabled by default in the BRPM caching step. Chunking should only be enabled if processing is too slow. To enable chunking, configure the BRMChunkSize parameter in P4P_PARAM as follows:

Table 4–3 BRMChunkSize Parameter Values

BRMChunkSize Value	Description
0	No chunking (the default)
> 0	Chunks created of size specified
< 0	Chunking not allowed

The value can be set manually or by using the script `..\modules\tools\bin\plsetbrmchunksize.sh`. The value is set to the default value of 0 at the time of the initial load.

PRERUN consists of the following steps:

1. Tag added to disable Model Run Indexes.
2. The BRPM business rules are cached into the ITEM_BRM_RULES table.
3. All indexes are dropped on the ITEM_MODELRUN_TBL table.
4. The ITEM_MODELRUN_TBL table is truncated.
5. All What If output tables are truncated.
6. The WIF_SCENARIO_TBL table is populated with the required row of seed data.
7. FULL_PRICE and PRICE_LADDERS are cached for items.
8. The ITEM_MODELRUN_TBL table is populated.
9. All dropped indexes are restored on the ITEM_MODELRUN_TBL table.
10. The IR_WAREHOUSE_CACHE_TBL, which is a cache for IR_WAREHOUSE, is loaded.
11. BRM_ATTRIBUTE_VALUE_TBL is populated.
12. HIST_MARKDOWNS_MODELRUN_TBL (HIST_MARKDOWNS cache) is populated.
13. The PERIODS_MD_CAL_TBL table, which is a subset of PERIOD_TBL, used by the IR_MARKDOWN_CALENDAR view, is populated.

14. The P4P_LADDER_ROLES_TBL is populated.
15. All table statistics are updated.
16. All invalid views and schemas are recompiled.
17. The Model Run indexes and constraints are disabled.
18. The IR_METRICS cache tables are populated.

POSTRUN

During the POSTRUN portion of the model run, the P4P_FORECAST_DATA table is updated with the latest model run results, the ITEM_DATA table is updated with certain metrics, and RECOMMENDED_COLLECTION_FLAG in P4P_COLLECTIONS is updated with data from the ITEM_DATA table.

POSTRUN consists of the following steps:

1. All indexes are dropped on the P4P_FORECAST_DATA table.
2. The P4P_FORECAST_DATA and TMP_P4P_FORECAST_DATA tables are truncated.
3. The TMP_P4P_FORECAST_DATA table is loaded.
4. Statistics are collected on the P4P_FORECAST_DATA table.
5. The P4P_FORECAST_DATA table is loaded.
6. All dropped indexes are restored on the P4P_FORECAST_DATA table by the RestoreTable procedure.
7. Statistics are collected on the P4P_FORECAST_DATA table.
8. The TMP_P4P_FORECAST_DATA table is truncated in preparation for the load.
9. All indexes are dropped on TMP_POSTRUN_ITEM_DATA.
10. The TMP_POSTRUN_ITEM_DATA table is truncated.
11. The temp table used in the ITEM_DATA update to populate proj_oh_units_eff_dt is loaded.
12. All dropped indexes on TMP_POSTRUN_ITEM_DATA are restored using the RestoreTable procedure.
13. Statistics are collected on the TMP_POSTRUN_ITEM_DATA table.
14. The COLLECTION_NAME, PROJ_OH_UNITS_EFF_DT, and RECOMMENDED_COLLECTION_FLAG columns in ITEM_DATA are updated, based on the most recent model run results.
15. Statistics are collected on the ITEM_DATA table.
16. The P4P_COLLECTION.RECOMMENDED_COLLECTION_FLAG column is updated with the latest information from ITEM_DATA.
17. Statistics are collected on the P4P_COLLECTION table.
18. All invalid schema objects are recompiled.
19. All invalid views are recompiled.

Monitoring an Model Run

The commands you can use to monitor the progress of the model run include:

- **getCurrentJob.sh**
- **getCurrentJobStatus.sh**
- **isDone.sh**
- **jobHistory.sh**
- **jobReport.sh**
- **runReport.sh**

The model run can be monitored by reviewing the exit codes for the worker processes from **runCalcEngine.sh** and **multiChunker.sh**.

Resource monitoring of the service host that the worker processes are running on and the database host that the worker processes communicate with is also recommended. The saturation or overuse of hardware can indicate a configuration problem, such as the wrong number of worker processes, the wrong number of worker processes per machine, the wrong chunk size, or inappropriate heartbeat times.

The **isDone.sh** utility returns an exit code of 0 if the current batch run is complete; otherwise, it returns an exit code of 1.

The **getCurrentJobStatus.sh** utility prints a number between 0 and 100, which represents the approximate percentage of processing completed. This value is computed as a weighted percentage of completed chunks from the work queue, so the value is less accurate if business rules are more heterogeneous across merchandise or if the chunks are large.

The **jobReport.sh** utility prints a detailed breakdown of the number of items completed, the number of pricing groups completed, and the number of optimizations of each type that have failed.

The **runReport.sh** utility prints the Stoplight Summary. This is available at any time during the batch process, but it does not indicate if the job is complete.

These monitoring scripts provide a database-level view of how the run is proceeding. However, monitoring the exit status of the worker processes for unexpected failures is also recommended. These unexpected failures may indicate a configuration or data problem such as overly aggressive suicide times or problems with inference rule customization. It is also recommended that you redirect *stderr* to a log file in order to view any warning messages.

External Base Demand

The base demand calculation can be run either internally via the Calculation Engine or externally. The internal calculation is the default. The external calculation is useful for store level calculations in situations where a low rate of sales can lead to inaccurate forecasts and optimizations. The external base demand calculation uses aggregate-level values and is performed within the database in the evening during the week when users are not using COE and during the weekend model run.

The following setting in `IR_ITEM_BASE_DEMAND` determines which type of calculation will be used:

`Base_Demand_Usage` – must have a value of either `Override` or `Floor`. If set to `Override`, the external base demand is used. If set to `Floor` (the default), the internal base demand value is used.

Scripts and Procedures

The following scripts, located in <install_base>/modules/tools/ebd, are used for the external base demand:

enable_ebd.sh

Description: Used to enable external base demand. It populates P4P_PARAMS and related database tables that are used in the model run.

ebd_task_manager.run_weekday_task

Description: Executes a series of tasks to initiate the weekly portion of the external base demand calculation. This script can be used to start the initial model run as part of new implementation. In addition, it can be used during the week to suspend the run when users are logged into COE. It takes a value for the number of hours to run each day.

ebd_task_manager.run_weekend_task

Description: Executes a series of tasks to initiate the weekend portion of the external base demand calculation. This script can be used to start the initial model run as part of a new implementation. It is the last step of PRERUN.

ebd_task_manager.reset_all

Description: This script is used to restart the external base demand process if the data becomes corrupted.

set_ebdparameter.sh

Usage: set_ebdparameter.sh ConfigRoot param_name param_value

where param_name can be:

EBDLowPriceRatio

EBDHighPriceRatio

EBDWtdSalesAlpha

EBDLocWtSalesWks

EBDInSeasAlpha

EBDLocWtSalesThold

EBDLocWtAngle

EBDLocWtIteration

EBDInvPrior

EBDRelativeErr

Description: This script can be used to changed the parameters stored in P4P_PARAMS. These parameters are pre-populated with default values using enable_ebd.sh.

ebdrunparameters.sh

Usage: set_ebdrunparameters.sh ConfigRoot type parallel_degree chunk_size

where

ConfigRoot	output directory
type	LOCATION, MERCHANDISE or ITEM
parallel_degree	number of task instances to run at one time
chunk_size	number of IDs assigned to each call

Description: This script is used to change the chunk size and how many chunks to run at the same time. External base demand uses LOCATION_ID, MERCHANDISE_ID or ITEM_ID to chunk.

The following procedures, which are discussed in detail in [Chapter 3, "Standard Load"](#) can be used to reload promotions or activities:

LoadSales

Description: Can be used to save weekly sales to reload_activities by calling ebd_agg_sales.save_reloaded_activities.

LoadPromotions

Description: Can be used to save reloaded promotions into RELOADED_PROMOS_TBL

Task Manager

The Task Manager is a PL/SQL package (ebd_task_manager) that provides an entry point for the running of the external base demand tasks, weekday or weekend.

The following tasks, which can be called by a job scheduler, comprise the weekly external base demand process:

Weekday Tasks Through a Single Task Manager Call

1. Calculate aggregated weekly sales
2. Calculate location weights
3. Reset reloaded promotions
4. Maintain MerchandiseID mapping
5. Maintain phi input data
6. Maintain seasonality input data
7. Calculate aggregated seasonality values

Weekend Tasks Within Standard Load

1. LoadSales to save reloaded activities
2. LoadPromotions to save reloaded promotions

Weekend Tasks Through a Single Task Manager Call Within PRERUN

1. Maintain MerchandiseID mapping
2. Maintain changed phi input data
3. Maintain changed seasonality input data
4. Maintain changed aggregated seasonality values
5. Calculate external base demand

Monitoring and Managing External Base Demand

You can use the following to monitor and manage the external base demand process:

- `EBD_TASK_STATUS_TBL` – used to track the external base demand progress and determine working state for each task. It is seeded and updated by the external base demand process.
- `user_scheduler_job_run_details` and `user_scheduler_running_jobs` – views that can be used to monitor jobs.
- `user_scheduler_jobs` and `user_scheduler_job_log` – views that can be used to manage jobs.

Running Reports and Diagnosing Problems

The `runReport.sh` utility prints the Stoplight Summary. It is available at any time during the batch job, regardless of the value returned by `isDone.sh`.

The Stoplight Summary section of the report provides a count of all errors, categorized by the level of severity of the error. The red category indicates system or configuration errors that must be fixed. The yellow category includes errors that result from missing data or a possible mis-configuration of the service. The green category indicates no errors.

The Message Breakdown section of the report lists the errors in the order of severity and provides a count of the number of items affected.

If items or pricing groups are missing, the run can stop prematurely or have difficulty writing its results to the database. If this is the case, you can check the service server logs and database logs to determine the cause.

If the problem is not caused by missing data, you should first look at system and model configuration errors (Red category). You should diagnose and fix these problems and then restart using `generateErrorWorkQueue.sh` or run a completely new job.

The frequency of errors in the various categories may supply information that can be useful in diagnosing problems.

If worker processes exit prematurely with an exit code greater than zero, you should examine the item-level status and error messages with `runReport.sh`. You should also review the `worker.lifetime` setting to ensure that it provides enough time for even the longest-running pricing group optimizations. Overly aggressive settings for `worker.lifetime` can cause workers to exit abruptly.

The data structure that Delphi gathers from the inference rules and feeds to Agorai, as well as Agorai's responses, can be saved as an XML file. These messages, which contain the precise information sent to and returned from Agorai, are useful in determining whether a problem is with the data itself or has resulted from a mis-configuration (such as in the business rules).

To save these messages to an XML file, in the `delphi.properties` file set `engine.record.internals=true` and specify a complete path and directory name in `engine.record.directory`. (See “Settings for `delphi.properties`” on page 4-3 for more information.) Changes to these settings apply when the worker processes or the RMI server are restarted.

The `stderr` stream, if redirected to a log file, can also yield information about the cause of an exit and whether or not it involved `worker.lifetime`.

Restarting a Run

If some optimizations fail during the model run, you should correct any problems that affected the job and then re-execute the parts that had previously failed. Generate an error work queue, which contains the chunks for which one or more items or pricing groups reports a failure. The chunks themselves contain only those items or pricing groups that have failed. Run **generateErrorWorkQueue.sh** in order to mark these chunks as available for processing again. Then restart the model run as normal.

Performance Considerations

The items in a batch run are grouped into chunks, which are processed together. This design improves performance; however, if an item fails because of a programming or configuration error, then the failure affects the processing of the entire chunk. This situation can be addressed as follows.

Configuration

Three parameters in **job.properties** affect this issue: **chunk.sizes**, **chunk.tryLimit**, and **worker.lifetime**. These parameters are discussed earlier in this chapter. In most cases, the default values for these properties are adequate.

Automatic Restart

Worker processes that terminate before completion are automatically restarted via the **runChunker.sh** script. It restarts processes that have exited with a status *other than 0* (success) or 1 (unrecoverable failure). This convention should be followed if other custom scripts are used.

Stopping Jobs

Use **closeCurrentJob.sh**, described earlier in this chapter, to stop all worker processes. A new batch job can be started before the old one has completely stopped.

The **kill** and **killall** commands cannot be used to stop worker processes.

Worker Restart Messages

A worker start-up message that displays at the start of a run is a normal occurrence. A worker start-up message during a run indicates that a failure has occurred.

Worker Time-outs

Worker processes detect items whose processing is taking longer than expected. In such a case, a message will be displayed indicating that the worker process has timed out and is being restarted to process the remaining items.

Problem Analysis

The failure of an item does not necessarily indicate that the entire run is bad; however, the run may take longer to complete.

To determine how much of the run has completed, use **getCurrentJobStatus.sh**, which is described earlier in this chapter. The command prints the percentage of the job that is complete and the amount of time that has elapsed. This information can be used to project the completion time for the run.

Failure Diagnosis

To determine what has gone wrong with a run that has completed, do the following:

1. Locate an item that has a status of *missing* (which indicates that the item has not been processed) using the following query:

```
select *
from item_status_tbl t, item_status_labels_tbl l
where t.status_id = l.status_id and l.status_desc = 'open'
```

2. To obtain a description of the item from ITEM_DATA, use the following query:

```
select *
from item_data
where item_id in (list from above query)
```

3. Capture the XML file for the item and analyze.

Job Controller

When a batch job is terminated, any worker processes that are working on that job should stop updating it. This is necessary because, if a new job is started and new batch workers are created, then the updates should apply to the new job rather than the job that has just been terminated. It is possible that a worker from an old job can live long enough to save changes into a new job, which is a bad outcome.

Performance

Production performance can vary, depending on a specific client customization.

To identify performance problems:

1. Measure performance. Determine whether the database hardware is saturated. It should be close to 100% CPU utilization. If it is not, worker processes can be added to increase throughput.
2. If CPU utilization is at 100% and the batch process cannot be completed within the production window, then verify that the database server (hardware and software) is configured correctly.
3. If the database is configured correctly, determine which Inference Rule is taking the most time by logging into the database server as administrator and examining the execution profile. An IR that is dominating the execution profile may need to be reconfigured.
4. The strategy used to query the database can be configured for an individual IR. For more information, see the Inference Rule chapter in the *Clearance Optimization Engine Configuration Guide*.
5. The chunk size setting in job.properties can be modified. This is discussed earlier in this chapter.

Sendback Files

Sendbacks are used to query the COE database and extract the forecast and markdown recommendations for all eligible items. Three sendback files are generated that contain the data to be exported. The sendback file contains information about changes made via the service user interface. The file is the mechanism for transmitting the updated markdown information to the customer. The content of the sendback file is determined by the SQL query.

The schedule for generating and transmitting a sendback file is determined by the needs of the business. Individual retailers may require sendback files at regular intervals during the week or may even require daily sendback files. The script to automate the sendback process should be designed to manage the schedule.

The default shell script, `coe-sendback.sh`, located in `$INSTALL/modules/tools/bin`, generates the following three sendback files in the directory specified as an input parameter in the shell script.

- `forecast_activites_sendback.txt`
- `forecast_summaries_sendback.txt`
- `markdown_activities_sendback.txt`

The following three default sendback tags are created in `p4p-gui-config.xml`:

- `forecast-summ`. This tag is used to generate the forecast summary file by querying the `f_forecast_summaries pl/sql` function. The user can select the full set or a subset of the columns returned by the function.
- `forecast-act`. This tag is used to generate the forecast activity file by querying the `f_forecast_activities pl/sql` function. the user can select the full set or a subset of the columns returned by the function.
- `markdown-act`. This tag is used to generate the markdown activity file by querying the `f_markdown_activities pl/sql` function. The user can select the full set or a subset of the columns returned by this function.

Sendback File Example

The following example shows the generation of a sendback file with a typical weekly schedule, called the markdown cycle:

Only one sendback file is included in this example; however, retailers may require the generation of more than one sendback file as part of their standard schedule.

To generate a sendback file, you must:

- write one or more SQL queries against the database. A query should specify the name (type) of the sendback file, line ending, file delimiter, and information to be included in the sendback file, such as item, location, value of the new price after markdown, and date of price change. Edit the `p4pgui-config.xml` file in the configuration root directory to include the necessary queries

The following sample query generates information about outdates:

```
<sendback-query name="pl-outdates"
line-endings="unix" result-delimiter="|" "><![CDATA
[select item_id, modified_out_of_stock_date from
p4p_items where modified_out_of_stock_date is not
null]]></sendback-query>
```

- edit the property, `p4pgui.sendback.dir = pathname` in the `configuration_root/p4pgui/config.properties` file to specify the destination of the generated sendback file.
- create a script to automate the scheduled weekly generation of the sendback file that includes the necessary Admin commands.

Automating COE Processes

The following COE processes occur regularly. Most of these processes consist of a sequence of steps. These processes may be suited to scripting/automation and scheduling using an enterprise scheduler. Some processes, such as the standard load and the model run, may benefit from a granular, step-wise process in which each step

returns an exit code upon completion. Such a design can help with troubleshooting and recovery.

- **Standard Load.** The service provides two scripts that stage, transform, and load data into the target database tables in the service database. See [Chapter 3, "Standard Load"](#) for details.
- **Model Run.** This process takes the raw input data from the client, runs the data through the forecasting and Calculation Engine, and writes the results to database tables that are read by the service. This process is discussed in detail in this chapter.
- **Sendback Generation.** Sendback files are scheduled according to a client's business needs. Sendback generation is discussed in detail in this chapter.

In addition to these standard processes, most COE implementations include customized processes that are tailored to specific customer requirements. The most common of these involve custom sendback feeds in which a specific file or set of files must be generated in order to feed data to another system.

Clearance Optimization Engine Tools

This chapter contains the following:

- Clearance Optimization Engine Admin Commands
 - `disableLogin`
 - `enableLogin`
 - `generateSendback`
 - `listSendbackTypes`

Clearance Optimization Engine Admin Commands

COE Admin commands address functions used in model runs and in managing the service. These commands can be used in scripts to automate the weekly batch process.

The PriceAdmin utility requires that you set up an user account with the PRICE_ADMIN_USER role, and then set up an alias in the password store for the application.

Note: By default, the User Management Bulk Loader script automatically adds a price_admin user account (with the same password) associated to the PRICE_ADMIN_USER role. You can choose to use this user account for the PriceAdmin utility.

For more information on setting up aliases for the user accounts mentioned above, see the section *Setting Up a Password Store for the Application Installation* in the *Oracle Retail Clearance Optimization Engine Installation Guide*.

The commands require the following:

- Java Version
 - See the Application Server Requirements section of the Clearance Optimization Engine Installation Guide.
- Client-side Library referenced by a command
 - For WebLogic, use **PriceAdmin.jar**
- For the following commands (`generateSendback`, `listSendbackTypes`, `disableLogin`, and `enableLogin`) use http with either service server.

You should invoke the commands from **PriceAdmin.jar** via **com.profitlogic.adm.price.PriceAdmin**. For example:

Here is an example of a WebLogic command to generate a sendback file:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar com.profitlogic.adm.price.PriceAdmin generateSendback -s REMOTE_URL -t SENDBACK_TYPE -o OUTPUT_FILE -a PRICEADMIN_ALIAS -p PATH_TO_TRUSTSTORE -k TRUSTSTORE_ALIAS
```

In the example above,

- <WebLogic_Home> is the location where the WebLogic Server is installed.
- <install_dir> is the location where the COE application is installed.
- In order to get user credentials from the wallet file, the retail-public-security-api.jar file is included in classpath.
- -Dcsm.home must point to the location of wallet file.
- REMOTE_URL is the additional protocol information you can use based on whether you send the request using SSL or non SSL. For example, if the server is enabled with only HTTPS, you must specify https://<host URL>:<PORT>.
- PRICEADMIN_ALIAS is the alias name set up for the user account associated with the PriceAdmin utility.
- PATH_TO_TRUSTSTORE is the location to the trust store that contains certificates a client can trust from servers. This location can point to a ".jks" Java Key Store or a ".pem" base64 encoded certificate.
- TRUSTSTORE_ALIAS is the alias name set up for the trust store. To access a client's truststore, you must provide the password of the trust store file. To maintain security, it is recommended that the truststore password is saved in the wallet file. You then specify the truststore alias name to PriceAdmin utility.

Note: For more information on setting up identity and trust keystores, refer to the *Oracle Retail Clearance Optimization Engine Installation Guide*.

You can access help on each command by using ? or --help. For example, enter enableLogin -?.

disableLogin

Description: The **disableLogin** command prevents all users with the exception of the System Administrator from logging into the service.

Syntax:

For SSL implementation:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar com.profitlogic.adm.price.PriceAdmin disableLogin -s <server url> [-v] -a ${PRICEADMIN_ALIAS} -p ${PATH_TO_TRUSTSTORE} -k ${TRUSTSTORE_ALIAS}
```

For non-SSL implementation:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar com.profitlogic.adm.price.PriceAdmin disableLogin -s <server url> [-v]
```

```
-a ${PRICEADMIN_ALIAS}
```

Arguments:

```
-s, --server <server url>    the url of the remote service server
-v, --verbose                 displays logging messages as
                              command executes
```

Return Values: The command returns 0 if it is successful. The command returns a value other than 0 if it fails.

enableLogin

Description: The **enableLogin** command allows all users to log into the service.

Syntax:

For SSL implementation:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar com.profitlogic.adm.price.PriceAdmin enableLogin -s <server url> [-v] -a ${PRICEADMIN_ALIAS} -p ${PATH_TO_TRUSTSTORE} -k ${TRUSTSTORE_ALIAS}
```

For non-SSL implementation:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar com.profitlogic.adm.price.PriceAdmin enableLogin -s <server url> [-v] -a ${PRICEADMIN_ALIAS}
```

Arguments:

```
-s, --server <server url>    the url of the remote service server
-v, --verbose                 displays logging message as
                              command executes
```

Return Values: The command returns 0 if it is successful. The command returns a value other than 0 if it fails.

generateSendback

Description: The **generateSendback** command creates a file containing data for import to an ERP system.

Syntax:

For SSL implementation:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar com.profitlogic.adm.price.PriceAdmin generateSendback -t client-markdowns-daily -o filename.txt -a ${PRICEADMIN_ALIAS} -p ${PATH_TO_TRUSTSTORE} -k ${TRUSTSTORE_ALIAS}
```

For non-SSL implementation:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_
```

```
dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the
password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar
com.profitlogic.adm.price.PriceAdmin generateSendback -t client-markdowns-daily -o
filename.txt -a ${PRICEADMIN_ALIAS}
```

Arguments:

- | | |
|--|--|
| <code>-t, --type<sendback type></code> | the type of sendback file as provided by the <code>listSendbackTypes</code> command. |
| <code>-o, --output <filename></code> | the directory path and filename where the sendback information should be written. |
| <code>-s, --server <server url></code> | the url of the remote application server |
| <code>-v, --verbose</code> | displays logging messages as command executes |

Return Values: The command returns 0 if it is successful. The command returns a value other than 0 if it fails.

listSendbackTypes

Description: The `listSendbackTypes` command provides a list of the types of sendback available.

Syntax:

For SSL implementation:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_
dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the
password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar
com.profitlogic.adm.price.PriceAdmin listSendbackTypes -s <server url> [-v]
-a ${PRICEADMIN_ALIAS} -p ${PATH_TO_TRUSTSTORE} -k ${TRUSTSTORE_ALIAS}
```

For non-SSL implementation:

```
java -cp <WebLogic_Home>/wlserver_10.3/server/lib/wlclient.jar;<install_
dir>/CSM/lib/retail-public-security-api.jar; -Dcsm.home=<location where the
password store is installed>;<install_dir>/modules/tools/lib/PriceAdmin.jar
com.profitlogic.adm.price.PriceAdmin listSendbackTypes -s <server url> [-v]
-a ${PRICEADMIN_ALIAS}
```

Arguments:

- | | |
|--|---|
| <code>-s, --server <server url></code> | the url of the remote service server |
| <code>-v, --verbose</code> | displays logging messages as command executes |

Return Values: The command returns 0 if it is successful. The command returns a value other than 0 if it fails.

Output: The command provides a list of the available sendback types.

Troubleshooting

This chapter contains the following:

- [Assessing Optimization Run Problems](#)
- [Guidelines for Fixing Problems](#)
- [Diagnostic Messages](#)
- [FAQs](#)
- [Other Troubleshooting Tips](#)

Assessing Optimization Run Problems

Problems can occur at any point in the run process. Some errors will prevent the run from completing and others will not. Clearance Optimization Engine provides a report that contains two levels of error messages. this report can be accessed via `runReport.sh`.

Stoplight Summary

The Stoplight Summary section of the report provides a count of all errors, categorized by the level of severity of the error. The red category indicates system or configuration errors that must be fixed. The yellow category includes errors that result from missing data or a possible mis-configuration of the application. The green category indicates no errors. A run can be considered successful if there are no errors in the red category.

Outcome Messages

The Message Breakdown section of the report lists the errors in the order of severity and provides a count of the number of items affected. The outcome messages are categorized according to the following criteria:

- System errors are caused by conditions that should not occur in a properly configured system. These conditions include system-level problems, application inconsistencies, mis-configurations, communication errors, time-outs, and unrecoverable data failures. Any exception with a severity of Fatal is automatically included here. All System errors are included in the red category of the Stoplight Summary and should be immediately corrected.
- Model Configuration errors indicate that the configuration of the model is incomplete or contains errors/inconsistencies. Information supplied during the configuration, such as optimization parameters or stochastic samples, may be missing, incomplete, or invalid.

Errors may also have arisen during the customization of the Inference Rules. All Model Configuration errors are included in the red category of the Stoplight Summary and should be immediately corrected.

- Item Data errors indicate missing or inaccessible retailer data. Either the data is missing, a problem occurred in loading the data, or the data is inaccessible because of a problem with the inference rules.
- Inactivity errors indicate that there is not enough historical information to drive the model as it is currently configured.
- Error indicates problems that are not categorized.
- Markdown Blocked messages indicate that a markdown was not permitted on the effective date because of business rules, promotions, or other factors. A markdown at a later date may have been recommended. This information comes from the inference rules.
- Not Recommended messages indicate that a markdown was possible on the effective date, but it was not recommended. Based on the history, model configuration, and business rules, the application determined that revenue would be maximized by leaving the current price unchanged for at least one more week. This outcome typically occurs because the next markdown price available on the price ladder is lower than the optimal markdown.
- Warning messages indicate a general condition that is less severe than an error and are provided to flag a condition of note, such as a price above the full price.
- Information messages provide general diagnostic information.

Modifying Optimization Run Error Messages

You can change the text of specific error messages that are produced by the Calculation Engine during the run.

The default error messages are located in the file, `config/suite/resources/EngineResources.properties`. You can create a file, also called `EngineResources.properties` that contains the changed text only. This file should be located in either `config/suite/environment/resources` or in `config/suite/client/resources`. Any messages in the `EngineResources.properties` file in either of these two subdirectories will override the default message text.

Guidelines for Fixing Problems

Here are some guidelines for fixing the problems you have diagnosed.

- Correct system errors first.
- Both Model Configuration errors and Yellow-level errors can cause data problems. If the problem is the result of a mis-configuration, you may want to compare the configuration settings to the original, default settings. When making changes to the configuration, use a systematic, incremental approach and record the effect of any configuration changes.
- Yellow-level messages may indicate data problems or may be legitimate. Data may be missing or invalid. Alternatively, an error may have occurred during the run.
- Note changes in the number of error messages from week to week. Significant changes may indicate a problem.
- When analyzing data problems, consider the following causes:

- Problems loading the data
- Data missing from database tables
- A mis-configuration of the inference rules that prevents data from being visible
- Business rule parameter changes

Diagnostic Messages

Table 6–1 COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
activityDataNotBuilt	Could not build ActivityData for item.	Error	Data Access layer	Model misconfiguration
alreadyInClearance Already in clearance	A markdown is not possible on the effective date because the item is already in clearance, meaning a clearance markdown has already occurred.	Blocked	Calculation Engine	This sort of clearance is from specific client definition, and depends on how the client is configured.
badCollectionPricing Value Invalid collectionPricing valueInvalid Collection Pricing rule value: <val>	Agorai uses the collectionPricing value to determine the pricing interdependencies when marking down items in the pricing group. There are three supported values: "MarkdownTogether" (item may be marked down to different prices), "PriceTogether" (items must have same price), or "PercentOffTogether" (items must be the same percentage of the full price).	Model Conf	Calculation Engine	This is likely an error in Didyma customization or data in the business rules table.Should not occur in properly customized system.
badDemandStrategy Invalid Demand Strategy Value:	Agorai's heuristic model uses the demandStrategy provided to it to define how it is to use recent activity data to determine demand. It must be one of the following values: "Average", "Maximum", "TrimmedMean", "TrimmedMinMean".	Model Conf	Calculation Engine	Model configuration error.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
badDispatch Error dispatching to Agorai, details: <details>	This message reports problems interfacing with Agorai - unable to load Agorai, bad Agorai input/output, associated exceptions.	System	Data Access Layer	The path to the AgoraiJNI.so file is incorrect in the job.properties file, or the AgoraiJNI.so file is missing or inaccessible, or the AgoraiJNI.so file could not be loaded because the operating system is not configured properly.
badInWarehouse Count Number of In Warehouse quantities doesn't match size of historical Sales data	The number of historical "in warehouse quantity" reports provided to Agorai is different from the number of historical sales.All the historical arrays passed to Agorai must be the same size.	Model Conf	Calculation Engine	Missing historical data not properly handled by Didyma; error in Didyma customization.Should not occur in properly customized system.
badLastStoreCount Last week of historical activity does not have a good Store Count	The system requires a positive store count for the last week. Historical sales are normalized using store counts, and we need a proper value here to forecast forward.	Model Conf	Calculation Engine	Lack of good recent data, or error in Didyma customization.
badOnHandCount Number of On Hand quantities doesn't match size of historical Sales data	The number of historical "on hand quantity" reports provided to Agorai is different from the number of historical sales.All the historical arrays passed to Agorai must be the same size.	Model Conf	Calculation Engine	Missing historical data not properly handled by Didyma; error in Didyma customization.Should not occur in properly customized system.
badOnOrderCount Number of On Order quantities doesn't match size of historical Sales data	The number of historical "on order quantity" reports provided to Agorai is different from the number of historical sales.All the historical arrays passed to Agorai must be the same size.	Model Conf	Calculation Engine	Missing historical data not properly handled by Didyma; error in Didyma customization. Should not occur in properly customized system.
badPastTicketPrice Count Number of Past Ticket Prices doesn't match size of historical Sales data	The number of historical "past ticket price" reports provided to Agorai is different from the number of historical sales.All the historical arrays passed to Agorai must be the same size.	Model Conf	Calculation Engine	Missing historical data not properly handled by Didyma; error in Didyma customization.Should not occur in properly customized system.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
badPriceCount Number of sales different from the number of pricesNumber of Average Sales Prices doesn't match size of historical Sales data	The number of historical "average sales price" reports provided to Agorai is different from the number of sales reports.All the historical arrays passed to Agorai must be the same size.	Model Conf	Calculation Engine	Missing historical data not properly handled by Didyma; error in Didyma customization.Should not occur in properly customized system.
badPriceForHeuristic Price less than or equal to 0 - too small for the Heuristic modelBad Price for heuristic model: <val>	The forecasting engine detected an invalid price.	Model Conf	Calculation Engine	You probably won't see this; it would be caught by an earlier validation.
badPriceInterp Price Interpretation out of range: <val>	Historical, promo, and price ladder prices provided to Agorai each have an interpretation to indicate the nature of the price: markdown, promo, and so on. This value is out of range.	Model Conf	Calculation Engine	Bug in Didyma or Didyma customization. Bad data not properly screened by Didyma.
badSeasonality Seasonality too small or negative: <val>	A seasonality value provided to Agorai is less than a certain threshold value.	Model Conf	Calculation Engine	This is likely a model misconfiguration.
BadSeasonalityFor Heuristic Seasonality less than or equal to 0 -- too small for Heuristic model.Bad Seasonality value for heuristic model: <val>	The forecasting engine detected an invalid seasonality value.	Model Conf	Calculation Engine	You probably won't see this; it would be caught by an earlier validation.
badStoreCountCount Number of Store Count quantities doesn't match size of historical Sales data	The number of historical "store count" reports provided to Agorai is different from the number of historical sales.All the historical arrays passed to Agorai must be the same size.	Model Conf	Calculation Engine	Missing historical data not properly handled by Didyma; error in Didyma customization.
bayesianDataNotBuilt	Could not build BayesianData for item.	Error	Data Access Layer	Model misconfiguration.
beforeEffectiveDate Effective Date inconsistency	There is inconsistent data within Agorai, where somehow the effective date is considered out of range.	Model Conf	Calculation Engine	This represents an inconsistency of information within Agorai. Most likely grossly bad data or an Agorai defect.
bizPolicyNotBuilt	Could not build BusinessPolicy for item.	Error	Data Access Layer	Model misconfiguration.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
businessRuleBlocks Markdown prohibited this week due to Business Rule	A business rule prohibits a markdown this week.	Blocked	Data Access Layer	This is defined in the inference_rules.
clearanceNot Permitted Model not configured for Clearance markdowns	Model is not configured to permit clearance markdowns. Optional "clearance" tags in the request's business policy section trigger this.	Model Conf	Calculation Engine	Could result from an inconsistency in business rules. Probably clearance rule information was provided without a clearance price ladder.
collectionBuild Error building Optimization Request for collection	More information accompanies this to provide detail.	Error	Data Access Layer	Look at the other errors for more info.
collectionItemErrors Collection contains items with errors	This is put on the pricing group when errors are found in one or more of its items. It will show for the items without errors as well, to better indicate what occurred.	Error	Calculation Engine	Refer to the item errors to see what occurred.
databaseErrorData	Didyma encountered database connectivity problems while trying to create Agorai input.	Model Conf	Data Access Layer	Configuration/customizat ion error or worse.
dateInvalidDay Date Error - Invalid day: <val>	Problem with the day portion of a date value.	Model Conf	Calculation Engine	Probably bad data from Didyma, perhaps due to data or customization problems.
dateInvalidDayOf Week Date Error - Invalid day of week: <val>	Problem with a day of week value.	Model Conf	Calculation Engine	Probably bad data from Didyma, perhaps due to data or customization problems.
dateInvalidMonth Date Error - Invalid month: <val>	Problem with the month portion of a date value.	Model Conf	Calculation Engine	Probably bad data from Didyma, perhaps due to data or customization problems.
dateInvalidWeek Number Date Error - Invalid week number: <val>	Problem with a week number value.	Model Conf	Calculation Engine	Probably bad data from Didyma, perhaps due to data or customization problems.
dateInvalidYear Date Error - Invalid year: <val>	Problem with the year portion of a date value.	Model Conf	Calculation Engine	Probably bad data from Didyma, perhaps due to data or customization problems.
DistributionDoesNot Sample0First Stochastic Sample distribution does not sample 0 first	The first point of the stochastic sample provided to Agorai must have a multiplier of 0.	Model Conf	Calculation Engine	

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
duplicateTag ERROR: duplicate tag ({0}) at {1}).	Problem parsing the XML.	Model Conf	Calculation Engine	Didyma probably left something malformed. Perhaps due to data or customization problems, or mixed component versions.
EffectiveDateMust PrecedeOutDate Out Date precedes Effective Date	The out date for this item has already passed or will pass before our recommendations could take effect.	Item Data	Calculation Engine	Can occur normally. An item with an old out date was still selected by the eligibility query (which defines the items/pricing groups to be included in a run). This could be bad data or an error in database configuration.
effectiveDatesDiffer Effective Dates can't differ within collection	All items in a pricing group must have the same effective date. In fact, the effective date should be the same for everything in an entire run.	Model Conf	Calculation Engine	Business rule configuration or Didyma customization error.
elementContentError Error in content of XML element (<tag> at <pos>	Problem parsing the XML. Perhaps a value is the wrong type of missing.	Model Conf	Calculation Engine	Didyma probably left something malformed. Perhaps due to data or customization problems.
emptySeasonalities Empty seasonalitiesNo Seasonality values provided	No seasonality values were provided to Agorai.	Model Conf	Calculation Engine	Improper population of seasonality data in the database or an error in Didyma customization.
errorOpeningLogFile Error opening log file: <file>	Agorai could not open its log file.	System	Calculation Engine	Problem in Agorai's configuration, or a problem in the file system to which logs are directed.
ErrorReadingElement Content Error reading content of XML element (<tag>) at <pos>	Problem parsing the XML. Usually a value is of the wrong type or missing.	Model Conf	Calculation Engine	Didyma provided a value of the wrong type, or it was missing. Perhaps due to data or customization problems.
ErrorWritingElement Content Error writing content of XML element (<tag>)	Agorai is having trouble writing a value in its results. Indicates a major malfunction.	System	Calculation Engine	Probably an Agorai defect.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
histPeriodNotPositive Historical Period must be positiveDays Per Historical Interval value is not positive	The daysPerInterval value is not positive. This is the number of days represented by each period of historical data provided to Agorai. It is usually 7 days. Elsewhere where we refer to "weeks of activity" we are usually referring to intervals of this number of days.	Model Conf	Calculation Engine	This is likely an error in Didyma customization or data in the business rules table. Should not occur in properly customized system.
internal The message varies depending on what is found. Many such messages are generated by the operating system and passed through unchanged.	This message reports unexpected internal errors that really should not occur.	System	Calculation Engine	This indicates an unexpected situation. It could be a software bug, or it could be that the software is operating outside of its expected parameters in some way that isn't being rigorously validated. In any case, this situation should be reported to Customer Support.
invalid Validation error	Appears with other errors that occur during validation. That is, this message groups accumulated validation errors.	Error	Calculation Engine	See the associated messages for the details.
InvalidClearanceSell through Invalid Clearance Sell-Through rule value: <val>	The clearance sellthrough value provided to Agorai must be between 0 and 1. This is the optional sell-through ratio that triggers a clearance markdown.	Model Conf	Calculation Engine	Business rule configuration or Didyma customization error.
invalidClearanceLock out Invalid Clearance Lockout rule value: <val>	The clearance lockout value provided to Agorai must be >= 0. This is the optional number of days before the out date where a clearance markdown is forced.	Model Conf	Calculation Engine	Business rule configuration or Didyma customization error.
InvalidCumulative TotalUnitsSold Invalid cumulative total units soldSales data contains invalid cumulative total units sold	SalesData contains an invalid total unit sold value.	Item Data	Calculation Engine	Likely a model configuration error.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
invalidDemandMultiplier Invalid demand multiplier. Check stochastic demand uncertainty and sample multipliers.	Calculation of the demand multiplier involves the product of the demand uncertainty and a stochastic sample's multiplier value. In this case it yielded an number <=0.	Model Conf	Calculation Engine	Most likely a misconfiguration of the model.Should not occur in properly customized system.
invalidInterpInPriceLadder Price Interpretation not appropriate for Price Ladder: <val>	A price ladder supplied to Agorai contains at least one price with an interpretation other than 1 (markdown start) or 6 (clearance start).	Model Conf	Calculation Engine	Likely a model configuration error.
InvalidInterpretationForPromo Invalid Price Interpretation for Promo: <val>	Promo information provided to Agorai contains prices without a promo interpretation (2, 3, or 9.)	Model Conf	Calculation Engine	Likely a model configuration error.
invalidInventoryTarget Invalid Target Inventory value: <val>	The inventory target value provided to Agorai must be >= 0. This is the desired inventory at the target date.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.
invalidMaxAbsolutePrice Invalid Maximum Absolute Markdown Price: <val>	The max absolute price value provided to Agorai must be between 0 and 1.A markdown recommendation may not yield a price higher than this. A price relative to ticketPrice.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.
InvalidMaxFirstMarkdownPercent Invalid Maximum First Markdown Percentage: <val>	The maximum first markdown percentage value provided to Agorai must be between 0 and 1.This is the maximum markdown percentage (0 to 1) for the first markdown, as compared to the current price.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.
InvalidMaxNumberOfMarkdowns Invalid Maximum Number of Markdowns: <val>	The max number of markdowns value provided to Agorai must be > 0.Maximum number of markdowns permitted during item's entire life cycle. This includes markdowns that already occurred in history.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
invalidMaxPrice Invalid Maximum Absolute Markdown Price: <val>	Value supplied for maxAbsolutePrice was not from 0 to 1.A markdown recommendation may not yield a price higher than this. A price relative to ticketPrice.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.
InvalidMaxSubsequen tMarkdownPercent Invalid Maximum Subsequent Markdown Percentage: <val>	The maximum subsequent markdown percentage value provided to Agorai must be between 0 and 1.Maximum markdown percentage (0 to 1) for all markdowns after the first, as compared to the current price.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.
InvalidMinFirstMark downPercent Invalid Minimum First Markdown Percentage: <val>	The minimum first markdown percentage value provided to Agorai must be between 0 and 1.This is the minimum markdown percentage (0 to 1) allowed for the first markdown, as compared to the current price.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.
InvalidMinMarkdown Interval Invalid Min Markdown Interval value: <val>	The minMarkdownInterval value provided to Agorai was <= 0.	Model Conf	Calculation Engine	
InvalidMinMarkdown Intervals Invalid dated Min Markdown Interval value: <val>	A (date-specific) minMarkdownIntervals value provided to Agorai was <= 0.	Model Conf	Calculation Engine	
InvalidMinmarkdown IntervalsDates Invalid dates for Min Markdown Intervals: <start> > <end>	A improper date range was supplied in minMarkdownIntervals.	Model Conf	Calculation Engine	
InvalidMinMarkdown PercentOfFullPrice Invalid Minimum Markdown Percentage of Full Price: <val>	The minimum markdown percentage of full price value provided to Agorai must be between 0 and 1.Minimum step of each markdown as a percentage (0-1) of the full price.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
InvalidMinSubsequentMarkdownPercent Invalid Minimum Subsequent Markdown Percentage: <val>	The minimum subsequent markdown percentage value provided to Agorai must be between 0 and 1. Minimum markdown percentage (0 to 1) for all markdowns after the first, as compared to the current price.	Model Conf	Calculation Engine	Business rule configuration or model configuration error.
InvalidNumberOfUnitsOnHand Sales data contains invalid number of units on hand: <val>	SalesData contains an invalid unit on hand value.	Item Data	Calculation Engine	Didyma customization error or Agorai defect.
invalidObjectType Invalid Object Type: <val>	Problem identifying objects for status messages.	System	Calculation Engine	Probably an internal problem.
invalidPriceInterpretation Price Interpretation out of range: <val>	Same as badPriceInterp, but in slightly different code. Historical, promo, and price ladder prices provided to Agorai each have an interpretation to indicate the nature of the price: markdown, promo, and so on. This value is out of range.	Model Conf	Calculation Engine	Defect in model configuration.
invalidRelativePrice Invalid relative price	A price is less than or equal to zero and not marked as "Bad data".	Model Conf	Calculation Engine	Be suspicious. Bad price data or error in model configuration.
invalidSalesInterpretation Sales data contains invalid Interpretation: <val>	SalesData contains an invalid interpretation value.	Model Conf	Calculation Engine	Model configuration error.
invalidSeasonalityLength Improper number of Seasonality values provided: <val> days	Agorai needs to be supplied with either 52 or 53 weeks of seasonality. This is by interface contract.	Model Conf	Calculation Engine	Seasonality data or model configuration, most likely the latter.
invalidSeverity Invalid Severity: <val>	Problem identifying severity (status level) for status messages.	System	Calculation Engine	Probably an internal problem. Should be reported to Customer Support.
invalidStoreCount Sales data contains invalid store count: <val>	SalesData contains an invalid store count value.	Item Data	Calculation Engine	Model configuration error.
invalidTicketPrice Invalid Full Price: <val>	The ticket price (full price) provided to Agorai must be ≥ 0 .	Item Data	Calculation Engine	

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
invalidTotalDollar Sales	SalesData contains an invalid total dollar sales value.	Item Data	Calculation Engine	Model configuration error.
Sales data contains invalid total-dollar sales: <val>				
itemBlocksMarkdown	At least one item in the pricing group does not permit a markdown on the effective date, therefore the pricing group as a whole can not be marked down.	Blocked	Calculation Engine	Look at the associated item messages for more information.
Item blocks markdown for collection on Effective Date				
itemBuild	More information accompanies this to provide detail.	Error	Data Access Layer	Look at the other errors for more info.
Error building Optimization Request for item				
LastSalesDataDiffers FromStartSimulation	Inconsistency in historical data.	Model Conf	Calculation Engine	Model configuration error.
End of Sales data <date> differs from Simulation Start Date <date>				
MarkdownTogether Advanced	This item in a "markdown together" pricing group would not have been marked down this week by itself, but is recommended because of the pricing group.	Warning	Calculation Engine	Can occur in normal situations.
Item recommended this week due to MarkdownTogether collection				
MarkdownTogether Delayed	This item in a "markdown together" pricing group would have been marked down, but was blocked due to the pricing group.	Not Rec	Calculation Engine	Can occur in normal situations
Item not recommended for this week due to MarkdownTogether collection				
missingMarkdown Dates	Item is missing markdown dates.	Error	Data Access Layer	Markdown date missing (not start date or out date; those are caught individually).
missingTag	Problem parsing the XML.	Model Conf	Calculation Engine	Didyma probably left something malformed. Perhaps due to data or customization problems, or mixed component versions.
XML error: Missing tag (<tag>) at <pos>				
missingTagErrors	Problem parsing the XML. This collects a number of missing tag errors.	Model Conf	Calculation Engine	Didyma probably left something malformed. Perhaps due to data or customization problems, or mixed component versions.
XML error: Missing tags				

Table 6-1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
needMoreSales Not enough historical Sales data to determine demand	This occurs when the sales history, as trimmed according to the configured demandStrategy, has fewer entries than needed, as determined by demandIntervals. (These are both configurable).	Inactivity	Calculation Engine	Can occur normally. Most likely this is sales inactivity, although it is possible the demandStrategy and/or demandIntervals are misconfigured.
NoAdditionalMark downsPermitted No additional markdowns permitted	maxNumberMarkdowns has already been reached for this item.	Blocked	Calculation Engine	Can occur in normal situations.
noCandidatePrices No candidate prices available for markdown: filtered Price Ladder is empty	The price ladder coming in to Agorai is empty. Didyma has filtered the price ladder so it contains only values below the current price and valid according to various business rules, in this case there is nothing left.	Item Data	Calculation Engine	Lack of good recent activity data, or error is Price Ladder data or configuration.
noCollectionPricing OrID	Pricing group is missing pricing group pricing or ID.	Error	Data Access Layer	Model misconfiguration.
noDataForForecast No historical Sales and Price data available to determine demand	This occurs when Agorai goes through the sales history to get the normalized demand and does not find any entries that have both "known" (not "unavailable") sales data and "valid" (not unknown) price data (average selling price).	Inactivity	Calculation Engine	Can occur normally.
noFullPrice This item has no Full Price	Didyma was unable to obtain a full price for an item.	Item Data	Data Access Layer	Some items without a full price are getting through the eligibility query. It could also be an error in Didyma customization.
noGamma This item missing Price Elasticity (gamma)	Didyma was unable to obtain a price elasticity value (gamma) for this item.	Model Conf	Data Access Layer	Model misconfiguration.
noInventory There is no inventory to clear	The last week of historical activity provided to activity has no units remaining.	Item Data	Calculation Engine	
noItemsFoundFor Collection	No items found for this pricing group.	Error	Data Access Layer	Data configuration not consistent.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
noItemsInCollection No Items in this Collection	No items in a pricing group. This represents a pricing group-mapping problem prior to Agorai.	Model Conf	Calculation Engine	Should never have been sent to Agorai. Likely a customization problem.
NoMarkdownPricesAtEffectiveDate No markdown prices available on Effective Date	There were no legal price candidates to consider for markdowns at the effective date.	Blocked	Calculation Engine	Look at current price, price ladders, business rule price restrictions.
noOutDate This item has no Out Date	Didyma was unable to obtain an out date for an item.	Item Data	Data Access Layer	Some items without an out date are getting though the eligibility query. It could also be an error in model configuration.
noPriceAtEffectiveDate No price is available on Effective Date	The model was unable to determine the price on the effective date.	Blocked	Calculation Engine	Something occurred in the simulation before the effective date that made this information unavailable.
noSampleDistribution No Stochastic Sample distribution provided	There must be at least one point in the stochastic sample supplied to Agorai.	Model Conf	Calculation Engine	
noStartDate This item has no Start Date	Didyma was unable to obtain a start date for an item.	Item Data	Data Access Layer	Some items without a start date are getting though the eligibility query. It could also be an error in model configuration.
NotEnoughForTrimmedMean Not enough clean Sales history to take a Trimmed Mean	This error occurs because the system got some normalized sales history, but there are fewer entries than required. This problem occurs only occur with the TrimmedMean demandStrategy.	Inactivity	Calculation Engine	Lack of good recent activity data., or demandIntervals/demand Strategy misconfiguration.
notEnoughForMean Not enough data to take a mean.Not enough clean Sales history to take an Average	This error occurs because the system got some normalized sales history, but there are fewer entries than required. This problem occurs only occur with the Average demandStrategy.	Inactivity	Calculation Engine	Lack of good recent activity data., or demandIntervals/demand Strategy misconfiguration.
NotEnoughForTrimmedMinMean Not enough clean Sales history to take a Trimmed Min Mean	This error occurs because the system got some normalized sales history, but there are fewer entries than required. This problem occurs only occur with the TrimmedMinMean demandStrategy.	Inactivity	Calculation Engine	Lack of good recent activity data., or demanIntervals/demand Strategy misconfiguration.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
noTicketPrice This item has no Ticket Price	Didyma was unable to obtain a ticket price for an item. (ticketPrice tag in request)	Item Data	Data Access Layer	Some items without a ticket price are getting through the eligibility query. It could also be an error in model configuration.
notInClearance Calendar Clearance markdown not permitted by Clearance Markdown Calendar	Business rules are attempting to force a rule-based clearance markdown, but the date is not available in the clearance calendar.	Blocked	Calculation Engine	
notInMarkdown Calendar Markdown not permitted by Markdown Calendar	The effective date was not included in the calendar of permitted markdown dates provided to Agorai. The date may not be in the client's markdown calendar, or may have been filtered out by Didyma due to a promo or business rule.	Blocked	Calculation Engine	Messages emitted by Didyma may provide more information.
notRecommended Markdown not recommended for this week	A markdown was possible this week, but was not deemed optimal.	Not Rec	Calculation Engine	This usually means that the price is set correctly, which is what you were hoping for! But if the item is one that "should" have gotten a markdown, then you might want to check into why it did not.
noUsefulSales Data is too dirty to deal with -- zero useful sales foundData too dirty to determine demand: zero useful sales found	Applying the demandStrategy to determine normalized sales yielded a value ≤ 0	Inactivity	Calculation Engine	Activity Data values are not adequate for the heuristic model as configured.
outDateTooFarAhead Builder Error: outDate must be within 560 days of lastDataDate Out Date cannot be more than <n> days after the Start of Simulation	This error prevents wasting time optimizing items whose out date is wildly in the future. The error occurs when the Out Date is more than 560 days after the Start of the Simulation (first forecasted day). Specifically, this refers to the outDate and startSimulationDate values provided to Agorai in markdownDates.	Item Data	Calculation Engine	Could occur normally, but is cause for suspicion. Could be missing activity data or an erroneous out date. Or an error in Didyma customization yielding same.
pastOutDate Already past Out Date	A markdown is not possible on the effective date because the out date will have already passed.	Blocked	Calculation Engine	Can occur normally.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
pastOutOfStockDate Already past Out Date	A markdown is not possible on the effective date because the out date will have already passed.	Blocked	Calculation Engine	Can occur normally
priceAboveFull A relative price is higher than the full price	This is a warning that occurs when a relative price is greater than 1, meaning it is higher than the full price.	Warning	Calculation Engine	Be suspicious. Relative prices are supplied to Agorai in many contexts: Average Sales Prices, Past Ticket Prices, Price Ladders, and Planned Promotions, This may be intrinsic to the client's data or an error in customization.
promoBlocks Markdown prohibited this week due to Promotion	A promotion prohibits a markdown this week.	Blocked	Data Access Layer	This is defined in the inference_rules.
promoStartAfterEnd Promo Start Date later than End Date: <start> > <end>	Bad promo data provided to Agorai.	Item Data	Calculation Engine	Bad data or error in model configuration.
SalesDataStartDiffers FromStartDate Date of first Sales data <date> differs from Start Date <date>	Inconsistency in historical data.	Model Conf	Calculation Engine	Bad data or error in model configuration.
sellsOutWithout Changes Sells to target without changes; Markdown not recommended	This simply means that this item or the pricing group it is in sells out to the inventory target without any new markdowns. Given this, we do not attempt any recommendations as they are deemed to be of limited utility.	Not Rec	Calculation Engine	This was introduced in 3.0 to avoid recommending markdowns that appear to be superfluous and have limited value, usually in low inventory situations.
StartDateMustPrecede SimulationStart Builder Error: startDate must precede lastSalesDataStart of Simulation cannot be before Start of historical data	These two dates provided to Agorai do not make sense together. How can the start of our historic sales activity be after the end of it? The Start Date (beginning of history provided to Agorai) is not before the Start Simulation Date (first forecasted day).	Model Conf	Calculation Engine	Bad data or model configuration error.

Table 6-1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
StartSimulationDate MustPrecedeEffective Date Builder Error: lastSalesData must precede effectiveDate Simulation Start Date cannot be after the Effective Date	These two dates provided to Agorai do not make sense together. That is, how can we have activity reports after the date our recommendations are to take effect? Specifically, inconsistent startSimulationDate and effectiveDate values have been provided to Agorai in the markdownDates section.	Item Data	Calculation Engine	Bad data or model configuration error.
stochasticDataNot Built Could not build StochasticData for item.	The data required to build a necessary forecasting feature could not be read from the database.	Error	Data Access Layer	Model misconfiguration.
ticketPriceTooLow ticket price too lowFull Price too low: <val>	The ticket price (full price) provided to Agorai in the Activity Data is less than 0.005.	Item Data	Calculation Engine	Bad data or error in Didyma customization.
tooFewSales No historical Sales data provided	There were no historical sales provided to Agorai.	Inactivity	Calculation Engine	Can occur normally.
tooManymarkdowns No additional markdowns permitted	A markdown is not permitted on the effective date because maxNumberMarkdowns has already been reached for this item.	Blocked	Calculation Engine	Can occur normally.
tooManyValidation Errors Too many validation errors	Some validation errors were suppressed because there were too many of them.	Error	Calculation Engine	Look at the other messages.
tooSoonForMark down Too soon for new markdown	The minimum markdown interval has not passed since the last markdown. See minMarkdownInterval and dated minMarkdownIntervals.	Blocked	Calculation Engine	Can occur normally.
topLevelData	This item is missing some item parameters.	Error	Data Access Layer	Something missing from ir_item_parameters.
unexpectedTag XML error: Unexpected tag (<tag>) at <pos>. Expected tag (<tag>)	Problem parsing the XML.	Model Conf	Calculation Engine	Didyma probably left something malformed. Perhaps due to data or customization problems, or mixed component versions.

Table 6–1 (Cont.) COE Diagnostic Messages

Message ID/ Message Text	Description	Outcome Category	Source	Possible Cause/Solutions
unknown_resource_ key Unknown i18n Engine Resource Key	Indicates no resource value was found for a resource key. For example, a message was generated by resource key in the Engine, but no text for it was defined in the engine resource bundle.	Model Configuration	System	May indicate a version skew with the resource.properties files, or an error is customization or localization of those files.
UnknownError ReadingElement Content Unknown error reading content of XML element (<tag> at <pos>	Problem parsing the XML. Perhaps a value is of the wrong type or missing.	Model Conf	Calculation Engine	Didyma probably left something malformed. Perhaps due to data or customization problems.
unknownTag XML error: unknown tag (<tag>) at <pos>.	Problem parsing the XML.	Model Conf	Calculation Engine	Didyma probably left something malformed. Perhaps due to data or customization problems, or mixed component versions.
version Agorai version: <buildid>	Shows the build version number of the Optimization Engine.	Informational	Calculation Engine	Not an error; for diagnostic purposes.
version Didyma version: <build>	Shows the build version number of the Data Access Layer	Informational	Data Access Layer	Not an error; for diagnostic purposes.
writeResults Didyma error writing results	This groups other errors that occurred during the Calculation Engine's Write Optimization Results step.	Error	Data Access Layer	See associated messages for more info.

FAQs

This section provides answers to frequently asked questions.

Two levels of solution are provided for each question:

- Verification can be done by anyone with the appropriate level of access to the application and its components as a way to define the scope of the problem.
- Level I support is the responsibility of someone with SQL knowledge who has access to the database tables, front end configuration files, and log files.

If additional support is required to address a problem, contact Oracle Customer Support.

A What If scenario does not make sense. What is happening?

What If is designed to provide information about an Item forecast or a Group forecast to the end-of-life. Most What If questions are actually forecast questions, such as "Why does an item's forecast show the incorrect sell through?"

Verification.

Do the following:

- Check the item's Sell Through % and other settings in the BRPM. The model is always constrained by the business rules, even if the result is that an item has inventory left over.
- Make sure the item is not already at its lowest possible price.

Level 1.

Do the following:

- Review the forecast and check to see if the model is projecting any markdowns. The absence of price changes usually means that the model is constrained from making a recommendation. Possible reasons for this include:
 - business rule conflicts such as Min MD % Off > Max MD % Off.
 - the Max MD # has been reached.
 - the markdown calendar is too sparse.
 - the price ladder is too sparse.
- If the item does not achieve its Sell Thru target with any valid pricing strategy, the model optimizes Gross Margin using a lower Sell Thru value.
- All business rules always apply, even if this means there are no possible prices left for the model to recommend. Business rule conflicts can be especially complicated in Price Group scenarios.
- When researching forecasting, take price ladder information from IR_PRICE_LADDER. Logic may be built into this view that is used to trim price ladders in order to implement complex rules.
- Markdowns are usually blocked during the last week or two of life. This could be an issue in implementations with sparse markdown calendars.
- The Min MD % Off and Max MD % Off business rules often interact poorly with sparse price ladders. This can cause problems when items have been marked down outside the system in implementations that do not use the Markdowns Taken data feed. Items remain bound by 1st Markdown rules (which can be stricter) even though the user is expecting the item to be impacted by the Subsequent Markdown rules.

Why is my Pricing Group recommendation different than the Item recommendation?

Pricing Groups provide another forecasting option by allowing an item to be forecasted along with similar items (such as other colors in the same style). Pricing groups can be powerful when used appropriately, such as at the beginning of life for a set of items that have the same expected life cycle. Confusing results can occur if pricing groups are not managed correctly.

Verification.

Do the following:

- Check the item recommendation and the pricing group recommendation.
- If both the item and the pricing group hit Sell Thru, then there is usually not a problem. Since a pricing group introduces an additional constraint to a scenario, pricing group results may be less optimal than item results. The optimal path may be different for pricing groups and items.

Level 1.

Do the following:

- Use ITEM_DATA and FORECAST_ACTIVITIES to check item and pricing group forecasts. What If only displays one of the forecasts, and both together can provide additional context.
- A pricing group receives a recommendation for all forecasted items in the same week. However, item recommendations can be staggered or at different depths. For example, if the model expects to make recommendations for two items (for \$14.99 and \$11.99, respectively) in a group in the following week, it may still make sense to make a recommendation for the group as a whole for \$13.99 for the current week.
- A shallow group recommendation and a deep item recommendation in the current week may be offset by a deeper group recommendation and a shallower item recommendation at a later date.
- Check business rules and item prices. Business rule conflicts are more common in Pricing Group scenarios. Business rules must be satisfied for all forecasted items in the group in order for a recommendation to be possible.
- Pricing groups that contain items at different prices can be caught between Min and Max rules (for example, an item at \$20.00 with a 50% Max MD and an item at \$12.99 with a 15% Min MD).
- Items with different full prices may have different minimum prices. Pricing groups cannot project recommendations past the exit date of any forecasted item. However, once the item is past its exit date, it is dropped from the group forecast.
- Check the item history in ITEM_DATA and HIST_MARKDOWNS_TBL. Items in the No Touch period will prevent the group from receiving a recommendation.

Why doesn't the forecast take my promotion into consideration?

Bad promotion data is a frequent cause of failure. Common problems with promotion data include duplicate promotions at different price points, end dates that occur before start dates, and promotions that occur in the past. From an analytical perspective, promotions can be a source of forecast inaccuracy. If a promotion is created at the last minute, the model may not have time to respond. For some items, the promotional effect can be difficult to evaluate.

Verification.

Do the following:

- If promotions block markdown recommendations, make sure that the model is correctly timing markdowns.

Level 1.

Do the following:

- Check the PLANNED_PROMOS_TBL to determine if the promotions data has been loaded correctly.
- Promotions may be entered at higher levels of the Merchandise Hierarchy. PLANNED_PROMO_MAPS_TBL maps individual items to promotions.
- Items may have multiple promotion periods and different concurrent promotion types.

- Check ITEM_DATA to determine if the promotion information has been populated. Information includes Lowest_Future_Promote_Price and Lowest_Future_Promo_Date.
- Check FORECAST_ACTIVITIES to make sure that promotions are being considered. Sales_Price should be the promotion price for full week promotions. Sales_price should be between ticket price and the promotion price for partial-week promotions.

Did I change the settings in the BRPM correctly?

The BRPM is used to manage retailer-defined business rules at defined levels. Any setting mistakes can impact the recommendations.

Verification.

Do the following:

- Make sure the entered values are correct and are for the correct attribute.
- Make sure the entered values are at the correct level in the Merchandise Hierarchy and Location Hierarchy.

Level 1.

Do the following:

- Query BRM_INSTANCE_TBL for the settings at all levels for a given attribute.
- Evaluate the actual results as soon as possible after the next model run.

Why are the No Touch periods behaving in an unexpected manner?

The No Touch rules govern the amount of time at the beginning of life during which an item is not eligible for a recommendation. This is used so that an item can produce a reasonable sales trend, so that the model does not mis-interpret a partial week of sales or a staggered flow pattern and produce poor recommendations.

No Touch rules also govern the amount of time between a markdown taking effect and an item being eligible for another recommendation.

Verification.

Do the following:

- Check the markdown number in the application. An item may not have received a markdown.
- If the locations for a single item show different markdown numbers, then the item may have been taken in some locations and is currently being recommended in others.
- Make sure the markdown's requirements are valid.
- Check the timing of previous markdown actions.

Level 1.

Do the following:

- Check HIST_MARKDOWN_TBL. If no entries exist for the most recent week, the sendback may not have functioned correctly.

My implementation of COE includes a custom weekly process, which seems to have failed. How can I confirm this?

Client-specific custom logic is configured using tables, view, and procedures that have a prefix of ISC_.

For example, *forcing* is used to highlight items that have not been taken to markdown and have not received recommendations. The status metric is populated to indicate the action. A price point may be chosen. A custom rule could be created that specified that if an item is three weeks from its exit date and only on its second markdown, for it to 75% off. The following steps are recommended if the item is not forced.

Verification.

Do the following:

- Check the logic of the Forcing logic for conditions that include time to exit date, specific cutoff dates, inventory threshold, and markdown number.

Level 1.

Do the following:

- Check ITEM_DATA to determine if the forcing requirements have been met.
- The status flag is usually configured in User_Text_*

Other Troubleshooting Tips

Here are solutions to some common issues.

String Calculations

The data type for NULL is character. All the other fields in a derivation are numbers. The application can crash when trying to perform a calculation. To avoid this situation, convert NULL from a character to a number type.

Example of Issue:

```
(DECODE (NVL (EOL_CUM_UNIT_SALES, 0) + NVL (ENDING_INVENTORY_UNITS, 0), 0, NULL,
NVL (EOL_CUM_UNIT_SALES, 0) / (NVL (EOL_CUM_UNIT_SALES, 0) + NVL (ENDING_INVENTORY_
UNITS, 0))) )
```

Example of Fix:

```
(DECODE (NVL (EOL_CUM_UNIT_SALES, 0) + NVL (ENDING_INVENTORY_UNITS, 0), 0, TO_
NUMBER (NULL), NVL (EOL_CUM_UNIT_SALES, 0) / (NVL (EOL_CUM_UNIT_SALES, 0) +
NVL (ENDING_INVENTORY_UNITS, 0))) )
```

Checking for NULL in xml Derivations

When a metric or a where clause in a report is configured, check the use of NULL.

Example of Issue:

```
CURRENT_UNITS_ON_HAND + CURRENT_UNITS_ON_ORDER
```

This will return NULL if one of the fields are NULL/blank.

Example of Fix:

```
(case when CURRENT_UNITS_ON_HAND is null then 0 end) + (case when
CURRENT_UNITS_ON_ORDER is null then 0 end)
```

This will return at least one value, if the other field is NULL/blank.

Division in an xml Derivation

Division by zero should be avoided.

Example of Issue:

```
1-CURRENT_RETAIL_PRICE / ORIGINAL_RETAIL_PRICE
```

This does not avoid a division by 0.

Example of fix:

```
case when ORIGINAL_RETAIL_PRICE <> 0 then 1-CURRENT_RETAIL_PRICE/ORIGINAL_RETAIL_PRICE end
```

This ensures there is no division by 0.

