Infor CloudSuite Industrial Forecasting User Guide

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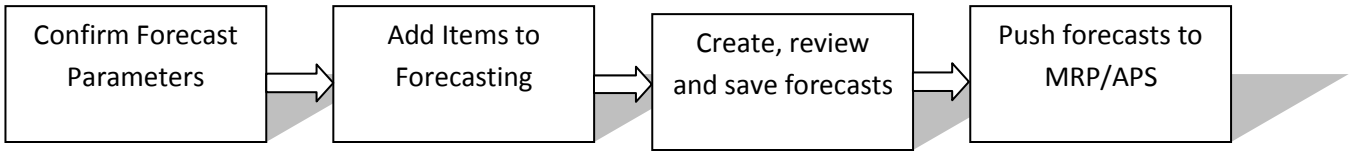
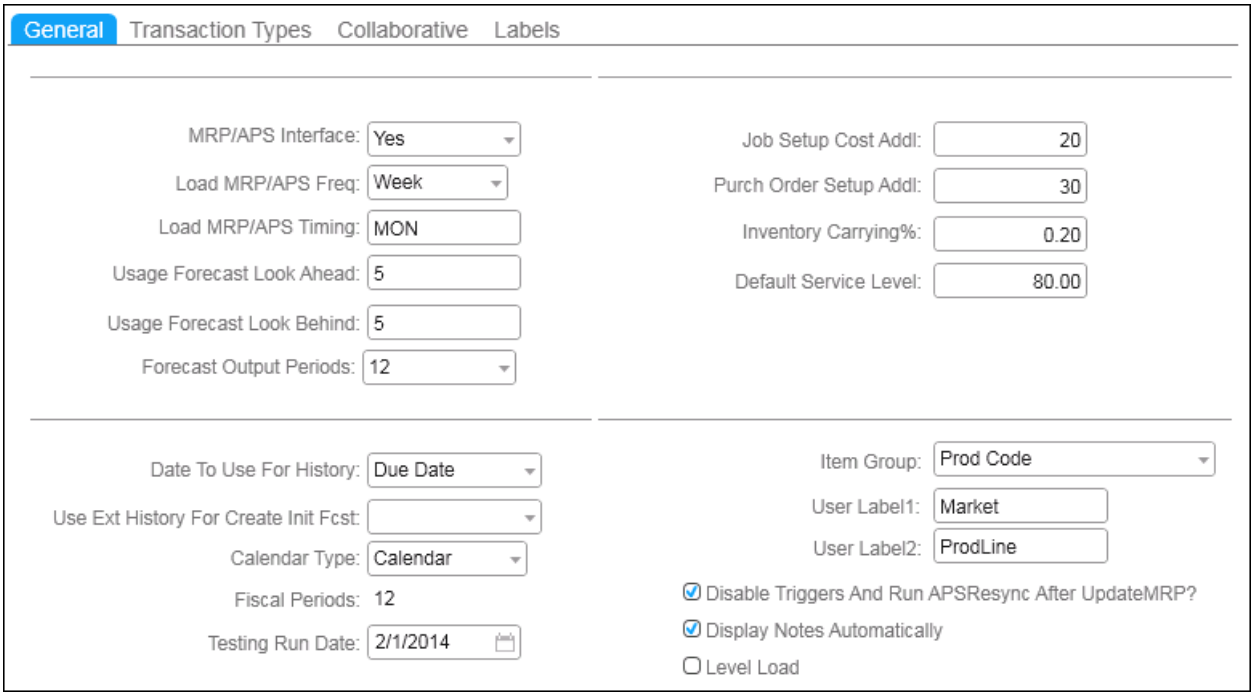
SECTION 1 – Forecasting Quick Start Guide

Overview of Quick Start Steps



Confirm Forecast Parameters

The Accounting Periods form must be setup for at least the last four years, the current year, and next year. Also be sure the manufacturing calendar in the MRP/APS Planning Parameters form is setup to include this year and next year. Then confirm the forecasting Parameters per below.



Key Fields to Consider for Quick Start:

MRP/APS Interface: "Yes" allows Forecasting to update the MRP/APS planning system

Load MRP/APS Frequency: "Week" breaks the Monthly forecasts into weeks when loaded into MRP/APS

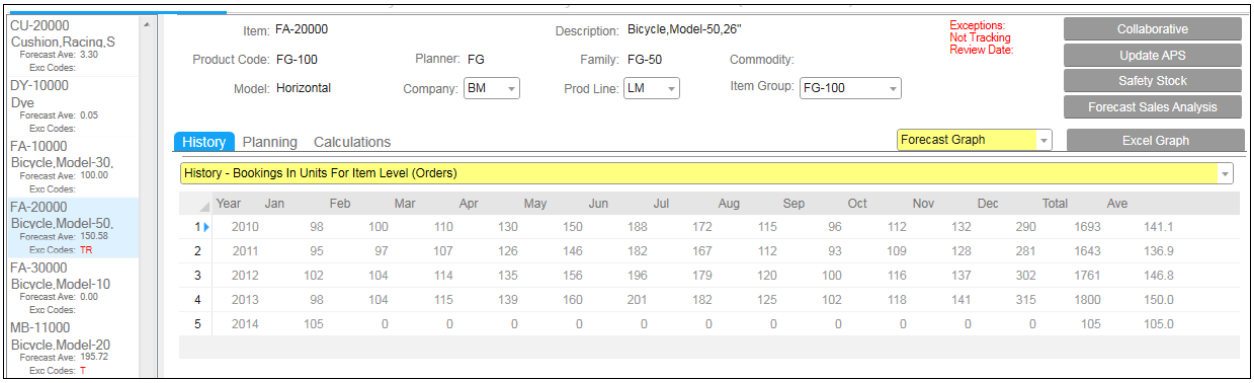
Load MRP/APS Timing: "Mon" loads the forecasts to be due on Monday of each week
(For "Month" specify the day of the month)

Date to Use for History: "Due Date" captures the history based on the due date of customer order lines

Testing Run Date: "Blank". Can be used to freeze what "todays" date is.

Add Items to Forecasting

Add a few items to Forecasting that have been sold on customer orders over the last few years.



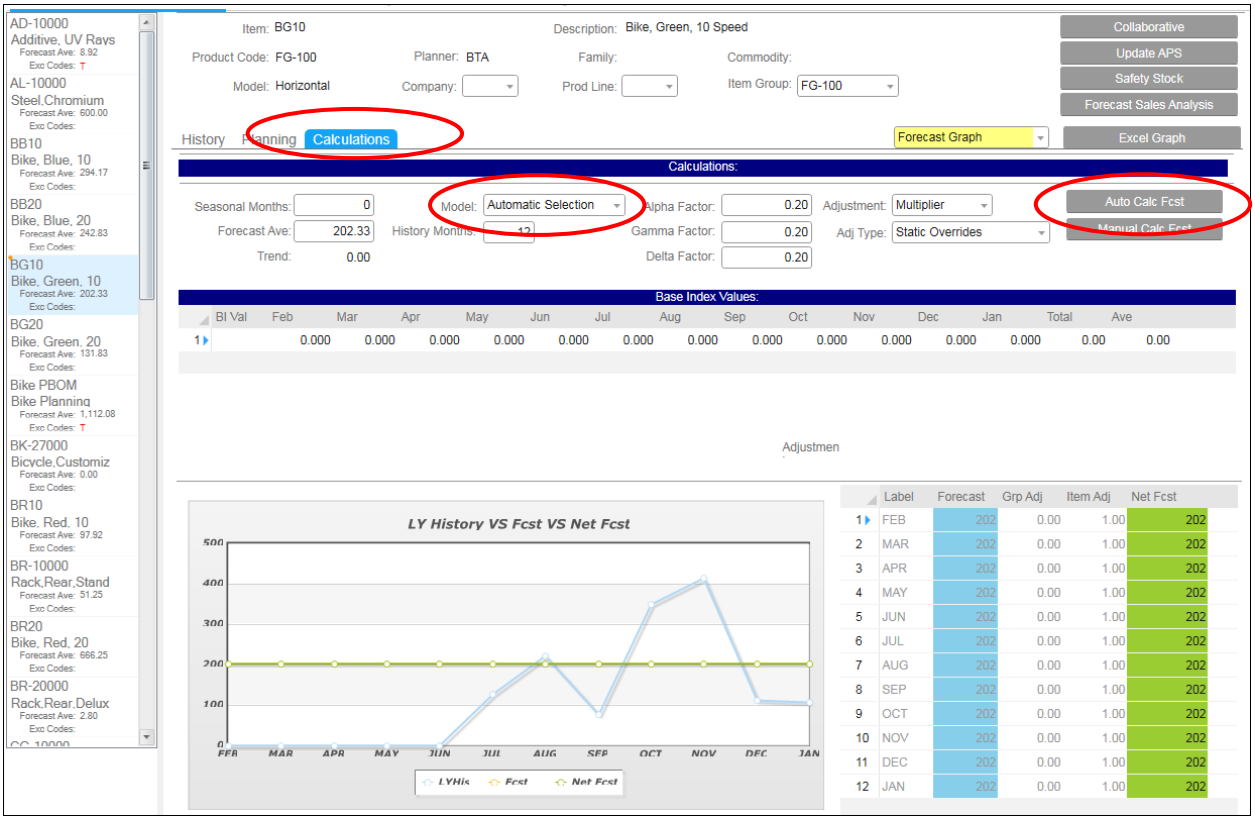
1. Open the Forecast Main form
2. Click the Filter button to release it
3. Click the New button
4. Enter the Item number, Data Type=Orders (Planning tab), then click the Save button
5. Select “Rebuild History” from the right click (Actions) menu.

The Rebuild History function will gather history from the customer order files including bookings and shipments, units and dollars, and display the default of units booked for each period. Using the wide yellow drop down you can select to view Bookings or Shipments, Units or Dollars. If you do not have history, see the section on Extended History.

Note: You can add multiple items to Forecasting using the Create Initial Forecasts utility, or with the standard Paste Rows Append functionality in the Forecast Main grid. See Creating Initial Forecasts. You can build history for multiple items using the Rebuild History utility.

Create, Review and Save Forecasts

Now you can calculate forecasts by selecting a Model, or using the Automatic Selection.



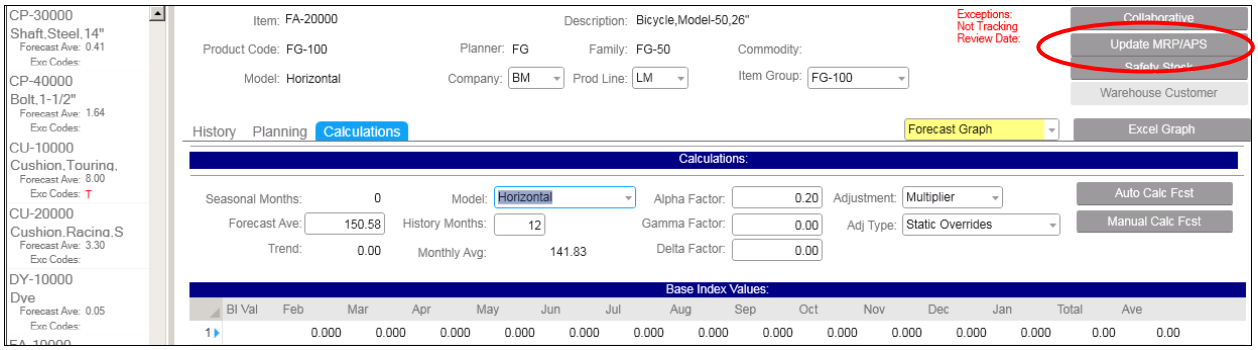
1. Select the Calculations Tab.
2. In the Model field, select “Automatic Selection” or pick a Model. (Automatic Selection will create a best fit recommendation for a Model)
3. Click “Auto Calc Fcst”, which will calculate a forecast based on the selected model using the historical data.
4. Click Save.

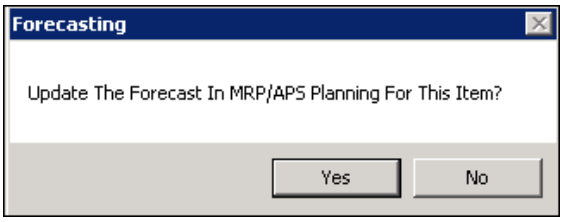
The calculated values are represented in the blue “Forecast” column in the lower right hand corner. If you are not going to adjust the calculated forecast, you are now ready to push the forecast to the MRP/APS planning system.

Note: The calculated forecast can be adjusted at the group level or item level to arrive at the green “Net Forecast” which will be posted to the MRP/APS planning system. See Manipulating Individual Items in this manual for more explanation on adjusting forecasts.

Push Forecasts to MRP/APS

1. After reviewing and adjusting the item's forecast, select the "Update MRP/APS" button on Forecast Main.





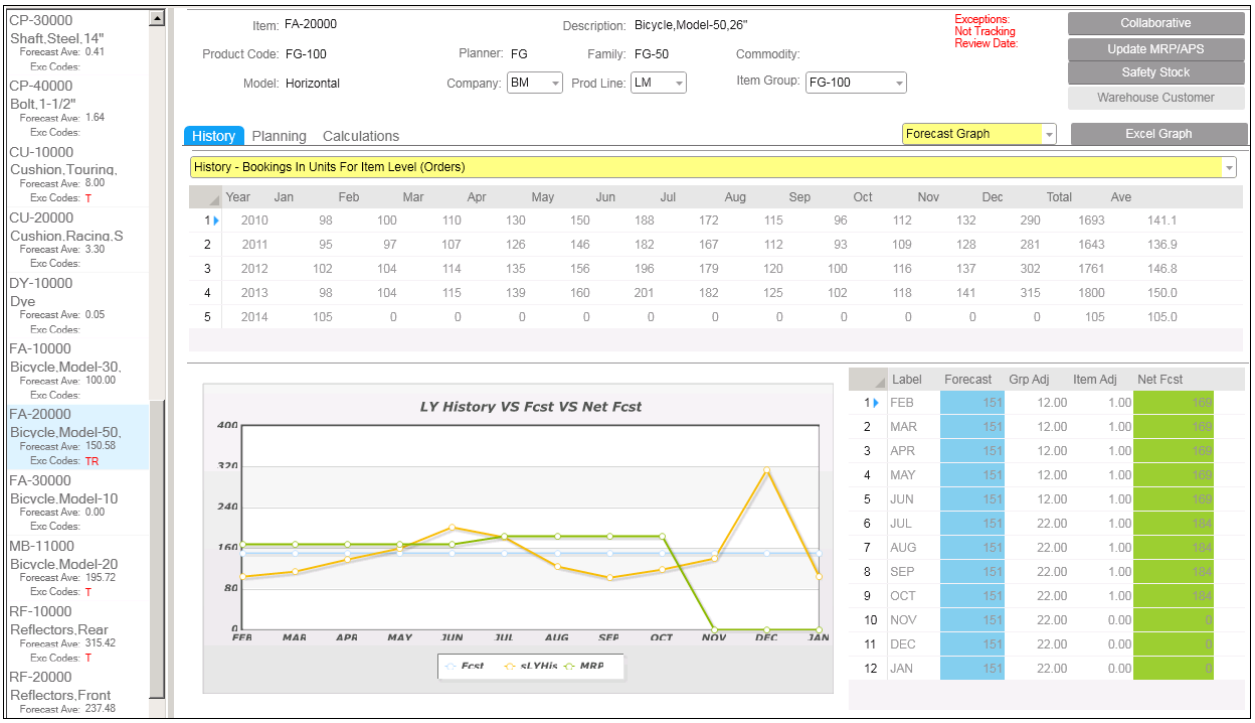
2. Choose "Yes" to send the Net forecast (green column) for this item to the MRP/APS planning system, or "No" to cancel.

3. To see this Forecast in the planning system, choose Action, APS Forecast, and the Forecast (Linked) form will open.

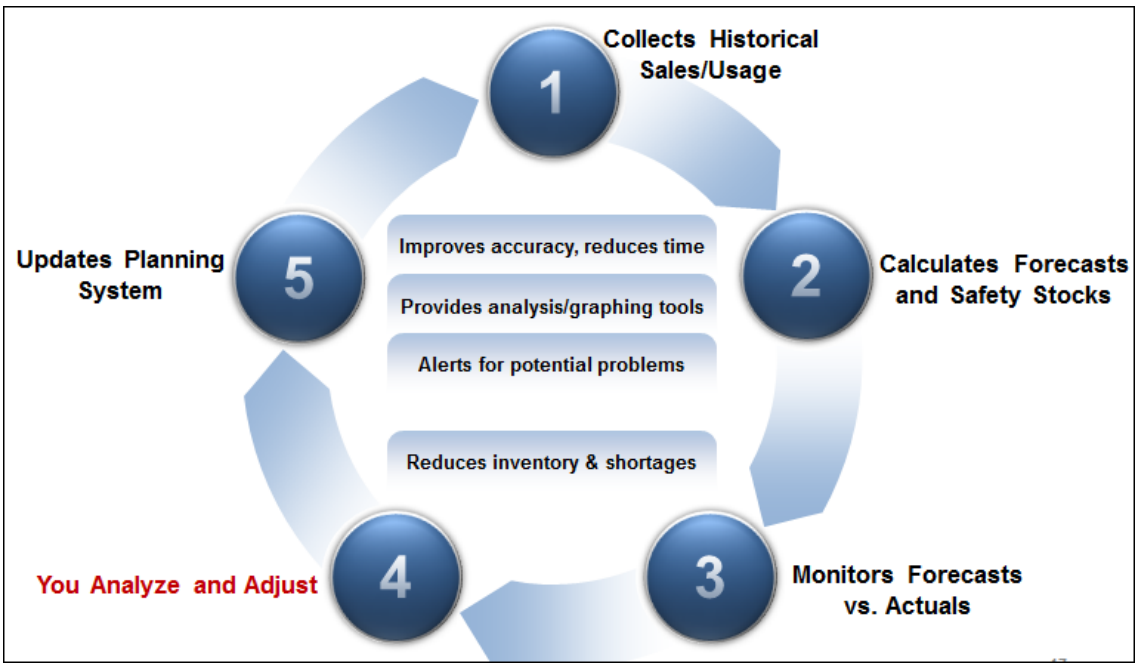
Congratulations! You have configured Forecasting, created a statistical forecast for an item and transferred this item's forecast to MRP/APS planning.

SECTION 2 – Forecasting Overview

Forecasting is a comprehensive set of tools that calculates and manages the demand forecasts that drive material planning using statistical models and collaborative processes. These projections can be posted to the Material Planning system (MRP/APS). Forecasting includes a variety of analysis and monitoring tools to assist with determining product and market trends and managing inventory levels.



Forecasting can be a component of a Sales and Operations Planning (S&OP) process to set goals and manage attainment of those goals through an integrated management process that aligns company activities to balance supply and demand. The optional **SytePlan** application works with the Forecasting application and provides a set of integrated tools to create Annual Sales/Operations Plans, Manage Supply Chains, Control Inventory, and Manage Backlog and On-time Performance. Once a forecasting process has been implemented with the Forecasting application, the process can be expanded into a complete S&OP process with the SytePlan application.



Forecasting Functionality Notes

- Multiple statistical models are available to use in projecting demand including Moving Average, Horizontal (Exponential Smoothing), Lumpy, Trend, Seasonal, Trend Seasonal and Holt Winters.
- Calculated forecasts can be adjusted with overrides at the item level or multipliers at the item or group level before being posted to the MRP/APS planning system.
- Forecasting compares forecasts to actual demand and automatically generates exception alerts.
- Forecasting can automatically select the best statistical model for each item or it can be used to analyze user input forecasts (from customers, salespersons, etc), or can support a collaborative process.
- Forecasting can calculate forecasts at the warehouse or customer level.
- Forecasts can be calculated for sellable items, components, or planning BOMs.
- Forecasting allows the planning system to consume forecasts when customer orders are entered, or will take over the consumption process to allow for Usage Based Consumption or Planning BOM consumption. This allows for either sellable item or components to be forecasted, and the consumption is automatic.
- Forecasting automatically updates MRP/APS with the new forecasts, including any adjustments.
- Forecasting keeps a history of forecasts and tracks forecasting variances by item.
- A Demand Filter is provided to generate alerts when a month's demand is unreasonably high. The user determines how sensitive this filter is to changes in the demand.
- A Tracking Signal feature informs the user when the demand is not tracking to the forecast and corrective action is needed. The user can specify the sensitivity of tracking limits.
- Forecasting supports both Fiscal and Calendar Year Forecasting and Reporting.
- Forecasting supports the use of planning bills of material (PBOM's) including consumption algorithms to eliminate the manual process of adjusting planning BoM forecasts for actual sales.
- A Sales Analysis tool is provided to help determine trends and shifts in customer and market demand.
- Forecasting calculates optimum safety stock levels, reorder points, and order mins and updates the MRP/APS planning system.

What's New in Version 9

- **Default input for collaborative forecasting.** A parameter that specifies which collaborative input will automatically be defaulted to the consensus forecast. For example, you may want a customer (or salesperson) supplied forecast to be used as the default forecast unless it is manually adjusted.
- **All items of dimension tab in collaborative form.** Used to see how forecasts roll-up, or what source it comes from. For example, to view all item forecasts of a particular customer, or all customers of a particular item.
- **Warehouse-customer** forecasting**.** Statistically calculates forecasts at the warehouse and/or customer level and posts the warehouse and/or customer level forecasts to the MRP/APS planning system.
- **Multi-site view.** On Forecast Main, allows selecting another site or all sites so as to view an item forecast in another site or the total of all forecasts across sites for the selected item.
- **Last 24 Actual VS Forecast By Item Report.** Lists and graphs forecasts and actuals for a range of multiple items in a single report.
- **Transfer Orders Drives Consumption**. The Consumption Utility now includes Transfer Orders to consume the forecast if the "include transfer orders in history" option is selected in Forecasting Parameters.
- **Forecasts Used to Create a Sales Plan and vice versa**. The SytePlan application allows using the Forecasts as the starting point for creating an Annual Operating Plan (AOP) or a Multi-Site Sales Plan (MSSP). Also, the AOP or MSSP can be used to create forecasts in the Forecasting Application.
- **Seasonal Months.** This new setting allows you to separately control the number of history months used to determine the seasonal pattern from the number of history months used to calculate average demand.
- **Current Period Delta**. New fields on the Forecast Main grid that displays the difference between the forecast value in the MRP/APS system versus the Net Forecast in the Forecasting app in both units and dollars. Allows user to see the effect of updating the planning system with the newly created forecasts.
- **Forecasts on Main Grid**: The Forecast Main grid now lists the forecast values for the next 12 periods to allow for viewing of forecasts for multiple items in one view and easier copy/paste to Excel.
- **Safety Stock Vendor/Critical adjustment**: The Safety Stock calculation now allows for user to enter additional requirements for each item based on vendor situations or critical item status.
- **Exclude from History**: The Related Variables/Auto Update form now allows a new rule (1003) that can be setup to exclude certain Order Lines, Transfer Order Lines, Customers, or Items from being included in history. A logical UET (uf_exclude) needs to be setup on these forms. If the field is checked on the form for a record, then the record is ignored when history is built.

Approaches for Developing Forecasts - What and How

The CloudSuite (SyteLine) Forecasting application offers multiple approaches to developing the forecasts that drive material planning. The ultimate goal of the forecasting process is to estimate demand for each sellable item or major component, in unit quantities for future periods. This item level forecast (independent demand) is used by the planning system to calculate a time phased, exploded demand (dependent demand) for the components, materials, and resources needed. An additional purpose of this forecasting process can be to develop goals for sales dollars and units by product group, territories, salespersons, warehouses, customer types and customers… which is extending the forecasting process into the realm of Sales and Operations Planning, which can be managed with the optional SytePlan application. (See Top Down, Multidimensional Sales Planning in Forecasting Approaches - How)

The key to designing the most efficient and effective approach to forecasting demand is to first establish the end goal for sales planning and material planning, and then determine the starting points of WHAT to forecast and HOW to forecast:

- **WHAT**: Do we want to start the process by forecasting dollars or units? Do we want to start by forecasting specific item numbers, or product groups? Is it more efficient to forecast our sellable items, or to forecast the components?
- **HOW**: Do we want to start by calculating forecasts using a statistical projection, and then manually adjusting the calculated forecast? Or, are historical sales not a good predictor of future demand, so we want to develop the forecast based on collaboration and input from salespeople or customers and just use history as a data point to consider? Do we want to forecast the demand for an item by specific customer, or by customer type, or warehouse, or salesperson…or just forecast total demand for the item?

The primary purpose of this sectiom is to help an organization decide what forecasting approach, and accordingly what functionality of the Forecasting application, will be implemented to drive the MRP/APS material planning process by addressing What to forecast and How to forecast.

Forecasting Approaches - WHAT

An organization can develop forecasts for one or all of the following categories and use those forecasts to drive the MRP/APS engine:

- Sellable items
- Components
- Planning BOM's (PBOM's)

The following is a high-level explanation of each of these approaches.

Sellable Items

Forecasting sellable items works well for standard products and high volume products. This approach uses sales history (booked orders or shipments history) to statistically project demand for the items that will be entered on sales orders. Or, the forecast can be developed through a collaborative process that analyzes multiple opinions or data points, such as salesperson projections, forecasts received from customers, and statistical projections. Forecasts are consumed by sales orders. This approach does not work well for configure-to-order or engineer-to-order product lines, where the same item numbers are not sold over and over. The Sellable Items method is the easiest approach to implement.

Components (usage based forecasting)

Forecasting components works well for product lines that have many common components (or raw materials) that are assembled (or fabricated) into a wide variety of end items. In these situations, the number of possible item numbers that might be on a sales order is much greater than the number of sub-assemblies that are common to those end products. Usage based forecasting allows the component and/or raw material forecasts to be consumed by the usage (actual demand) for the components.

Planning BOM's (family forecasting)

Forecasting Planning BOM's works well for configurable product lines or situations where forecasting a base model works better than forecasting all the variations of the model that might be sold. PBOM functionality allows forecasting a family of products rather than individual SKU's. "Top-down" logic is used to forecast a Planning BOM of sellable items, or major components, of the family. The MRP/APS planning system then creates dependent demand for the sellable items or components in the PBOM. When a member of the family is sold (as defined in the "Forecast As" cross reference) the Planning BoM parent is consumed (netted) against the forecast of the Planning BoM parent. PBOM forecasting is more work to implement and manage than the Sellable Item or Component forecasting approaches.

Parent: Bike PBOM Bike Planning BoM Process

	Item	Current Matls	Difference	Last Year	Last 3 Months	Last 6 Months	Low Level	Aug	Sep	Oct	Nov	Dec	Jan	Description
1	P1	.400	.108	.292	.500	.500	1	0.500...	0.500...	0.500...	0.500...	0.500...	0.500...	Paint, Green
2	P2	.400	.400	0.000	0.000	0.000	1	0.000...	0.000...	0.000...	0.000...	0.000...	0.000...	Paint, Red
3	P3	.500	.191	.309	.548	.551	2	0.482...	0.225...	0.953...	0.705...	0.466...	0.471...	Gear, 10 Speed
4	P4	.640	.365	.275	.452	.449	2	0.517...	0.774...	0.046...	0.294...	0.533...	0.528...	Gear, 20 Speed
5	P5	2.000	1.417	.583	1.000	1.000	2	1.000...	1.000...	1.000...	1.000...	1.000...	1.000...	Wheel, Basic Bike
6	P6	1.000	.417	.583	1.000	1.000	2	1.000...	1.000...	1.000...	1.000...	1.000...	1.000...	Seat, Basic Bike
7	P7	1.000	.417	.583	1.000	1.000	2	1.000...	1.000...	1.000...	1.000...	1.000...	1.000...	Frame, Basic Bike
8	P8	.300	.300	0.000	0.000	0.000	1	0.000...	0.000...	0.000...	0.000...	0.000...	0.000...	Paint, Blue
9	Sub1	0.000	.583	.583	1.000	1.000	1	1.000...	1.000...	1.000...	1.000...	1.000...	1.000...	Basic Bike Assy, Unpa
10	Sub10	0.000	.309	.309	.548	.551	1	0.482...	0.225...	0.953...	0.705...	0.466...	0.471...	Gear Assy, 10 Speed
11	Sub20	0.000	.275	.275	.452	.449	1	0.517...	0.774...	0.046...	0.294...	0.533...	0.528...	Gear Assy, 20 Speed

This form shows the Bike PBOM, which is the item that is forecasted. The P1, P2, etc are the items for which demand is created when we forecast the Bike PBOM. The form shows the percent chance that a P1, P2, etc will be ordered when a member of this PBOM family is ordered (50% 10 Speed, 64% 20 Speed) It also shows the percent of time the item was selected in the past.

Forecasting Approaches - HOW

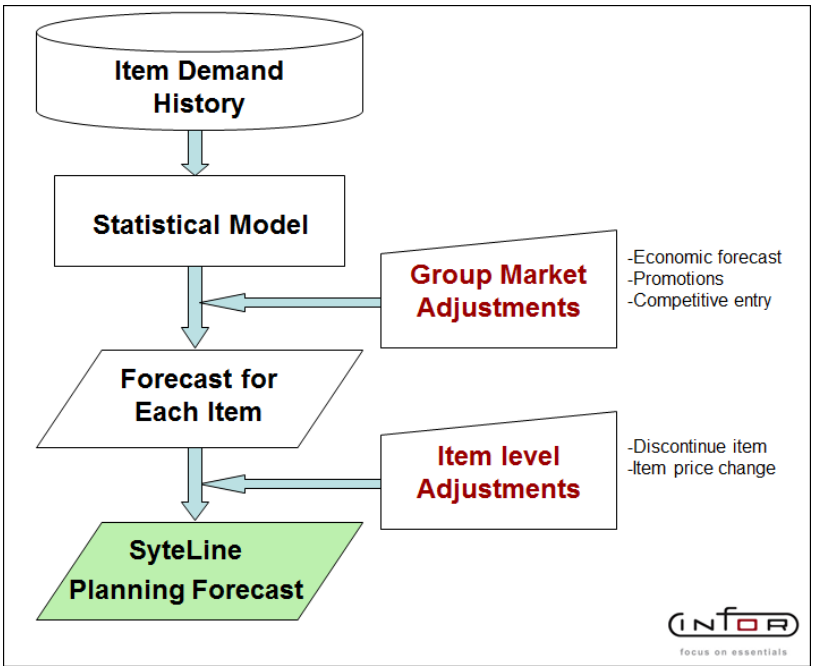
The following approaches can be used to develop a demand forecast for sellable items, components, or PBOM's:

- Statistical Forecasting
- Collaborative (Roll-up) Forecasting by Customer/Salesperson/Whse/etc
- Warehouse and/or Customer level Statistical Forecasting
- Top Down, Multi-dimensional Sales Planning (Requires SytePlan S&OP)

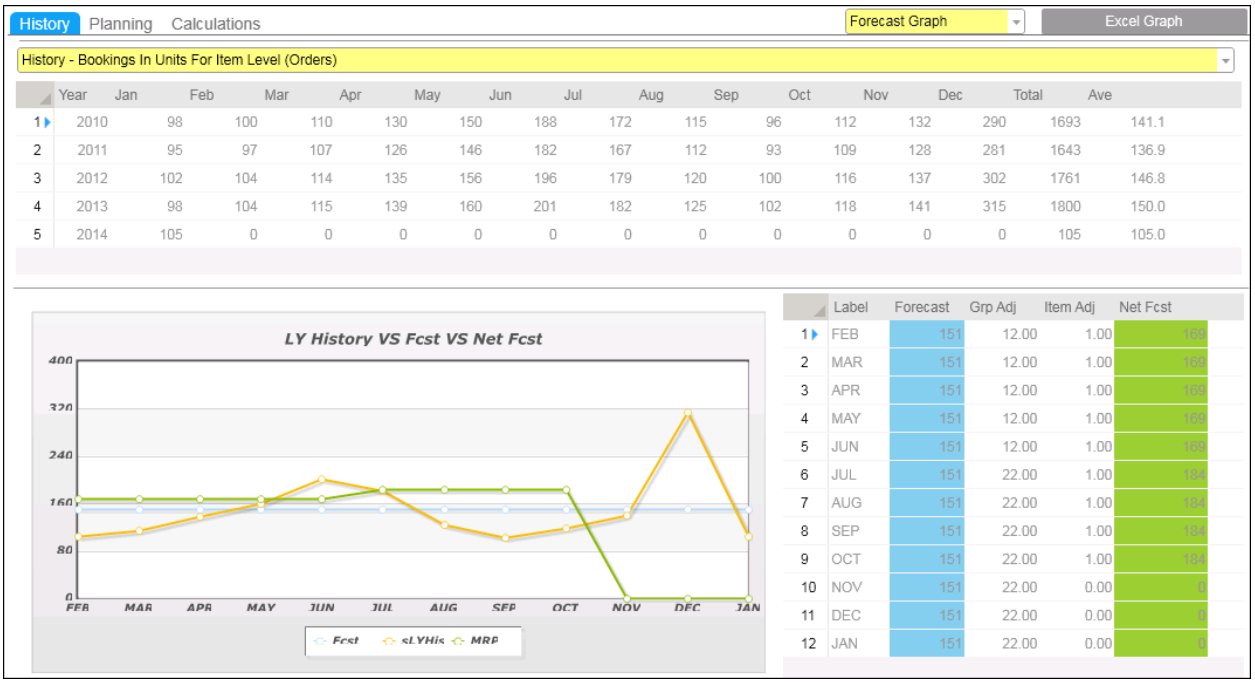
The following is a high-level explanation of each of these approaches.

Statistical Forecasting

The forecast is developed by applying a statistical model/algorithm (seasonal, trend, moving avg, Holt-Winters, etc) to historical demand to calculate the forecast. Then the calculated forecast can be reviewed and adjusted at the item level or group level. The forecast can be for a sellable item, component or PBOM. Statistical forecasting is the easiest approach to implement, and generally the most accurate.



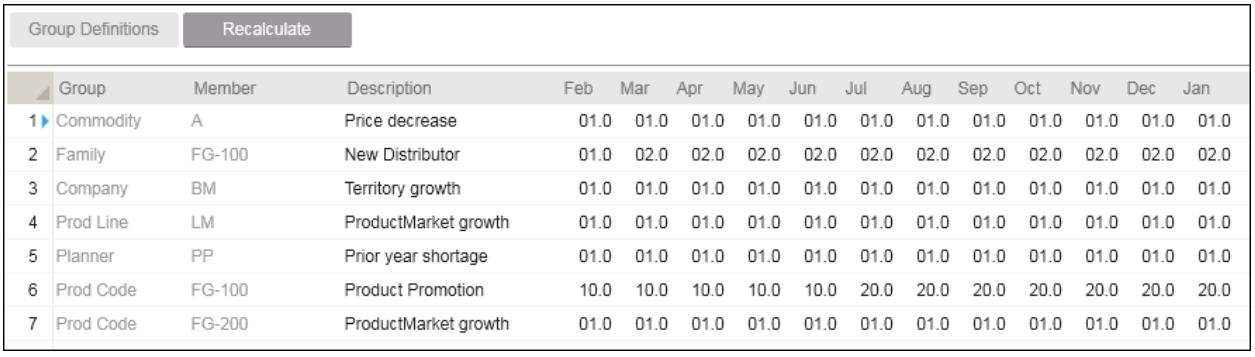
The below form shows five years of unit demand history for the item in the top grid. The blue column is the calculated forecast, the green is the net forecast after group adjustments and item adjustments. In this example, the statistical calculation predicts a demand of 151 units in November. This statistical forecast is then increased by 22%, due to this item being a member of groups that were adjusted, but the item adjustment zeroed the forecast because the item is planned to be discontinued in November.



	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Ave
1	2010	98	100	110	130	150	188	172	115	96	112	132	290	1693	141.1
2	2011	95	97	107	126	146	182	167	112	93	109	128	281	1643	136.9
3	2012	102	104	114	135	156	196	179	120	100	116	137	302	1761	146.8
4	2013	98	104	115	139	160	201	182	125	102	118	141	315	1800	150.0
5	2014	105	0	0	0	0	0	0	0	0	0	0	0	105	105.0

	Label	Forecast	Grp Adj	Item Adj	Net Fcst
1	FEB	151	12.00	1.00	169
2	MAR	151	12.00	1.00	169
3	APR	151	12.00	1.00	169
4	MAY	151	12.00	1.00	169
5	JUN	151	12.00	1.00	169
6	JUL	151	22.00	1.00	184
7	AUG	151	22.00	1.00	184
8	SEP	151	22.00	1.00	184
9	OCT	151	22.00	1.00	184
10	NOV	151	22.00	0.00	0
11	DEC	151	22.00	0.00	0
12	JAN	151	22.00	0.00	0

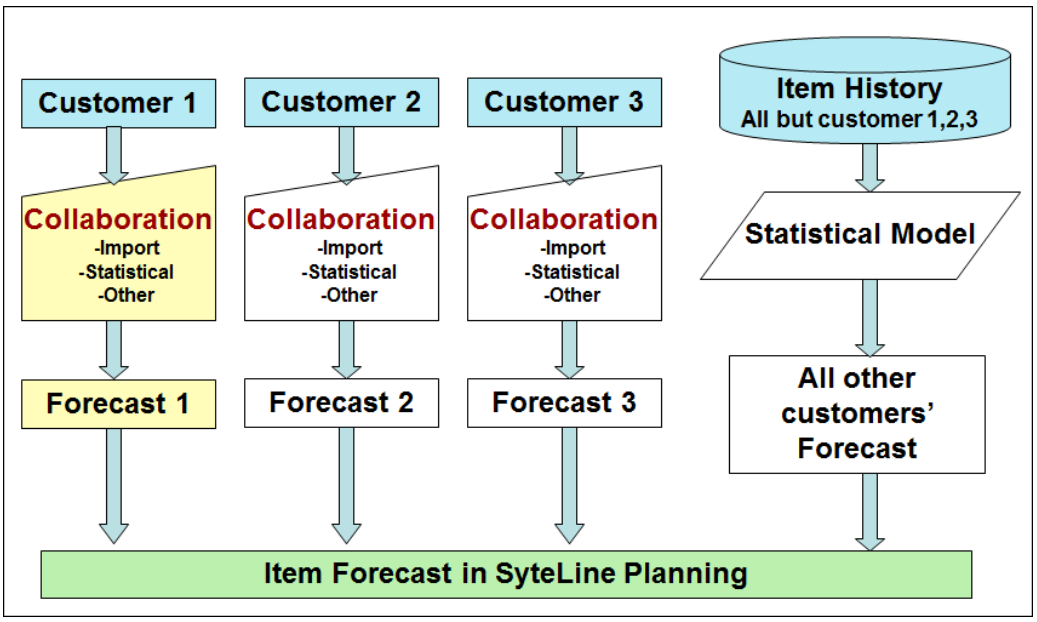
The below form is used to specify group adjustments (expressed as percentages) that will affect all items assigned to a member of a group. Multiple groups can be managed and an item can belong to multiple groups. In the below example, the calculated forecast will be increased by 10% for Feb due to a Product Promotional for all items in the FG-100 Product Code group.



	Group	Member	Description	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
1	Commodity	A	Price decrease	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0
2	Family	FG-100	New Distributor	01.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0
3	Company	BM	Territory growth	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0
4	Prod Line	LM	ProductMarket growth	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0
5	Planner	PP	Prior year shortage	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0
6	Prod Code	FG-100	Product Promotion	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
7	Prod Code	FG-200	ProductMarket growth	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0

Collaborative (Roll-up) Forecasting by Customer/Salesperson/Whse/etc

The forecast is calculated by totaling up the specified forecast for each customer that buys the item. (Or the parameters can be setup to roll-up from a list of salesperson, warehouses, or customer types). Each customer's forecast for an item can be imported, manually entered, or statistically calculated… Or, multiple data points can be compared (customers forecast vs statistical vs salespersons) and a consensus forecast developed. Collaborative forecasting is more work to implement and manage than Statistical forecasting, and can sometimes not be as accurate due to human bias and the amount of data to be managed.

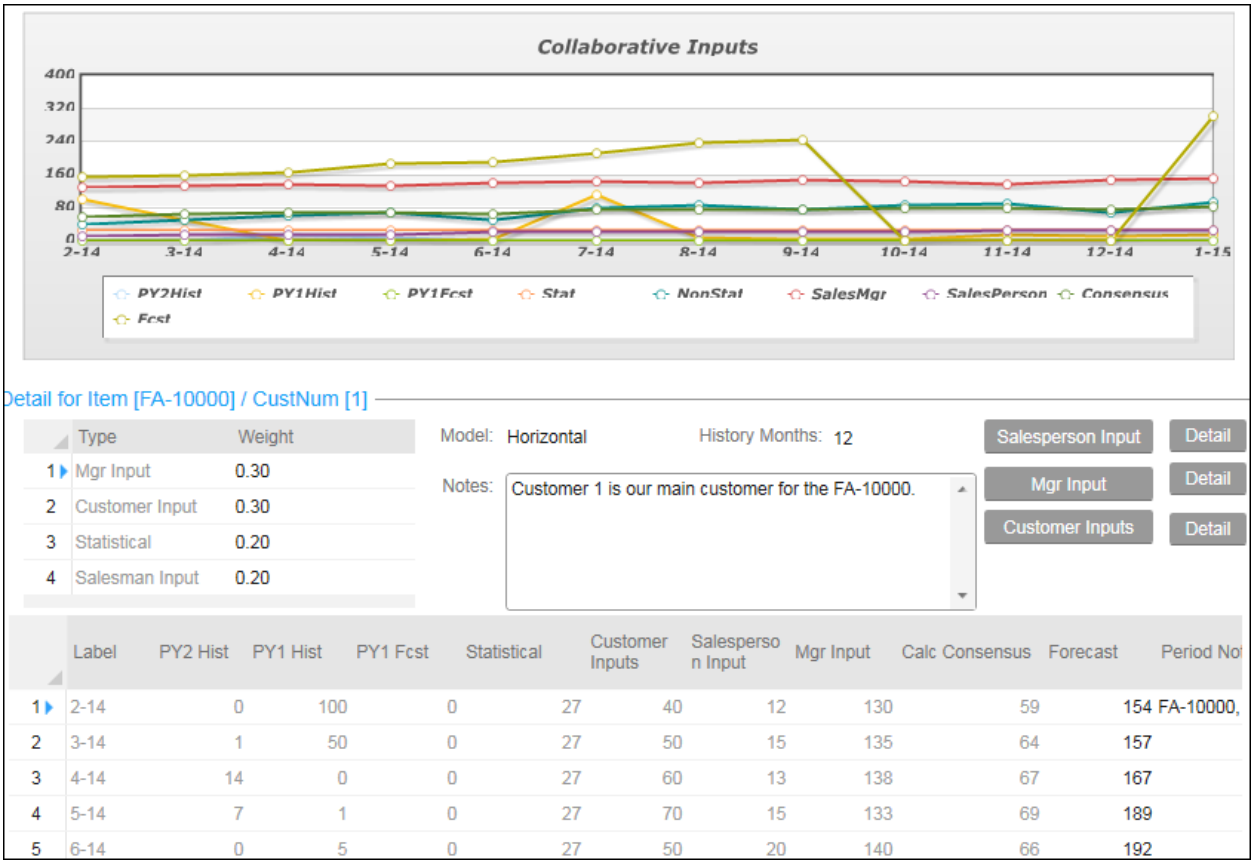


Below form shows how multiple customers can be listed with a separate forecast for each item the customer buys. These values can be input or copy/pasted.

Item: FA-10000 Bicycle,Model-30,26" Input Type: Salesperson Input Show All Items

	ID	Description	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total
1	1	Coordinated Bicycles	12	15	13	15	20	20	20	20	20	25	25	25	230
2	3	Claymore Bicycles	20	15	20	10	20	20	15	25	20	25	20	25	235
3	Total		32	30	33	25	40	40	35	45	40	50	45	50	465

The below form shows Collaborative forecast development, which compares multiple data points to forecast the demand of a specific item by a specific customer (or whse, salesperson, etc). The collaborative method also allows manually specifying the major customers that buy an item and statistically calculating all the remaining demand that comes from multiple smaller customers.



Detail for Item [FA-10000] / CustNum [1]

	Type	Weight
1	Mgr Input	0.30
2	Customer Input	0.30
3	Statistical	0.20
4	Salesman Input	0.20

Model: Horizontal History Months: 12

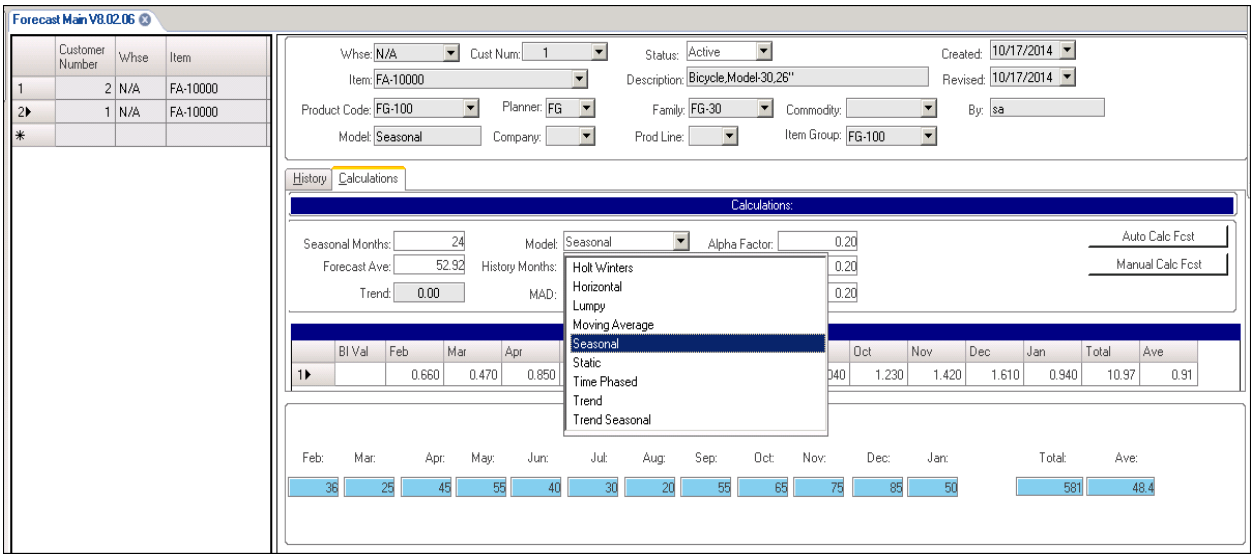
Notes: Customer 1 is our main customer for the FA-10000.

Salesperson Input Detail
Mgr Input Detail
Customer Inputs Detail

	Label	PY2 Hist	PY1 Hist	PY1 Fcst	Statistical	Customer Inputs	Salesperson Input	Mgr Input	Calc Consensus	Forecast	Period No
1	2-14	0	100	0	27	40	12	130	59	154	FA-10000,
2	3-14	1	50	0	27	50	15	135	64	157	
3	4-14	14	0	0	27	60	13	138	67	167	
4	5-14	7	1	0	27	70	15	133	69	189	
5	6-14	0	5	0	27	50	20	140	66	192	

Warehouse and/or Customer level Statistical Forecasting

Warehouse-Customer forecasting will allow you to enter/import forecasts or statistically calculate forecasts at the warehouse and/or customer level. These forecasts can be loaded into the MRP/APS system at the warehouse and/or customer level and be consumed at the warehouse and/or customer level by the MRP/APS system. This approach can be helpful for distribution requirements planning, or customer consigned inventory planning situations.



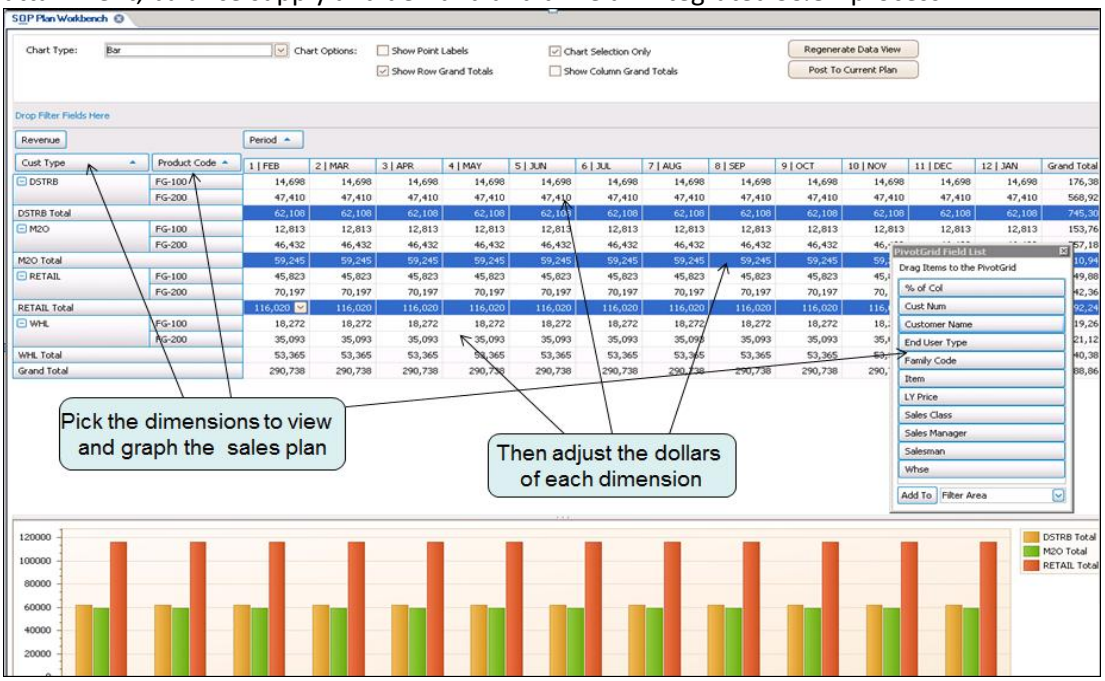
Top Down, Multi-dimensional Sales Planning (Requires SytePlan S&OP)

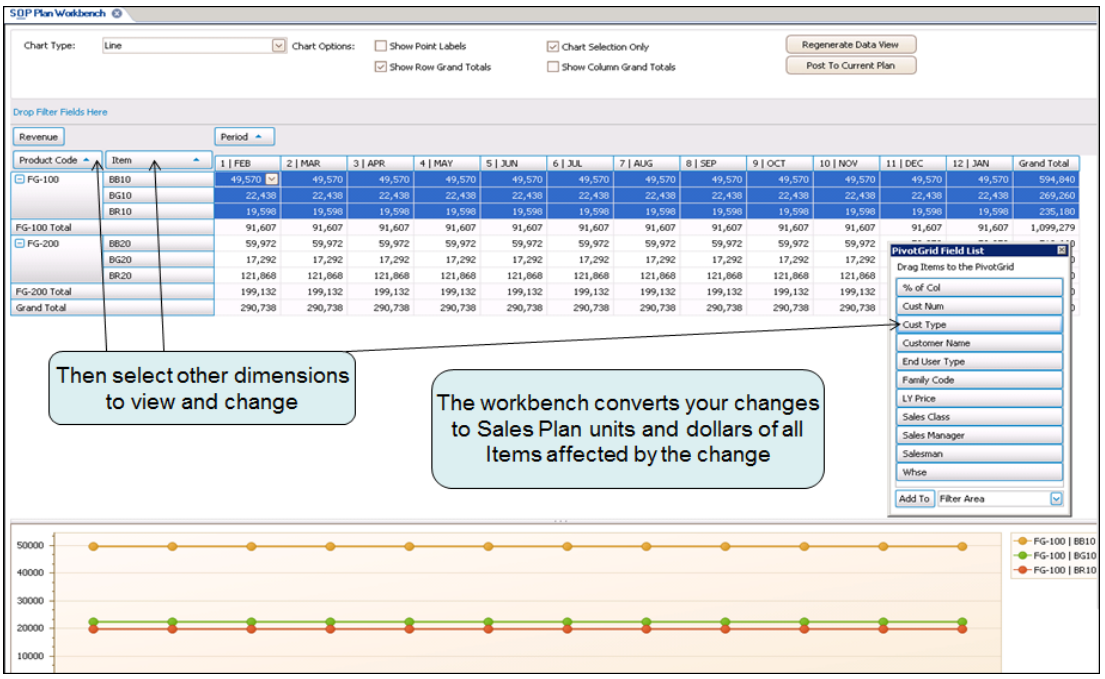
In order to integrate sales dollars goal setting and material planning forecasting into a single Sales & Operations Planning process, the sales and material planning groups must agree on an integrated process… for example, sales cannot collaborate to create just categories of revenue dollars on a quarterly basis, while material planning uses monthly statistical projections based on history at the item unit level and the two independent forecasts are never shared or reconciled with each other. An S&OP process allows both groups to work together on developing and managing attainment towards revenue goals and inventory planning, which may require both the Forecasting and the SytePlan applications.

Generally, Forecasting allows you to start by forecasting unit quantities for specific items or specific customers … this item unit level forecast can be rolled up allowing you to view and analyze the Forecast by various product groupings in units or dollars. Also you can do percentage adjustments to the forecast for groups of items, but you cannot do group adjustments based on customer, customer type, warehouse, territory, or salesperson.

Generally, SytePlan S&OP allows you to start by developing a Sales Plan by using historical sales to build a dollars and units plan for a group of products or customers or salespersons or sites (or other grouping) and use the relative sales of the past along with the average selling prices to allocate the group forecasts to the individual items.

The SytePlan workbench below can be used to manipulate this forecast by multiple dimensions (item, product group, customer, customer group, warehouse, territory, site, salesperson, etc) and it will allocate the forecast to all other dimensions based on the historical relative mix. The plan can then be compared to actual sales and forecasts and used along with other tools in SytePlan to manage goals and attainment, balance supply and demand and drive an integrated S&OP process.





Forecasting Implementation and First Month Operation

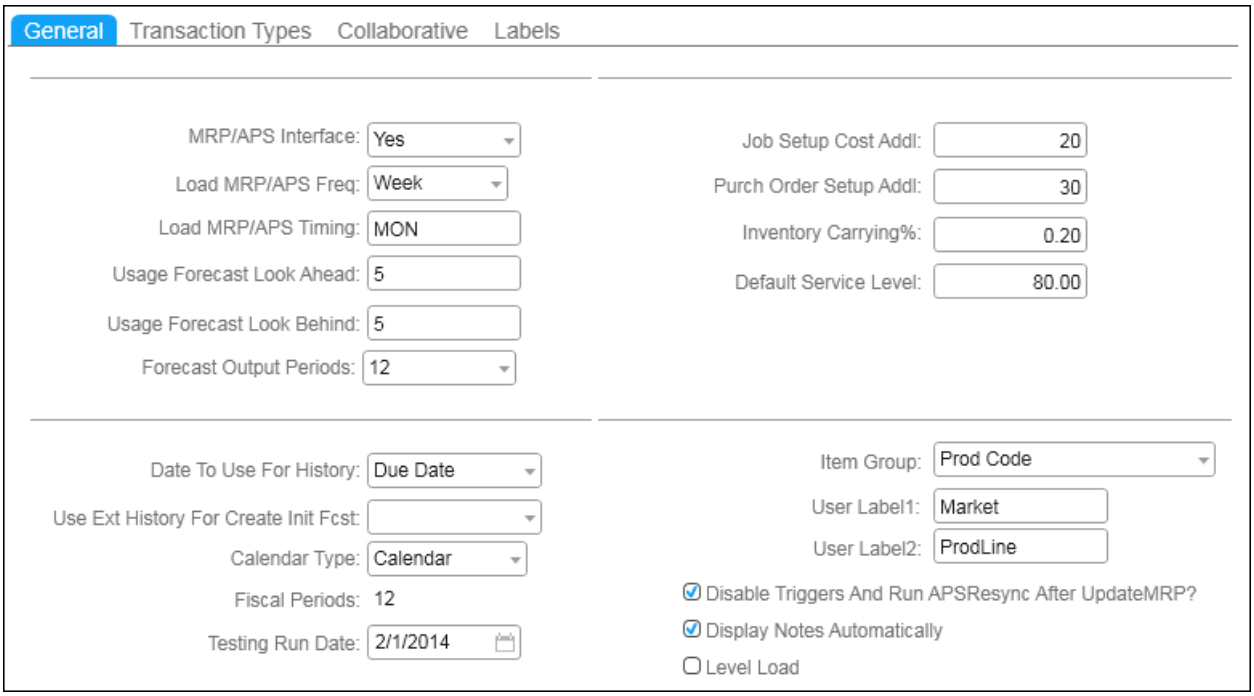
1. Implement the basics of MRP/APS in the ERP system and have an understanding of how material planning, BOM explosions, time phasing, and forecast consumption works.
2. Install the Forecasting application in each of the desired sites.
3. Review the What and How to Forecast section and build a general consensus on **What** (end items, PBOMs, components) and **How** (statistical, collaborative, customer/warehouse) to forecast. Design your forecasting work process including roles and responsibilities.
4. Setup the Forecasting Parameters.
5. Create the Forecast Items by adding the items to be forecasted to the Forecasting application.
6. Load History that will be used to calculate the statistical forecasts.
7. Calculate Initial Forecasts using the Statistical method, Collaborative Method, and/or the Statistical Warehouse/Customer method. Use the Forecast Auto Calc Item Forecasts utility the first time the forecasts are calculated to initialize all the variables. In future periods, use the Monthly Utility to update the variables and calculate new forecasts.
8. Review the forecasts using the Forecast Main (home page) form and modify the variables and forecast models as needed.
9. Adjust forecasts as needed (item level adjustments and group level adjustments)
10. Push forecasts to MRP/APS. Be aware that the Update MRP/APS function will delete the forecasts that already exist in the MRP/APS planning system. So, you may want to test this implementation in a pilot database first.
11. Calculate and update safety stocks.
12. Establish daily and monthly processes and periodically review the processes for possible improvement. Consider segmentation so as to group products by the 80/20 rule and focus on high impact and high volume products for adjusting forecasts and analyzing cause of variances.
13. If desired, implement the optional SytePlan Sales & Operations Planning application.

SECTION 3 – System Set-Up, Forecasting Parameters

The initial set-up for the Forecasting application involves setting up the Forecasting Parameters, confirming the Accounting Periods setup, setting up User Authorizations, and confirming the MRP/APS Planning Parameters as described below.

Forecasting Parameters

The Forecasting Parameters form contains basic settings and defaults which will control how the forecasting application functions.



The form has the following tabs:

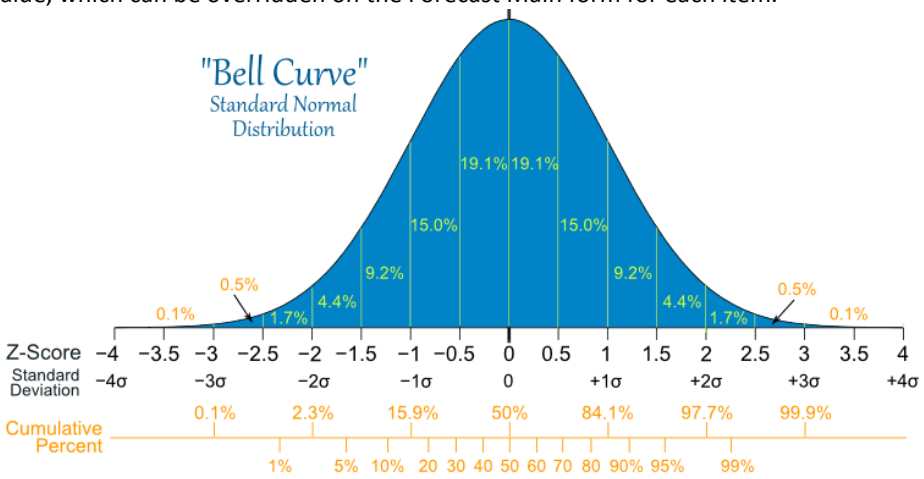
- General – overall functions of the program
- Transaction Types – details the type of data to gather during History Data collection
- Collaborative – Used to define Collaborative Functionality
- Labels – defines the months that correspond to each period for purposes of labeling the periods

The details on each of these tabs is described below.

General Tab

1. **MRP/APS Interface:** Choose Yes to enable transfer of forecasts from the Forecasting application to the forecast in the planning system.
2. **Load MRP/APS Freq:** Load MRP Frequency can be Monthly or Weekly. Forecasts will be calculated and displayed in Monthly periods in Forecasting, but when the forecasts are passed to the planning system, they can be passed as monthly forecasts or broken down into weekly buckets.
3. **Load MRP/APS Timing:** Used to specify the day of the month (i.e. 06, 15, etc) or the day of the week (MON, TUE, etc) to load the forecast. This is the due date of the forecast.
4. **Usage Forecast Look Ahead, Usage Forecast Look Behind:** Enter the number of days (Mdays) to look forward and backward for consumption of the forecast when the Forecast Consumption Utility is run when using Usage Based Forecasting or PBOM Forecasting.
5. **Forecast Output Periods:** To define whether you forecast in 12 or 13 period years.
6. **Date to Use for History:** Choose Order Date, Due Date or Request Date to determine if history is built based on the date the order was taken, or the order line Due Date, or the order line Request Date.
7. **Use Ext History for Create Init Fcst:** Select "Yes" to gather data from the Extended History tables when creating an initial forecast. See Create Initial Forecast and Extended History for more information.
8. **Calendar Type:** Select Fiscal or Calendar. Selecting Fiscal allows processing forecast in periods tied to the Accounting Periods
9. **Fiscal Period:** Displays if 12 or 13 periods have been specified in the Accounting Periods form.
10. **Testing Run Date:** Used to override the current system date to fool Forecasting as to what today's date is. Use caution when updating this field. It can be used to go back in time to recalculate forecasts when periods were skipped.
11. **Job Setup Cost Addl (Additional):** The dollar amount entered in this field is used by the system as an input to the order minimum calculations. This cost is in addition to any setup charges that are defined in the item's current routing.
12. **Purchase Order Setup Addl(Additional):** The dollar amount entered in this field is used by the system as an input to the order minimum calculations.
13. **Inventory Carrying %:** This percentage is the annual estimated cost of carrying inventory used by the system as an input to the order minimum calculation. If 20% is the estimated annual cost of carrying inventory (warehouse space, insurance, taxes, handling, etc) enter .2 in this field.

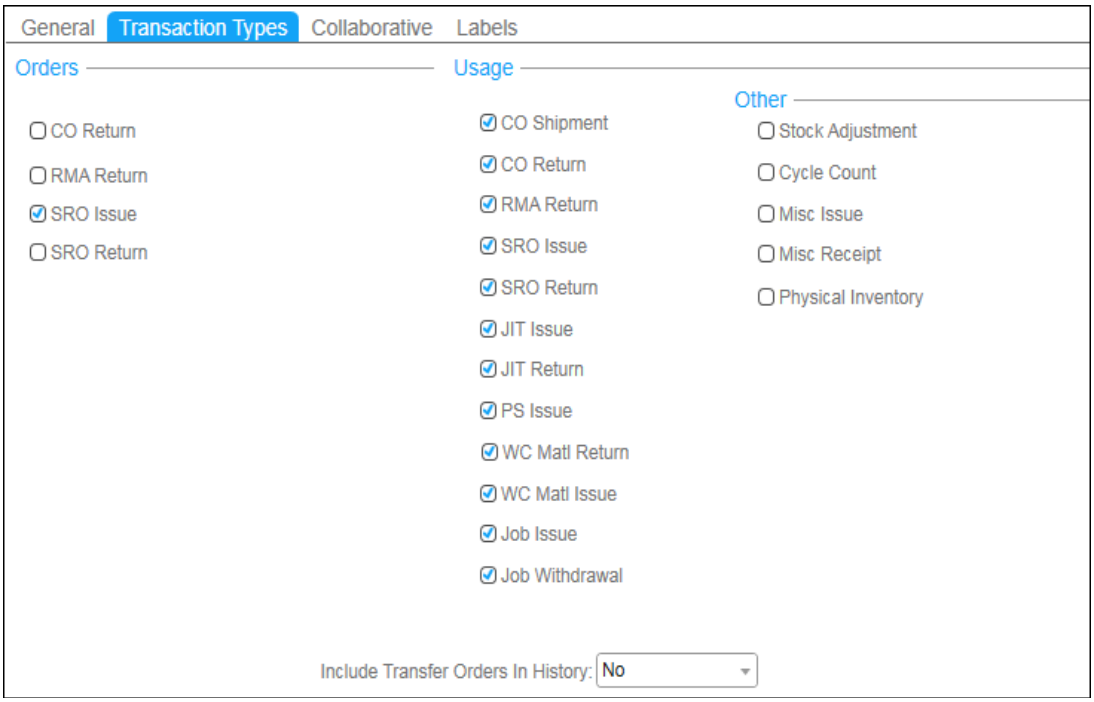
14. **Default Service Level**: A desired measure (expressed as a percentage) of satisfying unusual demand. It is the percent of the Bell Curve of possible demand that you want to be able to cover without having a stock out. This value is used in the calculation of Safety Stocks and Reorder Points by looking up standard deviation values in a statistical table (ex: 95% Service Level returns 1.96 standard deviations). A higher percentage results in the system calculating higher safety stock/ROP levels. Use this field to set the default value, which can be overridden on the Forecast Main form for each item.



15. **Item Group:** Select whether the ItemGroup value for each item is same as the Product Code, Family Code or Neither (Item Group will be a separate group of its own).
16. **User Label 1**: Forecasting allows custom groups to be assigned to the forecasted items. Use this field to specify the label to be used for the first custom group. (ex: Prod Line, Market)
17. **User Label 2**: Forecasting allows custom groups to be assigned to the forecasted items. Use this field to specify the label to be used for the second custom group. (ex: Prod Line, Market)
18. **Disable Triggers and Run APSResync after UpdateMRP?** Normally this box should be selected, which controls the Update MRP/APS utility. When the forecasts are pushed to MRP/APS, to improve performance, the utility will turn off the triggers on the forecasts table that update the planning tables while loading in the new forecasts, then will run the APS Resync to update the planning tables in mass. If there are relatively few items setup in this Forecasting application, then the update might run faster if the triggers are enabled during the load and the Resync does not have to run afterwards for all the items in the APS system.
19. **Display Notes Automatically:** Controls whether the notes for a forecasted item automatically pop up when the item is selected on Forecast Main.
20. **Level Load:** This functionality will "level" the calculated forecast across the periods when it is posted to the planning system without changing the forecast stored on Forecast Main. When the forecast is loaded into the planning system, the total forecast for the year is used to create a daily average, which is multiplied by the number of work days in that week or month to calculate the forecast. This creates a forecast that does not fluctuate, but rather is based on what can be produced.

Transaction Types

A forecasted item can use two types of data for History. Items can be forecasted based on Customer Orders history or Usage history. Forecasting usage of components can be powerful when a large number of customer order Items are made from a relatively small number of materials. (ex: configure-to-order or engineer-to-order environments). Specify on Forecast Main for each item to use Customer Orders history or Usage history to forecast the item. Use this Parameters form to specify what types of transactions are included in Customer Order history and Usage history.



Orders – If using Orders based history, select if you want to include CO Returns, RMA Returns, SRO Issues and SRO Returns in history**.** For Orders based forecasting, the MRP/APS system handles the Customer Order based consumption automatically.

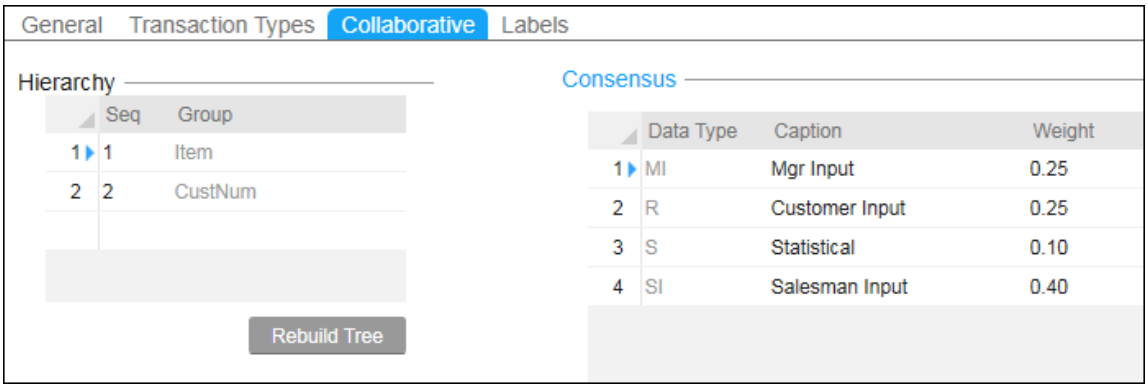
Usage – If forecasting based on usage you generally want to include ALL types of usage transactions – whether you issue an item to a job, ship it to a customer, etc. The system defaults to exclude the "non-standard" inventory transactions, but you can select to include them on this form.

Include Transfer Orders in History - For multi-warehouse or multi-site environments where items are transferred to other warehouses or sites where they are shipped to the customer. To be included in History a transfer order must be FROM a "non-dedicated" warehouse and TO a "dedicated" warehouse since transfers within non-dedicated warehouses are essentially move transactions and you would want the customer orders or shipping transactions at the site to build the history. See Forecasting Using Transfer Order History.

Collaborative Parameters

The Collaborative parameters allow you to define three levels of detail on the collaborative form. Item must be the top level, then you can select the levels that roll up to the item level. In this example we will be able to see both a collaborative forecast for Items and for the Customers of each item. You could also select another dimension for the next level such as Whse, or Salesperson, etc.

CAUTION: **The "Rebuild Tree" Button is designed to allow you to change your approach to collaborative forecasting. For that reason, when you Rebuild your collaborative relationships, you will lose all Notes and manually input forecasts based on the old tree.**

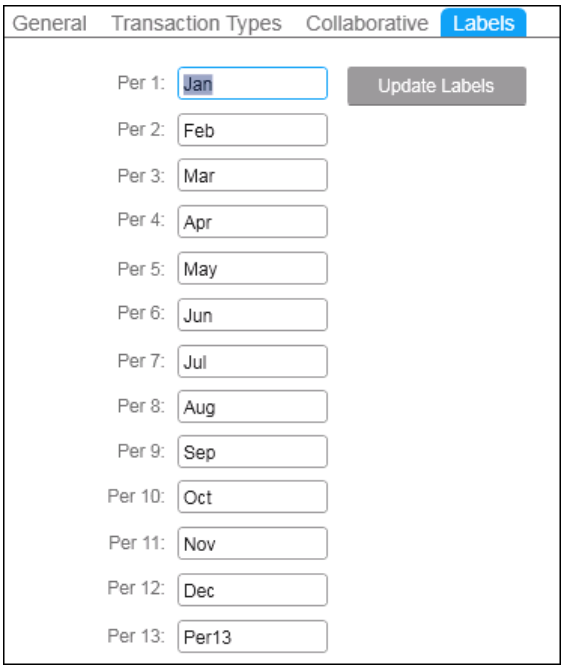


The Consensus Labels allow you to "Name" the parties involved in the Forecasting Process as well as assign their default weighting percentages which are used to calculate a weighted consensus forecast. Be aware of the difference between the Hierarchy (Roll-up) fields and the Data Type (Source) fields. For example, you could have multiple customers (CustNum Hierarchy) you want to forecast for an item, and for each of these customers, you might have the customer's forecast, the Manager's forecast, and the Salespersons forecast.

Labels – Fiscal Year or Calendar Year

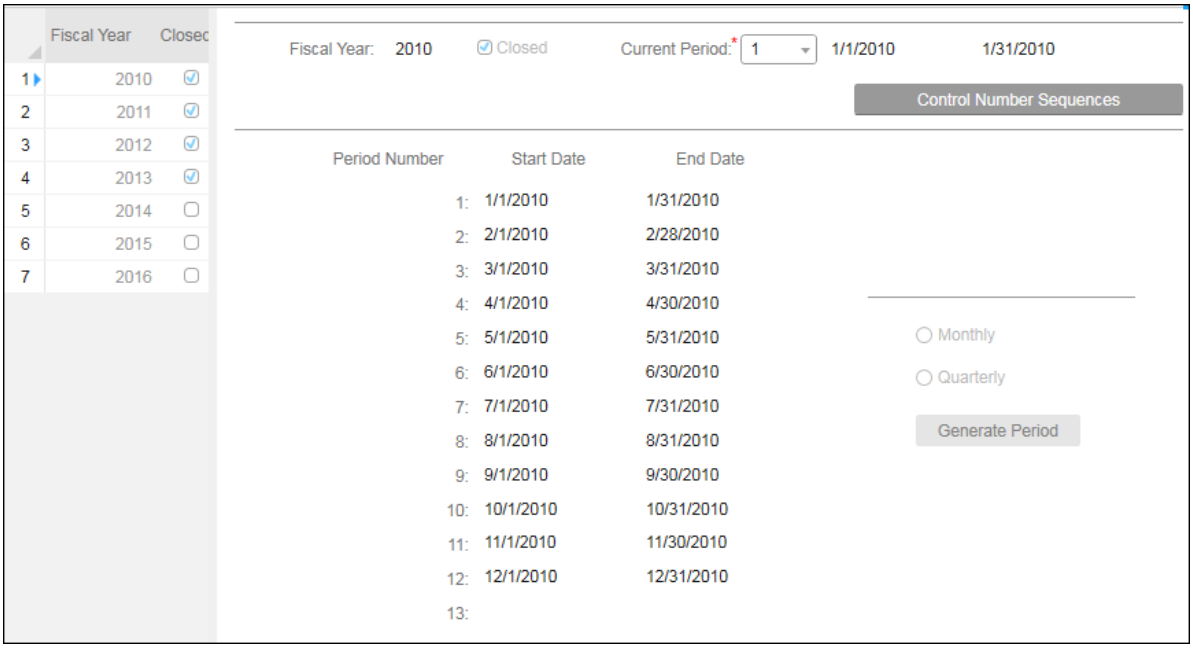
Forecasting aligns the forecast periods with the Accounting Periods. So, in addition to the traditional monthly 4-4-5 buckets (where the weekly amount of the 5th months' forecast might appear lower because of the addition of the 5th week) forecasting can bucket the forecast into 13 periods to match the accounting year.

On the Parameters General tab, select the Calendar type to be either "Fiscal" periods or "Calendar" periods. On the Labels tab define the names of each of the 12 or 13 periods. These labels are used on Forecast Main, the Calendar method will have 12 monthly buckets and the Fiscal method will display 13 period buckets.



Accounting Periods

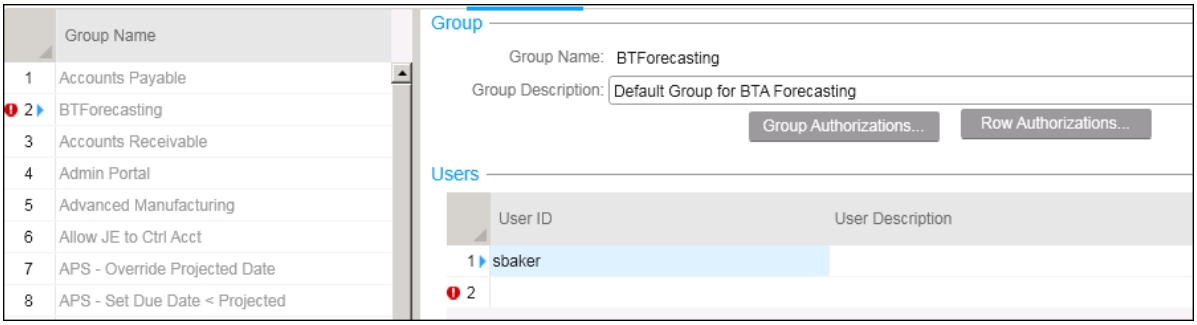
Define the financial accounting periods in the Accounting Periods form.



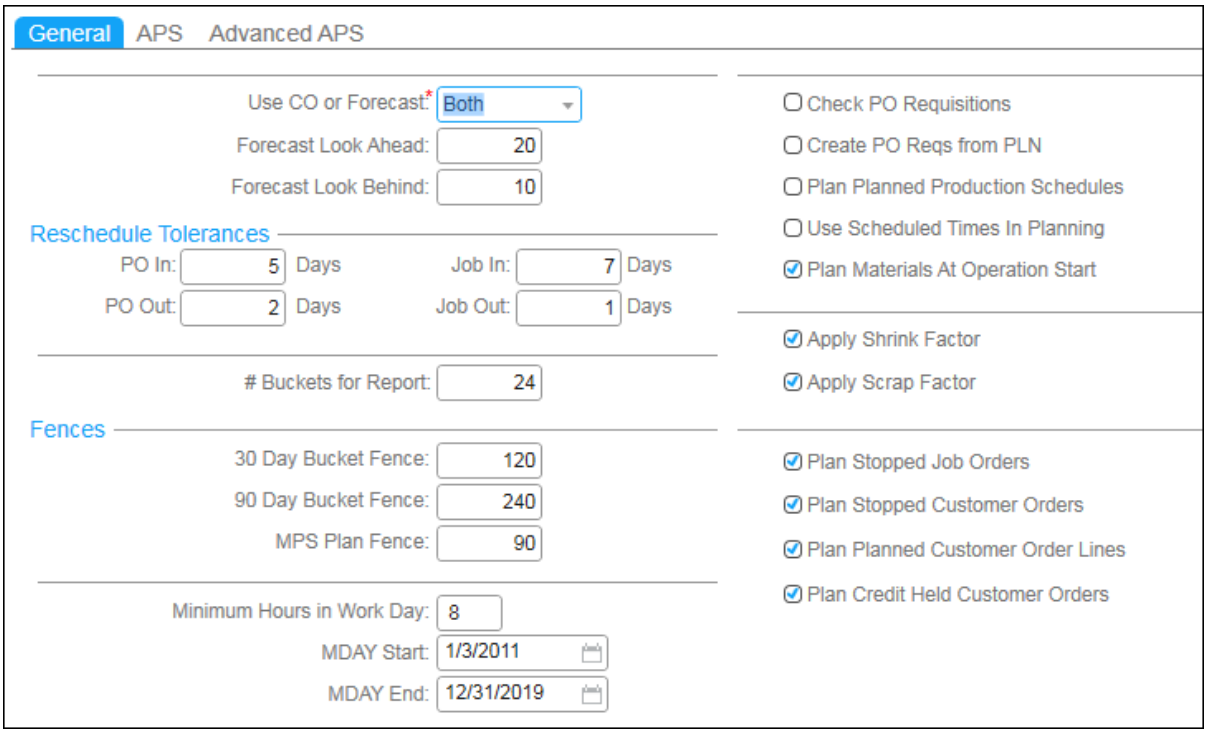
To use Fiscal periods to forecast, you must have the current year, next year, and at least 4 prior years defined in the Accounting Periods form. The History data will be bucketed according to the dates specified on this form.

Forecasting Authorizations

The Groups form is used for giving users access to the Forecasting application. When installing the Forecasting application a script is provided that creates a “BTforecasting” group, the default group for BTA Forecasting. Run the script by logging into the App database in SQL Management Studio and update the script to point to your Forms database, then run the script to install the group. Add the users to this group that need access to the Forecasting application.



MRP/APS Planning Parameters



Use CO or Forecast: This option determines whether the system uses forecasts and/or customer orders to create independent requirements. Select one of the following options:

- **CO** - The system plans customer orders but does not plan forecasts.
- **Forecast** - The system plans forecasts but does not plan customer orders. The output forms and reports do not show the forecasts being allocated to customer orders. When this option is selected, the system uses the forecast's Original Quantity as the demand quantity instead of the Outstanding Requirement.
- **Both** - The system plans both customer orders and forecasts. Forecasts are planned using the Outstanding Requirement value as the demand quantity. Forecasts are shown as being consumed by customer orders on output forms and reports.

Forecast Look Ahead/Behind: Set the number of days into the future and past to look for forecasts to be consumed by customer orders during a run of MRP Planning or APS Planning. When a customer order is entered in Order Entry, the system begins at the customer order item due date and looks this number of manufacturing days into the future or the past for forecasts to be consumed by the customer order.

Manufacturing Calendar: The MCAL should be setup to include at least this year and next year.

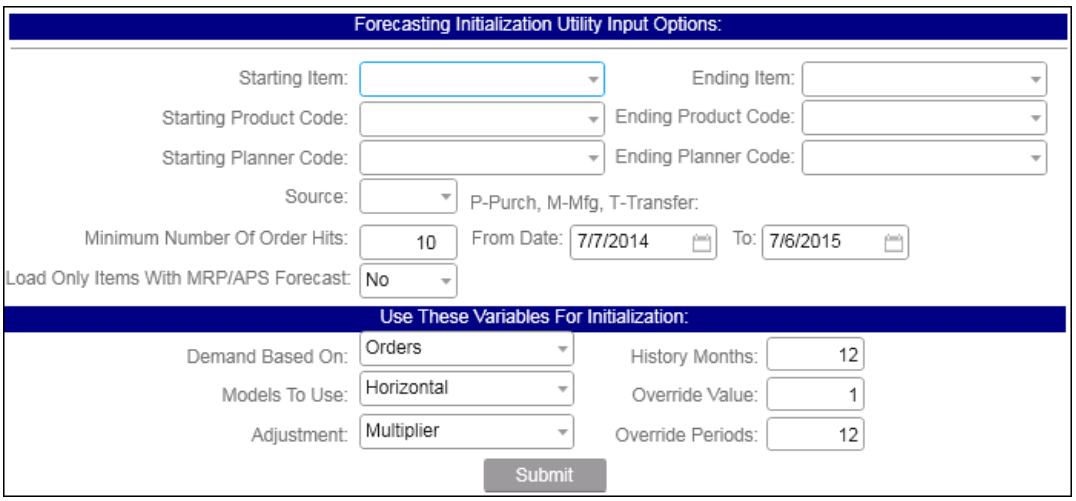
NOTE: The MRP/APS Planning system uses the Forecast Look Ahead field on the Planning Parameters form only if this same field is not entered on the Product Codes form. Consumption always looks **Back** first. The Look Back Parameter also controls when unconsumed forecasts are dropped from the system.

SECTION 4 - Creating Forecast Items

To calculate statistical forecasts you need to enter the forecasted items and then retrieve sales or usage history. A new item can be entered into Forecast Main three different ways: Clicking the New Button, using the Create Initial Forecasts utility, and Bulk Add using the Edit-Paste Rows Append function.

Create Initial Forecasts Utility

You can create the list of items to be forecasted in mass from your Item data with the Forecast Create Initial Forecasts utility. This utility can be run multiple times to add groups of items and can default the initial variables for each group of items imported.



Import Options

This form has the ability to create the initial set of items to be forecasted from three different sources. One imports items that have been sold in the past, another imports items already being forecasted, and the third imports items from item masters.

Use the Item, Product Code, Planner Code ranges, and Source to specify which items will be imported. Then select to only import items that have a minimum number of order lines within a range of due dates, **OR** to only import items that already have forecasts in the planning system within a date range.

- If you select "0" for number of order hits **and** "No" for Load Only Items with MRP/APS, then the range of items selected will be imported without regard to existing Customer Orders and Forecast records.
- If you select "0" for number of order hits and "Yes" for Load Only Items with MRP/APS, then the range of items selected that also have forecast records will be imported without regard to existing Customer Orders.
- If you select a value for number of order hits and "No" for Load Only Items with MRP/APS, then the range of items selected that also have at least the number of customer order lines specified will be imported, without considering if forecast records exist.

After making the desired selection above, specify the variables to be assigned to the imported items.

- **Demand Based On**: Sets the Data Type field for the imported items to Orders or Usage. See Forecast Main Planning Tab for an explanation of this field.
- **Model to Use / Adjustment**: Sets the Model and Adjustment fields for the imported items.
- **History Months, Override Values and Override Periods**: For most situations, use the default values for these variables. See more information on adjusting forecasts in the Manipulating Individual Items section.

Bulk Add/Update of Forecast Items

Forecast Main Grid View

The Grid view on the Forecast Main form includes the standard functionality to populate tables using the Paste Rows Append functionality. This can be a quick and easy method to load items to Forecasting. You can just load the item (not including its forecast) or load existing forecasts from spreadsheets. **Use extreme caution whenever you use the Paste Rows Append functionality… it provides some data validation but it is easy to make mass unintended changes.**

Item	Description	Company	Product Code	Prod Line	Item Group	Monthly Avg	Ave Forecast	Exc Codes	Model	Service Level
AD-10000	Additive, UV Rays Prevention		RM		RM	14.42	8.92	T	Trend	80.00
AL-10000	Steel,Chromium		RM		RM	422.08	600.00		Horizontal	80.00
BB10	Bike, Blue, 10 Speed		FG-100		FG-100	228.17	294.17		Horizontal	80.00
BB20	Bike, Blue, 20 Speed		FG-200		FG-200	0.00	242.83		Horizontal	80.00
BG10	Bike, Green, 10 Speed		FG-100		FG-100	0.00	202.33		Horizontal	80.00
BG20	Bike, Green, 20 Speed		FG-200		FG-200	0.00	131.83		Horizontal	80.00
Bike PBOM	Bike Planning BoM		FG-100		FG-100	1,036.17	1,112.08	T	Horizontal	80.00
BK-27000	Bicycle,Customized,27",*BA...		FG-CUS...		FG-CUST...	0.00	0.00		Horizontal	80.00
BR10	Bike, Red, 10 Speed		FG-100		FG-100	0.00	97.92		Horizontal	80.00
BR-10000	Rack,Rear,Standard		PP		PP	0.83	51.25		Horizontal	80.00
BR20	Bike, Red, 20 Speed		FG-200		FG-200	0.00	666.25		Horizontal	80.00
BR-20000	Rack,Rear,Deluxe		PP		PP	25.00	2.80		Trend Seasonal	80.00

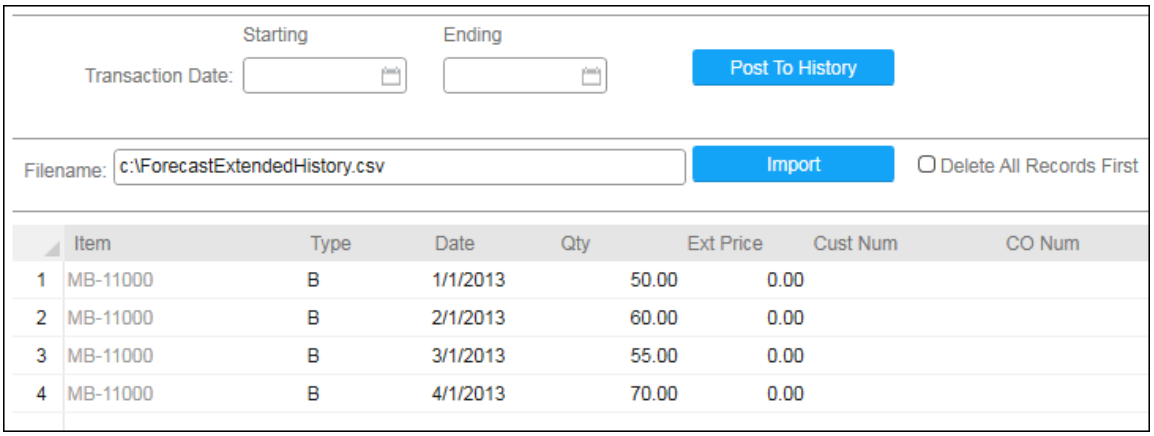
Loading History

After loading items into Forecast Main, the sales or usage history needs to be loaded for the items. The history can be loaded individually for each item by selecting Rebuild History from the right click (Actions) menu on Forecast Main, or by running the Rebuild History utility. It is recommended that at least two to three years history be available to calculate a forecast. If you have insufficient Customers Orders and/or Material Transactions history, see the Extended History section for information on pulling in history from other sources.

Extended History

The Extended History form is used to bring in sales or usage history from other systems into the Forecasting application for viewing or for using to calculate forecasts. The history will be automatically collected starting with the date you went live with the Order Entry system, but you may have history before your go live date in your previous ERP system that you want to bring into the Forecasting app. If you can get that history into a csv file or Excel spreadsheet, it can be imported into this form and then posted to the Forecasting History and combined with the history that is automatically collected from the Customer Order and Material Transaction files by the Monthly Utility.

Warning: Be sure to understand how the Rebuild History Utility works before using this function.



	Item	Type	Date	Qty	Ext Price	Cust Num	CO Num
1	MB-11000	B	1/1/2013	50.00	0.00		
2	MB-11000	B	2/1/2013	60.00	0.00		
3	MB-11000	B	3/1/2013	55.00	0.00		
4	MB-11000	B	4/1/2013	70.00	0.00		

Key Fields:

Transaction Date: Enter the Dates with which you want the information to post into Forecast History – Note that the history will be compressed to one "data point" per month.

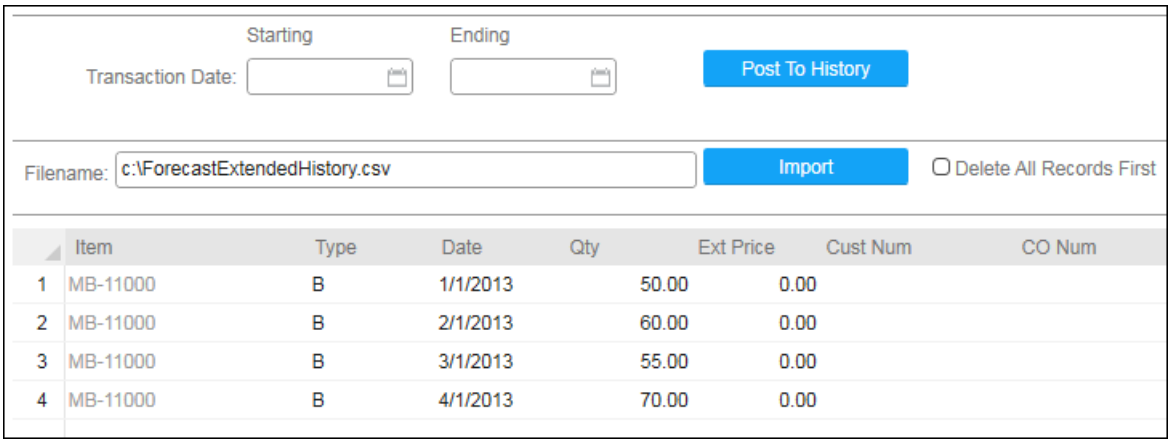
Import Button: You have the choice to Paste Rows Append or to import data into this form from a .CSV file.

Delete All Records First: Check this box to delete all data in the table prior to importing new records.
Item: Any item number can be stored in the Extended History table, including items not found in the SyteLine Items Form. If the Item does not exist in the Forecast Main form, then the Item's history will not load when the post button is selected.

Type: Enter S for “Shipment Data” and/or B for “Bookings” data
Qty: Quantity Shipped or Booked
Ext Price: Note that this is EXTENDED PRICE

CUST Num: Special Format Customer Num for sorting and storing data.
CO Num: Special Format Customer Order Num for sorting and storing data.
CO Line: Special Format Customer Order Line for sorting and storing data.

Extended History Form Functionality



	Item	Type	Date	Qty	Ext Price	Cust Num	CO Num
1	MB-11000	B	1/1/2013	50.00	0.00		
2	MB-11000	B	2/1/2013	60.00	0.00		
3	MB-11000	B	3/1/2013	55.00	0.00		
4	MB-11000	B	4/1/2013	70.00	0.00		

Import: The headers on the spreadsheet are required and the import will skip this first line. Clean the data before importing. At a minimum you must have:

1. Item – Does not have to be a SyteLine item.
2. Type – S or B
3. Date – transaction date
4. Qty – transaction quantity

Save the Excel file as .CSV format. The Import button will load the data in the .CSV file to this form. It will not be validated in any way. Think of this form as a vault that stores your legacy sales/usage history.

Notes:

“Delete All Records First” will delete all history in the vault.

Use the Transaction Dates to Limit the Posting if necessary.

The item **must be in Forecast Main** before history can be collected.

Process to load Extended History

1) Use the Create Initial Forecast utility to mass load new items.
2) Run Rebuild History for all items to retrieve History from Customer Orders and Material Transactions. Only rebuild the History forward from the ERP go live date.
3) Import Extended History.
4) Post Extended History using the end of the month prior to Go Live to populate the history file with the Imported History.
5) Run the Forecast Auto Calculate Forecasts utility which essentially runs the Auto Calc button for all the items to generate a forecast.

This results in the History file containing Imported History and order/usage history. The monthly utility adds the most recent complete month to this history.

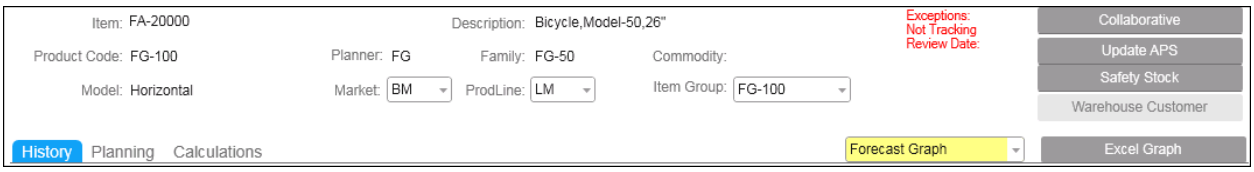
WARNING: if you run the Rebuild History Utility, it will wipe out the history that was brought in with the Extended History Import. So restrict the rebuild dates to not affect the history that was brought in from the Extended History. To be safe, you should save the Extended History File so it can be imported again.

Next: After loading history, you are ready to calculate forecasts using the following methods. See the related sections of this manual for more information on these methods.

- Statistical Forecasting
- Collaborative Forecasting
- Statistical Warehouse and/or Customer Forecasting
- Planning BOM Forecasting

SECTION 5 – Forecast Main (Home Page)

The Forecast Main form is the "home page" from where you can access most of the commonly used functionality and view the most important forecasting information for a forecasted item.



Header Information

- **Item:** Item Number – Must exist on the Items form.
- **Description:** Item's Description from Items form
- **Product Code:** Item's Product Code from Items form
- **Family Code:** Item's Family Code from Items form
- **Planner:** Item's Planner Code from Items form
- **Commodity:** Item's Commodity Code from Items form
- **Model:** Forecast Model selected on the Main form Calculations tab
- **User Defined Field 1:** User defined to be "Company" (defined in Forecasting Parameters)
- **User Defined Field 2:** User defined to be "Prod Line" (defined in Forecasting Parameters)
- **Cur Period Delta (grid):** Difference between the forecast value in the MRP/APS system versus the Net Forecast in the Forecasting app in both units and dollars. Allows user to see the effect of updating the planning system with newly created forecasts.
- **Excel Graph:** Used for graphing history and forecast information.
    1. Forecast Graph: displays last 24 periods history and next 12 periods forecast (unadjusted)
    2. History Graph: displays last 36 periods actual history and the last forecast for those 36 periods allowing you to view the forecast variance over the last 36 periods.
    3. Net Forecast Graph: displays last 24 periods history and next 12 periods forecast (after Group and Item adjustments)

Exceptions

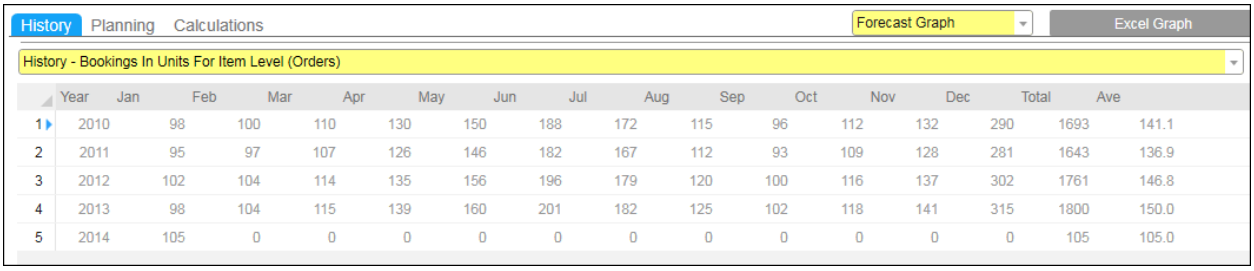
The main form displays Exception messages that are triggered by the Monthly Utility. The Exceptions appear at the top of the Main form in red and also in the grid view (Exc Codes) which can be used to clear exceptions.

- **"R" Review:** Indicates that the Review Date has passed. To clear the review exception, remove or push out the Review Date on Forecast Main. Then you can remove the "R" from the Main grid. Also, there is a utility to set the review date for a group of items.
- **"T" Tracking:** The monthly utility accumulates a new "sum of errors", computes a new forecast average, and divides the new sum of errors by the average error – this quotient is the Tracking Value. If it is greater than or equal to the Track Limit, then the exception occurs. To clear it, deal with the sum of the errors situation and zero the sum of errors on Forecast Main to start tracking over again. Then delete the "T" in the grid view.

- **"D" Demand:** The monthly utility calculates a new monthly average and a new average error. The demand signal is multiplied by the average error and added to the monthly average. IF the prior month's bookings were greater than or equal to this number then the exception condition is set. Deal with the condition, then delete the "D" in the grid view.

See the Planning Tab notes in this section for information on setting the Tracking Limit and the Demand Filter.

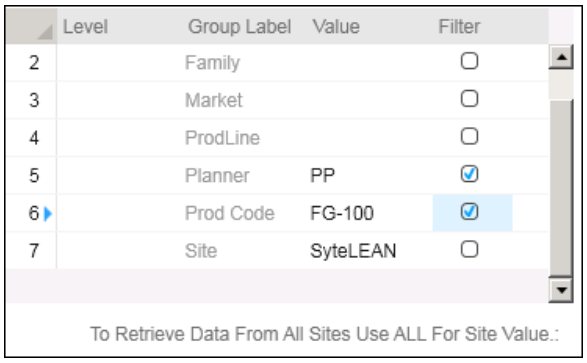
History Tab



	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Ave
1	2010	98	100	110	130	150	188	172	115	96	112	132	290	1693	141.1
2	2011	95	97	107	126	146	182	167	112	93	109	128	281	1643	136.9
3	2012	102	104	114	135	156	196	179	120	100	116	137	302	1761	146.8
4	2013	98	104	115	139	160	201	182	125	102	118	141	315	1800	150.0
5	2014	105	0	0	0	0	0	0	0	0	0	0	0	105	105.0

History Type Selection Bar: Select how the history is displayed for the selected item:

- Booked Unit Quantities. Note: the selection bar for "Bookings" will display "Orders" or "Usage" depending on the selection for Data Type on the Planning tab.
- Booked Net Sales Dollars
- Shipped Unit Quantities Note: If the Data Type is "Usage" this selection will display all usage.
- Shipped Net Sales Dollars
- Group Level history – this option allows selecting a group that this item belongs to, which then will display the total for the entire group. It also allows selecting another site or all sites so as to view an item forecast in another site or the total of all forecasts across all sites for the selected item. Enter the site name or "All" in the Value field (*tip*: you can also check one of the levels to view the total of that level value of another site or across all sites). The following example will display the total of all items that are in the PP Planner Code and the FG-100 Product Code.



	Level	Group Label	Value	Filter
2		Family		☐
3		Market		☐
4		ProdLine		☐
5		Planner	PP	☑
6		Prod Code	FG-100	☑
7		Site	SyteLEAN	☐

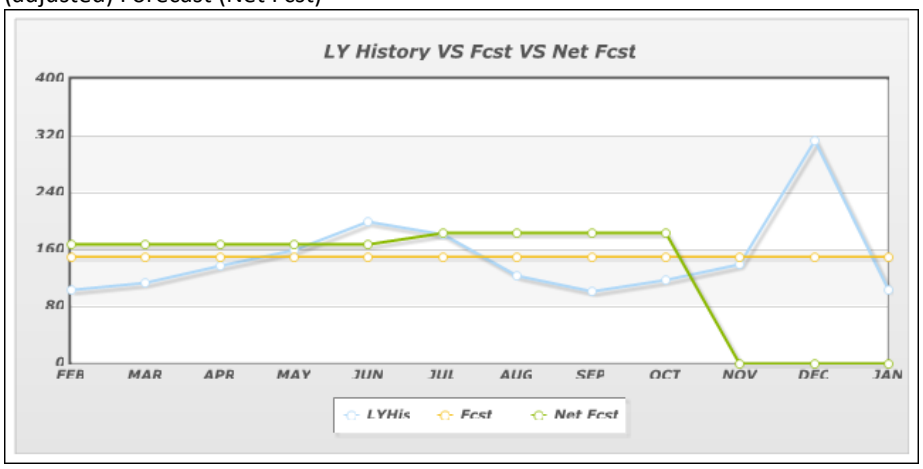
To Retrieve Data From All Sites Use ALL For Site Value.:

Demand History Grid: Displays up to 5 years of demand history. Can be sales or usage history based on the "Data Type" selection for the item. Also note that the Forecast-As relationships are reflected in the history.

- If the item Data Type = Orders, "Bookings" history is extracted from customer order line quantities based on either the order date, due date, or request date per the Forecast Parameters form and Transfer Orders are included if selected in the Forecast Parameters. The "Shipments" selection displays history pulled from the shipping transactions file using the ship date and quantity.
- If the Data Type = Usage, "Bookings" history is extracted from the material transaction files based on the transaction date and the types of transactions specified in Forecast Parameters. The "Shipments" selection displays the same history as the "Bookings".

Warning: The right click menu option "Rebuild History" will delete all history for the item and rebuild it from the customer order and material transaction files. So, if you have manually edited the history or imported it using the Extended History form, it will be lost. See the section on the Rebuild History utility on how to restrict the dates that are rebuilt.

- **Form Graph:** Shows Last 12 months actual demand (LYHis), Current Calculated Forecast (Fcst), and Net (adjusted) Forecast (Net Fcst)

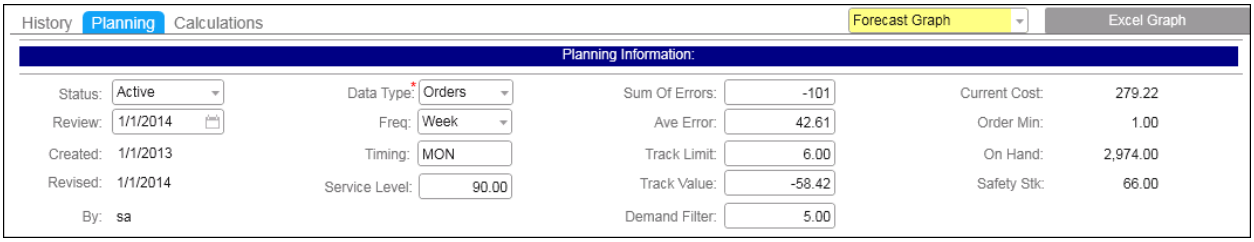


- **Forecast and Adjustments pane:**
- Label: Forecast Period: Starts with the current period. The labels come from Forecast Parameters form.
- Calculated Forecast (blue column): The system calculated forecast using the selected model, or the values from the Collaborative form if this item uses the Consensus Model.
- Group Adjustment percentage: Derived from the Group Memberships form showing the total of all Group Adjustments for the groups that this item is a member of.
- Item Adjustments for this item: Manually entered adjustments for this item (can be an override or a multiplier depending on the "Adjustment" field. Right click to update this item's adjustments, or the Item Adjustments form can be opened independently to update the adjustments for multiple items.
- Net Forecast: (green column): The adjusted forecast (after group and item adjustments) that will be applied to MRP/APS.

	Label	Forecast	Grp Adj	Item Adj	Net Fcst
1	FEB	151	12.00	1.00	169
2	MAR	151	12.00	1.00	169
3	APR	151	12.00	1.00	169
4	MAY	151	12.00	1.00	169
5	JUN	151	12.00	1.00	169
6	JUL	151	22.00	1.00	184
7	AUG	151	22.00	1.00	184
8	SEP	151	22.00	1.00	184
9	OCT	151	22.00	1.00	184
10	NOV	151	22.00	0.00	0
11	DEC	151	22.00	0.00	0
12	JAN	151	22.00	0.00	0

Planning Tab

The Planning Tab is used to see how the forecast is tracking and to specify settings for the item that control capture of history, calculation of safety stocks, and loading of the forecast into the planning system.



- **Status:** Used to categorize items. The only Status that affects Forecasting functionality is "Inactive". The Forecast Monthly Utility and the Update MRP for All Items utility will ignore "Inactive" items, however the Rebuild History for All Items utility will still update the history for the item.
- **Review Date:** Enter a date to have the Monthly Utility automatically trigger an Exception for this item after the Review Date has passed. You can use the "Forecast Update Review Date" to change a range of items.
- **Created, Revised, By:** Auto updated when a forecast item is created or changed to record the date and user.
- **Data Type**:
    - Orders: History is extracted from customer order line quantities based on either the order date, due date, or request date per the Forecast Parameters form and Transfer Orders are included if selected in the Forecast Parameters. The shipments history is pulled from the shipping transactions file using the ship date and quantity.
    - Usage: History is extracted from the material transaction files based on the transaction date and the types of transactions specified in Forecast Parameters.
- **Service Level, Frequency and Timing:** Allows you to **o**verride the setting from the Forecast Parameters Maintenance form. See the Forecast Parameters section for a definition of these fields.
- **Current Cost, Order Min, On Hand, and Safety Stock:** From the Items form. Displayed for convenience.
- **Average Error**: Average of the last 12 months of absolute variances between the statistical forecast before adjustments for each period and actual demand for that period.
- **Sum of Errors**: Total of all absolute variances between what was forecasted versus the actual demand. These absolute variances are accumulated each period by the Monthly Utility until the value is reset. This value is reset whenever a new model is selected for the item.
- **Track Value:** Calculated as the **Sum of Errors** divided by the **Average Error**. When being compared to the Track Limit, the +/- sign is ignored. Resetting the Sum of Errors resets the Track Value.
- **Demand Filter:** This value is used to trigger an unreasonable/unusual demand exception "D" when the actual demand is higher than the forecast. Normally set this value between 4 and 6. A lower value is more sensitive to triggering an exception if the actual demand in a period is higher than forecasted. The Exception is triggered if the demand exceeds the **forecast average** by more than the product of the demand filter value and the **average forecast error** (Mean Absolute Deviation). So, the Demand Filter can be used to trigger an alert when actual demand is unusually higher than the forecast.

  When this condition is triggered, this unusual "outlier" demand period will still be processed by the Monthly Utility to build the last month's history and perform the time phase shifts, but will not update the forecast average, trend, and seasonality base index values. Which essentially means the period will not be included in calculating the new forecast. The Update MRP/APS for All Items Utility will update the forecasts in the

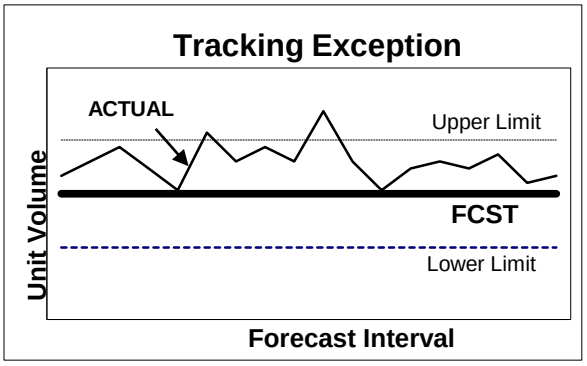
planning system, even if the item has triggered an exception.

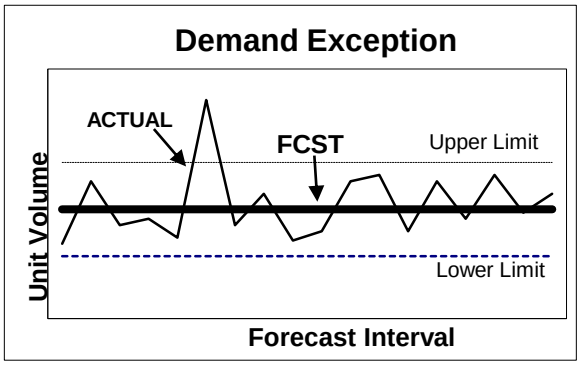
- **Track Limit:** The Track Limit is used with the Track Value to determine a Forecast Tracking Exception. The smaller the value, the more sensitive the Track Limit is to generating an exception condition. Normally set this value to "6". If the item is a new product and the forecast is to be monitored closely, then specify a smaller value. **T**he Track Limit will trigger an exception when the actual trend and the forecast trend are not tracking together.

  When this condition is triggered, this unusual "outlier" demand period will still be processed by the Monthly Utility to build the last month's history and perform the time phase shifts, but will not update the forecast average, trend, and seasonality base index values. Which essentially means the period will not be included in calculating the new forecast. The Update MRP/APS for All Items Utility will update the forecasts in the planning system, even if the item has triggered an exception.

  Each time the Monthly Utility runs, it accumulates a new "sum of errors", computes a new forecast average, and divides the new sum of errors by the average error. This quotient is the Track Value. If it is greater than or equal to the Track Limit then the exception is triggered. To clear it, you should delete the "T" in the Forecast Main grid Exceptions field, then deal with the sum of the errors, and zero out the sum of errors to start tracking over again.

  Tracking Example - If the forecast was 100 a month and 50 were sold in the first month and 25 were sold in the second month, then the running sum of errors would be -50 + -75 or minus 125, since the last time we this item was manually updated. This is an increasing gap between the forecast and actual demand and the avg error is 62.5 (125/2 periods). The sum of the errors divided by the average error is 2.0, which is less than 6 (the tracking limit). Therefore the Tracking Exception is not triggered.



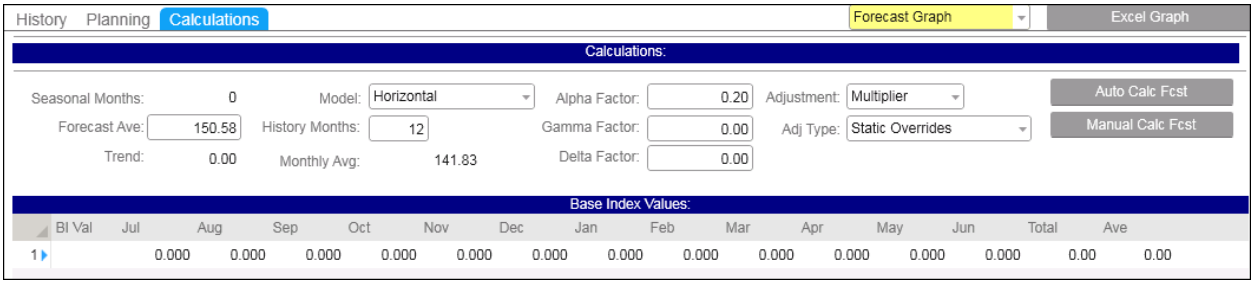


USEFUL REPORTS AND ACTIVITIES:

Forecast Exceptions Report, Forecast Consumption Exceptions Report

Calculations Tab

The **Calculations Tab** is used to calculate statistical forecasts and to test different forecast models.



Field Descriptions

- **Seasonal Months:** Select the number of months of history to be used in calculating the base index values used in models that consider seasonality. The number of History Months is used to calculate the average demand, but the number of Seasonal Months is used to determine the seasonal pattern.
- **Forecast Ave:** Calculated as the total forecast divided by 12 or 13 periods. This value can be input by the user to manually calculate the forecast with the Manual Calc Fcst button.
- **Trend:** Used to specify the increment each period for a trend model calculation when the Manual Calc button is clicked. Automatically calculated when the Auto Calc button is clicked.
- **Monthly Avg**: Latest 12 periods of actual demand history divided by 12.
- **Model:** Forecast Model that will be used the next time the forecast is calculated. See the appendix on Forecasting Models for details.
- **History Months:** Select the number of months of history to be used when calculating a forecast.
- **Alpha, Gamma and Delta Factors:** Used by different models to control the behavior of the model. See the Section on Model Choices for more information.
- **Adjustment:** Controls how the item Adjustment functions. See the Manipulating Individual Items section.
- **Adj Type**: Controls if adjustment rolls forward each period. See the Manipulating Individual Items section.
- **Base Index Values:** Calculated values when using Trend/Seasonal models. These indicate the monthly deflection from Calculated Average for each forecast bucket.

Typical Process to Calculate an Item Forecast:

1. Choose a model.
2. Enter the number of history months to use to calculate a forecast.
3. Click ”Auto Calc Fcst” button – a calculated Forecast will display in the blue Forecast column.
4. Review the graph and analyze for adequacy of the calculated forecast, then change the Model and other settings if appropriate.
5. Click the save button when satisfied with the forecast calculation.
6. Right click the Forecast and Adjustments pane to enter any needed adjustments or overrides.
7. Click the “Update MRP/APS” button to pass the forecast to the MRP/APS planning system. Or, you can calculate and update multiple item forecasts, then run the Update MRP/APS for All Items utility.

Auto Calc vs Manual Calc Buttons

The Manual calc button on the calculations tab allows you to do a statistical calculation of the forecast using the Forecast Ave, Trend, and Model selections. This calculation will ignore history and just use the Forecast Ave value. The Auto Calc will use the selected Model to calculate the forecast using the actual history for the item for the selected History Months. If Manual Calculation was chosen, then the forecast average must be manually input.

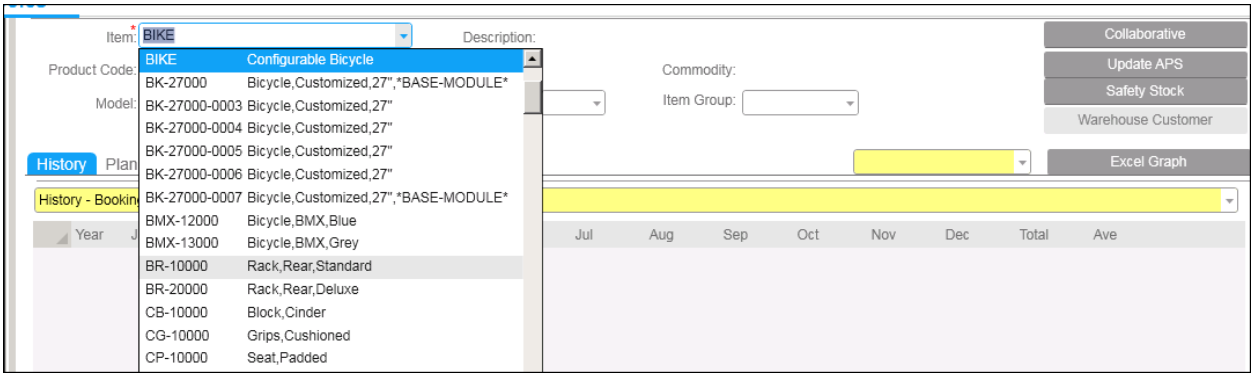
USEFUL REPORTS AND ACTIVITIES:

- Forecast Detail Report
- Forecast Summary Report
- Forecast Items Ranking Report
- Forecast Export Forecasts
- Forecast Last 24 Actual VS Forecast By Item Report
- Forecast Calculate Best Fit Models Report

SECTION 6 – Working with Forecasts

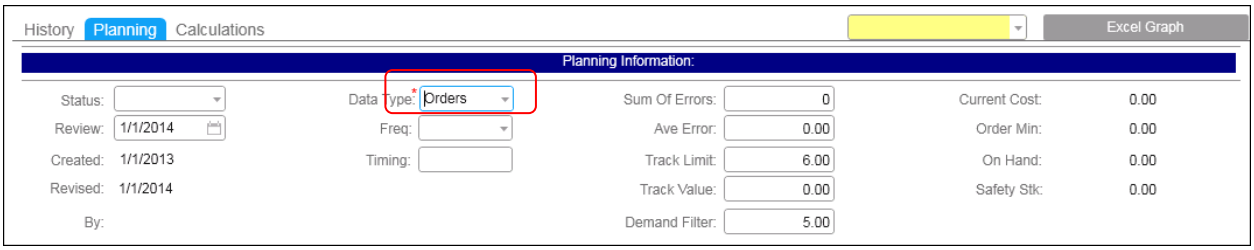
Adding a New Item

New items can be loaded into Forecast Main three different ways: Clicking the New Button, Edit-Paste Rows Append, or using the Create Initial Forecasts utility. Below are the New Button instructions. See the Create Initial Forecasts section for the latter two methods.



To add an item to the Forecasting Application:

1. Open the Forecast Main form.
2. Click the New Record icon.
3. Enter your item number or, using the drop down Menu, select the item you wish to enter. (Note: data will be displayed from the Items form, such as description, product code, etc.)
4. Select the Planning Tab and choose a Data Type of either “Orders” or “Usage”, then save.



The next step would be to right click on Forecast Main and select to rebuild the history for the item, then you can calculate a forecast for this item.

See the Create, View and Save Forecasts topic for Quick Start instructions on creating an individual item’s forecast, or see the Forecasting Implementation and First Month Operation for more complete start up instructions. See the Monthly Processes topic for recommended operating procedures.

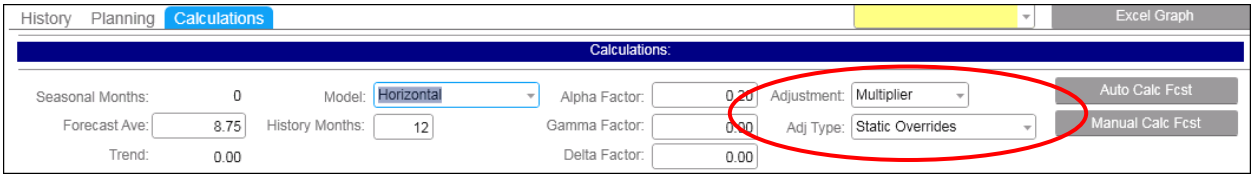
Manipulating Individual Items

To adjust or override the calculated Forecast before the forecast goes to the MRP/APS Engine, use the Item Adjust function in the bottom right portion of the Forecast Main form.

- The blue Forecast column is the calculated forecast. The Item Adj column is the manual adjustment for the period. The green Net Fcst column is the adjusted value that will flow to MRP/APS.
- If the Adjustment on the calculations tab is set to "Multiplier" and Adj value is "1" there is no Item Adjustment applied, the Net Forecast equals the Forecast after the Group Adj is applied.

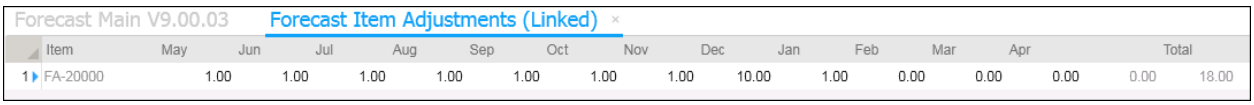
	Label	Forecast	Grp Adj	Item Adj	Net Fcst
1	MAY	9	12.00	1.00	10
2	JUN	9	12.00	1.00	10
3	JUL	9	12.00	1.00	10
4	AUG	9	12.00	1.00	10
5	SEP	9	12.00	1.00	10
6	OCT	9	22.00	1.00	11
7	NOV	9	22.00	1.00	11
8	DEC	9	22.00	1.00	11
9	JAN	9	22.00	1.00	11
10	FEB	9	22.00	0.00	0
11	MAR	9	22.00	0.00	0
12	APR	9	22.00	0.00	0

Before entering an Item Adjustment, specify the Adjustment method and Adj Type on the Calculations Tab:



- Adjustment method has three options:
  - None- the item adj will be ignored when the Net Forecast is calculated
  - Multiplier – the forecast is multiplied by the value in the Item Adj field to get the Net Forecast
  - Replace – the Grp Adj and the Item Adj are ignored. The Forecast is replaced by the value in the Item Adj field to get the Net Forecast when the forecast is calculated.
- The Adjustment Type has two options:
  - Static Override – an override adjustment in the second period will stay in the second period – even when the month changes.
  - Time Phased Override – the adjustment will move with the bucket in which the adjustment is made. Example: an adjustment to the 4th period when that period is June, will tie the Adjustment to the Month of June, so that next month when June is the 3rd period, the adjustment is still applied to June.

- To enter item adjustments, right-click on the Item Adj column and select Update Item Adjust. To enter adjustments for multiple items, open the Forecast Item Adjustments form directly.



	Item	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
1	FA-20000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00	1.00	0.00	0.00	0.00	0.00	18.00

	Label	Forec...	Grp Adj	Item Adj	Net Fcst
1	FEB	26	0.00	0.50	13
2	MAR	26	0.00	1.00	26
3	APR	26	0.00	1.50	39
4	MAY	26	0.00	2.00	52
5	JUN	26	0.00	1.00	26
6	JUL	26	0.00	1.00	26

This example illustrates a MULTIPLIER Item Adjustment: 26 X .5 = 13

	Label	Forec...	Grp Adj	Item Adj	Net Fcst
1	FEB	26	0.00	21.00	21
2	MAR	26	0.00	28.00	28
3	APR	26	0.00	50.00	50
4	MAY	26	0.00	45.00	45
5	JUN	26	0.00	26.00	26
6	JUL	26	0.00	22.00	22
7	AUG	26	0.00	15.00	15
8	SEP	26	0.00	15.00	15
9	OCT	26	0.00	2.00	2
10	NOV	26	0.00	1.00	1

This example illustrates a Replace Item Adjustment. Notice that the Override is what will be used in Planning.

Tip: To manually manage an item's forecast, set the Override Type to "Replace" then enter or copy/paste the forecasts into the Item Adjustment. This will keep the monthly utility from updating the forecasts. Also consider using the Collaborative Forecasting or the Warehouse Customer forecasting (which are explained later in this section.

“Replace” Adjustment: Static Overrides vs Time Phased Overrides:
Selecting Adjustment method="Replace" for an item causes forecasting to use the values in the Item Adjustment field as the Forecast. It “overrides” the calculated forecast. The item adjustments will be a rolling “static” override by default, i.e. the manually entered adjustment will be for this month, next month, and the month after. (It rolls to next month when next month is this month). For example, a forecast of 10 for this month will become a forecast of 10 for next month when next month becomes the current month. The alternative to a rolling “static” override is a Time Phased override, which will keep the override with the specific month you entered it for.

Replace Override Static Example:
> May Jun July
> 10 20 30
Next Month
> Jun July Aug
> 10 20 30

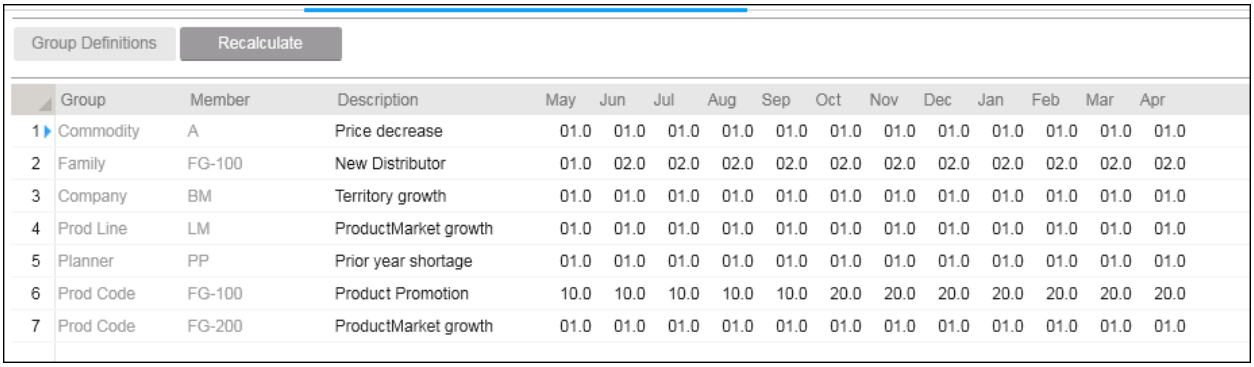
Replace Override Time Phased Example:
> May Jun July
> 10 20 30
Next Month
> Jun July Aug
> 20 30 0

USEFUL REPORTS: Forecast Last 24 Actual VS Forecast By Item Report

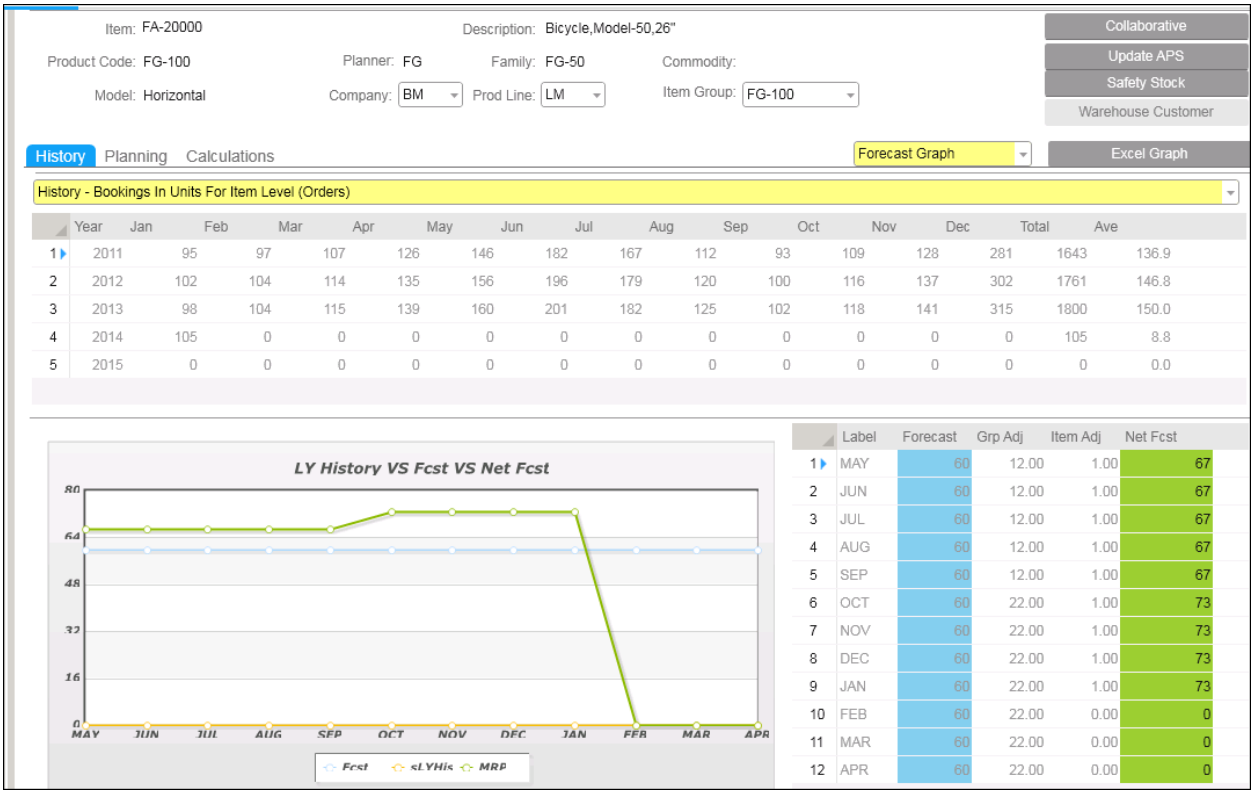
Manipulating Groups of Items

The Group Memberships form allows adjusting the forecasts for an entire group of items by a percentage increase or decrease. Groups include the standard groups specified on the Item form (Planner, Product Code, Family Code, Commodity Code) and two user defined groups specified on the Forecast Main form. The labels for these user defined groups are defined in the Forecasting Parameters form.

To adjust a Group of Items, open the Group Memberships form from the menu or by right clicking on the Grp Adj column. After updating the matrix, click the Recalculate button to update the Grp Adj column of all items.



	Group	Member	Description	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	Commodity	A	Price decrease	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0
2	Family	FG-100	New Distributor	01.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0	02.0
3	Company	BM	Territory growth	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0
4	Prod Line	LM	ProductMarket growth	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0
5	Planner	PP	Prior year shortage	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0
6	Prod Code	FG-100	Product Promotion	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
7	Prod Code	FG-200	ProductMarket growth	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0	01.0



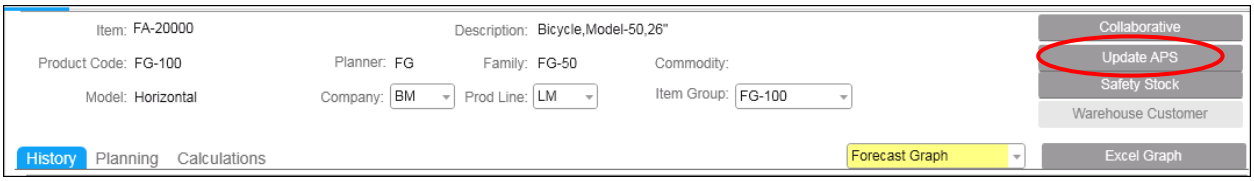
In the above example the Item belongs to the Product Code FG-100, Company=BM, and Prod Line=LM. So the group adjustment for this item is +12% (10+1+1) for May through Sep and +22%(20+1+1) for Oct through Apr. Notice that the Blue column (calculated Forecast) is multiplied by the values in the Group Adjustment column to calculate the Net Forecast that will go to the APS/MRP planning system.

USEFUL REPORTS: Forecast Group Membership Report

Pushing the Forecast to the Planning Engine

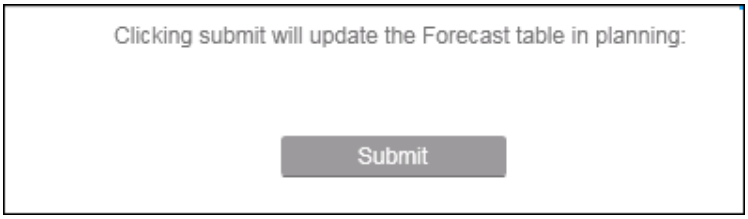
Once you are satisfied with the forecast in the green Net Fcst column at the bottom of Forecast Main, then you can apply the forecast to the MRP/APS Planning system. This can be accomplished for each item individually, or in mass for all items.

Individual Update: On Forecast Main, click the "Update APS" button.



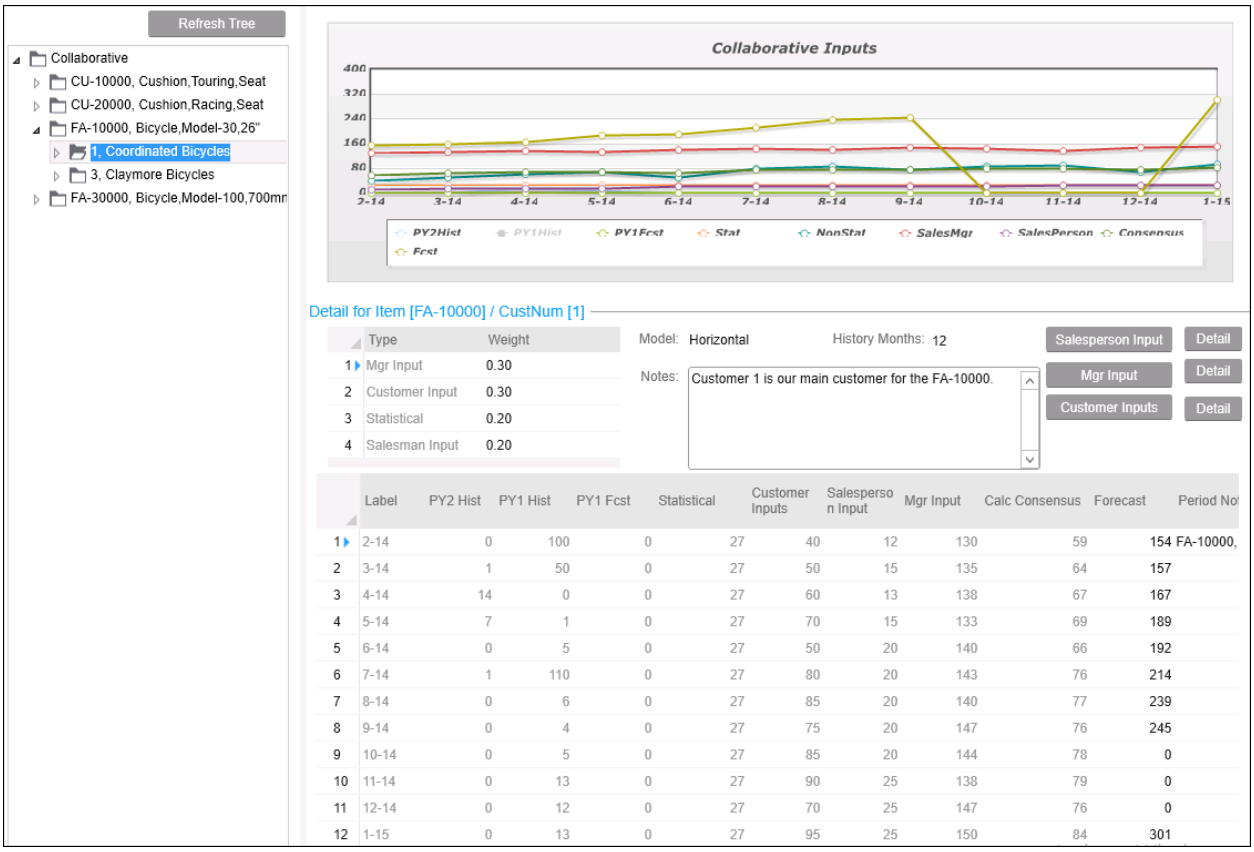
- To view the forecast in the MRP/APS system, select Actions, View Syteline APS, which opens the Forecast form for the item.

Mass update all items: Navigate to the Utility "Forecast Update MRP/APS For All Items", then click Submit.



Collaborative Forecasting

The Collaborative Forecast functionality replaces Combo Forecasting and Roll-Up Forecasting from previous versions. It allows comparison of many inputs (data points or opinions) to develop a consensus forecast. This can be done at the Item level or via custom roll-up hierarchies you define (ex: Whse forecast rolls up to Customer forecast, which rolls up to item total forecast). For example you can input multiple opinions of the forecast for each customer of an Item and compare these inputs at each level in the hierarchy. When the Collaborative method is selected for an item you are responsible for keeping the forecasts up to date, the Monthly Utility does not calculate them.



The “Detail for Item” pane shows the Weighting Factors used to derive a Calculated Consensus forecast for this item. The values are inherited from the Collaborative Parameters form but can be changed on this form. The Model shows how the Statistical forecast is being calculated.

The user named (Input Type) buttons open the Non Statistical Input form filtered for the dimension you have highlighted. For example, if you have setup your Collaborative Tree hierarchy to forecast by customer and roll up to item, and then select customer 1 in the tree, the Named button “Salesperson Input” will open the Input form for a salesperson to enter the forecast for customer 1**.**

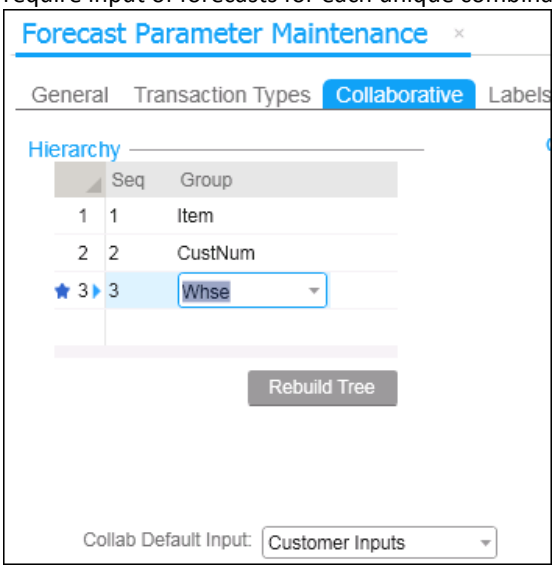
It is important to understand that the Input forms allow entering forecasts for multiple "Dimensions" (customer, salesperson, whse, etc) and for multiple "Input Types" (Ted, Alice, Customer, Mgr). These Input Types labels are user defined in the Forecasting Parameters form and are meant to be used to identify the source of the forecast. This can be confusing because "Customer" can be a source (Input Type), but it is also a Dimension. Also, "Salesperson" can be a source and also a dimension. Which means a salesperson provided the forecast (source), and the salesperson dimension is set to the salesperson's ID. By allowing for Dimensions AND Input Types, you can have the Salesperson), and the Customer, and the Manager all have input for a particular customer's forecast.

Configuring Collaborative Hierarchy and Specifying Inputs

The first step in setting up Collaborative forecasting is to setup your hierarchy in the Forecast Parameter Maintenance form. The hierarchy is fully customizable up to 3 levels and provides the flexibility to define how the levels of the forecasts are structured to roll up.

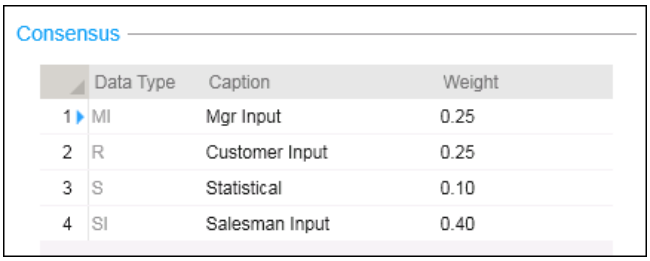
Using the Hierarchy builder specify Item as the first level. Any group (dimension) may be selected for level 2 and level 3. The maximum number of levels is three.

Below is an example of a 3 level hierarchy (it is suggested to minimize the number of levels to two so as to minimize the complexity of managing multiple roll up levels). This example is Item, CustNum, Whse and will require input of forecasts for each unique combination of CustNum/Whse for an item.



After specifying the levels in the hierarchy, click "Rebuild Tree" to make it live. If you are changing a previously specified hierarchy be absolutely sure, since **clicking the Rebuild Tree button will delete all notes, forecasts, and consensus weights that have previously been entered** in the Collaborative screen that are different than the newly created hierarchy.

Next, specify the Inputs Types (opinions) labels and weightings which are used to calculate a weighted average forecast (Calculated Consensus) on the Collaboration form. Label these inputs by updating the caption and saving the Forecast Parameters screen. This will change the label of that Source on all Collaborative screens.



In this example there are 3 different user defined manual input sources, which will appear as three buttons on the right of the Collaborative form. The 4th input (Statistical) is statistically calculated by the system. This setup will allow capturing the Sales Person's opinion for the forecast, the Sales Manager's opinion, and the forecast provided by the customer.

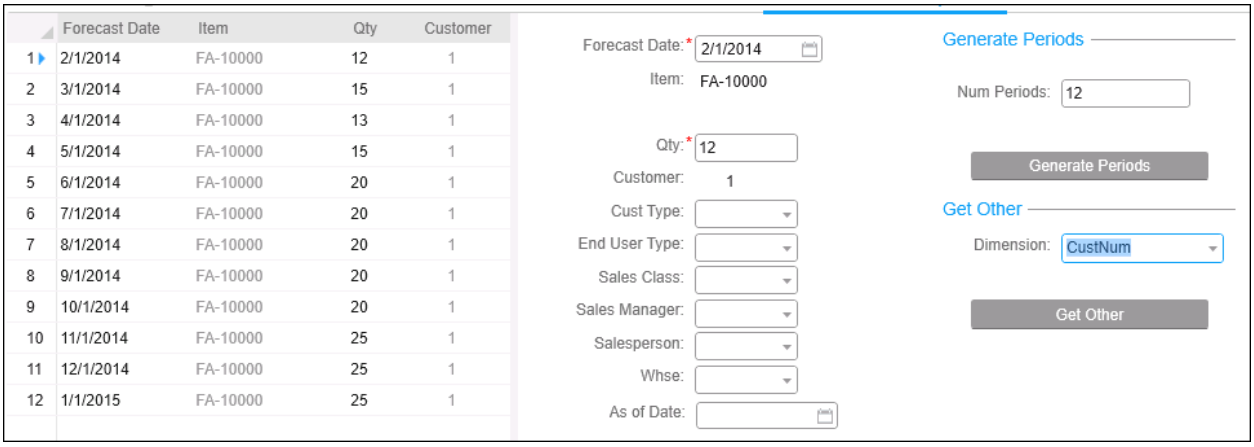
Input Data in Collaborative

To use the Collaborative method for an item, on Forecast Main Calculations tab select "Consensus" from the model drop down box. Then open the Collaborative form and the item will appear in the Tree. To Input data, the salesperson would click his/her Input Type button and enter the forecast for the selected customer (or any dimension in the hierarchy). Click the "Refresh Tree" button after entering any new Input data in order to see the updated quantities in the grid.

To define the specific customers, warehouses, salespersons (based on the defined hierarchy) that you want to roll up to the total forecast for an item, you must enter the inputs and then the hierarchy will appear in the Tree. For example, if you want to forecast customer 1 and customer 3 for the FA-10000, then enter input records for these customers and then the customers will appear in the Tree.

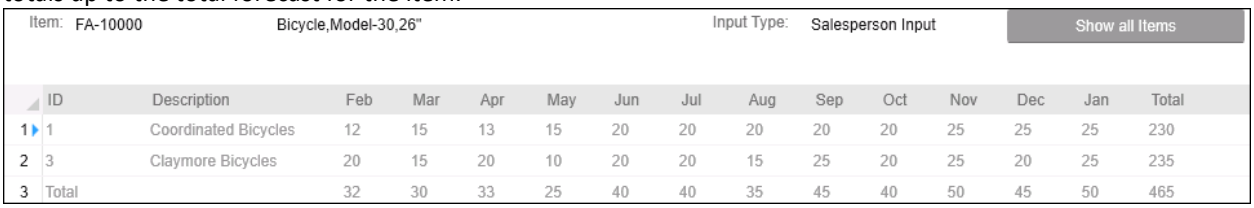
If you highlight the word "Collaborative" in the tree, and click an Input button, the Non Statistical form will be opened in a non-filtered mode for the selected Input Type so that forecasts for multiple dimensions and sources can be entered or copy/pasted in mass. Also, the form can be opened standalone using Ctrl O "Forecasting Non Statistical Input". The Non Statistical Input form has tabs that allow you to view "All items of Dimension" and "All Dimensions of Items". The dimension displayed is the first level down from Item per the Forecasting Parameters. An example of when this is helpful would be to view all the items that are forecasted for a specific customer, or all customers that are forecasted for a specific item (when Customer is the first level down from Item in Parameters).

Also note that in the Non-Statistical Input form, you can auto generate the forecast periods for an item (select the number of periods then click the "generate periods" button.



	Forecast Date	Item	Qty	Customer
1	2/1/2014	FA-10000	12	1
2	3/1/2014	FA-10000	15	1
3	4/1/2014	FA-10000	13	1
4	5/1/2014	FA-10000	15	1
5	6/1/2014	FA-10000	20	1
6	7/1/2014	FA-10000	20	1
7	8/1/2014	FA-10000	20	1
8	9/1/2014	FA-10000	20	1
9	10/1/2014	FA-10000	20	1
10	11/1/2014	FA-10000	25	1
11	12/1/2014	FA-10000	25	1
12	1/1/2015	FA-10000	25	1

Detail Buttons open a form that shows how the forecast rolls up to the quantities displayed in the grid for the selected item. For example if you have setup your Collaborative Tree hierarchy to forecast by Customer and roll up to Item, if you select an item in the tree, the detail buttons show the Input Type detail for each customer that totals up to the total forecast for the item.



Item: FA-10000 Bicycle,Model-30,26" Input Type: Salesperson Input Show all Items

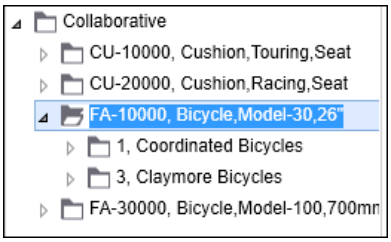
	ID	Description	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total
1	1	Coordinated Bicycles	12	15	13	15	20	20	20	20	20	25	25	25	230
2	3	Claymore Bicycles	20	15	20	10	20	20	15	25	20	25	20	25	235
3	Total		32	30	33	25	40	40	35	45	40	50	45	50	465

The “As of Date” on the Non Statistical form controls which forecast is the most current. For instance, if your customer gives you a forecast on 2/1/15(As of Date) for May2015, then on 3/1/15(As of Date) changes the forecast for May2015, then the system will ignore the 2/1/15 forecast. You can filter on this field to only display the most current forecasts. Blank is treated as the most current date.

The “Show all Dates” check box filters out the forecasts for past periods.

The Collaborative Tree and Grid

Use the Collaborative Tree to select the item and the level that you want to work on or view.



Label	PY2 Hist	PY1 Hist	PY1 Fcst	Statistical	Customer Inputs	Salesperson Input	Mgr Input	Calc Consensus
2-14	0	1,421	0	177	40	32	280	111
3-14	1	186	0	177	50	30	256	106
4-14	24	55	0	177	60	33	256	110
5-14	7	3	0	177	70	25	253	108
6-14	0	25	0	177	50	40	265	112
7-14	1	240	0	177	80	40	268	121
8-14	0	22	0	177	85	35	265	119

Selecting FA-10000 displays the total for the FA-10000 which is the sum of the customer 1 and customer 3 data.

Label	PY2 Hist	PY1 Hist	PY1 Fcst	Statistical	Customer Inputs	Salesperson Input	Mgr Input	Calc Consensus
2-14	0	100	0	27	40	12	130	59
3-14	1	50	0	27	50	15	135	64
4-14	14	0	0	27	60	13	138	67
5-14	7	1	0	27	70	15	133	69
6-14	0	5	0	27	50	20	140	66
7-14	1	110	0	27	80	20	143	76
8-14	0	6	0	27	85	20	140	77

Selecting Customer 1 in the Collaborative Hierarchy displays the data for inputs where Customer = 1, and item = FA-10000.

Adjusting and Finalizing the Collaborative Consensus Forecasts

Once all of the input has been entered, use the Collaborative screen to compare all the inputs for the item at each level, review the calculated Statistical forecast and calculated Consensus forecast and then enter the desired forecast for each level.

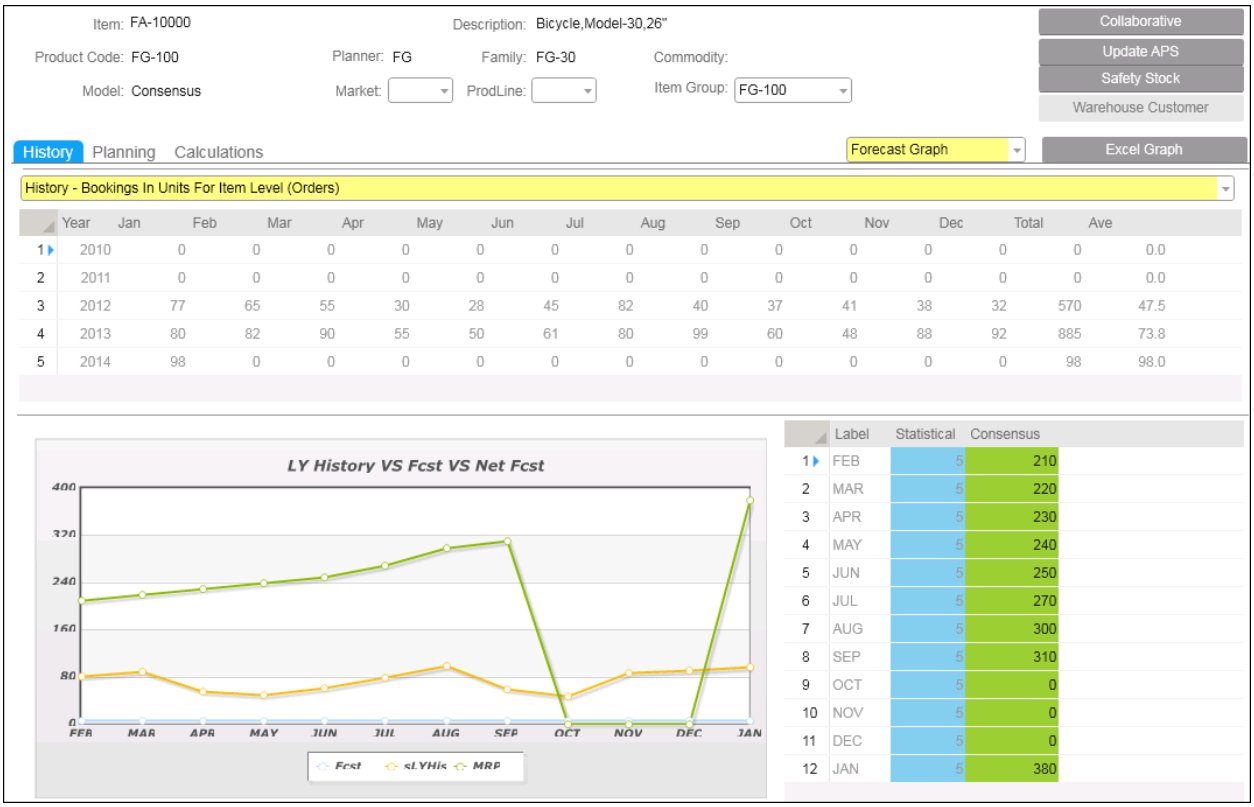
You can right click an Input Type column to copy it to the Forecast column, or manually enter the Forecast column. Note that you can change the Forecast at higher levels to override the individual inputs, and it will push the change down to the Forecast column on the lower levels.

Also note you can **default the Input Type** that will appear in the Forecast column. A setting in the Forecasting Collaborative Parameters allows you to specify which Input to use as the Net Forecast. For instance, if you specify "Customer Input" as the "Collab Default Input" in the Parameters, then every time you enter or change a Customer Input value in the Non Statistical Input form, the value entered will update the Forecast column on the Collaborative form at this level and all higher levels for this item. This is very helpful for situations where you will probably use a Customer Input or a Salesperson Input as the forecast; however you still want to capture other opinions. Then you can copy/paste your customer (or salesperson) forecasts into the Non-Statistical form and the system will use that forecast unless you override it.

	Label	PY2 Hist	PY1 Hist	PY1 Fcst	Statistical	Customer Inputs	Salesperson Input	Mgr Input	Calc Consensus	Forecast
1	2-14	0	100	0	27	40	12	130	59	154
2	3-14	1	50	0	27	50	15	135	64	157
3	4-14	14	0	0	27	60	13	138	67	167
4	5-14	7	1	0	27	70	15	133	69	189
5	6-14	0	5	0	27	50	20	140	66	192
6	7-14	1	110	0	27	80	20	143	76	214
7	8-14	0	6	0	27	85	20	140	77	239
8	9-14	0	4	0	27	75	20	147	76	245

The data entered in the Forecast column for the lower levels will roll up to the item level and will appear as the "Consensus" on Forecast Main. The forecasts must be saved at the lowers level first, then they can be modified at any level. *Because this is a roll-up process, entering data at higher levels calculates a percent increase to apply at lower levels and so there must be something other than 0 in the lower levels to apply that change to.*

The last step is to verify the item level forecasts in Forecast Main and Update APS. Notice the forecast grid changes to show the Consensus forecast instead of the columns that are listed for a non-consensus item. Now the forecasts can be pushed to the planning engine using the Update APS button or utility.

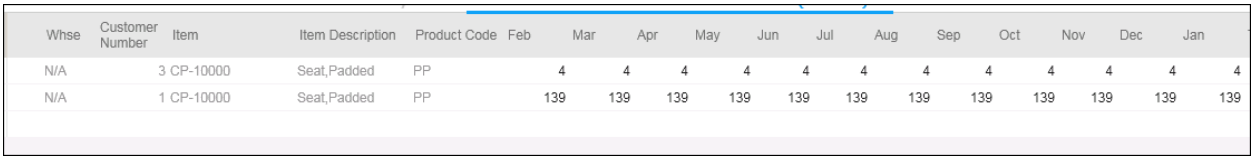


Statistical Forecasting at the Warehouse and/or Customer level

The "Warehouse Customer" model allows generating customer level and/or warehouse level forecasts for an item. These forecasts are then loaded into the planning system at the customer level and/or warehouse level by the Update MRP/APS for All Items utility, or clicking the Update APS button on Forecast Main. The forecasts can be statistically calculated for the specified customers and/or warehouses, or the forecasts can be manually entered at the customer and/or warehouse level.

Caution: Before using this method, be sure you understand how the consumption of forecasts works when you have warehouse or customer level forecasts in the planning system and that you have setup the warehouses and planning parameters to accomplish your desired planning outcome.

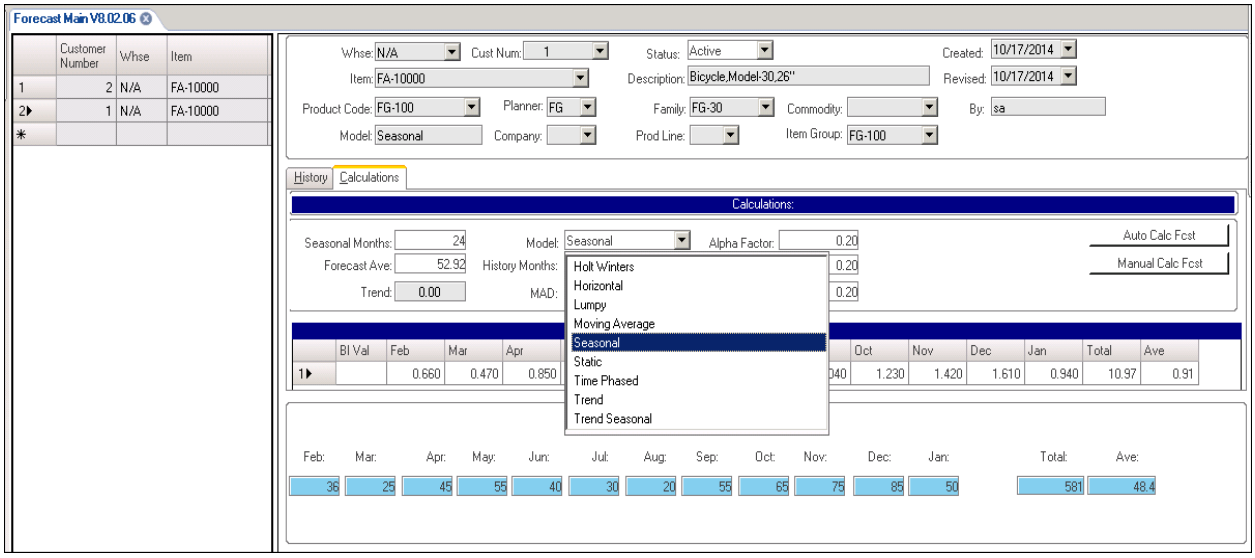
You must manually add each customer and/or each warehouse to the Warehouse Customer form for an item and run the Rebuild History for the item, before you can calculate that item's forecast. This is how to control what customers and/or warehouses are forecasted for each item. For mass adding/editing, these warehouse and/or customer records for each item can be copy/pasted directly into the Warehouse Customer form when the form is opened directly from the menu.



Whse	Customer Number	Item	Item Description	Product Code	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
N/A	3	CP-10000	Seat,Padded	PP	4	4	4	4	4	4	4	4	4	4	4	4
N/A	1	CP-10000	Seat,Padded	PP	139	139	139	139	139	139	139	139	139	139	139	139

Process to Forecast an Item at the Warehouse or Customer Level

1. Setup the item on the Forecast Main form, and select "Warehouse Customer" as the model.
2. Specify Customers and/or warehouses. Click the Warehouse Customer button to open a linked form and enter the customers and/or warehouses you want to forecast for this linked item and specify the model for each. (you can enter or copy/paste multiple items, customers, and warehouses by directly opening the Warehouse Customer form from the Forecasting menu). **Tip:** To determine which customers or warehouses have sales history for an item, use the Sales Analysis form.
3. Run the Rebuild History utility for the items you want to calculate forecasts. (Rebuild History can be run for all items in mass. Refer to the Rebuild History topic to understand what affects this will have).
4. Enter or calculate forecasts. Manually enter, or copy/paste the forecasts in the Warehouse Customer form grid. Or, you can select the Calculation tab on the Warehouse Customer form and auto calc the forecast for an item. (Or you can run the Monthly utility or Calculate Forecasts for all items utility to calculate the customer/whse forecasts for all items, including the Warehouse Customer model items)
5. Review the forecasts on the Forecast Main form, comparing the item forecast to its history and noting any Group Level adjustments that have affected the forecast.
6. Click the Update APS button on to update planning for just the selected item, or run the Update MRP/APS for All Items utility to post the new forecasts in mass. Hint: you can review what posted by selecting "View APS" from the right click menu on Forecast Main, which opens the Forecast form used by MRP/APS.



Notes regarding warehouse and/or customer level forecasting:

- Time Phased model on Warehouse Customer form drop down. Select this if you do not want the forecast recalculated past the current month. For instance, when you have copy/pasted forecasts from customers.
- To forecast a customer for a specific warehouse, be sure the consignment warehouse customer relationship is properly setup in the Warehouse form. If you enter a customer forecast for a dedicated inventory warehouse, the customer must be the same as the consignment customer assigned to that warehouse.
- The history on the Forecast Main form is the total history for the item, all customers and warehouses. The history on the History tab of the Warehouse Customer form is for just the selected warehouse or customer.
- You can update the history on the Warehouse Customer History tab by right clicking. However, do this for testing purposes only since the history will be reset when the Rebuild History utility is run. Read the section in this manual about Extended History if you want to load history from sources other than just the ERP system.
- Note that the diff between “Forecast” and “Net Forecast” on the Forecast Main form is due to any item or group adjustments. These adjustments are prorated to the whse/customer level forecasts when they are passed to planning. The forecasts entered on the Warehouse Customer form are left unchanged.
- You can also perform warehouse and customer level forecasting using the Collaborative Forecasting function, which allows for entering and comparing multiple opinions or data sources for an item’s forecast. However, the collaborative forecast loads an item level forecast into the planning system.
- The “Forecast-As” functionality applies when the History on the Warehouse Customer form. Ie if an item has a Forecast-As relationship to other items, then the combined history of all the items appears on the history tab, and is used to calculate the forecast for the item at the warehouse and customer levels.

Usage Based Forecasting

Companies that have customizable products cannot forecast the items that will appear on a Customer order, since these are often unique items. These products have many common components, but virtually an unlimited number of possible sellable item numbers. The solution is to forecast components. The usage based forecasting functionality allows a company to forecast components based on usage history and then consume the forecast based on usage (demand from jobs) rather than customer orders. This is also helpful for forecasting Transfer Orders to other sites, and consuming the forecast based on the actual transfer order shipments. (See appendix on Forecasting Using Transfer Order History)

Consumption of an item's Forecast in the standard planning system occurs ONLY when a Customer Order is entered for the item (with the exception of Configured items using the Features and Options Configurator). Even though you can enter a forecast for any item in the database, the consumption only occurs when a Customer Order is entered for that item. It is therefore problematic to forecast components, where the demand comes from usage rather than customer orders, since the forecast will not be consumed by the standard planning system.

Forecast Main allows you to select how to collect an Item's History, which is used to calculate the forecast:

- Data Type="Orders" - Order History is collected from the Customer Order tables
- Data Type= "Usage" - Usage History is collected from Material Transaction tables and includes customer order shipments, job issues, and all other usage history as defined in Forecasting Parameters.

To forecast a component based on its total usage, select "Usage" as the Data Type on Forecast Main. Run the Forecast Consumption utility each day before running MRP/APS Planning. Both can be run as automatic back ground processes.

The Forecast Consumption utility consumes forecasts when an item is used. It uses the material transaction table AND the requirements table to determine the actual usage (demand) for an item and the forecast is decremented by this actual usage. For "usage" type items, the material usage that consumes the forecast is the material issues (Job material issues, JIT, issue to WC – see topic on Forecast Consumption Utility for list of transaction types) plus all PPLN's (all planned job/PS/TO material requirements) within the look-ahead, look-behind period specified in Forecasting Parameters).

Notes on Usage Based Forecasts:

- Unlike Order Consumption logic in the planning system, Usage Consumption reduces the Forecast Original quantity as well as the Outstanding Requirement in the planning system. However, the original forecast quantity is retained in the Forecasting application (Forecast Main).
- The Forecast Consumption Utility also consumes the forecast of the "Forecast As" items by orders for its Order Items. See the Forecast-As section in this manual for details.

Historical Forecasts

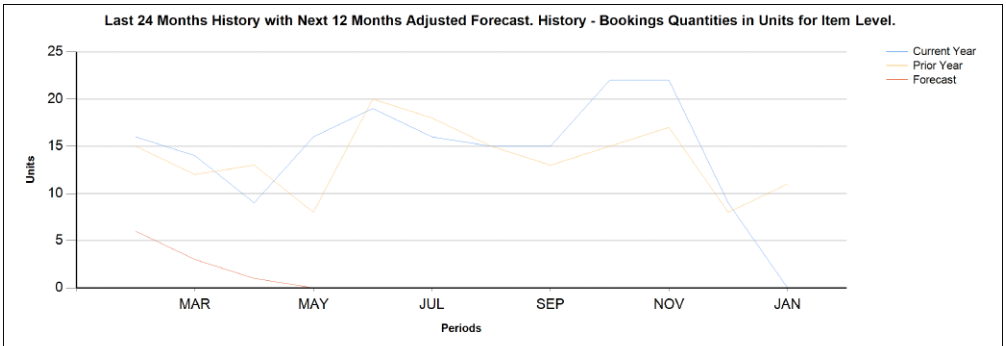
Forecasting keeps track of what the forecasts have been in the past. When the Update MRP/APS Utility is run, the forecasts values for the next 12-13 periods are stored in the Forecast Historical Forecasts form. This form displays the date the forecast was stored and what the forecasts were for each of the 12-13 periods.

	*Item	*Period	*Year	*Date	Period	Period + 1	Period + 2	Period + 3	Period + 4	Period + 5	Period + 6
4	910	6	2013	6/25/2013	1	5	5	5	5	5	
5	AD-10000	1	2014	1/14/2014	6	3	1	0	0	0	
6	AD-10000	1	2014	1/14/2014	6	3	1	0	0	0	
7	AL-10000	1	2014	1/14/2014	272	272	272	272	272	272	27
8	AL-10000	1	2014	1/14/2014	272	272	272	272	272	272	27
9	BB10	1	2014	1/14/2014	90	87	92	90	95	92	9
10	BB10	1	2014	1/14/2014	90	87	92	90	95	92	9
11	BB10	1	2014	1/15/2014	90	87	92	90	95	92	9
12	BB10	1	2014	1/15/2014	294	294	294	294	294	294	29

The above example shows that a forecast was generated for item 910 on 6/25/2013, when the current period was 6/2013. The forecast values for each of the next 12-13 periods are displayed in the columns. This example shows that the Update MRP/APS utility was run twice on 1/14/2014, and it stored the forecast values for each of the next 12-13 periods when the utility was run.

Comparing Historical Forecasts to Actual Demand:

The Excel Graph on Forecast Main called History Graph shows the most recent forecast for the last 36 periods compared to the actual demand for each period. he Last 24 Actual VS Forecast By Item Report lists and graphs the most recent forecasts for the last 24 periods and the actuals for a range of multiple items in a single report.



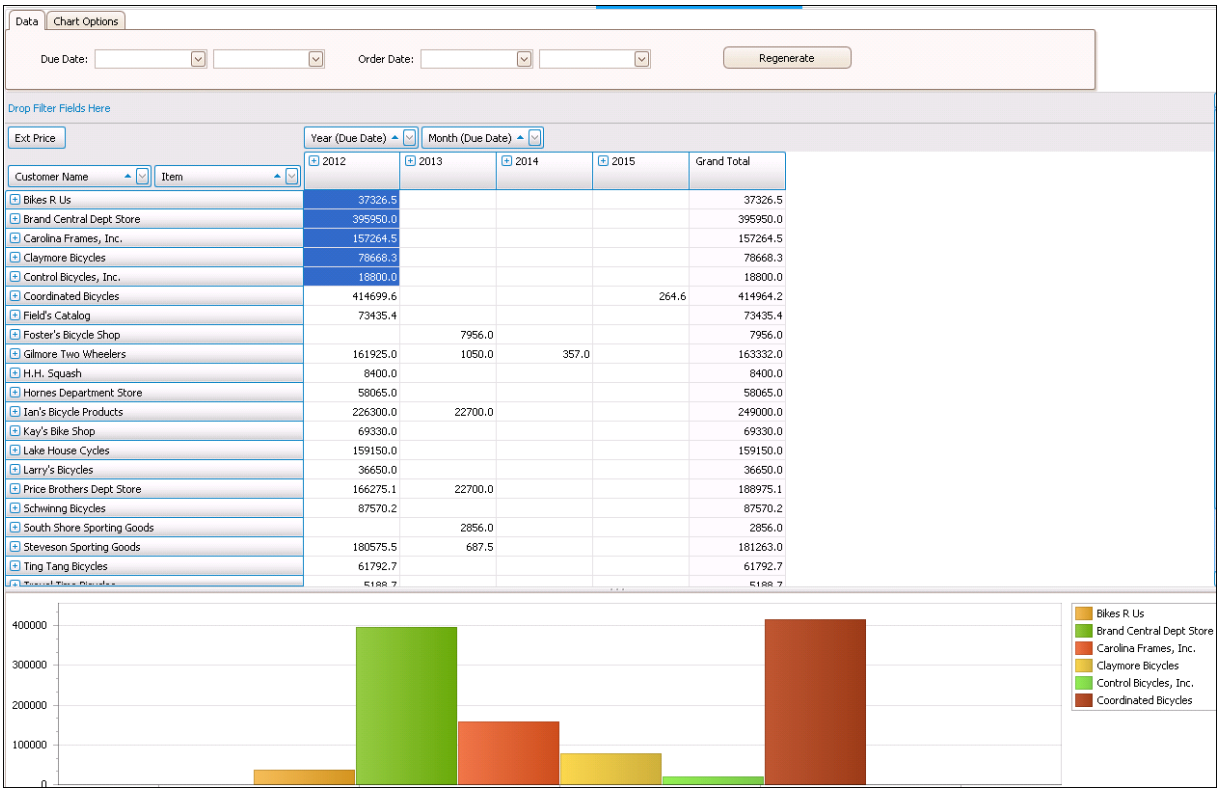
Item	Period	sPriorYear	sCurrentYear	Forecast
AD-10000	FEB	15	16	6
AD-10000	MAR	12	14	3
AD-10000	APR	13	9	1
AD-10000	MAY	8	16	0
AD-10000	JUN	20	19	0
AD-10000	JUL	18	16	0
AD-10000	AUG	15	15	0
AD-10000	SEP	13	15	0
AD-10000	OCT	15	22	0
AD-10000	NOV	17	22	0
AD-10000	DEC	8	9	0
AD-10000	JAN	11	0	0

SECTION 7 – Sales Analysis

The Forecast Sales Analysis form allows reviewing sales history or open orders (backlog) by multiple dimensions, levels of detail, groupings, hierarchy, dollars/units, and time periods based on data from Customer Orders. It is an interactive form that allows you to drag and drop to "pivot", drill down, filter and graph to analyze real time sales history data.

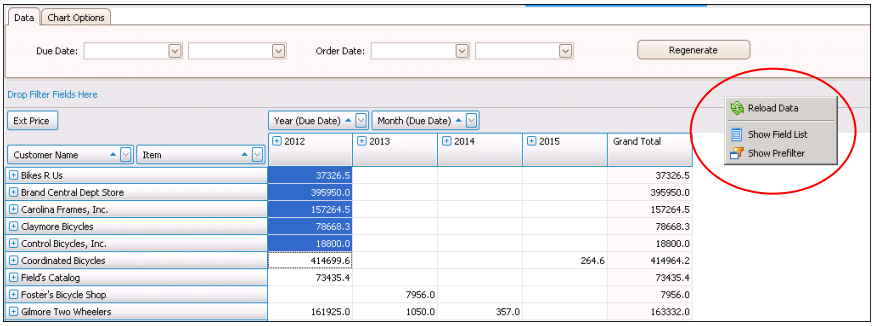
Generate the Sales Analysis data

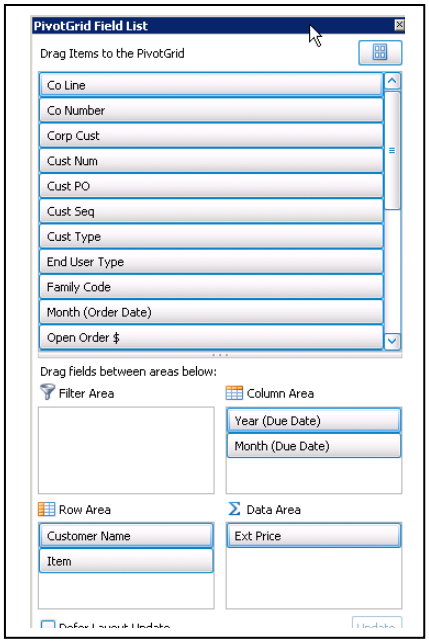
Choose to view sales based on the bookings date (Order Date) or based on the planned shipment date (Due Date), then click the Regenerate Button to build a view.



Select Fields to Display and Pivot By

Right click in the “grey banner” area and choose Show Field List to select the data an dimensions to display.





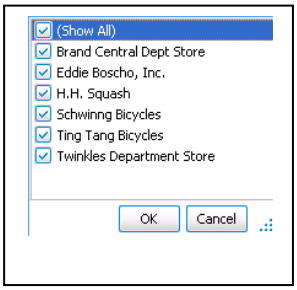
This opens a list of fields (data and dimensions) you can use to perform the analysis.

Each data grouping (dimension) can be expanded, removed, filtered, or repositioned by dragging the dimension icon to different areas on the form, or by dragging the icon to the areas on the popup field list.

For example, to add “Customer Type” to the above view, left click “Customer Type” in the Field list and drag it in front of the “Customer Name” icon. Or, you can drag the icon into the “Row Area” at the bottom of the field list.

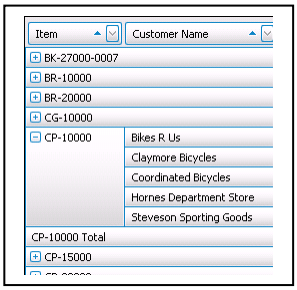
<u>To filter Customers:</u>

Click the  Icon
And check/ uncheck boxes.



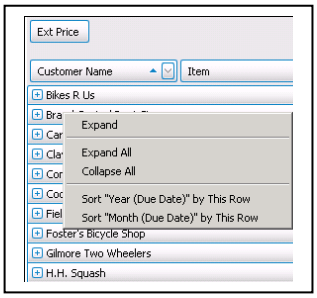
<u>To Show Customers of Items:</u>

Drag the Customer Icon to the left of Item icon and click “+”.



<u>To collapse or expand Customers:</u>

Right click the list of Customers, and select to Expand or Collapse.



To remove a dimension from the display, right click the icon and select “hide”, which will move the dimension back to the field list. Or you can drag the dimension icon.

To change the sort of a dimension, click on the blue triangle in the icon. 

Note that whatever is highlighted in the grid is graphed below, and a legend is automatically created for the graphed data.

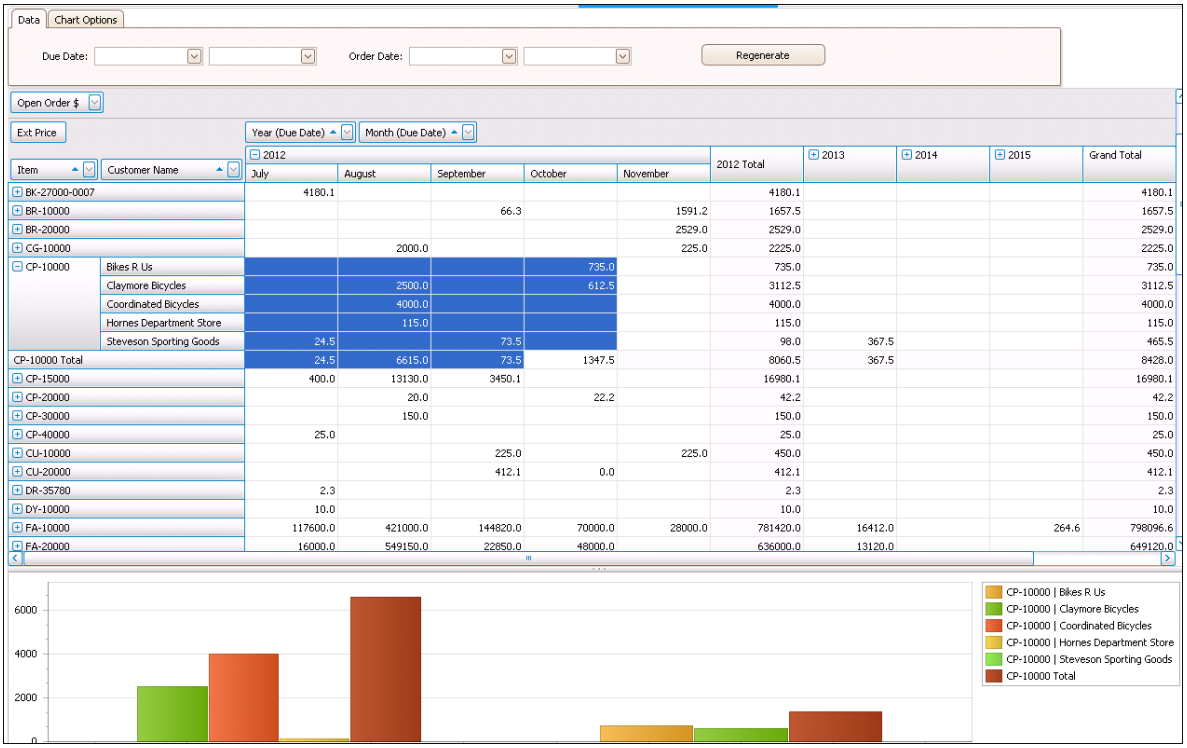
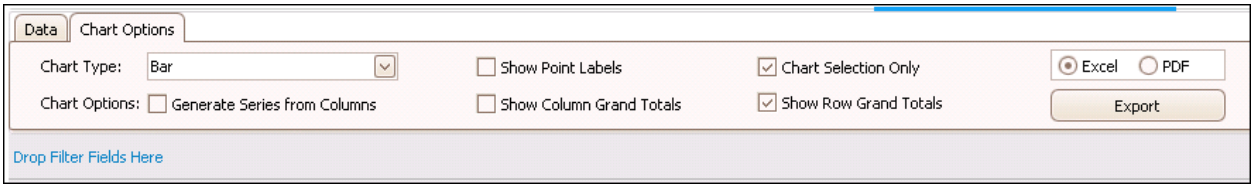


Chart Options and Report or Spreadsheet Generation



By selecting Chart Options you can control how the chart displays labels, legends, and totals and can Export your Sales Analysis to either Excel or generate a pdf document.

Useful Reports and Activities:

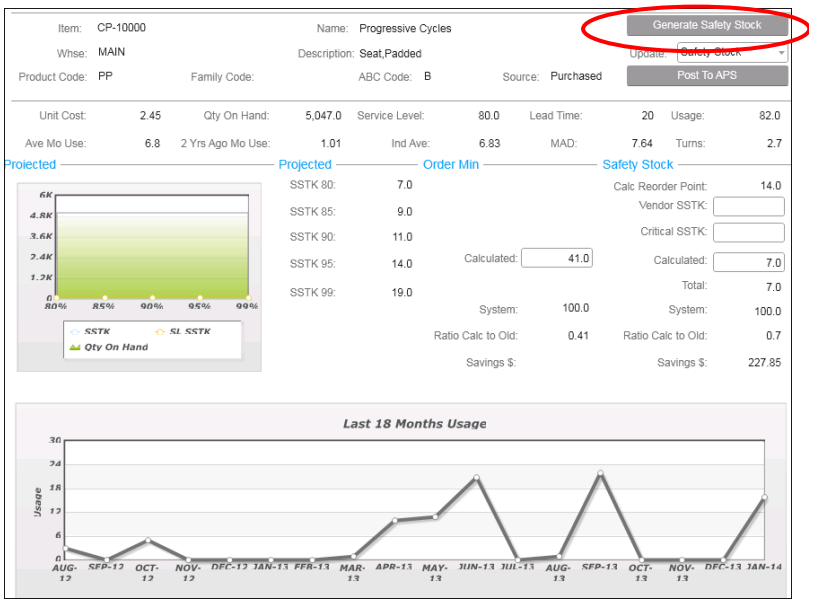
Forecast Items Not Forecast with Sales Report,
Forecast Item Ranking Report,
Forecast Group Level Options,
Forecast Sales by Customer Report

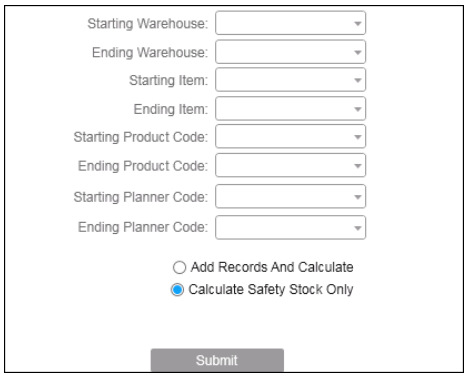
SECTION 8 – Working with Safety Stocks

Safety Stocks, Reorder Points, and Order Mins (lot sizes) can be reviewed, calculated and maintained using the Forecast Safety Stock Maintenance form. You can calculate these values for any item that has an item master, not just the forecasted items. The form can be opened unfiltered from the menu, or can be opened for a specific item with a button on the Forecast Main form. The process is to first Generate the Safety Stock values, then review and edit the calculations in the Safety Stock Maintenance form, then post the values.

Generate Safety Stock

The Generate Safety Stock form calculates Safety Stocks, Reorder Points, and Order Mins at the Warehouse level. Select the **Generate Safety Stock** button on the Safety Stock Maintenance form to specify the items and warehouses to calculate:



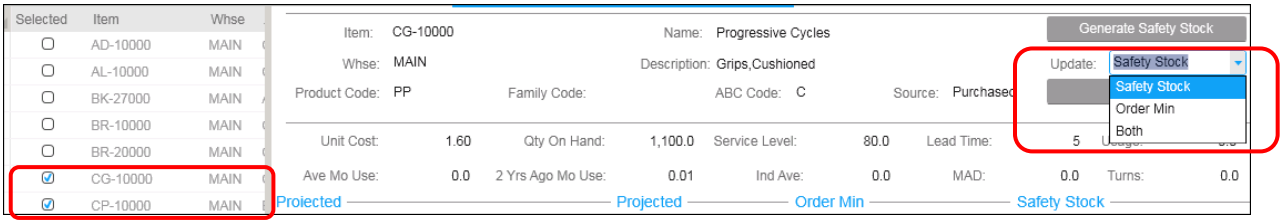


The generation can be run multiple times to populate the Safety Stock Maintenance form. Or, can just recalculate the items already loaded in the form.

The Safety Stock Maintenance form is a workbench that displays the data used used to calcualte the Safety Stocks. It also displays a graph of usage history and a graph that shows the affect of various Service Levels on the safety stock calculation.

Review, Edit and Post Values

The Safety Stock Maintenance form calculates both a Safety Stock, Reorder Point and the Order Minimum (Economic Order Quantity-EOQ). These values can be reviewed and adjusted before posting to the Item Warehouse form (safety stock) and the Items form (order min). After reviewing/editing these values, check the box in the "Selected" column. After checking off the items to be posted, click the Post button. Tip: right click in the selected column to select multiple items.



This example is selecting to Post Only the Calculated Safety Stock for ONLY the warehouse Main and ONLY the items CG-10000 and CP-10000. To also post the Order Min for these items, then select "Both" before clicking the Post button.

Vendor Safety Stock and Critical Safety Stock.
These values are input by the user to increase the calculated safety stock. For example, the Vendor SSTK quantity could be used to increase the safety stock for a supplier that has unpredictable lead times. The Critical SSTK could be used to increase the safety stock for an item where a stock out would result in major problems. These values are added to the calculated safety stock to arrive at the Total safety stock that is posted to the Item Warehouse.

Safety Stock vs. Reorder Point
The value posted to the Item Warehouse Safety Stock field can be a Safety Stock value or a Reorder Point trigger value depending on how you want to manage the replenishment of the item. The Reorder Point calculation is generally used for items that are not forecasted, but rather a replenishment order needs to be triggered when the quantity on hand drops to the reorder point (these are typically low cost, short lead time, high volume items). Typically a Reorder pont trigger value needs to be greater than a safety stock trigger value. Safety stock logic is typically used to accomidate for forecast variances and unexpected demand during an item's lead time because the replenishment is primarily driven by forecasts and acutal demand. In a Reorder point situation, the replenishment is driven by actual demand from jobs and customer orders and lead time, but not forecasts, so more cushion is needed. To use the Reorder Point calculated value rather than the Safety Stock calculated value, copy/paste the Reorder Point value into the Calculated Safety Stock field before posting.

Note: The "Use Reorder Point" functionality on the Items form uses a fixed order quantity replenishment method, whereas using the Safety Stock value on the Item Warehouse form uses standard APS/MRP logic to replenish. Be very careful to understand how the planning system uses order mins, multiples, and safety stocks when deciding what value to use in the Item Warehouse Safety Stock field.

See the appendix on Safety Stock and Order Min Calculations for additional explanation about these calculations.

SECTION 9 - Planning BoM's

Planning BoMs allow forecasting a family of products rather than individual SKU's when it is impractical to forecast individual items; either because the item is configured at order entry or because there are so many permutations of the item. A Planning BOM parent consists of percentages of demand for the children, which can be components or sellable items. This parent is forecasted which passes demand to the children. The parent's forecast is consumed when a family member (specified on the "Forecast As" form) is entered on a Customer Order.

A PBoM that is structured to plan the components (rather than all the configurable variations of the sellable items) results in the Forecast driving component material planning, but only customer orders will drive the demand for the top level items. This is helpful for an assemble-to-order product line where only customer orders should create suggested jobs for sellable items and the PBoM forecast drives the demand for the components. Alternatively, A PBoM could contain the top level Items (all the possible sellable items in the family) resulting in APS/MRP creating Planned Orders for the sellable end items that are entered on customer orders.

Set-Up

1. The Planning BoM (PBoM) is setup in SyteLine like any other BOM, it is not a features and options configurator BOM. The PBoM materials are all of the sellable items in the family, or all of the components in the family you wish to plan. The percentages of expected sales or usage are specified as fractions in the Current Materials field. Ex: if an item in the PBOM is expected to be used 20% of the time that a member of the PBOM family is sold, then enter ".20" as the Current Material quantity. As stated above, if the PBoM contains the components, then forecasts control the component demand that is passed to the planner's workbench and customer orders pass the sellable item demand.
2. The "Forecast-As" form is setup listing all of the sellable items in the family. This is used to consolidate the sales history of all the sellable items in the family and to identify which items when sold will consume the PBoM forecast. The Forecast As item is the Planning BoM and the Order Items are the items you expect to sell.
3. If new sellable items are added on the fly (Ex: product configurator), a customization/personalization can be created to automatically populate the Forecast-As table.

Process

1. Statistically calculate a forecast for Planning BoMs (PBoMs) based on the sales history of the entire family. Or, manually enter a forecast for the PBoM using item adjustments or Collaboration. See Forecasting Approaches-How, and Working with Forecasts.
2. Sales history is automatically consolidated for all Forecast-As items in the family and all standard tracking and reporting tools are available for monitoring the forecast accuracy.
3. The consumption is performed by the Forecast Consumption Utility and the net (consumed) forecast is passed to the planning system. Bookings of any sellable item (Order Item) contained in the Forecast-As form consume Forecasts using the look ahead/behind window specified in Forecasting Parameters. The Forecast Main form displays the gross forecast before consumption and the Forecast form in the planning system displays the net after consumption.
4. Planning BoM Component Mix form shows percent of the time each component is selected for last year broken down by month. The usage is derived from the Forecasting History file. All PBoM items and the components of all PBoM items are displayed. Assists in analyzing and populating the percentages in the PBoM.

5. Forecast As Sales Mix form shows the unit sales history for the last year for the Forecast-As items (sellable items in the family). Allows for analysis of the volume and relative sales of the various products in the family broken down by month.
6. Note that when testing the PBOM process, the Testing Run date should be blank. Otherwise all the dates of the various data will not sync up well, for example: the forecasts you enter for past periods will not show up in Forecasting

Useful Report: Forecast As Item Report

Example: You have a family of products that are similar and you prefer to setup each of the end items in advance of entering customer orders rather than use the F&O configurator. You would like to forecast the family instead of each variation individually. Two approaches are available:

Approach 1. Create a planning BoM made up of all of the sellable products in the family and specify the probability of each item being sold.

a. Use the Forecast-As functionality to list all the item numbers, that when sold, will consume the PBoM forecast.
b. Enter or calculate a forecast for the PBoM. The Forecast Consumption Utility will consume the forecast for this planning BoM based on the sales of the Forecast-As items.
c. The sales mix form lets you review the relative sales of the items in the planning BoM

Note that with this approach, you will get planned orders for the parent items, so you need release control to decide which ones to build. If you create new sellable item numbers every day, you will probably want to write a utility that automatically adds them to the Forecast-As table.

Approach 2. Create a planning BoM made up of the components you want to plan (sub assy or purchased). Note that this may not be all components, as many may be planned by other methods such as ROP, bulk purchase, JIT, etc.

a. Use the Forecast-As functionality to list the item numbers, that when sold, will consume the PBoM forecast.
b. Enter or calculate a forecast for the PBoM. The Forecast Consumption Utility will consume the forecast for this planning BoM based on the sales of the Forecast-As items.
c. The component mix form shows explosion of every bill of every item in the planning BoM and shows the components as a % of the family that they represent. With this form you can decide if the planning BoM has the right percentages.

The Forecast As Sales Mix form allows us to see the sales of the specific Order Items within the Family. This will help to adjust the amount in the Planning BoM for future forecasts.

Parent: Bike PBOM | Bike PBOM | Process

	Parent	Item	Aug	Sep	Oct	Nov	Dec	Jan	Last 3 Months	Last 6 Months	Last Year
1	Bike PBOM	BG10	222	351	414	113	113	108	111	220	121
2	Bike PBOM	BG20	238	17	173	129	129	121	126	135	83
3	Bike PBOM	Sub Total	460	368	587	242	242	229	238	355	204
4	Bike PBOM	Bike PBOM	725	862	598	798	798	0	532	630	824
5	Bike PBOM	Total	1,185	1,230	1,185	1,040	1,040	229	770	985	1,028

The Forecast Planning BoM Component Mix form allows the user to analyze a Planning BoM where the current materials are components rather than Order items. It displays the usage of the components in the planning BoM which will help in adjusting the percentages (Current Materials Quantities) in the Planning BoM.

Parent: Bike PBOM | Bike Planning BoM | Process

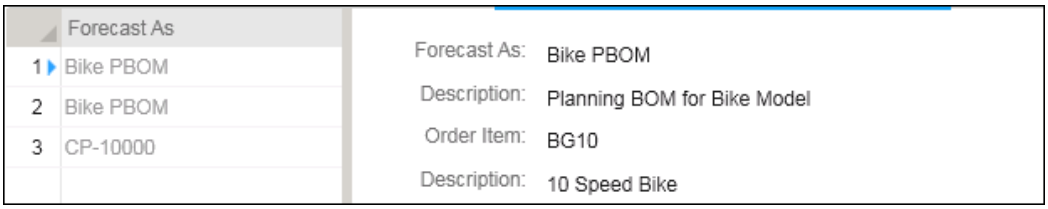
	Item	Current Matls	Difference	Last Year	Last 3 Months	Last 6 Months	Low Level	Aug	Sep	Oct	Nov	Dec	Jan	Description
1	P1	.400	.108	.292	.500	.500	1	0.500...	0.500...	0.500...	0.500...	0.500...	0.500...	Paint, Green
2	P2	.400	.400	0.000	0.000	0.000	1	0.000...	0.000...	0.000...	0.000...	0.000...	0.000...	Paint, Red
3	P3	.500	.191	.309	.548	.551	2	0.482...	0.225...	0.953...	0.705...	0.466...	0.471...	Gear, 10 Speed
4	P4	.640	.365	.275	.452	.449	2	0.517...	0.774...	0.046...	0.294...	0.533...	0.528...	Gear, 20 Speed
5	P5	2.000	1.417	.583	1.000	1.000	2	1.000...	1.000...	1.000...	1.000...	1.000...	1.000...	Wheel, Basic Bike
6	P6	1.000	.417	.583	1.000	1.000	2	1.000...	1.000...	1.000...	1.000...	1.000...	1.000...	Seat, Basic Bike
7	P7	1.000	.417	.583	1.000	1.000	2	1.000...	1.000...	1.000...	1.000...	1.000...	1.000...	Frame, Basic Bike
8	P8	.300	.300	0.000	0.000	0.000	1	0.000...	0.000...	0.000...	0.000...	0.000...	0.000...	Paint, Blue
9	Sub1	0.000	.583	.583	1.000	1.000	1	1.000...	1.000...	1.000...	1.000...	1.000...	1.000...	Basic Bike Assy, Unp
10	Sub10	0.000	.309	.309	.548	.551	1	0.482...	0.225...	0.953...	0.705...	0.466...	0.471...	Gear Assy, 10 Speed
11	Sub20	0.000	.275	.275	.452	.449	1	0.517...	0.774...	0.046...	0.294...	0.533...	0.528...	Gear Assy, 20 Speed

SECTION 10 – Activities and Utilities

Activities

"Forecast As" Item Maintenance

The Forecast As form links multiple items to a master item (order item). It only applies to items with Data Type = Orders. It allows Forecasting Multiple items as a single item. It also combines the history of multiple items under the Order Item. It also allows for consuming a forecast for a "Forecast As" item when a different item is sold.



Examples of applications for the Forecast As function:

- When items are very similar to one another it may be desirable to forecast these Items as a single Forecast As item by linking the items. The Forecast As Item must be in Forecasting and the "Order items" must NOT be in Forecasting Items as this would double the Forecasts.
- When obsoleting an item to replace it with a new item. The history for the linked items is combined and used to forecast the new item.
- When using the Forecasting Planning BoM function (PBoM). Forecast the PBOM item number (the Forecast As Item) then list the actual items that are sold on customer orders as the Order Items. When the Consumption Utility is run, the PBOM forecast is consumed by the sales of the Order Items within the Look Ahead – Look Behind window specified in Forecasting Parameters.

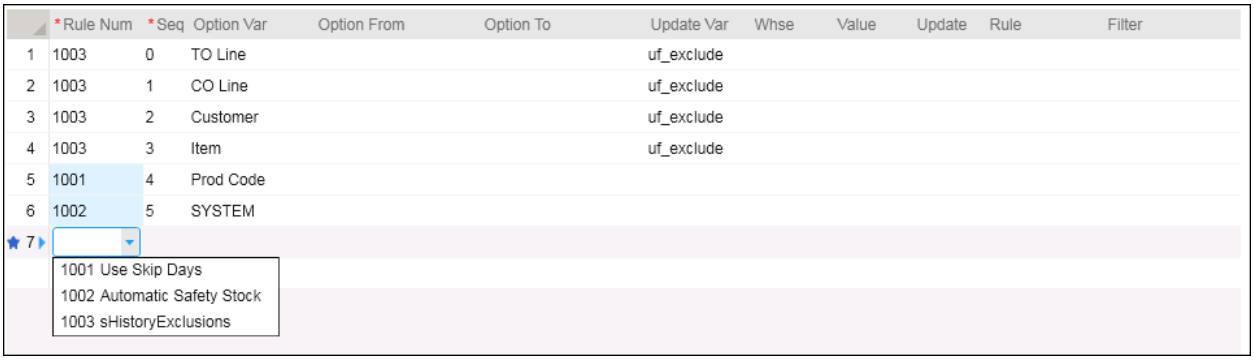
The Forecast Consumption Utility should be run whenever you are using Forecast-As relationships.

Forecast Related Variables/Auto Update

The Related Variable/Auto Update form allows rules to be automatically run to update data or perform specific functions. The three base rules are:

- **1001 Skip Days:** Skips the specified number of days before loading the forecasts into the MRP/APS planning system when the Monthly utility is run. This can be helpful if you want the forecasts to only control demand after a period of time and the actual demand to drive demand in the near team.
  The function allows using actual customer orders to drive demand in the near term and Forecasts to drive demand beyond that. The "skip days" variable will load the forecast into MRP/APS planning out past your order horizon… ie, if you normally ship in 1 week, then load the forecast out past 1 week so that actual demand creates requirements within 1 week and forecasted demand takes over after that.
  The parameter allows you to load the forecast only for "X" number of days out and delete all forecasts in MRP/APS planning prior to that date. Use the rules in the Forecast Related Variables/Auto Update form to set the number of calendar days to skip and specify specific product codes, family codes, items, or all items. You can have multiple rules that specify "X" skip days for a product code, and "Z" skip days for another product code, but "Y" skip days for items within that product code. The Update MRP/APS utility runs this logic at the same time it loads the forecasts and can be run as often as needed… for example if you want to skip 7 days, then you need to run the Update APS/ MRP utility weekly.

- **1002 Automatic Safety Stock**: Automatically updates the safety stock values on the Item Warehouse file, rather than going through the process of posting the values in the Safety Stock Maintenance form.
- **1003 History Exclusions**: Will exclude certain Order Lines, Transfer Order Lines, Customers, or Items from being included in history. A logical UET (uf_exclude) needs to be setup on these forms. If the field is checked on the form for a record, then the record is ignored when history is built by the Monthly Utility and the Rebuild History for All Items Utility.



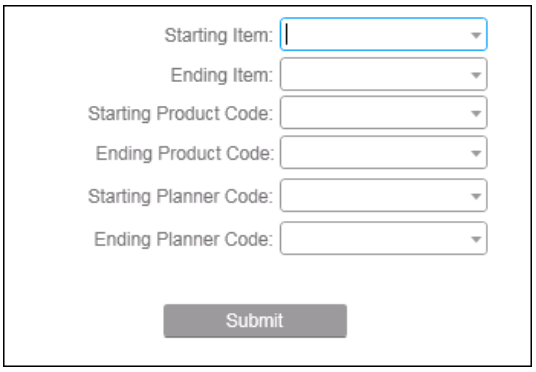
	*Rule Num	*Seq	Option Var	Option From	Option To	Update Var	Whse	Value	Update	Rule	Filter
1	1003	0	TO Line			uf_exclude					
2	1003	1	CO Line			uf_exclude					
3	1003	2	Customer			uf_exclude					
4	1003	3	Item			uf_exclude					
5	1001	4	Prod Code								
6	1002	5	SYSTEM								
7											

1001 Use Skip Days
1002 Automatic Safety Stock
1003 sHistoryExclusions

Utilities

Forecast Auto Calc Item Forecasts Utility

Use this utility for the first calculation of forecasts to initialize the variables for each item and calculate the statistical forecasts. This utility can be used at any time to calculate forecasts for a group of items. The functionality essentially runs the Auto-Calc button on the Forecast Main Calculations tab for the range of items selected. This utility does NOT replace the forecast calculation functionality in the Monthly Utility which manages multiple aspects of the forecasts, however the Monthly utility only looks back one month of history to update item variables, so the Auto Calc Item Forecasts utility must be used the first time forecasts are calculated to look back to all history and initialize the variables that the monthly utility will update each month. The Auto Calc Item Forecasts utility might also be used when mass changes are made to multiple items, such as a mass change of the forecasting model that is used.



Forecast Consumption Utility.

The Forecast Consumption utility is used with Usage Based forecasting and Planning BOM forecasting to consume forecasts in the Forecasting app and send the consumed forecast values to the MRP/APS planning system.

If an item's Data Type is "Orders", the utility looks to see if any Forecast As records have been created for the item and consumes the forecast. See Planning BOM forecasting for more information.

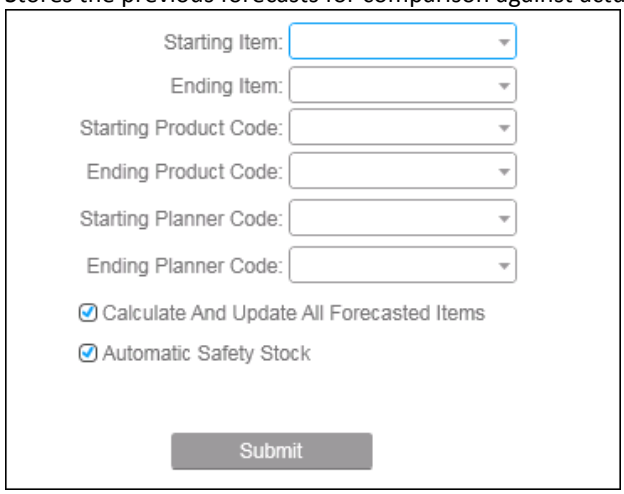
If an item's Data Type is "Usage" the utility consumes the forecast using the following material transactions plus all PPLN's (all planned job/PS/TO material requirements) within the look-ahead, look-behind period specified in Forecasting Parameters). Note: the standard planning system will also consume the forecast with quantities entered on customer orders. See Usage Based forecasting for more information.

```
(trans_type in('I') or --I (any issue except SRO's)
(trans_type = 'G' and ref_type = 'F') or (SRO Issue)
(trans_type = 'G' and ref_type = 'I') or (Misc Receipt)
(trans_type = 'H' and ref_type = 'F') or (SRO Receipt)
(trans_type = 'W' and ref_type = 'R') or (RMA Withdrawal)
(trans_type = 'T' and qty < 0)) (Transfer)
```

Forecast Monthly Utility

This utility should be run on or shortly after the 1st day of each new month (after closing the previous month's inventory and shipping) to calculate and update the forecasts. The utility performs multiple functions:

- Extracts the most recent month's sales/usage from customer orders and material transactions and adds it to the forecast history table. (To go back further use the Rebuild History utility)
- Calculates the forecasts using each item's specified model and history months.
- Triggers exceptions, which can be viewed on Forecast Main.
- Updates "Sum of Errors", Forecast Average, and Tracking Value for each item, which can be viewed on Forecast Main.
- Shifts the seasonal Base Index Values.
- Calculates the MAD (mean average deviation) for safety stock calculations.
- Stores the previous forecasts for comparison against actual history with the History Graph.



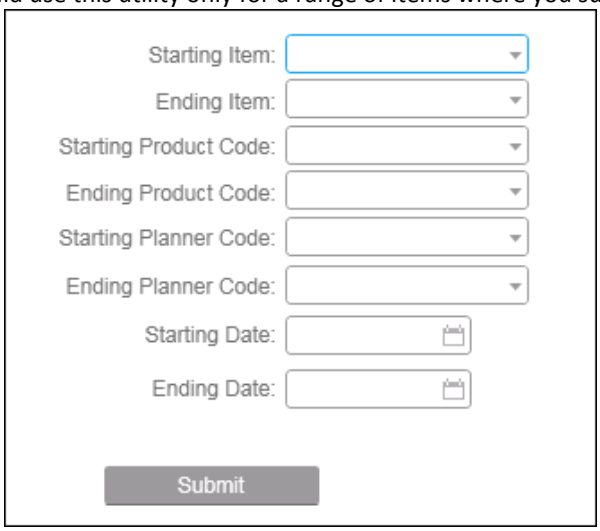
1. Select a Range of Items, or select the "Calculate and Update ALL Forecasted Items" checkbox
2. Selecting the "Automatic Safety Stock" checkbox updates safety stocks for the range of items.
3. Exceptions, messages and items process are detailed to the User Messages form.
4. The Monthly Utility will not run for Inactive items (per Forecast Main), except to extract the history

If the Monthly Utility is not run faithfully every month as early in the month as possible it causes problems in the way history is kept and forecasts calculated. The Base Index values for seasonal items are "shifted with the months" by the Monthly Utility and ONLY the most recent month of history is extracted. Fixing this requires running Auto Calc for each item that is forecasted with a seasonal model. Also, the Rebuild History for All Items utility will need to be run to bring in the sales/usage history for the skipped periods. Using the Testing Run date in Forecast Parameters to go back in time and run the Utility can resolve the issues. Please contact support to discuss the best process for your situation.

The Monthly Utility shifts the base index values to the previous month rather than recalculate them (so it runs faster). However, when you click the Auto Calc button for a forecasted item, it forces a recalc of the base index value for that item. Also note that the Auto Calc does not use the Alpha (weighting factor) but the Monthly Utility does so that you can see a level forecast when you Auto Calc.

Forecast Rebuild History for All Items

The Rebuild History for All Items utility will delete the existing history in the Forecasting app and rebuild it from the Customer Order and Material Transaction files for the selected item range and the selected dates. Typically you would use this utility only for a range of items where you suspect the history has been corrupted.



History is built based on the "Data Type" selection for the item. Also note that the Forecast-As relationships are considered when the history is built.

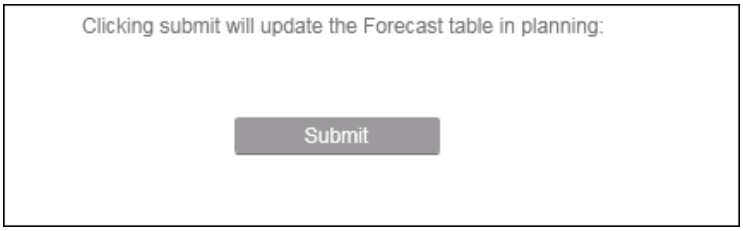
- If the item's Data Type = Orders, history is extracted from customer order line quantities based on either the order date, due date, or request date per the Forecast Parameters form and Transfer Orders are included if selected in the Forecast Parameters. The shipments history is pulled from the shipping transactions file using the ship date and quantity.
- If the item's Data Type = Usage, history is extracted from the material transaction files based on the transaction date and the types of transactions specified in Forecast Parameters.

Be aware:

- If you have a large number of items this may take a considerable time.
- If you have posted history from other systems using the Extended History form, or modified your Forecast history, this utility will overwrite that data with data from the Customer Order and Material Transaction tables. So, be careful to restrict the rebuild by setting the starting date to your "go live" date, or to save the Extended History file so it can be imported and posted again.

Forecast Update MRP/APS for All Items Utility

The Update MRP/APS For All Items utility deletes all the forecasts in MRP/APS planning for all the items on Forecasts main (unless the status is Inactive) and pushes the net forecasts on the Forecast Main form to the MRP/APS planning system where they can be viewed on the Forecast form. The utility will post the forecast to the day of the month specified in the Forecast Parameters form, or will divide the forecast into weekly buckets per the Forecast Parameters form. Also, the "Skip Days" rule per the Forecast Related Variables / Auto Update will be applied by this utility.



Conversion of Monthly Forecasts to Weekly Forecasts

Forecasting will push weekly quantities to the planning system in the specified frequency and timing and will carry forward partial units so that the monthly quantities in Forecasting are precisely the same as the forecast totals in the planning systems. This prevents differences between the quantities aggregated in the planning forms (Planning Summary, Master Planning Display) and the monthly forecast quantity in Forecasting.

		Monthly Forecast Value:	100				
		Month1 Daily Average:	4.166666667				
		Month2 Daily Average:	5.263157895				
Month	Week	Work Days	Forecast	Rounded Values (Old Logic)	Total	Carry Forward Remainders (New Logic)	
1	1	5	20.83333333	21		20	
1	2	4	16.66666667	17		17	
1	3	5	20.83333333	21		21	
1	4	5	20.83333333	21		21	
1	5	5	20.83333333	21	**101**	21	**100**
2	1	4	21.05263158	22		21	
2	2	5	26.31578947	27		26	
2	3	5	26.31578947	27		26	
2	4	5	26.31578947	27	**103**	27	**100**

The conversion uses the number of working days and the monthly forecast quantity. The below example is 100 per month converted to weeks.

Month 1 has 24 days, which is a daily average of 100/24 = 4.16
Month 2 has 19 days, which is a daily average of 100/19 = 5.26

- Each weeks forecast is the number of work days that week times the daily average.
- The previous version of the utility would round numbers up which caused a slight variance in the total forecast picked up by planning. In this example the numbers sum to 101 for month 1 and 103 for month 2 even though the forecast was actually 100. The new utility will carry forward the decimals to compensate for this anomaly.
- For Month 1 week 1 the forecast is 20.83333, 20 becomes that week's forecast and the .8333 moves forward to the next bucket which is 16.667. Week 2's forecast becomes 17 because .83333 + .6667 adds 1 to the 16 and .5 carries forward. The ending result is the total for month 1 and 2 result in a total of 100 for the month.

Forecast Import Forecasts Utility

Use this utility to import forecasts from a .csv file. The first row is considered a header row and will be skipped. Data must be in the below format. Note: this format is not the same as the Export Format.

Column Headings

A. Item Number – Item Number
B. Status - "A" (Active) or "I" (Inactive). Default is "A"
C. Demand Filter Limit - Default is 5
D. Tracking Signal Limit - Default is 6
E. Model – Choose one of the following (Use either a single letter or the full name of the model):
F. L or Lumpy
G. H or Horizontal
H. M or Moving Average
I. T or Trend
J. S or Seasonal
K. B or Trend Seasonal
L. W or Holt Winters
M. Model Months - for Model M (Moving Avg) only
N. Override Type - "M" (Multiplier), "R" (Replace) or "N" (None). Default is "N"
O. Blend Type - Default is "S"
P. Data Type - "O" (Customer Order) or "U" (Usage). Default is "O"
Q. Forecast Average. Default is 0
R. Mean Absolute Deviation or Average Error. Default is 40% of the Forecast Average
S. Alpha Factor - Usually between .05 and .30. Default is .2
T. Trend - Expressed as the monthly change to the forecast (for trend models).
U. Forecast Values 1 thru 13 in the next 13 columns starting with the current month
V. Override Values 1 thru 13 in the next 13 columns starting with the current month
W. Base Index Values (Seasonal Index Values 1 thru 13 in the next 13 columns starting with current month
X. Item Group Code – Code used to group forecasted items
Y. Gamma Factor - Usually between .05 and .30. Default is .2. Used by Holt Winters Model for Trend Component weighting
Z. Delta Factor - Usually between .05 and .30. Default is .2. Used by Holt Winters Model for Base Index Component weighting.

Import Template Format

Template in four parts (place them alongside each other in Excel to end in Excel column BD):

Item Nbr	Status	Demand Filter Limit	Track Signal Limit	Model	Model Months	Override Type	Blend Type	Data Type	Average	Average Error	Alpha Factor	Trend
Forecast 1	Forecast 2	Forecast 3	Forecast 4	Forecast 5	Forecast 6	Forecast 7	Forecast 8	Forecast 9	Forecast 10	Forecast 11	Forecast 12	Forecast 13
Override 1	Override 2	Override 3	Override 4	Override 5	Override 6	Override 7	Override 8	Override 9	Override 10	Override 11	Override 12	Override 13
BI Val 1	BI Val 2	BI Val 3	BI Val 4	BI Val 5	BI Val 6	BI Val 7	BI Val 8	BI Val 9	BI Val 10	BI Val 11	BI Val 12	BI Val 13
Item Group	Gamma Factor	Delta Factor										

Other Utilities

Forecast Create Initial Forecasts. Used to populate this Forecasting application with the items to be forecasted. See section on Creating Initial Forecasts.

Forecast Safety Stock Generation. Calculates Safety Stocks, Reorder Points, Order mins for range of items and warehouses. See Working with Safety Stocks section.

Forecast Update Review Date. Used to make changes to the Review Date field on Forecast Main for a range of items.

Forecast Export Forecasts. Exports forecasting data to a .csv file that can be opened with Excel for analysis.

SECTION 11 – Recommended Processes

Implementation Process and First Month Operation

- See the Implementation and First Month Operation section

Daily

- Add any **new items** to be forecasted to Forecast Main.
  Tip: The "Not Forecast with Sales" Report is useful for identifying items being sold regularly but not being forecast. This report can be set to analyze data for any period of time to determine how many order lines exceeded the input target during that period of time. The text output file can be customized in a special spreadsheet format and imported or copy/pasted back to load the new items.
- Add **new Order Items to the Forecast As** form as needed.
- Run the **Forecast Consumption Utility** each day before running MRP/ APS Planning. (this utility is only needed if using the Forecast As functionality or Usage Based forecasting)
- View the **Message Log File** by opening the User Messages form from the Menu.

Monthly

- Run the **Forecast Monthly Utility** to extract the last month of history and calculate the forecasts. Run as early every month as possible after all new orders and shipments have been processed for the preceding month.
- **Review Exceptions** and make and necessary changes. This can be done by filtering/sorting for exceptions in the Forecast Main grid view form or by running the Exceptions Report. Analyze items that are not tracking to see if there is an opportunity to improve the forecast by changing the model or adjustments, or making the track limit less sensitive (increasing the value)
  a. Tip: The exceptions will not be recalculated until the next Monthly Utility run, so you might want to clear the exception code in the grid view for the items that you have changed the model or forecasting parameters so you know the exception condition has been dealt with.
- Enter Item Adjustments and Group Adjustments for the new 12th period. Note that the item adjustments may be setup to roll forward automatically. See Manipulating Individual Items.
- Run the **Forecast Sales Analysis** form and meet with company sales, marketing and material planning people to analyze sales trends and determine if group adjustments (group membership form) or item adjustments are necessary due to new products, promotions, major customer changes, competition, product replacements, etc.
- Run the **Forecast Update MRP/APS for All Items Utility** to load the new forecasts into the MRP/APS planning system.
- Run the **Forecast Consumption Utility** after the Update MRP/APS for All Items Utility and before running MRP or APS Planning, so the forecasts used to generate material requirements are the consumed forecasts values. (this utility is only needed if using the Forecast As functionality or Usage Based forecasting)
- Use the **Safety Stock Maintenance form** to review and calculate Safety Stock, Reorder Points and Order Minimums.

Background Processes

The following utilities, that are part of the above Daily and Monthly processes, can be run automatically as background processes.

- Forecast Consumption Utility
- Forecast Update MRP/APS for All Items Utility
- Forecast Monthly Utility

SECTION 12 – Frequently Used Reports

Forecast As Items Report

- Shows the relationship between Forecast As items.

Calculate Best Fit Models Report

- Performs a series of calculations and suggests Model changes by item, where needed.

Consumption Exceptions Report

- Allows a "real time" review of forecasts and their consumption by customer orders. Early action can be taken on those items not tracking to their forecasts.

Detail Report

- Shows detail information. One item number is printed per page.

Exceptions Report

- Show forecast items with exceptions. Prints in summary report format.

Items Not Forecast with Sales Report

- Shows items being sold but not forecast and facilitates analysis for a period of time for items that are being sold but are not being forecast. A filter can be applied for the number of customer order lines so that items with only a few lines can be suppressed. These items should be reviewed to determine if they should be forecast.

Value of Standard Groups Report

- The report is actually several reports that can be run simply be changing the "No" to "Yes" for each report. Any "From" and "To" limits entered will be used for all of the reports that are selected. Useful for understanding the impact of a forecast.

Customer Items But Not Forecast Report

- Used to evaluate items that are not forecasted but do have Customer Orders to determine if that Item should be forecasted

Group Memberships Report

- Used to evaluate group memberships

Last 24 Actual VS Forecast By Item Report

- Lists and graphs forecasts and actuals for a range of multiple items in a single report.

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APPENDIX A – Forecasting Models

A – Automatic Selection

- Selecting this option will run multiple model simulations and rank the models based on what would have had the smallest variance in the past and then recommend a "best fit" model. This analysis can be run in mass for multiple items using the Forecast Calculate Best Fit Models Report.
- MAPE (Mean Average Percent Error) in the Auto Selection is the MAD expressed as a percentage. This is the probability that the forecast will be accurate. (Referred to as the Monte Carlo simulation method). The MAPE is more meaningful than the MAD, since with the MAD you need to look up the average to see how much fluctuation is occurring.
- MAD (Mean Average Deviation) is the Sum of the Absolute value of each History Month considered less the Forecast Average. (@MAD = @MAD + abs(@Mo - @AvgF)
- Adj RR (Adjusted R Squared) is a measure of variation.
- History Months are only used for the Moving Average model.

M - Moving Average for Number of Months

- The moving average model calculates the forecast using an average of a number of most recent months' data. The number of months field determines how many months of data will be used for the moving average. Each month a month is dropped and a new month of data is added.
- The advantage of this model is that it is both simple and represents the most recent data.
- The disadvantage is that if a high sales month is dropped and a low sales month is added (or vice versa) there can be a substantial change in the forecast.
- You need to select the number of months to consider… 6 is recommended.

H - Horizontal (Exponential Smoothing)

- The horizontal model uses a weighting factor (alpha factor) to give that factor's share or weighting to the current month demand. The old forecast is weighted by one minus that factor. This if the alpha factor (or weighting factor) is 0.1, then 10% weight will be given to the current month demand and 90% weight would be given to the old forecast. An Alpha of .3 puts 30% weight on the most recent month of history, which is the highest you should set this value to prevent the forecasts from being too "nervous" to monthly spikes.
- For example:
- Alpha Factor = 0.1
- Old Forecast = 100
- Current Demand = 140
- New Forecast = (0.1 * 140) + (0.9 * 100) = 14 + 90 = 104
- Exponential Smoothing has the advantage of smoothing demand fluctuations and does not require the maintenance of historical data to use. The calculations are simple if forecasting is being done manually.
- An alpha factor of 0.1 approximates a 19 month moving average and would be appropriate for stable products. Higher alpha factors should be used for faster response. Generally an alpha factor greater than 0.3 should not be used.
- Exponential Smoothing gets its name from the shape of the curve formed by the weight impact of previous demand periods.
- See the Alpha Factors table below for the relative weighting of alpha factors of 0.1 to 0.4.

The Alpha Factor is the Weighting Factor used to weight the Old Forecast and New Data Month. This factor usually varies between .05 (5% weight and .20 (20% weight) to New Data.

Period	0.1	0.2	0.3	0.4
-1	0.100	0.200	0.300	0.400
-2	0.090	0.160	0.210	0.240
-3	0.081	0.128	0.147	0.144
-4	0.073	0.102	0.103	0.086
-5	0.066	0.082	0.072	0.052
-6	0.059	0.066	0.050	0.031
-7	0.053	0.052	0.035	0.019
-8	0.048	0.042	0.025	0.011
-9	0.043	0.034	0.017	0.007
-10	0.039	0.027	0.012	0.004
-11	0.035	0.021	0.008	0.002
-12	0.031	0.017	0.006	0.001
-13	0.028	0.014	0.004	0.001
-14	0.025	0.011	0.003	0.001
-15	0.023	0.009	0.002	0.000
-16	0.021	0.007	0.001	0.000
Total	0.815	0.972	0.997	1.000

- For an alpha factor of 0.1 note that the current period (-1) has a 10% impact and 2 months ago a 9% impact and three months ago has an 8.1% impact.
- Number of Months to Reach 80%

Months	16	8	5	3
Total	0.815	0.832	0.832	0.870

- Note that the 0.4 factor gives 40% weight to the first previous month, then 24% weight to the second previous month, then 14.4% weight to the third previous month for a total of 78.4% weight to these three months. 0.4 is not recommended since the forecast would fluctuate too much month to month as the new month received 40% weight.

L - Lumpy Model - (Demand has several zero periods each year)

- The Lumpy Model is the same as the Horizontal Model but uses a very low alpha factor (usually 0.05). Consequently this model changes very slowly.
- Monthly data may come in as 0, 0, 0, 37, 0, 0, 3 and be smoothed by this model. If the demand is unreasonable it will not be used. If the demand is consistently higher or lower than the forecast then an exception condition (Forecast Not Tracking) will occur.
- Usually the initial Forecast average will be determined by management policy for this type of item depending on the customers, normal order sizes, and importance of quick deliveries for this kind of item. A Forecast override replacing the Forecast will frequently be used. The Forecast will then simply be a tracking and exception condition vehicle.
- A custom lumpy model that analyzes order size is available for those who are interested. This model can be customized to meet any unique requirements. There is no charge for this model.

T - Trend Model (Demand is increasing or decreasing)

- Trend models can be dangerous to use if not properly understood and managed. Since they are based on either history or management expectations and are either increasing or decreasing forecast levels, the actual

demand data may be rapidly changing direction without the model being able to adapt quickly enough (or too quickly in some situations).

- The trend model consists of a beginning point (Forecast Average) and a trend (slope) value. The Trend Value is the monthly quantity increase or decrease (minus) in the average.
- After the initialization process this model will use exponential smoothing to update the model's variables each month in order to stabilize fluctuations.

S - Seasonal Model (Demand has seasonal patterns)

- The Seasonal model is used when data exhibits a seasonal pattern year after year. For example calendar sales are high late in the year and early in the year and low the rest of the year. This model can be dangerous if seasonality is not consistent. It should not be used unless market conditions are thoroughly understood.
- This model uses the Base Index values as multipliers to adjust the Forecast Average for seasonality each month.
- After initialization, exponential smoothing is used to update these values each month.

B - Trend Seasonal Model (Demand has Trend and is Seasonal)

- This model combines the features of both the Trend and Seasonal models. Consequently it is also the most dangerous to use. Using the calendar example, if sales are expected to increase by 10% a month due to new contracts with new clients then this model may be appropriate.
- This model uses both the Trend Value and Base Index Values to adjust the Forecast Average.
- After initialization, exponential smoothing is used to update these values each month.

Holt-Winters Model

The Holt-Winters model is useful when demand exhibits both trend and seasonal characteristics. This model uses exponential smoothing with three different weighting factors in its formulas. These factors range in value from 0 to 1.00. This allows for more importance to be placed on more current data.

- The **first weighting factor** is for the **base average** and it uses a factor arbitrarily called the alpha factor. The new average is computed by multiplying the deseasonalized data (actual data divided by the current month's seasonal index value) for the most recent time period by the alpha factor and the old average by one minus the alpha factor. The sum of these values is the new forecast. This can be expressed as new forecast = (alpha * latest period of deseasonalized demand) + ((1 – alpha) * old forecast).
- The **second weighting factor** is for the **trend** and it uses a factor called the gamma factor. The new trend value is computed by taking the new average minus the old average and multiplying the result by the gamma factor. The old trend value is multiplied by (1 minus the gamma factor). The sum of these values is the new trend. This can be expressed as new trend = (gamma * (new average - old average)) + ((1 – gamma) * old trend).
- The **third weighting factor** is used for **seasonality** and it uses a factor called the delta factor. The new seasonal index value for the current month is computed by taking the delta factor times the Current Month Demand and dividing it by the average. The old Seasonality index value is multiplied by (1 minus the delta factor). The sum of these values is the new seasonality index for the current month.

Calculating the Holt-Winters Forecast

- The forecast is calculated separately by month. The forecast for month 1 is equal to the (average plus 1 times the new trend) times the seasonal index for that month. The forecast for the n^{th} month is equal to the (average plus n times the new trend * the seasonality index value for the n^{th} month.
- This can be expressed as the forecast for month n = (Average + (n * New Trend)) * seasonality index for month n where n is the month relative to today. (n = 1 is the first forecast month, n = 2 is the second forecast month, etc.)

Setting up the Holt-Winters Model for an Item

1. Determine the three weighting factors (Alpha, Gamma, Delta)
    a. The weighting factors are best calculated by a computer using the Best Fit analysis utility supplied with Forecasting. This program can simulate the use of different values for each factor. If you don't have enough history (3 years) then you can assign these values manually based on how volatile you feel the demand is. Typically these values will range from 0.1 (stable demand pattern) to 0.3 (rapidly changing demand pattern).
2. Enter the Model and the three weighting factors on the Forecast Calculations Tab.
3. Calculate the seasonality index values.
    a. If you have at least two years of history you can choose the Auto Calc button and the seasonality index values will be automatically calculated.
    b. If you don't have enough history you will need to develop them manually using available sales data. A seasonal index value of 1.00 is an average month. A higher number represents higher sales for the month and a lower number represents lower sales for the month. The sum of the twelve seasonal index values must equal 12.
4. Calculate the Trend.
    a. The Auto Calc button will automatically calculate the Trend. If you need to input it manually then enter the trend as the monthly increase (or decrease) in sales units.
5. Calculating the Forecast
    a. Again the Auto Calc button is the easiest way to do this. If you wish you can supply and Average and a Trend and press the Manual Calc button and Forecasting will base its forecast on these values.
6. Graphing the Results
    a. Check the reasonability of the new forecast using the Forecast Graph. This is a very important step and there may be special events (Price changes, Model changes, New Product introductions, Product discontinuance etc.) that Forecasting does not know about.

APPENDIX B – Safety Stock and Order Min Calculations

Below are details on the calculations used by the Generate Safety Stock form and the Safety Stock Maintenance form. See the Working with Safety Stocks section for information on using these forms.

Safety Stock Calculation

1. The latest 2 years (counting back from "yesterday") of matltran job issues and shipments are retrieved. The oldest year is averaged and the average is used only for display reference.

2. The Average and MAD (Mean Absolute Deviation) are calculated for the latest year. If any month has more than 80% of the demand for the year is dropped for calculations but left in history and totals.

3. Set Service Level to:
    1. Forecast Item's Service Level if not zero or
    2. Forecasting Parameter service Level if not zero or
    3. 80% if both of the above are zero.

4. Look up the Service Factor in a table for the given service level. (see Forecasting Parameters General Tab for explanation of Service Level). This is a statistical table of standard deviations and probability percent. (e.g. 95% Service Level has a service factor of 1.65 Standard Deviations).

5. Compute Safety Stock for one month by multiplying the Service Factor Times the MAD times 1.25 (1.25 MAD's = 1 Standard Deviation). The MAD must not exceed the Average or the Average is used. This corrects for certain unusual demand distributions.

6. Adjust Safety Stock if the lead time is greater than one month. If the lead time is zero use 1 month for Purchased items and 0.5 months for Manufactured items. Otherwise use the lead time. If the lead time is greater than 1 month then multiply the safety stock by the square root of the lead time in months. This is to compensate for not calculating the MAD and Average based on time periods that are a multiple of the lead time. In other words the safety stock for three months is less than three times the safety stock for one month. Data could be grouped in lead time intervals but one month is the usual time frame looked at and this approximation is easier for the user to understand and produces a more consistent result in the real world.

7. If the Safety Stock is less and 1 and at least 0.35 then the Safety Stock is set to 1.

8. The Reorder Quantity is the Monthly Average times the lead time plus the Variable Safety Stock. (Demand over lead time plus safety stock).

9. If the Reorder Quantity is Greater Than that of the default warehouse and the number of hits in 12 months is only 1 then the new reorder quantity is set to the old one and the variable safety stock is set to zero.

Note: The calculation of safety stock and reorder points is calculated based on all usage and is at the warehouse level, so it uses a different history file than the forecasting calculations. So the history can be different for the safety stock calculation than it is for forecast calculations. If the forecast Data Type is set to "Usage" then the history used to calculate safety stocks and the history used to calculate forecasts will be the same, if set to "Orders" then the safety stock history and forecast history can be different.

Order Minimum Calculation

1. The formula used is Order Minimum = square root ((2AS)/(IC)) where
   A = Annual Usage
   S = Setup Cost (See Below)
   I = Cost of Carry Inventory (Forecast Parameter)
   C = Item's Current Unit Cost

   The Setup Cost for Purchased items is a Forecast Parameter.
   The Setup Cost for Manufactured items is the Syteline setup cost for the item plus the Forecast Parameter for additional job setup cost.

2. The calculation is restricted to a minimum 1 month supply and maximum 6 month supply. If there is only 1 hit in the history then the new order minimum is set to zero.

Notes:

- The usage history for safety stock calculations is a different history file than the history used for forecast calculations. The history values may be the same, but be aware that safety stocks are calculated by warehouse and forecasts are calculated at the item level. Also, the history for forecast calculations can be selected as customer "Orders" rather than all "Usage".
- **Caution:** These calculations are a guide to help users review their safety stocks and lot sizes. Great care should be used since a major cause of excess and obsolete inventory is improperly used safety stocks and lot sizes. This is especially true in a multi-level MRP environment where safety stocks and order minimums must be restricted to only the appropriate items and never use on all items.

Role of Safety Stocks in Inventory Planning

Safety Stock should be used very carefully in an APS/MRP system as it often results in excess inventory. It can be helpful to manage inventory for high volume finished goods and repair parts to account for variability in demand and prevent stock outs if the forecast is underestimated. Be aware, Safety Stock on a finished goods drives demand through the BOM to all the components, so a Safety Stock on a low volume finished good can increase the risk of obsolete or excess inventory.

Be careful with Safety Stocks on purchased items... if the actual vendor lead time varies, it might be better to set the item lead time to the higher end of the range and monitor it rather than carry a safety stock that could become obsolete inventory when demand drops. If demand varies, Order Min (and\or # Days Supply) can be used to place an order for a higher quantity than the average usage during the lead time.

Be aware: if an item is discontinued or dependant or independent demand drops off suddenly and the item has a safety stock specified, then the planning system will still suggest keeping the safety stock quantity in stock, even if it is not needed any longer. Therefore the safety stock values in the Item Warehouse must be closely monitored to avoid excess and obsolete inventory. Safety stock levels must be reviewed monthly to prevent excess inventory.

Depending upon the product structure and manufacturing lead time, a manufacturer will want to consider if Safety Stock should be used for manufactured items or purchased items. When a manufacturer's product structure is "A" shaped (many raw materials going into few end products) Safety Stock should most likely be carried at the Finished Goods level. When the product structure is "V" shaped (many end items made from fewer raw material items) it is

generally appropriate to carry Safety Stock at the lowest level in the BOM (raw material or purchased components).

If APS/MRP is not being used to explode BOM's, net against supply, and offset for lead-times, then the safety stock value could be used as a Reorder Point trigger to plan high volume items. The safety stock field can function as a reorder point for an item and Forecasting will calculate the optimum Safety Stock level and the Order Minimum based upon usage levels, variability of demand, desired Service Level, and ordering costs. However, the planning system is not designed to use Safety Stock this way and you have to manipulate it into using Safety Stocks and Order Mins instead of true item min and max levels. So be very careful to understand how MRP/APS uses order min and safety stock and monitor it very closely.

Ex: if a supplier's lead time is 3 days and your planned demand is 10 per day (per sales orders, forecast, planned production) then you do not need safety stock since MRP will suggest an order when you get down to 30 on hand. So on average, the replacement order arrives on the same day the last item is used. You adjust the supplier lead time and the order min to account for variability in the actual lead times and actual demand vs. the plan.

If seasonality needs to be planned, then a seasonal forecast and MRP/APS explosions drive the replenishment. If you desire to build up finished goods inventory for the busy season but keep production levels constant then a seasonal forecast combined with a Master Production Schedule provides the ability to manage the building up of inventory in the off season to meet the demand in the busy season. For a highly seasonal manufacturer a combination of statistical forecasting (to calculate demand), Master Production Scheduling (to smooth or level production while building up inventory), and Safety Stock (to deal with unanticipated spikes in demand) are best used in combination.

APPENDIX C – Forecasting Using Transfer Order History

There are two parameters that will affect how history for forecasting is built: Include Transfer Orders in History and Use Default Warehouse for Transfer Orders.

1. Single site, multi Warehouse.
    a. If Include Transfer Orders in History is NO, then no transfer orders of any kind should be included in History, SS or order Min calculations. ie, Transfer orders should be ignored completely.
    b. If Include Transfer Orders in History is Yes, then the dedicated Warehouse Flag determines what happens.
        i. If the transfer order is FROM MAIN and TO a "Dedicated" warehouse then the transfer order should be include in history.
        ii. If the transfer order is FROM MAIN and TO a "non-dedicated" warehouse then the transfer order should be ignored (both warehouses are planned and therefore the T.O. is really a move transaction)
2. Multi-site, single warehouse
    a. If Include Transfer Orders in History is NO, then no transfer orders of any kind should be included in History, SS or order Min calculations. ie, Transfer orders should be ignored completely.
    b. If Include Transfer Orders in History is Yes, then include all transfer orders where FROM is the current site.
3. Multi-site, multi Warehouse.
    a. If Include Transfer Orders in History is NO, then no transfer orders of any kind should be included in History, SS or order Min calculations. ie, Transfer orders should be ignored completely.
    b. If Include Transfer Orders in History is Yes, then the From and TO Site on the Transfer Order control what happens:
        i. If the From Site is the current Site and the TO site is different then include the TO
        ii. If the From Site is equal to the TO Site and they are both the current Site then look at the dedicated Warehouse Flag to determine what to do.
            1. If the transfer order is FROM MAIN and TO a "Dedicated" warehouse then the transfer order should be included in history.
            2. If the transfer order is FROM MAIN and TO a "non-dedicated" warehouse then the transfer order should be ignored (both warehouses are planned and therefore the TO is really a move transaction)
        iii. It is not expected that the From Site = the TO site and they are not the current site.

Note about Dedicated Inventory Warehouse to control planning:
Select this field to "protect" the inventory stored at this warehouse from use by MRP, APS, and MPS Processor planning functions. When these planning functions search for available on-hand inventory to allocate to demands, they will ignore the inventory in this warehouse. This option is useful if you want this warehouse to serve only local-area orders and not orders entered at the main facility. The MRP and APS systems and MPS Processor calculate available on-hand inventory and safety stock replenishment needs using the total quantity at all warehouses in which Dedicated Inventory is NOT selected. Also, these planning functions ignore all demands and supplies that specify a dedicated-inventory warehouse.

Note about Consuming Forecasts of Transfer Orders:
The Forecast Consumption Utility will use Transfer Orders to consume the forecast if the "include transfer orders in history" option is selected in Forecasting Parameters. See the section on Usage Based Forecasting for an explanation of how the utility works.

APPENDIX D – Data and Primary Tables

The following tables store the key information used by the Forecasting application.

DfcstH_MST: Sales and usage history extracted from the ERP system.

Dfcst_MST: Primary forecasting data, holds most of the fields displayed on Forecast Main.

Dfcsthmonths_MST: History file, types are as follows:

- B – Booking Units
- C – Booked Dollars
- S – Shipment Units
- T – Shipment Dollars
- F – Historical Forecasts (prior periods net forecasts stored by the Monthly Utility)

DfcstFcst_MST: Calculated forecast (blue column on Forecast Main)

DfcstNetFcst_MST: Net (adjusted) forecast (green column on Forecast Main)

APPENDIX E - Forecasting Vs. Sales & Operations Planning

Most midsized manufacturing companies have a process for developing estimates of the future demand for their products and developing a plan to meet this anticipated demand. The cliché "failing to plan is a plan for failure" certainly applies to manufacturers. But, not all manufacturers need to "Forecast" inventory requirements and not all manufacturers benefit from a formal Sales & Operations Planning (S&OP) process. For instance a job shop that carries little inventory and buys materials to the customer's job has little need for forecasting. Low volume manufacturers with simple supply chains have little need for S&OP. Conversely, long lead times, high volume, high dollar inventory and capacity constraints can make profitability very difficult for a company that does not forecast inventory needs and follow a process for production planning and balancing supply and demand.

So what manufacturing environments benefit most from Forecasting or Sales & Operations Planning? Since the terms "Forecasting" and "S&OP" mean different things to different companies, I will start by explaining these terms based on how they are applied using and ERP system.

"Forecasting" In the ERP world…
"Forecasting" refers to the process of creating unit forecasts for the specific items that you sell (or you can forecast components if you are a job shop or ETO manufacturer, provided you use the component based forecast consumption logic in some ERP systems). These forecasts are used to drive the ERP planning (APS/MRP) system, which provides suggestions on what should be made and purchased. Notice I said "units", not dollars, and I said "specific items", not product groups.

An ERP's forecasting application is used to create item forecasts and calculate safety stock levels that are used by the ERP planning system. It also has tools that allow you to analyze historical demand and compare that to what was forecasted and monitor the current forecasts versus the actual demand. With an ERP forecasting system you are generally dealing at the item/unit level and using statistical models or collaborative/consensus approaches to build the material forecast.

If planning in units of specific SKU's doesn't work for you, then the S&OP approach may be better as it provides the ability to start by building a plan with dollars of product groups (a top down sales plan vs. a material demand plan) and then disaggregate this into a unit and item specific plan, which is needed to be able to compare your plans to the actual sales and production. Many refer to this as an Annual Operating Plan (AOP).

Forecasting is typically a sub process of S&OP…
S&OP is an integrated business management process to align company activities to balance supply and demand. Forecasting is just one part of the S&OP process, but S&OP does not necessarily require a Forecast, but it does require a plan, typically a Sales plan or an AOP. Whereas the goal of Forecasting is to develop a unit forecast to drive the MRP/APS system… the goal of S&OP is to maximize customer fill rates, optimize inventory levels, and maximize profits by:

- Establishing Sales goals and managing attainment
- Supply Chain management / Production planning
- Finished Goods & WIP management
- Backlog and on-time shipping management

This integrated process typically involves members from sales, production, material management, purchasing and accounting. The S&OP team meets periodically in the form of three types of meetings… Demand Meeting, Supply Meeting, and the Executive Meeting. It starts with creating a sales plan and then linking this with production plans and then managing operations to balance demand and supply using S&OP tools that analyze ERP data.

Sales and Operations Planning with ERP…

S&OP applications are used to develop a Sales and Operations Plan in dollars (and also units) at multi-dimensional group levels (product code, family, territory, sales rep, whse, customer type, etc), which can be disaggregated into an item level unit plan and then compared to the forecasts. This is used by many companies to come up with an annual operating plan (AOP: sales dollars, units, costs, margin) and revise it quarterly, whereas material forecasts typically change every month. Some companies develop a material forecast, then give it to the sales/marketing folks to analyze and adjust at the group level by dollars… i.e. the initial material demand forecast is the starting point for developing the AOP. Other companies develop the material forecast separately from the AOP and just compare the material forecast to the AOP that sales/operations created. Some companies just need material forecasts and no AOP. Others just want an AOP Sales/Operations plan and do not need a forecast to drive the APS/MRP planning system. The latter benefit from what the S&OP process offers which also includes a number of workbenches and analytical tools to measure performance and balance supply/demand. S&OP tools also help facilitate weekly S&OP meetings with manufacturing, purchasing, inventory, and sales managers working together to balance supply/demand.

When to use Forecasting vs. S&OP…

Typically S&OP applications are used by sales, marketing, business planning, and operations people, whereas Forecasting is used by material planners… but that is a major generalization. The best way to determine if either a Forecasting process or an S&OP process could benefit your company is to think about the primary goals of these processes. Forecasting is for driving the process of material planning, S&OP focuses on improving customer service, profitability and balancing supply and demand. A ERP consultant that is familiar with the functionality, implementation process, and results achieved with Forecasting and S&OP applications can help you assess if either or both of these tools can efficiently help improve your company's performance.

To learn more about CloudSuite (SyteLine) SytePlan S&OP visit www.BTAsystems.com/apps