Planning Optimization in AX2012
Streamline your manufacturing operations with Master Planning and Forecasting

8th Annual BDO Connections Conference

Kevin Cosman
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About the Presenter

• Kevin Cosman, Senior Solutions consultant with BDO, Microsoft Dynamics AX implementation and support
• Areas of specialty: Trade and Logistics, Master Planning, Production
• 16 years experience as an ERP implementation and support consultant
• Over 40 years manufacturing experience
• Background prior to consulting - Materials Management and Manufacturing Engineering
• Implementation and support with over 100 manufacturing companies:
  • Custom fabrication, Heavy equipment, Roll forming, Concrete precast, Window and Door, Food & Beverage, Injection and blow molding, Automotive tier 1, Cable assembly, Pet Foods, OEM and Contract Electronics, Aerospace, HVAC
Is AX Master Planning meeting your needs?

Where can we improve?

Who is currently using Master Planning?

Master Planning and Forecasting can enable a company to drive requirements and capacity planning in synch with their Sales and Operations Plan (SOP).

We will review tools & techniques that can help to optimize a planner’s time involved in reviewing and acting on planning output. The goal is to increase the planner’s time to focus on managing the accuracy of planning parameters and data in AX, as well as longer-term planning.

Simple techniques like using the right Coverage codes and leveraging other planning tools can greatly reduce the volume of planned order data that is generated, hence reducing the time required to analyze and act.

Coverage codes, Time fences, Forecasting and related settings can greatly enhance Supply Chain Management and optimize inventory turnover.
Agenda

- Master Planning
  - Master Planning Inputs and Outputs
  - Parameters
  - Master Plans
  - Coverage
  - Time Fences
  - Positive/Negative days
- Default order settings
- Minimum/Maximum Key
- Forecasting
  - Demand and Supply Forecasts
- Kanban
- Questions and comments?
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Setup
- Coverage groups
- Item coverage, default order settings
- Dimension groups
- Warehouse settings
- Master Plans
- Parameters

Master Scheduling

Forecast

Planned Orders
- Purchase Orders
- Production Orders
- Kanbans
- Transfers

Requests for quotation

Sales quotations

Purchase Orders

Production Orders

Sales Orders

Inventory quantity
Master Planning

General parameters

• Default plans for Master Scheduling
• Auto copy - Static to Dynamic
• Default coverage group - applied to newly released items
• Dynamic negative days should be used when items with the same coverage group have different leadtimes. Once dynamic negative days is set, the lead time defined on released product (default order settings, site specific or item coverage) will always be the minimum negative date counted from today.
Master Planning

Planned Order parameters

- Planned purchase orders based on the lowest unit price or least minimum lead time Vendor based on trade agreements
Master Planning
Standard update parameters

- Grouping of planned purchase orders
  - Vendor
  - Buyer group
  - Purchase agreement - combines requirements on one PO per agreement
- Period - group by time period by Vendor
- Find purchase agreements - will use price and discount values when firming
- Transfers - group by period
Master Planning
Master Plans

You can set up and use various master plans to support your company's daily working operations, simulate different planning strategies that you want to monitor, and implement a company policy, such as a policy about internal performance or customer satisfaction. You can configure master plans in the Master plans form. Examples:

• Set higher inventory levels to guarantee against stockouts.
• Set longer safety margins to protect against unreliable vendors.

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Master Planning

Master Plans - Dynamic and Static

**Static plan** - The master scheduling calculation uses the current data to generate a net requirements plan. This plan remains unchanged until the next time that you run master scheduling. It is an operating plan that various company personnel, such as a purchaser or production planner, can use to base their decisions on and perform their daily tasks and activities.

**Dynamic plan** - some companies prefer to use a unique Dynamic Plan so that simulations such as delivery promise inquiries by sales, do not alter the Static plan.

A simple approach is to have one plan and have the Static and Dynamic point to it in the Master planning global settings.
Master Planning
Coverage

Four types of coverage:

- **Period**
  - When demand reduces the projected inventory below the specified minimum quantity, a planned order is generated. This planned order is used to fulfill the sum of all demands that occur during the time period that you specify.

- **Requirement**
  - A planned order is generated to fulfill each requirement that reduces inventory below the minimum quantity.

- **Min./Max.**
  - When demand reduces the projected inventory below the specified minimum quantity, a planned order is generated. The planned order is used to increase the inventory to the specified maximum quantity.

- **Manual**
  - Master scheduling does not calculate requirements for the items.
Master Planning Coverage

Period

- This policy is used with items that have a high usage pattern and are typically, components, semi-finished, or raw materials that are used to produce many different items. This results in multiple demands from multiple sources over periods of time.
- These types of items generally fall into the “B” inventory class.
- By selecting the coverage code **Period** and then defining a period of days that reflects a reasonable replenishment horizon, you can combine requirements into a single planned order, thereby reducing the number of planned orders generated by Master Scheduling.
- This technique will also integrate with your default order setting parameters like: Minimum, Maximum, and Multiple order quantity, so that Purchase, Production, and Transfer orders are created according to lot/package sizing and inventory management rules.
Master Planning Coverage

Requirement

• This policy is used with items that have a high unit cost/annual demand value* generally, but can be applied to items that have a short shelf-life, are prone to obsolescence, or sensitive to design changes.

• The requirement code allows a “lot-for-lot” or plan to order exactly what is needed for each requirement.

• The value in this policy is that it is a great tool to help identify and stay focused on your “A” inventory items. Because the system can plan for each unique requirement, a planner can “peg-up” to the source of demand and quickly review the situation. The benefits here are reduced obsolescence and reduction in inventory investment through ordering high-value items to a unique demand, rather than buffering for extended periods.

*Annual demand value is a term used in Pareto analysis to classify inventory items, it is the value of total annual issue transactions X the Item unit cost.
Master Planning Coverage

Min./Max.

• This policy is used with items that have a low unit cost/annual demand value generally, items that fall into the “C” classification.

• The concept here is that due to the low annual demand value we can afford to carry large volumes of the item on hand and also afford to order large volumes.

• An extreme example would be that I order the item once per year and have a reorder point (minimum) of 6 months on hand, and a maximum of 12 months on hand, so when my projected on hand balance drops below 6 months, the system will generate a planned order to replenish with a quantity to bring us up to 12 MOH

• The value in this technique is to reduce planned orders, and free up planner’s time to focus on the more critical A and B items
Master Planning Coverage

Manual

- This policy has limited application as you would certainly want to plan all of your active items with one of the aforementioned approaches.
- This policy would be valid for obsolete items, items that are coming to the end of their life, or perhaps in a prototype or pilot stage of life managed by a project team.

Note that coverage parameters can be set up at the Group level and then the group can be applied to multiple items. The coverage settings can be further managed at the individual item level and in the case of the Min./Max. code, the min and max values must be defined on the coverage form at the item level.
Master Planning
Time Fences

Time fences can be used to control how far into the future that Master Planning will include various data and inputs related to the plan. By precisely defining the time segments, you can limit the amount of planning data that is generated.

Time fences can be defined at several levels: Master or Forecast Plan, Coverage Group, or Item Coverage.

Coverage: The Coverage time fence determines the period for which the requirement schedule covers requirements. The Coverage time fence is expressed in days and is calculated from the current date. Requirements that have a date earlier than the current date are always processed.

Basically, how far into the future do you want to process supply and demand?
Master Planning
Time Fences

**Freeze:** The Freeze time fence determines the period in which no new planned orders can be created. The Freeze time fence also determines the planned orders from previous requirement calculations that cannot be changed.

It is always wise to determine a “frozen period” in your production schedule. This means that you have defined a typical period, say two weeks, in which you allow no changes, either material or capacity related. This practice helps to ensure accurate delivery and efficient plant operations.
Master Planning

Time Fences

Firming: The Firming time fence determines the period in which planned purchase orders and planned production orders are automatically firmed. The Firming time fence is expressed in days and is calculated from the requirement calculation date.

This feature would typically be used with a product that has a highly predictable and repetitive order pattern. This would definitely help to reduce planning time.
Master Planning
Time Fences

**Explosion:** The period during which planned production orders for items that are on BOMs are exploded into requirements for components. The time fence is expressed in days, and it is calculated from the current date.

Selecting a shorter Explosion horizon is another way that you could reduce the amount of planning calculations and data generated during the Master Scheduling process.
Master Planning

Time Fences

Capacity: The period during which the planned production order is capacity scheduled. The master schedule uses the item's active production route, the route is planned, based on the requirement date.

How far into the future do you need to check available capacity?
Master Planning

Negative Days

Enter the days that are added to a requirement due date. This number defines a time interval during which a planned receipt that is due can be used to fulfill the requirement. A planned receipt that is outside the defined time interval cannot be used to fulfill the requirement. Master scheduling generates a new planned order. You can equate negative days with the number of delivery days that are past due. During this time, there is a negative inventory level for the item. You must accept the negative inventory level before you can create a new fulfillment order.

The value that you enter depends on factors such as item lead time and the organization’s policy about inventory. If an item has a long lead time, you can specify the typical lead time as negative days.

You can specify negative days in either the Item coverage form or the Coverage groups form.
Master Planning
Negative Days

Example
For a particular item, a purchase order is scheduled for receipt on September 20, and a sales order is scheduled for delivery on September 19. You must specify whether to generate a new planned purchase order to cover the requirement, or to accept a late delivery for the sales order on September 20.

If you set the negative days to 0 (zero), a new planned purchase order is generated. If you set the negative days to a number that is larger than zero, no planned purchase order is generated. Instead, an action message is generated for the purchase order, and a futures message is generated for the sales order.

How accurate are your supply dates? Do you want MP to create planned orders or warn you via Futures and Action messages?
Master Planning
Positive Days

Enter the number of days that is subtracted from a requirement due date. This number defines a time interval during which on hand projected quantity and/or a planned receipt that is due can be used to fulfill the requirement. A planned receipt that is outside the defined time interval cannot be used to fulfill the requirement. Master scheduling generates a new planned order. You can equate positive days with the number of days that you can use existing inventory before you must create a new fulfillment order. You can specify positive days in either the Item coverage form or the Coverage groups form.
Master Planning
Positive Days

Example

For a particular item, there is inventory, and a sales order is scheduled for delivery in 90 days.

If you enter a number that is less than 90, a new planned purchase order is generated. If you set the positive days to a number that is more than 90, no planned purchase order is generated. However, the current inventory levels of the item are no longer available for new sales orders.
Master Planning
Default Order Settings

• Set site specific parameters for ordering
• Multiple, Minimum, and Multiple quantity values
  • These values work with your coverage settings to create planned orders
• Standard order quantity - default value when you create a manual Order
• Apply lead times here
Master Planning
Minimum/Maximum Key

- You can use minimum and maximum keys to handle seasonal fluctuations in demand. For example, you can decrease the minimum inventory level of an item in the off season, and then gradually increase the level in the following months.
- During master scheduling, the factored inventory levels are used to calculate net requirements for the item.
- In the example on the right, minimum inventory levels are doubled from May to July, back to par in August and then halved September through November.
Master Planning
Forecast - Demand

- A Demand Forecast is used to simulate sales of Finished Goods or any Saleable item that you need to supply for a customer.
- AX Master Planning uses these simulated sales quantities to create planned supply orders.
- You can create and use period keys to distribute forecast monthly quantities based on seasonality.
- You can use Item Allocation keys to create aggregate forecasts by Item group.
- Reduction Principle rules can be applied to consume forecast with Sales orders.

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Master Planning
Forecast - Supply

- A Supply Forecast is used to simulate anticipated demand for a BOM item
- AX Master Planning uses these simulated demand quantities to create planned supply orders
- You can create and use period keys to distribute forecast monthly quantities based on seasonality
- You can use Item Allocation keys to create aggregate forecasts by Item group
- Reduction Principle rules can be applied to consume forecast with Production or Purchase orders
Master Planning

Kanban

- Kanban is new in AX 2012, and can be used in a mixed-mode environment, anyone working toward Lean Manufacturing?
- A pull system produces goods only when goods are needed. This practice reduces delivery lead times and excess inventory. You can use kanbans to plan, track, and process requirements that are based on production flows. To create a kanban framework, create kanban rules that define when kanbans are created, and how the requirements are fulfilled.
Summary

AX has many effective tools & techniques to manage planning!
This presentation has hopefully provided you with a good insight to the potential of Master Planning in AX.

• Master Planning parameters can be fined-tuned to optimize planning data volume
• Coverage settings can optimize planning data, reduce inventory, and improve deliveries
• Minimum/Maximum keys can be used to manage seasonal demand patterns
• Forecasting can be used to improve customer service levels and avoid stock outs
• Lean, Kanban Flow Manufacturing is now available in AX 2012
Questions & comments?
Thank you!

Kevin Cosman