Master planning in Dynamics AX 2012

Presenters

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Agenda

- Brief introduction
- Introduction to master planning (Morning)
  - What master planning does
  - Break
  - How master planning ties into other modules
- Lunch (12:00-1:00pm)
- Advanced master planning (Afternoon)
  - Fine-tuning
  - Break
  - Scheduling
- Questions (4:00-5:00pm)

Introduction

- Who am I?
- Who are you?
  - Which version are you on?
  - Which industry you're in?
  - Are you currently using MRP?
  - Which areas of MRP were you hoping to learn more about today?

Plan for today

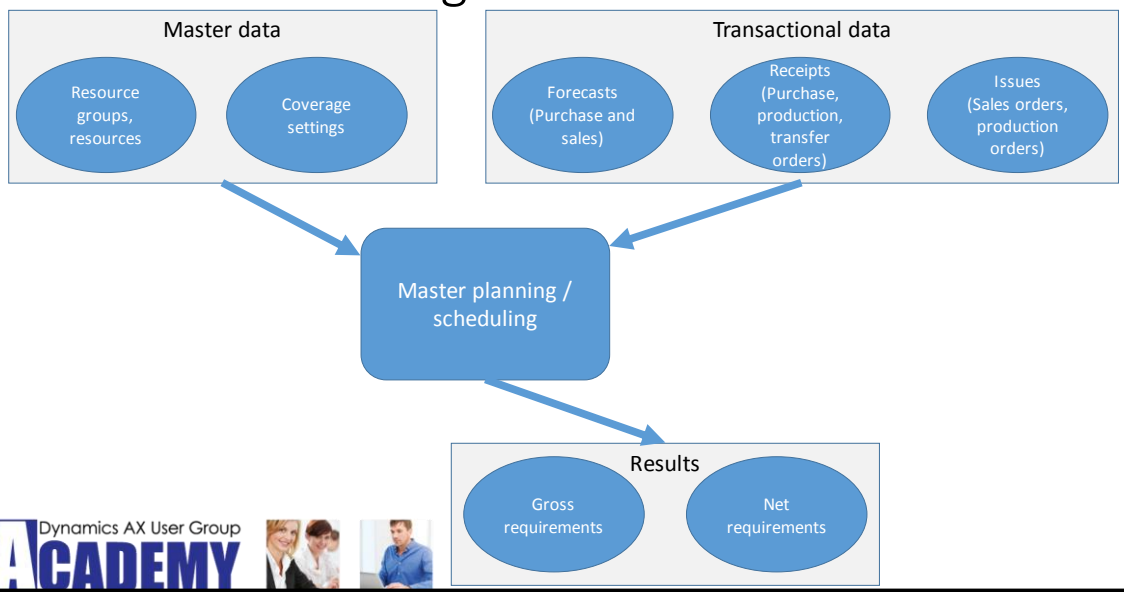
- Start small
  - Introduce a concept
  - Propose a scenario
  - Walkthrough scenario with my setups
  - Perform scenario on your own in demonstration environments
  - Compare

- **Sure-fire way to successfully implementing MRP**
  - Understand the basic concepts
  - Moved into more advanced areas slowly

Introduction to master planning

- What is master planning?
  - Planning engine in AX
  - Demand generates planned supply
    - Sales orders
    - Sales forecasts
    - Production / batch orders
    - Safety stock
  - Highly integrated
    - Setups in many modules
      - Inventory and warehouse management, production control, master planning, and organization administration

What feeds MRP engine?



Introduction to master planning, cont.

- MRP generates planned orders
  - Creates a list of "suggestions" from MRP
  - These orders are firmed into actionable orders
    - Could be "approved" by planning department and then firmed by production or purchasing employee
    - Production orders, purchase orders, transfer orders
  - "Pegged supply" shows link between demand and supply

Planned orders

- Master planning → Planned orders
- Master planning → Master planning parameters

Scenario 1

INFO

- Show how demand drives planned supply

TO-DO

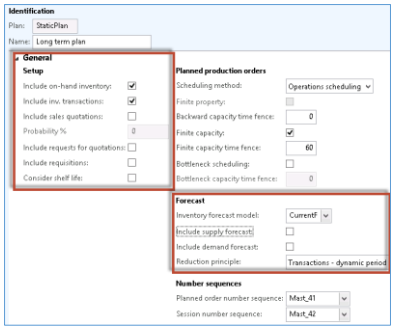
- Create a “coffee cup” item
- Add the item to a sales order
- Run local master planning
  - This generates planned supply
- Change quantity and approve planned order
- Re-run master planning
- Firm previously approved planned order

First scenario notes

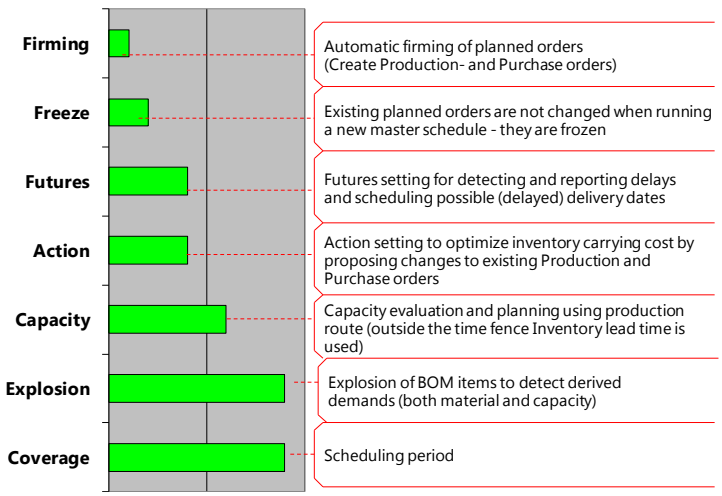
- Updated a master plan
  - Based strictly on item transactions
    - Sales forecast not used
- “Local” master planning update vs. full update
  - Updates net requirements only for selected item
  - Will not propagate through bills of materials
    - To update *ALL* requirements, must update the entire plan

Master plan parameters

- Master planning → Setup → Plans → Master plans
  - Plan ***StaticPlan***

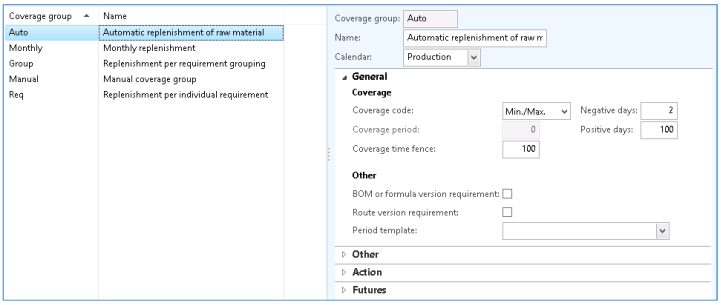


Time fences



Coverage groups

- Items assigned to coverage groups
- 4 “coverage codes”
  - Period
  - Requirement
  - Min/max
  - Manual



Scenario 2

INFO

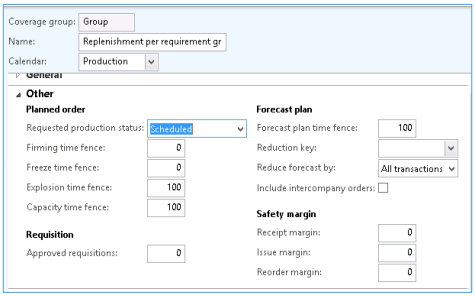
- Multiple sales order lines with the same quantity spread a week apart
- Coverage groups will be changed to demonstrate differences between planned supply results

TO-DO

- Create a “lid” item
- Add the item to a single sales order with multiple lines with different delivery dates
- Update master scheduling on coverage groups with different coverage group settings

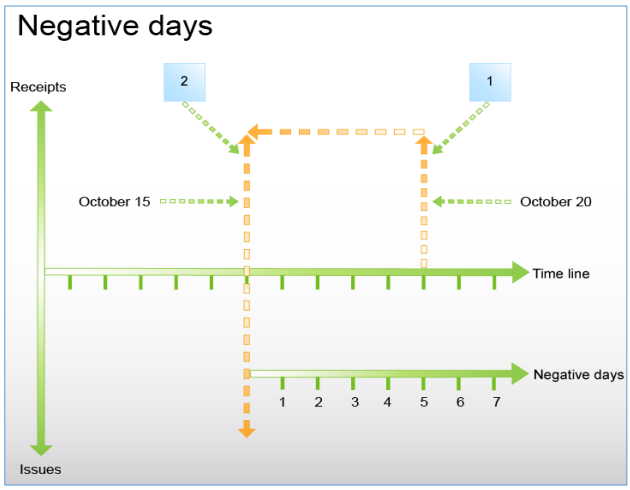
Coverage groups (cont.)

- Settings supersede similar settings on plan

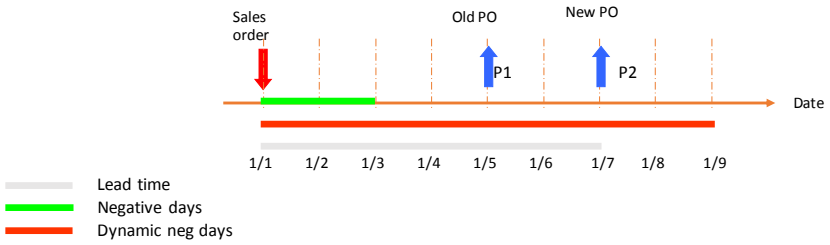


Negative days

- The number of days deemed acceptable to have negative inventory levels
- "Look forward" to see if there's supply close enough to use
- Without 5 negative days, planned order 2 would result



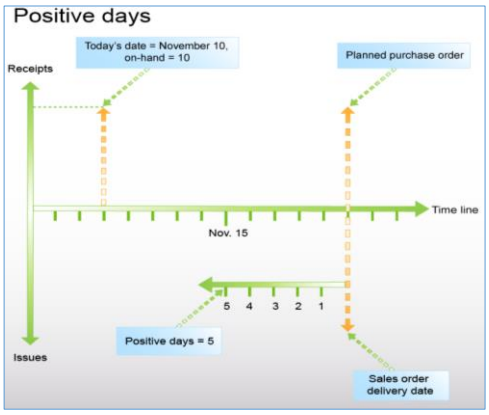
Dynamic negative days



- Adds lead time to negative days
- Enables a more realistic use of negative days
- Enabled in master planning parameters form

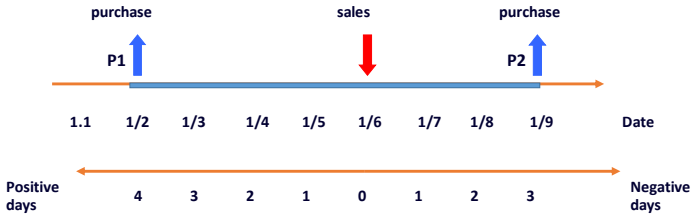
Positive days

- Number of days surplus inventory is acceptable
- Equal to the number of days existing inventory is used before creating new planned supply
- Typically set to same value as coverage time fence



Positive and negative days

- Control how "nervously" the system reacts
- Provide a buffer around the issue date which prevent new orders from generating
- Will reduce action messages as well



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Action and future messages

- Action messages
  - Used to enhance proposed plan
- Future message
  - Indicated proposed plan doesn't work
  - Provides more realistic approach based on lead-times and derived requirements
- Both show in "Net requirements" form

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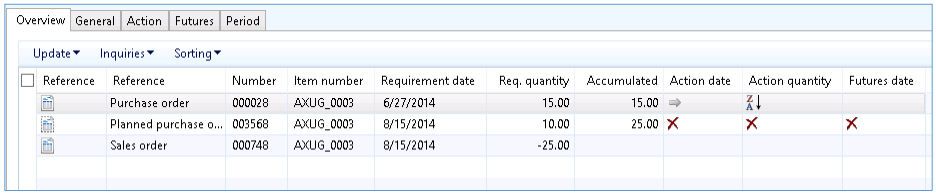
Action and future messages (cont.)

- "Net requirements" form with action and future messages



Action message types

- Increase
- Decrease
- Postpone
- Advance
- Derived actions

Scenario 3

INFO

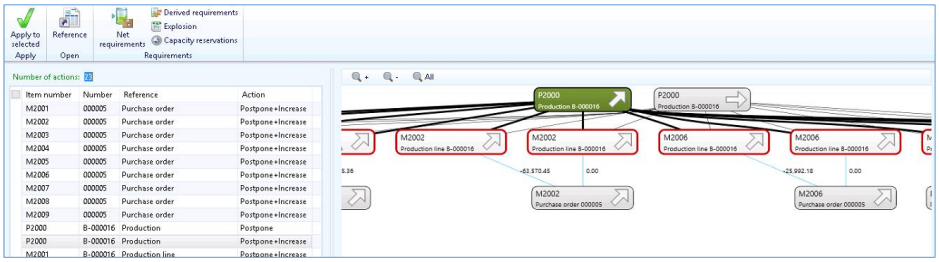
- A sales order and purchase order will be setup
- Action messages will be created for planned supply and actual purchase order

TO-DO

- Create a ”label” item
- Create a sales orders
- Create a purchase order to partially satisfy the sales demand, but make it arriving very early
- Act on action messages

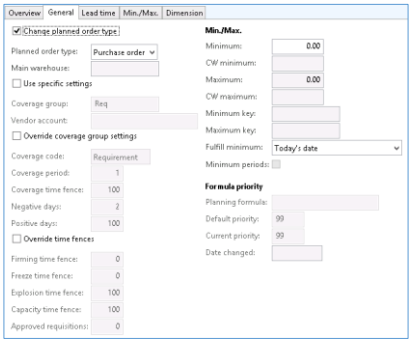
Action graph

- See the cascading effects of action messages for production material



Item coverage

- Item specific coverage overwrites coverage group



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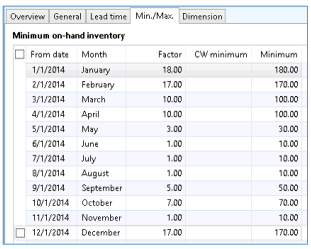
Min / max keys

- Units can be “Days”, “Months”, or “Years”
- “Fixed” enforces the start of the “Opening date”
  - Otherwise, changes based on when MRP is run
  - Unchecked for yearly strategic MRP run



From date	Month	Factor	CW minimum	Minimum
1/1/2014	January	18.00		180.00
2/1/2014	February	17.00		170.00
3/1/2014	March	10.00		100.00
4/1/2014	April	10.00		100.00
5/1/2014	May	3.00		30.00
6/1/2014	June	1.00		10.00
7/1/2014	July	1.00		10.00
8/1/2014	August	1.00		10.00
9/1/2014	September	5.00		50.00
10/1/2014	October	7.00		70.00
11/1/2014	November	1.00		10.00
12/1/2014	December	17.00		170.00

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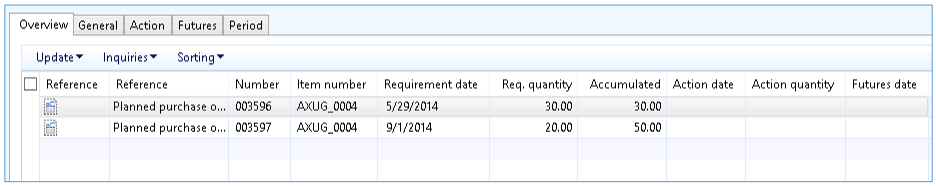
Min / max keys (cont.)

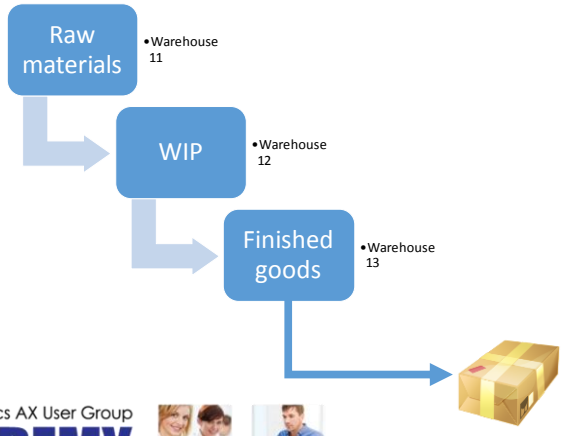
- Transactions look sort of strange
  - Only created when amount on-hand is below minimum
  - In the below example, 30 on-hand satisfies demand through September
  - In September, the minimum on-hand required is 50



Reference	Reference	Number	Item number	Requirement date	Req. quantity	Accumulated	Action date	Action quantity	Futures date
	Planned purchase o...	003596	AXUG_0004	5/29/2014	30.00	30.00			
	Planned purchase o...	003597	AXUG_0004	9/1/2014	20.00	50.00			

Warehouses

- Warehouse hierarchy is extremely important



Scenario 4

INFO

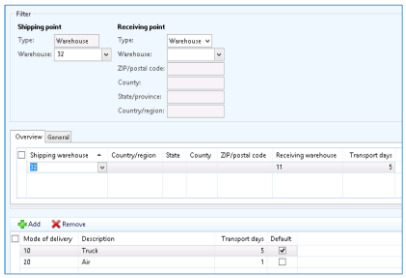
- Min levels will be created to drive demand
- Inter-warehouse relationship will be created

TODO

- Create a finished good item for the assembled coffee cup
  - We won't worry about BOMs yet
- Create min levels to generate demand
- Set up a warehouse-to-warehouse relationship
- Update master planning
  - Look at planned transfer orders
  - Examine settings that determine how planned transfer orders behave

Transit warehouse

- Warehouse that material sits in during transfer order processing
- Dictates how long delivery takes between geographical locations

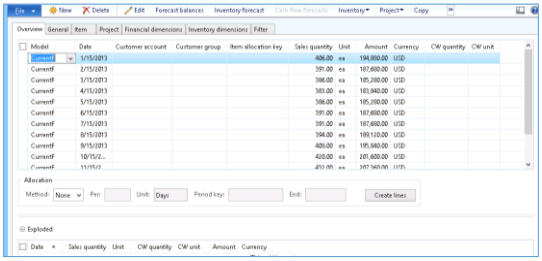


Forecasts

- Types
  - Demand – user-generated
  - Supply – user-generated, used rarely
  - Inventory – system-generated, based on Demand and Supply forecasts
- Models
  - Used to create for the forecast plans
  - Can include multiple sub-models

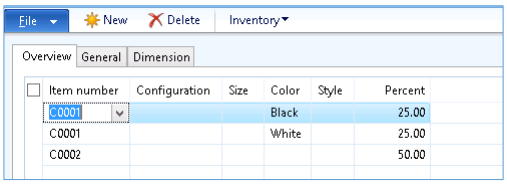
Forecast lines

- Can be manually entered through “Inventory and warehouse management” → “Periodic” → “Forecast” → “Entry” → “Items”
- Click “Demand forecast” button to open form



Forecast lines (cont.)

- Item allocation keys
  - Also known as “product family”
  - Can be forecasted against
  - Maintained in “Inventory and warehouse management” → ”Setup” → “Forecast” → “Item allocation keys”
  - Don’t need the same item



Forecast lines (cont.)

- Forecast lines can be allocated
- Types
  - None – lines must be manually entered for each date
  - Period – lines can be allocated over a given period
    - Select the unit to determine the period length
  - Key – can be used for seasonal items
- Reduction principle
  - Found on the master plan
  - Can be set to a key or reduction by sales / purchase orders
  - Can also select whether to reduce based on all transactions or just orders

Scenario 5

INFO

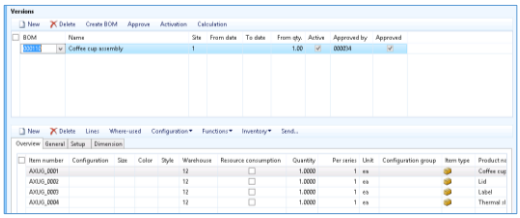
- Sales forecast will create demand
- Sales orders will consume this demand

TODO

- Create a sales forecast for an item
- Run master scheduling
  - Note new forecast lines
  - Note how sales orders reduce the forecast

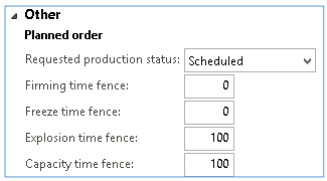
Planned production orders

- Same philosophy as planned purchase orders
- Look at active BOM that meets requirement
  - Must have active BOM, or no derived requirements will be created – just the planned production order
- Cycles through multiple levels of BOM to generate requirements



Planned production orders (cont.)

- Settings in coverage groups
  - Explosion time fence
  - Requested production status



Scenario 6

INFO

- A BOM (000110) has already been created and is available for use
  - Composed of one cup, one lid, one label, and one sleeve
- Use minimums to drive demand and see

TODO

- Attach BOM to finished good item (DEMO-0005)
- Indicate item should generate planned production order
- Update full master plan and examine results

Scenario 7

INFO

- Resources and resource groups set to infinite capacity

TODO

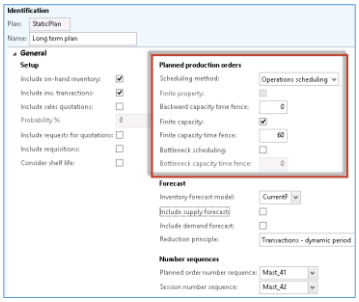
- Assign route to item (Route 000085 can be used)
- Manually create planned production orders that overlap
- Look at reserved capacity
  - Note how capacity is overbooked for certain days

Scheduling

- Resources / resource groups
- Capacity
  - Infinite vs. finite
  - Past the time fence, AX uses inventory lead time for production orders
  - Route is necessary to calculate time requirements on a resource
- Bottleneck scheduling

Master plan parameters (scheduling)

- Scheduling setups

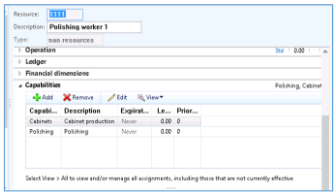


Resources

- Resources drive capacity
  - Example – Assembler
- Resource groups are groups of resources
  - Example – Assembly pool
- Operation can be assigned to either
- Capacity can be set as finite or infinite

Resources (cont.)

- Resources can have capabilities assigned
  - These can route capacity reservation to a particular resource
  - Example – high temperature furnace vs. low temperature furnace
    - Both might be resources in the same group
      - Either might be satisfactory for certain operations
    - Sometimes, though operations might need a high temperature furnace



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Routes

- Determine how long something takes to make
- Indicate how this time should be accounted for
- Indicate which resources should be used to complete them
  - For the example route
    - 1 hour per piece
    - Using the 1110 resource group (speaker assembly)

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Bottleneck scheduling

- Scheduling based on most constrained resource
- Can be set on a resource / resource group
  - Although routes exist for other work centers, only the bottleneck resource constrains the scheduling
  - All other work centers should use infinite capacity

Scenario 8

- **INFO**
- Use same planned orders from Scenario 7

- **TODO**
- Enable finite capacity on 1210, 1211, and 1212
- Manually reschedule each planned production order
  - Backward from scheduling date
    - Use the same scheduling dates – we're trying to overschedule a resource

Scheduling

- "Production control" → "Periodic" → "Scheduling"
- Doesn't include planned orders
- Can be run to firm up actual production orders in short term

Intercompany master planning

- Two ways this can be accomplished
  - Automatic – requires firming fence to be enabled in demand company
  - Semi-manual – requires intervention after other company MRP runs
- Can trace results in pegging

Tracing

- Through explosion
- Through Performance Monitor
  - Makes large files

Questions?

- Anything we didn't discuss?
- Any areas that we want to re-examine?
- jake@horsepeaks.com