Microsoft Dynamics 365 for Finance and SCM

Allocation & Replenishment Solution

[Draft] Design Notes | 6/26/2024 | Build-A-Bear Workshop

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# Overview

## Justification

Build-A-Bear Workshop is seeking to replace their inventory allocation and replenishment system based on Aptos software platform. New process is based on Microsoft Dynamics 365 for Finance and Supply Chain Management (D365 F&SCM). This process should leverage an existing production environment, master data, inventory details, and current processes for sales, procurement, and warehousing.

## Allocation & Replenishment Solution Overview

Build-A-Bear Workshop Allocation & Replenishment Solution includes the following:

* Master Planning (MRP) - satisfies the changing merchandise needs of stores, including a communication with Inventory and warehouse management, Sales, and Procurement. Master planning enables merchandise plans at a store level.
* Demand Driven Material Requirements Planning (DDMRP) - planning methodology that is based on the decoupling of supply and demand by setting up inventory buffers to ensure that the correct amount of stock is kept. Each buffer is intended to cover the average use of a part and can also be adjusted to cover demand spikes.
* Inventory and Warehouse Management - supports all inventory movement transactions including transfers, adjustments, and physical inventory, as well as receiving, picking, and distribution; it enables monitoring items as they move from supplier to store or individual customer.
* Master Data Management- a single point of entry for all information that defines a retail enterprise, such as list of merchandise company sells that can be used across all selling channels, planning profiles, stores, distribution centers, hierarchies, etc.

## Process and data flow

|  |  |  |
| --- | --- | --- |
| Input - master data and setup | Process | Output – orders, on-hand |
|  |  |  |

## Process highlights

Demand Driven Material Requirements Planning (DDMRP) is a key component of Build-A-Bear Workshop Allocation & Replenishment Solution. It consists of five components:

* Strategic inventory positioning – Identify decoupling points in the supply chain network. Decoupling points are specific points of your supply chain where you put an inventory buffer that you will monitor and replenish.
* Buffer profiles and levels – For each decoupling point, identify the buffer sizes (minimum quantity, maximum quantity, and reorder point) and the reorder quantity.
* Dynamic buffer adjustments – Adjust buffer levels, based on varying operating parameters or planned future events.
* Demand-driven planning – Generate supply stock transfers as they are required.
* Highly collaborative and visible execution – Run the supply orders with the help of visualization.

## Fit/Gap

D365 F&SCM is a general-purpose ERP that does not offer same functions as Aptos Allocation & Replenishment. Key highlights:

|  |  |  |
| --- | --- | --- |
| Aptos A&R Function | D365 SCM Function | D365 Fit / Gap |
| **Group: Table Maintenance** | **Group: Released products** |  |
| **Location Eligibility**  Specify whether a location is eligible to receive merchandise by merchandise level down to the style / color / size and by location. | **Item Coverage**  Specify item replenishment methods and quantity modification per item / style / color / size and by location / inventory status. Plain list, no levels, all combinations of eligible styles and locations to be specified. | **Partial**  Coverage settings per location groups or style groups are not supported require mode data management compared with Aptos A&R. |
| **Volume Grade Groups**  Location grading reduces the need to manage locations separately, by grouping locations whose performance is similar for a particular merchandise group. You define the criteria to assign stores to different grade groups for any level of merchandise. | **Not Applicable** | **Gap** |
| **Sell Thru Grade Groups; Ranking Groups**  Sell Thru grade groups are used only with the actual selling distribution method. Stores with a similar turnover of units (how fast an item sold) can be grouped to form a sell thru grade group. For each grade group, a sell thru lower limit is set. | **Not Applicable**  System calculates ABC classification and automatically assigns classifications to products. Used in reporting, analytics, cycle count frequency, etc. | **Gap** |
| **Size Scales**  Size scales define within a size category or group of sizes, each size’s proportion of a total quantity and can be expressed as a percentage breakdown (totaling 100%) or as a ratio. Used in planning, assortment, bulk PO documents, Min/Max profiles. | **Item Allocation Key**  Specify the item number and any applicable inventory dimensions with percentage of the total aggregate forecast quantity to allocate. Used in forecasts and supply schedule. | **Fit** |
| **Min Max Profiles**  Define the ideal levels of stock for each SKU/location combination; maintained at any level of the merchandise hierarchy; used with the SKU Min/Max distribution method. | **Coverage groups; Item coverage**  Coverage code Min/Max for static safety stock levels, and code Decoupling point for dynamic inventory buffers (DDMRP). | **Partial**  Settings at a hierarchy level is not supported. |
| **Comparable Sets**  A comparable set is a user-defined group of similar style colors that allows you to order, distribute or forecast a group of colors as one item. A comparable set can be used when discontinuing a style color that will be replaced by another style color. | **Not Applicable** | **Gap** |
| **Location Protection; Balancing Rules**  Protection level for each merchandise/location combination so that when distributing merchandise using the SKU Min/Max distribution method, each combination will be allocated sufficient inventory on a priority basis when there is insufficient inventory to meet the needs for all locations. | **Coverage Group**  Group-specific priority calculation method that defines priority to planned orders. The available values are Percent of maximum inventory quantity and Priority ranges. Coverage group codes are assigned for SKU/location combination. No levels. | **Gap** |
| **Location Groups**  Grouping of locations with the same seasonal curve or selling pattern. Location groups can be associated with seasonal profile groups and used when seasonal indices are calculated. | **Not Applicable** | **Gap** |
| **Seasonal Profile Groups**  Grouping of merchandise or locations that have the same selling curve. An item/location can belong to only one seasonal profile group | **Coverage group - Min/Max**  Define Maximum keys by going to Master planning > Setup > Coverage > Minimum/maximum keys. Minimum/maximum keys are incompatible with Decoupling point (DDMRP). | **Gap** |
| **Seasonal Indices**  Weekly percentage of annual sales for items belonging to the same seasonal profile group. Seasonal indices are maintained for a seasonal profile/year/location or a seasonal profile group/year/location group. | **Minimum/maximum Keys**  Minimum/maximum keys are incompatible with Decoupling point (DDMRP). | **Gap** |
| **Group: User-Defined Calculations** | **Group: Master Planning** |  |
| **Calculations Worklist**  User-defined calculations for distribution purposes. | **Master Plan**  System supports multiple master plans to plan operations daily, simulate planning strategies, and implement various planning strategies. | **Fit** |
| **SKU calculations; Pack calculations**  For SKU/Pack calculations, the system breaks the quantities calculated by the distribution method down to SKU/location using the formulas defined in the SKU calculation. | **Planned Order**  Planned orders are future supply transactions (PO, transfer, production) calculated by master plan run. | **Fit** |
| **Group: Worklists** | **Group: Inventory and Warehouse Mgmt.** |  |
| **To Do Worklist**  Contains entries that require action: Purchase order maintenance, ASN notification, PO Receipt notification, Unsuccessful generation of a PO. | **Delays; Action messages; MRP Log**  Master planning can calculate the delays – notifications of earliest fulfillment date, based on lead times, material availability, capacity, etc. Action messages indicate supply to-do list. | **Fit** |
| **Approval Worklist**  All distributions with a status of Pending. Users can open and view a distribution document, modify, approve and reject distribution documents. | **Planned Order; Approval Status**  Planned orders are regenerated at every master plan run unless approved. Approval process is simple flip the approval status on the order. | **Fit** |
| **Group: The Distribution Document** | **Group: Inventory and Warehouse Mgmt.** |  |
| **Distribution Document**  Initial statuses “New” and “Preliminary”. Distribution documents can be used together with the Purchase Order document or store transfer. | **Planned Order; Transfer Order**  Planned orders must be firmed as part of the master planning process. When planned orders are firmed, they become actual purchase orders, transfer orders, or production orders. | **Fit** |
| **Available On-Hand**  Available on-hand is based on on-hand and reserved orders. | **On-hand List**  On-hand list page is automatically updated when transactions are made in inventory. Those transactions might be expected, physical, or financial transactions. | **Fit** |
| **Distribute using Actual Selling**  Allows to review both sales volume and sell thru for specific merchandise for a range of weeks. | **Planned Order; Transfer Order**  Decoupling point planning strategy implements calculation based on average daily usage, lead time, spikes, and adjustments. | **Fit** |
| **Distribute using SKU Min/Max**  This is the traditional replenishment method. Both packs and loose items can be distributed; you do all your work in the distribution document in units. | **Planned Order; Transfer Order**  Planned order quantity is calculated based on item coverage strategy (min/max, decoupling point, etc.). There is no additional level of control at firming. | **Fit** |
| **Distribute using Manual Entry**  When distributing style/colors as loose items user selects the 0locations and specify the distribution quantities using Distribute Manually. | **Planned Order; Transfer Order**  There are three methods for firming planned orders: Manual; Auto-firming by default firming time fence (defined per coverage group); Query-based firming by specified items or planned orders’ properties. | **Fit** |
| **Submitting a Distribution**  A distribution document must be submitted to signify that it is complete and ready to be released to other systems. | **Release to Warehouse**  Transfer order can be released to warehouse both manually and automatically based on schedule and other criteria like store number. | **Fit** |
| **Generate Store Shipments**  Creating a store shipment completes the distribution. This relieves the warehouse of the allocated inventory, moving it from the warehouse to a store. The store inventory will be in-transit until the store receives the shipment. | **Shipment**  Warehouse management offers shipments representing individual outbound transactions and loads representing a truck or container. Shipment picking deducts warehouse inventory; confirmation updates transfer order status; transfer receipt updates store inventory. | **Fit** |
| **Group: Sales Forecasting** | **Group: Demand forecasting** |  |
| **Sales Forecasting**  Forecasting supports nine algorithms: Simple Moving Average; Weighted Moving Average; Exponential Smoothing; Double Exponential Smoothing; Adaptive Smoothing; Simple Regression; This Year/Last Year Trend; This Year/Last Year Season; Base Factor | **Demand Forecast; Demand Planning (Power App)**  Static demand forecast with basic allocation per period, seasonality schedule (period key), item allocation key. Forecasting features are implemented in the external product Demand Planning implementing sales data import and export to forecast. | **Gap** |
| **Calendar Shifts**  Some holidays such as Easter and Thanksgiving do not always fall on the same date each year. Additionally, some years have 53 weeks as opposed to the normal 52-week year. This can cause spikes in seasonality because of the change in week from year to year. Use this function to define these holiday periods and 53-week years by identifying the holidays each year by location/week and mapping the week to the same week in other years. | **Demand Forecast; Adjustment**  Various adjustment and copy functions can be used to update static demand forecast. There is no direct mapping to past-year sales. | **Gap** |

# Demonstration script

1. Master data and setup
   1. Released products
      1. Order default
      2. Coverage group
   2. Warehouses
      1. Stores and distribution centers
      2. Replenishing configuration
      3. Calendar

Weekly shipping schedules

Working days

* + 1. Negative stock
  1. Master plans
  2. Coverage groups
     1. Planning strategy
     2. Configuration
     3. Decoupling points formula
     4. Adjustment factors
  3. Workaround for mapping of last year’s sales
  4. Workaround for Presentation stock

1. Processes
   1. Review of decoupling point status by net flow
   2. Calculate buffer values
   3. Update decoupling point buffers to trigger replenishment
      1. Manual adjustment
      2. New forecast
      3. New sales
   4. Master plan run
   5. Planned transfer orders
   6. Planned data review, approval, correction
   7. Other master planning messages: delays, actions
   8. Firm planned transfer orders
   9. Review and update transfer orders
   10. Release to warehouse
   11. Transfer order shipment, inventory in transit, receipt at the store
   12. Calculate buffer values #2, and review of decoupling point status
   13. Master plan run #2
2. Review
   1. Inventory on-hand
   2. Orders
   3. Manual adjustments throughout the entire allocation process
   4. Process differences between D365 F&SCM and Aptos
      1. New advantages
      2. Gaps
      3. Improvement opportunities
   5. Data migration

# Questions

|  |  |
| --- | --- |
| Topic | Solution |
| 1. Key definitions | |  |  | | --- | --- | | BaB | D365 SCM | | location | warehouse configured as replenished from main warehouse (see “distribution center - below”); referred as store; configured with weekly/bi-weekly shipping calendar | | distribution center | replenishing warehouse; referred as DC; configured with generic calendar Mon-Fri, excluding holidays | | style | released products (individual items), and released product variants (end-level item variants at color, size, and style combination); variants are not used; also referred as item | | SKU | scannable code that tracks inventory at warehouse and product details; specified in orders and warehouse transactions; same as item (see “style - above”) | | presentation stock | minimum safety stock level | | allocation | master planning process; referred as planning | |
| 1. Allocation concept |  |
| 1. Split allocation work between three planners | *Currently organized by product hierarchy at a consumer group level (first level). Existing levels: consumer group; department; style.*  To be set as item buyer group. Value default from category hierarchy level |
| 1. New style | * Add new product to a category hierarchy level. Verify/update item buyer group. * Update inventory section of product’s default order settings with multiple by qty representing default transfer quantity by case/pack/skid. * Add demand forecast driving weekly demand. Copy forecast to future periods evenly or with seasonal allocation key. One line per location. Both copy-paste from Excel and data import are possible * Create/post safety stock journal for presentation stock qty. * Automation: Recalculate max. replenishment quantity: [presentation qty] + [historical sales] \* [reduction factor] |
| 1. New location | * Add/import demand forecast driving weekly demand for items. * Create/post safety stock journal for presentation stock qty. * Automation: Recalculate max. replenishment quantity |
| 1. Remove a style from allocation | * Change item lifecycle code -or- * Change item coverage group * (optionally) remove forecasts and item coverage |
| 1. Remove a location from allocation | * Remove item coverage |
| 1. Master data maintenance | * Adding and removing item coverage can be automated if system can determine product-specific and location-specific details:   + Presentation stock qty   + Future demand (in case last year sales data not available)   until then it is manual or data import. |
| 1. Explain warehouse calendar | DC calendars match regular working schedule like Mon-Fri, exclude public holidays, Christmas, etc.; used for planned PO receipt date.  Store calendars match default shipping schedule like every Tuesday, or every other Tuesday; or last Friday of the month; technically closed days are the days when warehouse cannot receive products, but without transit time configured in D365 SCM transfer shipping date match receipt date. |
| 1. Bi-weekly shipping | No problem with manual configuration or data import. Standard working time creation works with weekly templates. |
| 1. Weekly and Bi-weekly allocation | Setup as weekly, MRP bundle requirements based on warehouse calendar. MRP coverage period is to be two times of the longest replenishment period. |
| 1. Presentation stock | Safety stock. In min/max replenishment presentation stock qty is a minimum bucket. Maximum is to be presentation qty + adjusted last year’s weekly sales. |
| 1. Damaged stock | If Inventory status storage dimension is selected for “Coverage plan by dimension” (recommended), master plan will consume on-hand by inventory status. I.e. damaged/quarantined/lost stock will not be considered as supply. |
| 1. Last year sales | Last year’s and any other historical sales make no input to master planning (ignoring decoupling point method), therefore, additional business logic is needed to copy sales history into the future demand data.  Master planning accepts the following as sources of inventory demand:   * + - * Safety stock       * Demand forecast       * Fictitious sales orders/quotation   We shall disqualify sales orders/quotations due to high performance impact and unwanted mix with regular sales data. Safety stock is not a fit due to missing period reference, and because it is needed for something else (presentation stock). Demand forecast is a fit featuring multiple models that could be included/excluded in planning. |
| 1. Period shift | Forecast reduction key. Specified at a coverage group level and associated with item via coverage group code. Requires master plan configured with “Percent - reduction key” forecast reduction method.  Standard functionality adjusts period forecast up with negative reduction key and down with positive reduction key. Example: -10% reduction results in x 1.10 forecast quantity factor; +20% reduction results in x 0.80 forecast quantity factor.  Extended functionality – with extra column(s) in reduction key periods can be used for mapping last year’s period to current. |
| 1. Seasonal spikes | Item coverage’s maximum key is one of the methods allowing for auto-correction of maximum bucket based on period/weekly factors. There are 2 methods that work simultaneously on min/max: maximum key and forecast reduction key (see #14 above). |
| 1. Out of stock products | MRP’s job is to balance demand with supply, it cannot address the requirement of allocating stock withing available on-hand. We can get closer to the solution with additional data management steps:   * + - * Monitor for planned purchase orders created at DC location flagging short or no stock to fulfill transfers       * Custom report       * Removing item coverage manually - Or -       * Additional automation checking for an existing on-hand and replacing item coverage group code with “None”. Could be set as a part of “Recalculate max. replenishment quantity” job |
| 1. Allocate in each, transfer by case/pack | Update inventory section of product’s default order settings with multiple by qty representing default transfer quantity by case/pack/skid. Could be different by site (if required). Planned orders respect default order quantity settings. |
| 1. Manual allocation | Create/import planned transfer order or transfer order (without “planned”). Transfer order is recommended. |