thinkmax

Allocation and Replenishment

Prepared for

Build-A-Bear Workshop

Solution Architecture Design, ver. 1.0

Prepared by

Yury Pokusaev

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Revision Sheet

Change Record

Version	Author	Change reference	Date
1	Yury Pokusaev	Initial document	8/30/2024

1. Introduction

The proposed solution architecture for Build-A-Bear Workshop's Allocation and Replenishment system is designed to align with the organization's strategic objectives. This architecture outlines the key components, their interactions, and how they contribute to the overall solution vision.

The following diagram summarizes the solution architecture design pillars and how they relate to the vision.
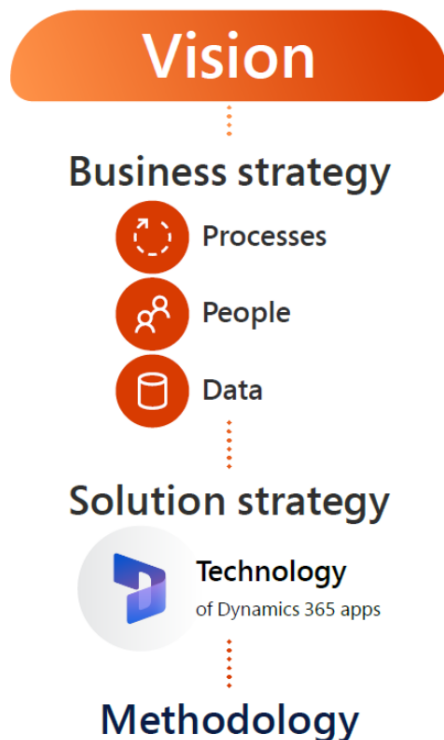
References:

General Vision: Section 1.1 (Justification)

Business Processes: Section 1.4 (Business Process Scope)

Organizational Scope: Section 1.2 (Organizational Scope)

Data Elements: Section 1.3.1 (Solution Data Flow) and Section 2

Technology Aspects:
Section 1.3 (Microsoft Dynamics 365 Supply Chain Management Scope)
Section 1.5 (Third-Party Solutions)
Section 1.6 (Additional Areas)

Implementation Methodology: Not defined in this document.

1.1. Justification

Build-A-Bear Workshop seeks to replace their inventory Allocation and Replenishment system, currently based on Aptos ERP software, with a new process using Microsoft Dynamics 365 Supply Chain Management (D365 SCM). The new process will leverage existing D365 SCM production environments, master data, inventory details, and current processes for sales, procurement, and warehousing.

The following provides details of the specific scope of the solution:

- **Organizational Scope:** Defines the scope of the project as it relates to the organizational entities.

- **Microsoft Dynamics 365 Supply Chain Management (D365 SCM) Scope:** Provides a listing of the modules.

- **Business Process Scope:** Defines the business processes included and excluded in this document.

- **Third-Party Solutions:** Provides a listing of identified third-party solutions or add-ons to handle unique requirements.

- **Additional Areas:** Provides an overview of interfaces, data conversion, software modifications, and report requirements.

1.2. Organizational Scope

While the solution initially considers one legal entity, its core D365 SCM functionality allows for easy application to multiple legal entities. Cross-company data sharing aspects, intercompany material demand planning, intercompany sales and replenishment transactions, and any of Microsoft Dynamics 365 Finance processes are not described in this document.

There may be significant changes to business processes that would require a high focus on change management by Build-A-Bear Workshop as a key part of the implementation. These changes will be performed during the implementation to facilitate the implementation of D365 F&SCM modules in their standard form as much as possible

1.3. Microsoft Dynamics 365 Supply Chain Management Scope

The following Microsoft Dynamics 365 Supply Chain Management modules are within the scope of the solution

Module	Scope	Description
Master planning	New implementation	Calculates net requirements for inventory replenishment and forecasts gross requirements for long-term planning. Uses Demand Driven Material Requirements Planning (DDMRP) and manages planned orders.
Warehouse management	Present in current solution, new configuration	Manage warehouse processes, including inbound/outbound loads, order release, and cycle counting. *New configuration of stores and distribution centers.*

Module	Scope	Description
Product information management	Present in current solution, new configuration	Defines product information, including configuration, lifecycle, hazardous materials, and components. *New configuration of products.*
Retail and commerce	New configuration used by Master planning	Setup of retail channels, channel hierarchies, product category hierarchy, and assortments
Inventory management	Present in current solution, No changes	Inbound, quality assurance, inventory activities, outbound, inventory visibility.
Procurement and sourcing	Present in current solution, No changes	Procure products and services from vendors, including RFQs, POs, and supply risk assessment.
Sales and marketing	Present in current solution, No changes	Manage sales data, including initiatives, follow-ups, promising, agreements, and returns.

1.3.1. Solution Data Flow

Demand	• Last year sales (forecast) • Presentation stock • Open orders
Supply	• On-hand inventory • In-transit transfers • Confirmed PO
Warehouses	• Calendars, ranks • Stores and DC • Hiearchy, assortments
Products	• Categories, attributes • Hiearchy, assortments • Order defaults
Configuration	• Master plans • Min/max profiles • Location/product eligibility

Master planning, DDMRP

DDMRP inputs **NEW PROCESS**

• Item coverage
• Buffer values, decoupling point status — Calculate ADU

• Planned orders
• Delay and overallocation messages — Master plan

• Transfer orders
• Delivery schedule — Firm planned

• Picking lists
• Shipments, loads — Release to warehouse

DDMRP outputs **NEW PROCESS**

pick pack dispatch ship **EXISTING PROCESS**

1.4. Business Process Scope

The modules identified above are essential for providing Build-A-Bear Workshop with the functionality required to support the in-scope business processes. This section provides detailed information on existing business requirements, including the following:

- **Functionality:** Identification of functionality currently supported by Aptos ERP.

- **Scope:** Indicates whether the function is included or excluded from the scope of the solution.

- **D365 SCM Solution:** Determines whether the functionality or business requirement is met by D365 SCM with of without customizations.

Functionality	Scope	D365 SCM Solution
Allocation & Replenishment: Ensures optimal inventory levels by allocating merchandise to stores based on demand. Streamlines communication with purchase and transfer order management. Maximizes sales, profits, and ROI through improved inventory turns and reduced markdowns.	In	Master planning module generating supply transfer and purchase orders as they are required. Master planning uses inputs from other modules.
Enterprise Data Management: Provides a centralized repository for all essential retail data, ensuring consistency across merchandising solution. Streamlines data entry and reduces errors.	In	Master data is distributed between Product information management, Inventory and warehouse management, and Master planning modules.
Inventory Management: Tracks and manages all inventory movements, from receipts to returns. Offers real-time updates and inventory statuses for informed decision-making. Includes invoice matching data for accounts payable.	Out	Although Master planning consumes inventory levels and other inventory management data, the solution will not alter existing inventory management configuration and processes.
Merchandise Planning: Enables flexible and granular merchandise planning at both chain, store, and SKU levels. Supports multi-channel retailing and tailored planning to meet specific store needs.	In	Various components of merchandise planning are addressed with Master planning module's item coverage, inventory management module's forecasts, and retail and commerce module's hierarchies and assortments.
Merchandising Analytics: Provides data-driven insights into all retail activities, from sales to returns. Supports informed decision-making and store performance optimization.	Out	Specific reporting is not considered a part of this solution. With many implementation options including external Power BI reporting, SSRS, and Electronic Reporting specifics, it is to be determined as a solution improvement.

Functionality	Scope	D365 SCM Solution
Price Management: Tools for managing temporary and permanent price changes. Enables granular price control by style, color, and location to maximize profitability.	Out	Solution has no requirements to sales order management and pricing.
Product Management: Maintains a centralized product database for seamless management across all selling channels, including web, kiosks, and catalogs.	In	Product information is essential for Master planning. Product data will be managed in Product information management and Retail and Commerce modules.
Purchase Order Management: Streamlines the entire purchase ordering process, from creation to delivery. Integrates with Allocation & Replenishment for efficient inventory management. Provides financial controls, approval workflows, and detailed reporting.	Out	Solution has no requirements to procurement and sourcing of products at distribution centers.
Stock Ledger: Facilitates integration with your general ledger system. Customizes stock ledger calculations to meet specific business requirements.	Out	Solution has no requirements to product costing and specific inventory valuation methods. The only requirement from Master planning process is to ensure planned products are stocking type.
Warehouse Management: Optimizes receiving, processing, and distribution operations. Ensures inventory tracking throughout the supply chain. Supports multi-channel fulfillment and warehouse management.	Out	Solution has no requirements to warehouse management and order fulfillment.

1.5. Third-Party Solutions

During the analysis session, the need to supplement the D365 SCM solution with external solutions was determined for the following requirements:

- **Demand planning in Microsoft Dynamics 365 Supply Chain Management**: Microsoft's collaborative demand planning solution. This app is powered by forecasting algorithms and offers forecasting solution integrated with D365 SCM.

1.6. Additional Areas

Key application customizations identified during planning and scoping have been outlined in the Gap Analysis (below). Please note that as the implementation progresses, some of these custom requirements may be deleted or changed, and others could be identified.

Before proceeding with any customization effort, a thorough review will be conducted to confirm the need for such customization. The Functional Design Document (FDD) approval will serve as the basis for determining whether to proceed.

Key highlights of D365 SCM gaps to be addressed via customization as a part of the Allocation and Replenishment implementation project:

Aptos A&R Function	D365 SCM Function	D365 Fit / Gap
Group: Table Maintenance	**Group: Released products**	
Location Eligibility	**Item Coverage**	**Partial**
Specify whether a location is eligible to receive merchandise by merchandise level down to the style / color / size and by location.	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.	Coverage settings per location groups or style groups are not supported require mode data management compared with Aptos A&R.
Volume Grade Groups	**Not Applicable**	**Gap**
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.		
Sell Thru Grade Groups; Ranking Groups	**Not Applicable**	**Gap**
	System calculates ABC classification and automatically assigns	

Aptos A&R Function	D365 SCM Function	D365 Fit / Gap
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.	classifications to products. Used in reporting, analytics, cycle count frequency, etc.	
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 Product/warehouse 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	**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.	**Gap**

Aptos A&R Function	D365 SCM Function	D365 Fit / Gap
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 codes are assigned for Product/warehouse combination. No levels.	
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	**Planned Order** Planned orders are future supply transactions (PO, transfer,	**Fit**

Aptos A&R Function	D365 SCM Function	D365 Fit / Gap
For SKU/Pack calculations, the system breaks the quantities calculated by the distribution method down to Product/warehouse using the formulas defined in the SKU calculation.	production) calculated by master plan run.	
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	**Fit**

Aptos A&R Function	D365 SCM Function	D365 Fit / Gap
	might be expected, physical, or financial transactions.	
Distribute using Actual Selling	**Planned Order; Transfer Order**	**Fit**
Allows to review both sales volume and sell thru for specific merchandise for a range of weeks.	Decoupling point planning strategy implements calculation based on average daily usage, lead time, spikes, and adjustments.	
Distribute using SKU Min/Max	**Planned Order; Transfer Order**	**Fit**
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 quantity is calculated based on item coverage strategy (min/max, decoupling point, etc.). There is no additional level of control at firming.	
Distribute using Manual Entry	**Planned Order; Transfer Order**	**Fit**
When distributing style/colors as loose items user selects the 0locations and specify the distribution quantities using Distribute Manually.	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.	
Submitting a Distribution	**Release to Warehouse**	**Fit**
A distribution document must be submitted to signify that it is complete and ready to be released to other systems.	Transfer order can be released to warehouse both manually and automatically based on schedule and other criteria like store number.	
Generate Store Shipments	**Shipment**	**Fit**
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.	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.	
Group: Sales Forecasting	**Group: Demand forecasting**	

Aptos A&R Function	D365 SCM Function	D365 Fit / Gap
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**

2. Functional Design

2.1. Overview

The following diagram summarizes the key functions of Allocation and Replenishment solution and relations between them.

Master data maintenance				
Products	Warehouses	Assorments	Forecasts	Item coverage

Record invnetory movements and stores sales (process out of scope)		
On-hand invnetory	Stores and DC receips	Stores and DC issues

Update demand forecast		
Copy last year's sales	Mapped items with adjustment	Manual updates/import

Calculate ADU		
ADU	Planning buffer values	Forecast

Master plan calculation	
Planned orders	Overallocation and delay signals

Approve allocations	
Approved planned orders for qty below on-hand	Planned orders for short stock delta

Review and alter approved planned orders	
Approved planned orders	Reporting

Firm approved planned orders
Transfer orders

Release to warehouse		
Picking lists	Shipments	Loads

2.2. Master Data Configuration

2.2.1. Products Overview

The Allocation and Replenishment solution will utilize existing product and product variant management processes. However, certain known process constraints should be considered:

- **Stocking items**: Stocking items are products without product dimensions, while product variants are defined with an item number. This approach simplifies warehousing operations but can introduce additional complexity when introducing new variants.
- **Item Number:** Different legal entities use the same item number for the same product.

To effectively support the Allocation and Replenishment functional requirements, the product introduction and phasing out processes may need to be extended or modified.

2.2.2. Products – Product lifecycle state

A product lifecycle state defines the current stage of a released product or product variant. This status determines which business processes, such as master planning, are enabled or disabled.

The following product lifecycle state configurations will support Build-A-Bear Workshop's new product introduction, product design, and phase-out processes:

D365 SCM Path: Product information management > Setup > Product lifecycle state
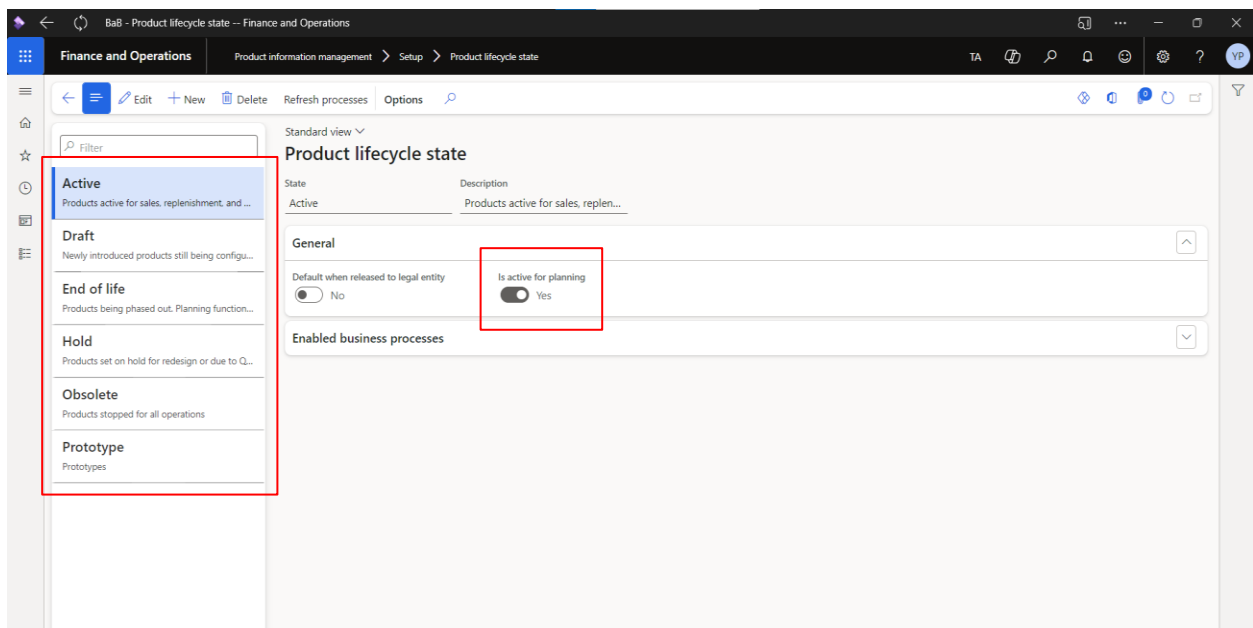
Lifecycle state	Planning active	Description
Draft	No	Newly introduced products still being configured and not active for sales or replenishment.
Active	Yes	Products active for sales, replenishment, and all inventory movements.
End of Life	Yes	Products being phased out. Planning function is required.
Obsolete	No	Products stopped for all operations.
Prototype	No	Prototypes.
Hold	No	Products set on hold for redesign or due to quality, safety, or supply issues.

2.2.3. Products – Commerce product hierarchy

D365 SCM allows merchandising managers to view a product property structure that is shared between the product hierarchy and released product details.

D365 SCM Path: Product information management > Setup > Categories and attributes > Category hierarchies; Product information management > Products > Released products (Product > Product categories).
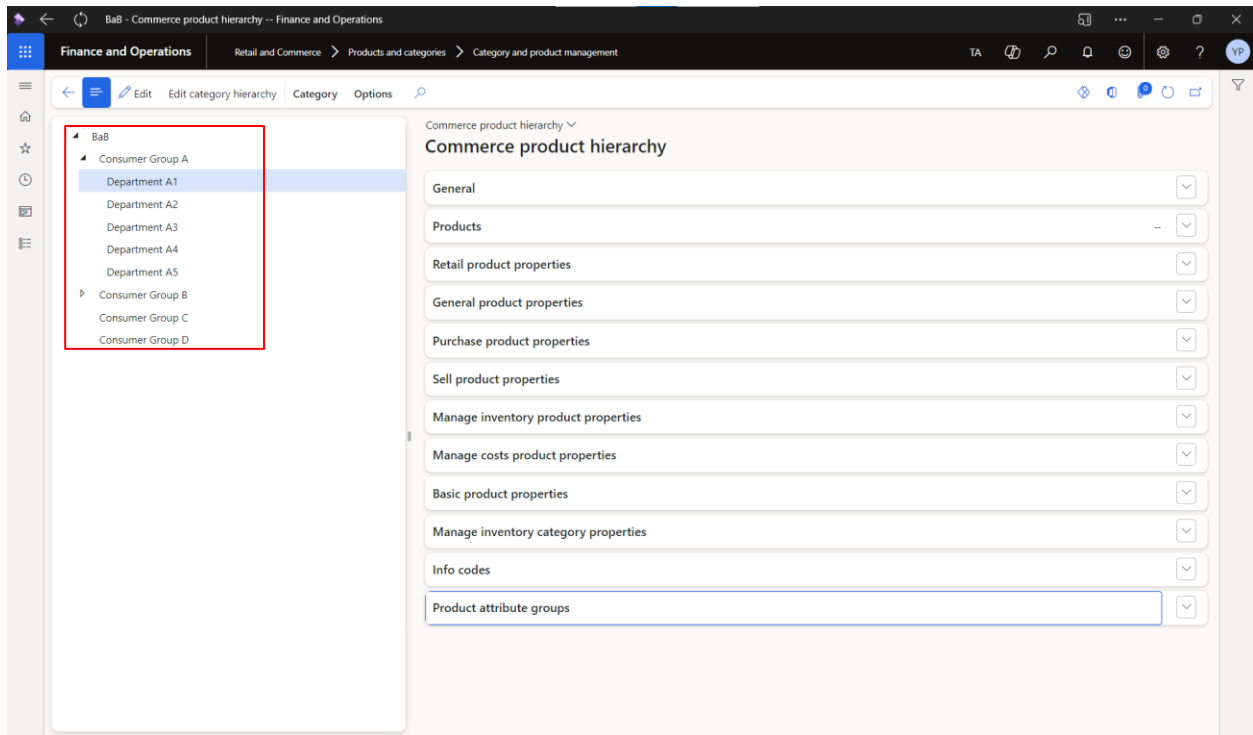
Product properties were divided into basic product properties and Retail product properties, based on the scope of their applicability. Retail product properties are global in their scope of applicability. Basic product properties are legal entity–specific.

Recommended commerce product hierarchy and sales category hierarchy levels:

- (ALL) – Root level
    - Merchandising category (consumer group)
        - Product family
            - Product

Use of the Commerce Product Hierarchy:

- **Uniform Product Configuration:** Provides default product settings per category.

- **Assortment Definition:** Defines product assortments based on the hierarchy.

2.2.4. Products – Default order settings and stopped items

Default order settings in D365 SCM define the location (site and warehouse) for sourcing or storing items, the quantity parameters (minimum, maximum, multiple, and standard), lead times, a stop flag, and the order promising method. These settings are used when creating purchase orders, sales orders, transfer orders, inventory journals, and by master planning

for generating planned orders. Default order settings can be specific to items, sites, product variants, product dimensions

Required Configuration in the Inventory Section:

- **Stopped:** Stops inventory movements for the product. Use this flag only for obsolete products.

- **Multiple Order Quantity, Min. Order Quantity, Max. Order Quantity, Standard Order Quantity:** As required for transfer orders.
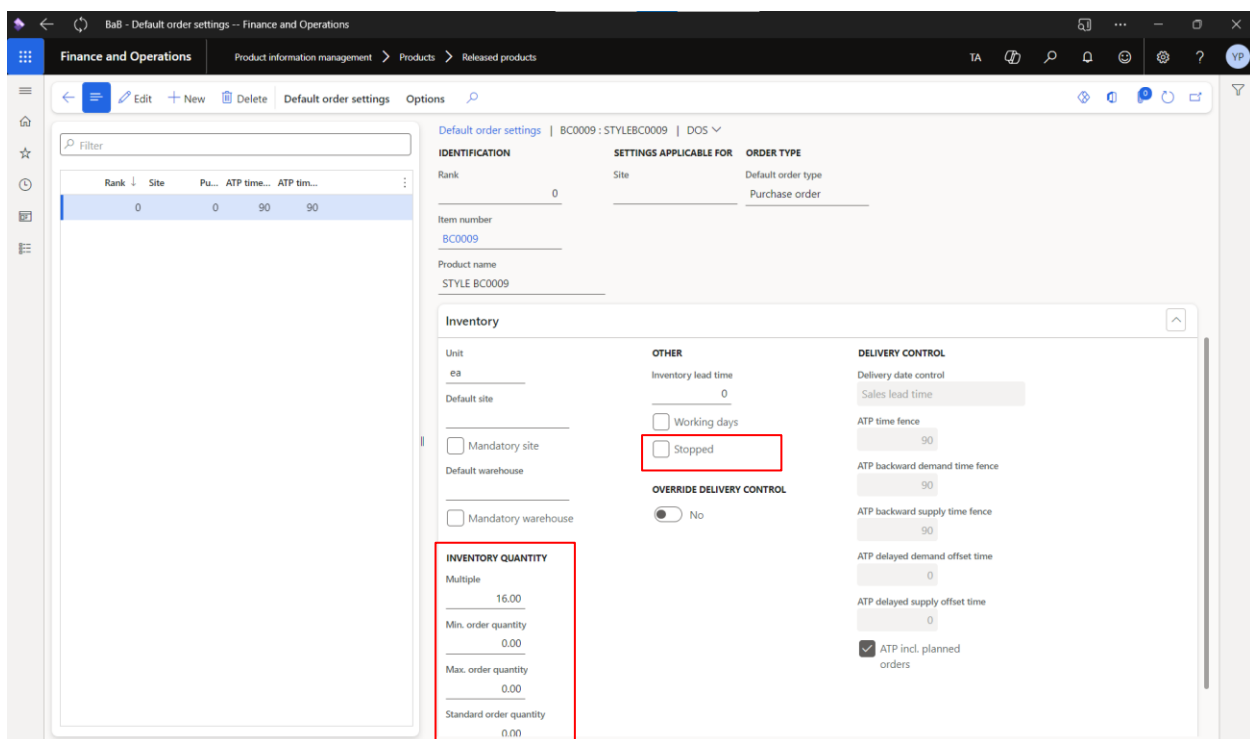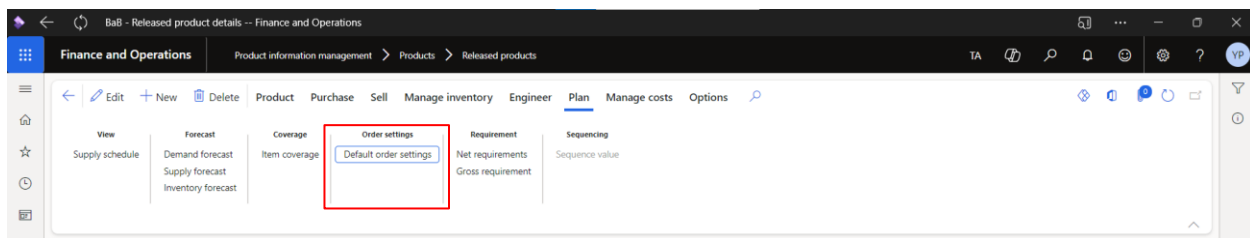
Order quantity definition is optional unless dealing with kits or transfer orders involving bundles, packages, skids, or other transport units.

2.2.5. Product – Season, valid from/to

A product's season and valid from/to dates control when orders for that item can be entered. While standard master planning is not directly sensitive to these configurations, they will be utilized in the master planning post-processing step.

Custom processes utilizing this configuration are described in sections 2.5.1 Create assortment item coverage; 2.5.3 Create assortment demand forecast; and 2.5.4 Create assortment presentation stock.

2.2.6. Warehouses – Setup for transfers

The Allocation and Replenishment solution leverages existing inventory breakdown sites and warehouses (stores and distribution centers). To configure the replenishment process for transferring inventory from distribution centers to stores, the following standard setup is required:

D365 SCM Path: Inventory management > Setup > Inventory breakdown > Warehouses.

Based on this setup, the master scheduling process will calculate item requirements at the individual warehouse level and generate planned transfer orders from assigned source warehouses to fulfill those needs.

Configuration:

- Item coverage:
  - **Manual**: No
- Main warehouse:
  - **Refilling**: Yes;
  - **Main warehouse**: distribution center warehouse (select the warehouse that is used as the refilling warehouse)
- Retail:
  - **Store**: select Yes for stores and No for distribution centers;
  - **Location replenishment weight**: A numeric factor used in calculating replenishment quantities in overallocation scenarios.
    > *Note:* While standard master planning is not directly sensitive to retail configurations, they will be utilized in the master planning post-processing step. The post-MRP custom process utilizing this configuration is described in section 2.6.1 Approve allocation.

- Transport lead time
  - Set up the **transport lead time** between the warehouses on the Transport days page.
    > *Note:* Transport days can be specified at the warehouse details form or via *Inventory management > Setup > Distribution > Transport days*

2.2.7. Retail channels – Stores

D365 SCM warehouses are single level list. The only standard functionality allowing to organize warehouses as hierarchy is retail channels.

The Allocation and Replenishment solution requires all stores and distribution centers (DC) be configured as retail channels.

D365 SCM Path: Retail and Commerce > Channels > Stores > All stores

2.2.8. Retail channels - Organization hierarchy

Recommended retail assortment organization hierarchy levels:

- (Organization) – Root level
  - Business unit: Store region
    - Department: Store performance level
      - Store
  - All Distribution Centers
    - DC

Use of the Retail Assortment Organization Hierarchy:

- Uniform item coverage : Provides default item coverage settings per product category defined at any store level
- Assortment Definition: Defines product assortments based on Organization Hierarchy.

D365 SCM Path: Organization administration > Organizations > Organization hierarchies
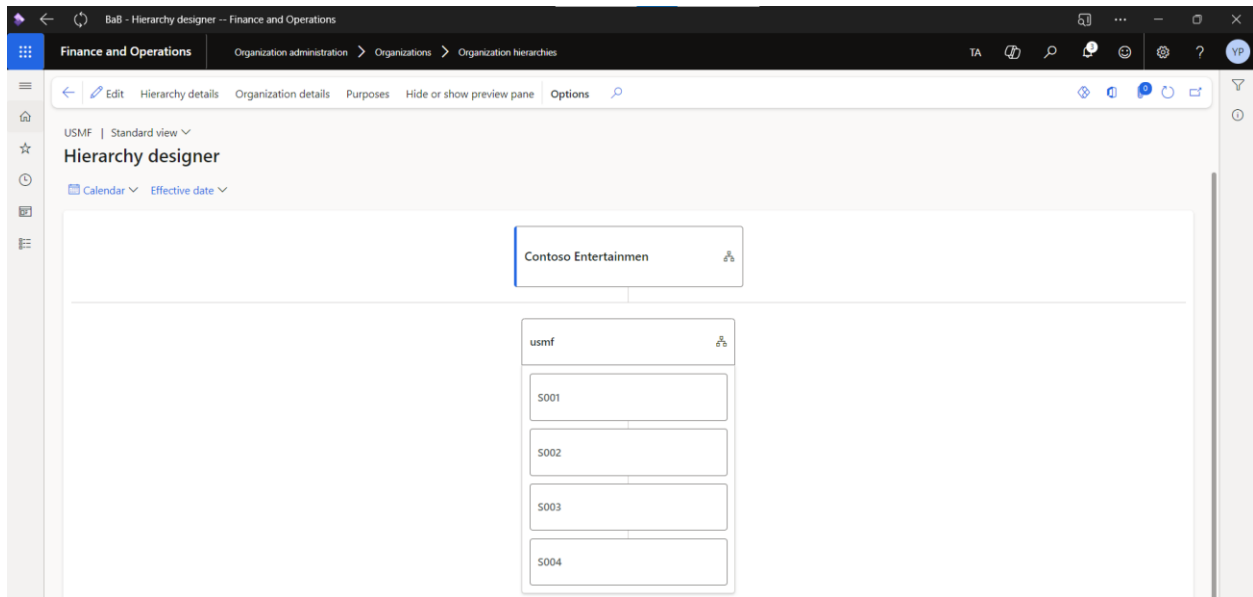
2.2.9. Assortments - Location Eligibility

D365 SCM utilizes assortments to manage product availability across various channels. An assortment defines which products are accessible at specific stores within specific timeframes. Essentially, it's a mapping between channels (or groups of channels) and products (or groups of products). The overall product selection offered by a channel is determined by a combination of multiple published assortments assigned to it.

The Allocation and Replenishment solution leverages assortments to ascertain product/store availability for planning purposes. In conjunction with default planning parameters typically defined at the product level, assortments enable the specification of store eligibility for receiving merchandise at different levels, ranging from merchandise down to the product/category level, with both inclusion and exclusion options.

When allocating merchandise, the system defaults to distributing products exclusively to eligible locations. However, users possess the flexibility to manually override a location's eligibility at the Item coverage level, thereby providing customized master planning settings at the item/warehouse level.

Organization hierarchies

In situations where multiple channels share the same product assortments, user can configure the assortments by using the Commerce assortment organization hierarchy. When nodes from this hierarchy are added, all channels in that node and its child nodes are included.
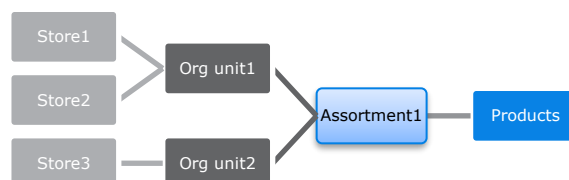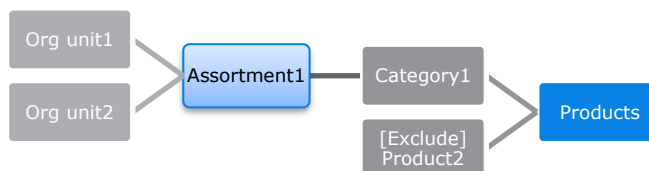
Product categories

Similarly, on the product side, users can incorporate groups of products by utilizing product category hierarchies. Assortments can be configured by including one or more category hierarchy nodes. In such cases, the assortment encompasses all products within that category node and its descendant nodes.
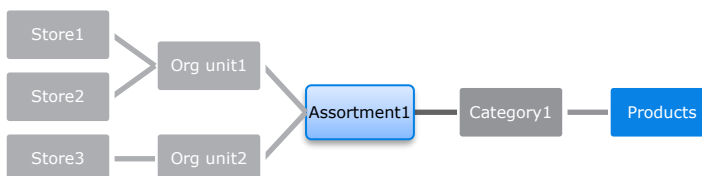
Excluded products or categories

In addition to including products and categories in assortments, users can employ the Exclude option to specify products or categories that should be excluded. For instance, if a user desires to include all products within a specific category except for product 2, they can simply include the category while excluding the product, eliminating the need to define the assortment product by product or create additional category nodes.

Dynamic and static assortments

Assortments can be defined using specific channels and products or by incorporating organization units and categories. Assortments that reference these groups are classified as dynamic assortments. If the definition or composition of these groups undergoes changes while the assortment is active, the assortment's definition is correspondingly adjusted.

For example, an assortment might initially be defined and published to reference a particular product category. Subsequently, if additional products are added to this category, these products are automatically incorporated into the definition of the existing assortment, eliminating the necessity for manual product addition. Similarly, if an organization unit is relocated to a different node, the assortment associated with that organization unit is automatically modified to reflect the new definition.

Stopped products

Users can "stop" released products for the sales process by activating a setting within the Default order settings. This setting is commonly enabled for products nearing the end of their lifecycle and should no longer be sold through any channel. Assortments adhere to this setting. If a product is halted in all legal entities where it's released, it is automatically excluded from assortments, regardless of the assortment configuration.

Date effectivity

Assortments are date-effective, allowing retailers to configure the availability or unavailability of products per channel. Users can specify precise start and end dates when defining and publishing assortments in advance. The affected products will automatically become available or unavailable within the designated date ranges.

Process assortments batch job

Assortments defined in D365 SCM must undergo processing before they become effective. This processing is essential for the following reasons:

- **Denormalization:** Assortment definitions need to be denormalized to facilitate easier consumption by channels. A product mix for a channel can be defined through multiple assortments spanning various date ranges. By pre-calculating some of this information on the server, performance at the channel level is enhanced.
- **Dynamic Changes:** The products and channels within an assortment can undergo changes independently of the assortment itself. Dynamic assortments that contain references to categories or organization units must be processed periodically to ensure they accurately include or exclude records based on their current assignments.

D365 SCM Path: Retail and Commerce > Catalogs and assortments > Assortments

2.2.10.Assortments – Seasonal and event products

The Allocation and Replenishment solution requires seasonal, and event products configured under a separate assortment code allowing for quick activation/deactivation with effectivity period.

2.2.11.Item coverage - Min/max profiles

D365 SCM Master Planning utilizes coverage settings to calculate item requirements. These coverage settings are specified by products and their corresponding product/storage dimensions (site, warehouse, inventory status).

Creating Coverage Groups:

- D365 SCM Path: Master planning > Setup > Coverage > Coverage groups.
- Create a new coverage group.
- Associate the coverage group with a product:
  - For warehouse-specific links, utilize Item coverage page.
  - For generic links, regardless of product/storage dimensions, employ the Coverage group field on the Product details page.

Coverage Codes

Master Planning can be configured to utilize various replenishment methods. These replenishment methods, or lot-sizing methods, are the techniques employed by the system to determine the batch size for purchased or produced items.

Each replenishment method is assigned one of the following coverage codes:

- **Manual:** The system does not suggest purchased, transfer, or production orders for the item. The planner is responsible for creating the necessary orders.

- **Per Requirement:** The system generates a planned purchase, transfer, or production order for each requirement of the item. Typically used for expensive items with intermittent demand.

- **Per Period:** Combines all demand for a period into a single order. The order is planned for the first day of the period and fulfills net requirements during the established period.

- **Min/Max:** Replenishes inventory up to a certain level when predicted on-hand falls below a threshold.

- **Priority:** Replenishes buffers according to minimum, reorder point, and maximum stock quantities, prioritizing urgent orders.

- **Decoupling Point:** Identifies a product as a decoupling point (buffer) according to the Demand Driven Material Requirements Planning (DDMRP) methodology.

The Allocation and Replenishment solution uses Decoupling point coverage code allowing to specify:

- Buffer values:
    - Minimum - The ideal minimum inventory that a product/warehouse should maintain. It can also be used as a trigger to determine a product/warehouse distribution requirement or as an indicator for low stock. Minimum includes[1] presentation stock that a product/warehouse should maintain for presentation or display.
    - Reorder point - Indicates the trigger that determines if a location is to be distributed merchandise will be the minimum or maximum profile.
    - Maximum - The ideal maximum inventory that a product/warehouse should maintain. It can also be used as a trigger and is the order-up-to-quantity when determining a product/warehouse distribution requirement.
- Order cycle
- Average daily usage (ADU)
- Order spike threshold

2.2.12. Coverage groups for decoupling point code

The number of Coverage Groups required for the Allocation and Replenishment solution is to be determined at the design phase based on the following considerations:

- Products with long and short lead times are likely to utilize different groups due to different settings of Lead time factor and forward period (days)
- Products planned based on historical sales and based on manual forecast input are likely to utilize different groups
- Products with different seasonality require different groups
- Products with different replenishment cycle (weekly, biweekly, monthly) require different groups
- Seasonal products require coverage groups different from regular products

The following DDMRP settings were used in solution prototype:

- Lead time factor: 1.00
- Variability factor: 0.00
- Min, max, and reorder-point period: Weekly
- Average daily usage based on: Forward
- Forward period (days): 7
- Relative weight of past/forward period for blended average daily usage: 33.33

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[1] Design consideration - whether the presentation stock quantity will be added to the reorder point quantity or to a minimum.

2.3. Master Data Customization

2.3.1. Products – New items forecasting

Demand forecasts will drive the Allocation and Replenishment master plan calculations. However, traditional forecasting methods based on historical sales data may not be suitable for new products with limited sales history.

To address this, the solution will employ techniques commonly used in forecasting solutions:

- **Item Mapping:** Identifying similar products to use as a reference for forecasting.

- **Forecast Adjustments:** Applying adjustments to the forecast based on analogy models.

Custom process utilizing this configuration is described in section 2.5.3 Create assortment demand forecast.

Master Data Requirements:

For the forecasting process, two master data items need to be defined at the released product level:

- **Forecast Item Mapping:** Defines the item number and product dimensions to be used as a source of forecast data while the product is building up historical sales data.

- **Allocation%:** An adjustment factor applied to the forecast quantity when sourced from the mapping item (default 100%).

Customization Considerations:

To avoid customizations, the following functionality can be leveraged for item mapping:

- **Alternative Product:** Use the alternative product fields within released products to store the mapping item SKU. Ensure the "When to use" policy is set to "Never."

- **Charges Percentage:** Repurpose this field (or another decimal field) to record the Allocation%. To prevent pricing conflicts, keep the "Sales price model" set to "None."

By repurposing existing fields on the released products table, the solution can reuse existing data entities for data import and export.

2.3.2. Warehouses – New stores forecasting

Demand forecasts will drive the Allocation and Replenishment master plan calculations. However, traditional forecasting methods based on historical sales data may not be suitable for new stores with limited sales history.

To address this, the solution will employ techniques commonly used in forecasting solutions:

- **Store Mapping:** Identifying similar stores to use as a reference for forecasting.

- **Forecast Adjustments:** Applying adjustments to the forecast based on analogy models.

Custom process utilizing this configuration is described in section 2.5.3 Create assortment demand forecast.

Master Data Requirements:

For the forecasting process, two master data items need to be defined at the warehouse level:

- **Forecast Warehouse Mapping:** Defines the warehouse ID to be used as a source of forecast data while the warehouse is building up historical sales data.

- **Allocation%:** An adjustment factor applied to the forecast quantity when sourced from the mapping warehouse (default 100%).

Customization Considerations:

While the warehouse details form lacks unused fields that could be repurposed for forecast warehouse references, such fields may exist in the retail channel configuration. Given the one-to-one relationship between channels and stores, retail channel details data can be used to record the Forecast Warehouse ID and Allocation% to avoid customizations.

Potential Fields:

- **Forecast Warehouse Field:** Channel profile, Store locator - Fulfillment group assignments

- **Allocation% Field:** Store area

By repurposing existing fields on the Retail channels table, the solution can reuse existing data entities for data import and export.

2.3.3. Assortments – Item coverage template

An item coverage template must be defined and associated with an assortment as part of master data maintenance. This template will be used in custom calculations to create item coverage settings for all products/warehouses linked to the assortment.

Two new fields must be added to the assortment details form:

- **Coverage Template Item:** Associates with released products.

- **Coverage Template Warehouse:** Associates with warehouses.

The following logic will be used to locate the correct item coverage associated with the Coverage template item and Coverage template warehouse:

1. Filter Item coverage by item using the Coverage template item value.

2. Filter Item coverage by warehouse using the Coverage template warehouse value.

3. Filter Item coverage by inventory status using the default inventory status associated with the Coverage template warehouse.

2.3.4. Assortments – Seasonal indices

Allocation and Replenishment process requires manual correction of last year's sales mapped into the current year's forecast. This solution utilizes seasonal indices Minimum/maximum keys (D365 SCM Path: Master planning > Setup > Coverage >

Minimum/maximum keys) to create future forecast periods and adjust last year's sales mapping with a numeric Factor (default = 1).

To enable the forecasting process to use Minimum/maximum keys to generate forecasts from sales history, a customization is required to associate Minimum/maximum key IDs with assortments. This association allows for one Minimum/maximum key ID to be linked to one assortment ID.

D365 SCM Path: Master planning > Setup > Coverage > Minimum/maximum keys

2.3.5. Assortments – Presentation stock

Minimum/maximum keys ID associated with assortment must include two new columns:

- presentation stock quantity:
  - o fixed quantity that is added to minimum buffer value after DDMRP ADU calculation
- presentation stock %
  - o percent quantity that is added to minimum buffer value after DDMRP ADU calculation

Custom process utilizing this configuration is described in section 2.5.4 Create assortment presentation stock.

2.3.6. Warehouses – Location protection policy

Master planning currently lacks the capability to restrict allocations based on available on-hand stock levels. To address this limitation, a post-MRP calculation will be implemented. This custom calculation will require input of minimum stock levels to be maintained at each distribution center (DC) for specific products or categories (location protection).

Location protection data will be defined per DC and per product/category. To simplify configuration, assortments can be used to specify stock protection for individual product/DC combinations.

Location protection will be defined using assortment attributes:

- **Fixed Quantity:** A specific quantity of stock that must remain at the DC.

- **Percent Quantity:** A percentage of the total stock for a product that should be retained at the DC.

Both attributes will be used to calculate the minimum inventory level that should be maintained at the DC after the allocation process.

Custom process utilizing this configuration is described in section 2.6.1 Approve allocation.

2.4. Calculations Configuration

2.4.1. Standard calculations

The Allocation and Replenishment solution will use the following standard calculations:

- Process assortments
  - o Path: Retail and Commerce > Retail and Commerce IT > Products and inventory > Process assortments
- Master planning
  - o Path: Master planning > Master planning > Run > Master planning
- Calculate buffer values
  - o Path: Master planning > Master planning > DDMRP > Calculate buffer values
- Planned order firming
  - o Path: Master planning > Master planning > Run > Planned order firming

2.5. Pre-MRP Calculations Customization

2.5.1. Create assortment item coverage

Create assortment item coverage is a new custom process updating item coverage records as follows:

- **New Product/Warehouse Combinations:** Creates new item coverage records for new product/warehouse combinations associated with active assortments.

  - o **Item Coverage Settings:** Copies item coverage settings from the Item coverage template associated with the assortment.

- **Removed Product/Warehouse Combinations:** Deletes item coverage records for removed product/warehouse combinations.

- **Stopped Products:** Deletes item coverage records for stopped products.

- **Item Coverage Template Changes:** Updates item coverage settings if the Item coverage template associated with the assortment changes.

2.5.2. Align buffer value periods

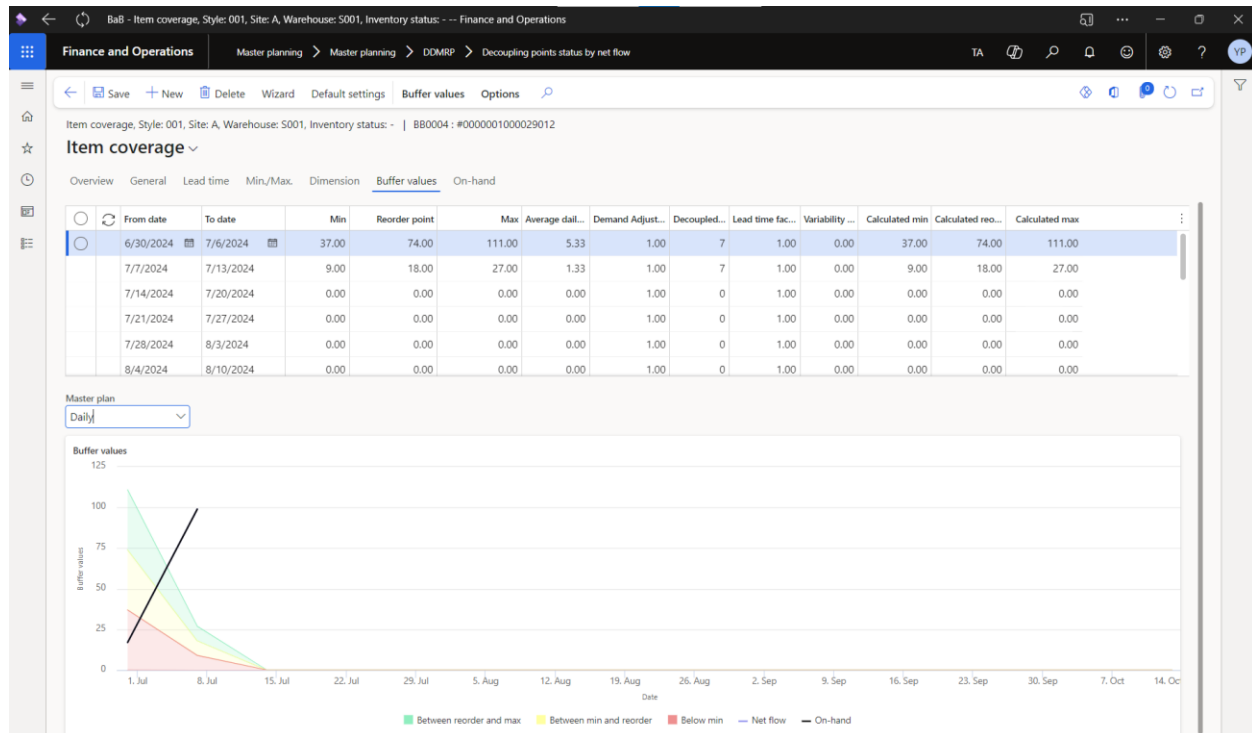Item coverage buffer values may not align with the week start if created manually. This custom process will:

1. **Remove Future Buffer Periods:** Remove future buffer periods that do not start on the first day of the week.

2. **Create First Correct Period:** Create the first correct buffer period.

Note: The standard **Calculate buffer values** process (Path: Master planning > Master planning > DDMRP > Calculate buffer values) creates periods up to the end of the coverage period.

D365 SCM Path: Master planning > Master planning > DDMRP > Decoupling points status by net flow

D365 SCM Path: Click on [Manage buffer values]

2.5.3. Create assortment demand forecast

Create assortment demand forecast is a new custom process updating demand forecast records as follows:

- **New Product/Warehouse/Period Combinations:** Creates new demand forecast records for new product/warehouse combinations associated with active assortments.

    - **Demand forecast:** Copies last year's sales of the same period as demand forecast in future period.

    - **If forecast item defined in released product**: Copy forecast item's forecast as current item/warehouse.

    - **If forecast warehouse defined in warehouse/channel**: Copy forecast warehouse's forecast as current item/warehouse

    - **If Minimum/maximum keys ID defined in assortment:** Alter forecast by Minimum/maximum keys factor in the relevant future period.

- **Removed Product/Warehouse Combinations:** Deletes demand forecast records in future periods for removed product/warehouse combinations.

- **Stopped Products:** Deletes demand forecast records in future periods for stopped products.

- **Item Coverage Template Changes:** Updates demand forecast records in future periods if run with override option.

2.5.4. Create assortment presentation stock

Create assortment presentation stock is a new custom process updating product's minimum buffer value with additional presentation stock quantity. This job is required for Decoupling point coverage groups.

Create assortment presentation stock functions:

- **New Product/Warehouse Combinations:** Update minimum buffer value with calculated presentation stock value for new product/warehouse combinations associated with active assortments.

    o **If Minimum/maximum keys ID defined in assortment:** Add presentation stock qty/% to minimum buffer value.

- **Removed Product/Warehouse Combinations:** Since buffer value reset with every run of **Calculate buffer values** process (Path: Master planning > Master planning > DDMRP > Calculate buffer values), no additional action is required for removed and stopped products.

2.6. Post-MRP Calculations Customization

2.6.1. Approve allocation

Approve allocations is a new custom process updating created planned transfer orders with:

- Approved status
- Planned quantity calculated based on:
    o Location protection policy.
        ▪ See section 2.3.6 Warehouses – Location protection policy, and
    o Location replenishment weight
        ▪ See section 2.2.6 Warehouses – Setup for transfers

As a result of Approve allocations job planned orders are altered with reduced quantity and approved. The following Master planning updates create planned orders for short stock delta, previously approved planned orders will not be affected.

2.7. Process - Worklists

Planned transfer orders created by Master planning are entries that require either automated or manual action as follows:

- Approve allocation job.
- Manual review/approval.
- Manually create, modify or delete.
- Firm and create transfer orders for merchandise distribution.

2.8. Process - Distribution Document

Transfer orders are generated from the planned order firming process to manage merchandise distribution. Multiple transfer documents are created, one for each DC-store pair, to define distribution routes.

Transfer orders between warehouses are a common practice in multi-site, multi-warehouse operations for inventory replenishment and sharing. Products are issued from a physical warehouse to a virtual transit warehouse and then received at the destination warehouse. The type of warehouse (advanced or standard) determines how the transfer order is received using the warehouse mobile application.

Multiple documents enable setting specific ship dates and delivery modes based on store shipping calendars and preferred transportation methods.

Transfer orders can be manually created, modified, and deleted. Quantity modifications are allowed before release to the warehouse.

2.9. Other inventory and warehouse management processes

After transfer orders are created, D365 SCM inventory and warehouse management oversee the following processes:

- Inventory and prior distribution lookup

- Inventory reservation

- Outbound quality management

- Cross-docking purchase orders

- Release to warehouse

- Pick list and label creation and printing

- Pick, pack, and ship

- Shipment cancellation

- Shipment reinstatement

- Shipping and receiving of transfer orders