SAP IBP for Demand Driven Replenishment and connected planning processes

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Today’s PRODUCTS & SOLUTIONS team for DDMRP in SAP IBP

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Agenda

Introduction to Demand-Driven MRP (DDMRP)

Update: SAP IBP for Demand-Driven Replenishment & Demand-Driven S&OP

Demo

DDMRP and Connected Planning Processes

Roadmap
Agenda

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Update: SAP IBP for Demand-Driven Replenishment & Demand-Driven S&OP

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DDMRP and Connected Planning Processes

Roadmap
Carol Ptak

- Partner and co-founder of the Demand Driven Institute ([https://www.demanddriveninstitute.com/](https://www.demanddriveninstitute.com/))
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Roadmap
SAP Considers the DDAEM a Strategic Direction in Supply Chain Management

SAP is embracing the Demand-Driven Adaptive Enterprise Model via …

Two Certified Compliant DDMRP solutions

And Now Announcing:

SAP IBP for demand-driven replenishment is a DDS&OP Certified Compliant Solution!
Agenda

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Roadmap
Demo Outline

Supply Chain Network Overview of AB Breakfast Foods Inc

Day In The Life Of

• Supply Chain Analyst
• Supply Chain Planner
• Supply Chain Director

What you will see

• Analyst reviewing results of DDMRP steps 1-3
• Planner focused on monitoring buffer status for DDMRP steps 4-5
• Analyst and Planner collaborating on DDSOP feedback
• Director focused on supply chain health metrics

Jobs completed successfully in the background

• IBP operators for Average Daily Usage, Decoupling Point Selection, Buffers, Net Flow Equation, Supply Heuristic, SAP ECC Integration
Description of Demo Supply Chain

Global supply chain in 4 regions

- Distribution network (Plant to Countries)
- Manufacturing of finished goods (Protein Bars, Cereals, Frozen Foods)
- Ingredients and Packaging sourced from suppliers
  (Oats, Flour, Oil, Sugar, Baking Powder, Large Bag, Large Box, Small Bag, Small Box, Wrapper)
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DDMRP and Connected Planning Processes

Roadmap
„How does it fit all together?“

Supply Chain Planning Processes

Demand Driven MRP

Sales & Operations Planning

Production Planning & Scheduling

Forecasting

Deployment

New Product Introduction

SAP IBP for Supply Chain

Demand Driven Adaptive Enterprise Model

Supply Chain Control Tower

Sales and Operations Planning

Demand

Inventory

Demand-Driven Replenishment

Response & Supply

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Two different views: **Process View** and **Product View**

**Process View**
- Forecasting
- Sales & Operations Planning
- New Product Introduction
- Production Scheduling
- Deployment

**Product View**
- IBP for Demand
- IBP for Sales and Operations Planning
- IBP for Inventory
- IBP *(Order based)* Response & Supply
- S/4HANA Production Planning & Detailed Scheduling *

*) PP/DS is not part of SAP IBP
Process View: DDMRP & connected planning processes

**Process View**

- Forecasting
- Sales & Operations Planning
- New Product Introduction
- Production Scheduling
- Deployment
DDMRP and connected planning processes
Simplified „Big picture“

**S&OP**
Output: Business Plan – incl. a (constrained) consensus FCST

**DDMRP**

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**DDS&OP: Adjust master settings**
Input: Business plan results – e.g. S&OP FCST as a parameter
Output: Model configuration for DDMRP

**DDMRP: Operational Planning**
Output: Supply elements

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**MPS Planning**
Input: Business plan results – e.g. S&OP FCST as a demand signal
Output: Supply Elements

**MRP-based Planning**
Output: Supply elements

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**Co-existence possible (not for the same SKU, but e.g. for different segments)**

**“Subsequent production scheduling & deployment steps“**

**Production Scheduling**
Priority by buffer status vs. Priority by due date

**Short-term Distribution Planning**
Priority by buffer status vs. Priority by volume

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“Replenishment & Inventory Planning“

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Model Projection & Recommendations
Variance Analysis

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DDMRP and Forecasting (1/2)
Question: „Do we still need a forecast when running DDMRP?“

YES!

Forecasted demand can (should) be used in conjunction with a DDMRP system as an input into the buffer zone calculation (*)

(*) Quote: Chad Smith – Demand Driven Institute
DDMRP and Forecasting (2/2)
Forecast as relevant demand signal outside the operational range

“Forecast is absolutely relevant for tactical & strategical planning – e.g. to calculate a projected stock outside decoupled lead time or strategical capacity planning"
DDMRP and Sales & Operations Planning
Reconciling operational (DDMRP) and tactical / strategic period (Sales & Operations Planning)

- Objective: The planning horizons for operational and tactical planning are integrated to provide a consistent planning result across the entire horizon

Operational horizon  Overlapping horizon  Tactical (& strategic) horizon

Operational DDMRP planning under consideration of buffer adjustments

Overlapping operational DDMRP and tactical horizon considering the integration of tactical planning decisions

Tactical (& strategic) horizon determining a (finite) supply plan and derive required DDMRP buffer adaptions

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Example: Reconciling DDMRP and Sales & Operations Planning (1/5)
Camelot ITLab implementation project with a SAP IBP customer

Use results from S&OP to configure DDMRP (Buffer Sizing):
1. Buffer zone adjustment via updated ADU
2. Integration of pre-build zone size into buffer sizing

Execute the agreed demand/supply plan

Determine the supply chain capabilities

Projecting DDMRP parameters to run S&OP (Supply Planning):
3. Integration of target buffer parameters into min / max inventory range
Example: Reconciling DDMRP and Sales & Operations Planning (2/5)

1. Buffer zone adjustment via updated ADU

S&OP: Consensus (constrained) forecast

Buffer zone update

Individual Part Properties
- Decoupled Lead Time
- Minimum Order Quantity (MOQ)
- Location (distr. parts only)

Group Settings (Buffer Profiles)
- Item Type
- Lead Time Category
- Variability Category

= Zone and Buffer Levels for each Part

Average Daily Usage (ADU)
Example: Reconciling DDMRP and Sales & Operations Planning (3/5)

2. Integration of pre-build zone size into buffer sizing

S&OP: Supply planning result

Inventory impact

Demand/volume
Supply quantities

Time

Projected inventory

Pre-build quantity

Target inventory

Time

Example: Reconciling DDMRP and Sales & Operations Planning (4/5)

2. Integration of pre-build zone size into buffer sizing

S&OP: Inventory Impact

DDMRP: Buffer Sizing

Pre-build quantities

Pre-build zone size

Projected inventory

Target inventory

Pre-build key figure as part of the yellow zone
Example: Reconciling DDMRP and Sales & Operations Planning (5/5)

3. Projecting DDMRP parameters to run S&OP (Supply Planning)

* Buffer zones also calculated also outside decoupled lead time (i.e. including tactical / strategical planning horizon)
The first challenge experienced by our clients when implementing DDMRP is the reconciliation of the supply orders between the decoupled lead-time and the tactical (S&OP) period.

The second challenge experienced is managing complex production resources and distribution networks:
1. Whilst using mixed planning methodologies (e.g. MRP & DDMRP items sharing resources)
2. Where complexity is too high to use simple heuristic/manual capacity solutions

**Approach:** By projecting buffers across the entire planning horizon we can create an unconstrained projected stock view based on Demand Driven Principles (note: stock can go into Red Zone during demand uplift).
Using the unconstrained projected (Demand Driven) stock as input (safety stock) to the optimizer, we can plan DDMRP & MRP items in the same run.

Constraints / pre-build is then managed using the standard optimiser cost model.

The difference between the unconstrained DDMRP stock and the constrained MRP stock is applied to the buffers as a yellow zone adjustment.

Where there is no constraint, the optimizer result matches DDMRP and means at DLT there is no difference to reconcile.
DDMRP and New Product Introduction

- DDMRP supports new product introductions by leveraging demand planning (forecast) information on phase-in / phase-out products
- As previously shown the forecast is reflected in the buffer calculations
- DDMRP is adaptive by nature (buffers are reflecting changes in demand)
- Planners can also manually adjust buffers for products during phase-in / phase-out
- **Future direction**: We are working on building smart out-of-the box logic to calculate ADU based on life cycle dates (maintained in SAP IBP „Product life cycle management“ app). (1)

(1) This is the current state of planning and may be changed by SAP at any time without notice.
DDMRP and Production Scheduling

Requirement

Scenario 1: Only DDMRP planned products the be scheduled on the resource

- The buffer status (for production scheduling) of the decoupling point (i.e. resource) shall be considered as the priority of the planned order.

Scenario 2: DDMRP and non-DDMRP planned products the be scheduled on the same resource

- Demand Driven Scheduling is using the buffer status as main criteria for scheduling
- “Classic” production scheduling is mainly using due date driven criteria (e.g. minimize sum of delays) as scheduling criteria
- Objective: Merge the different types of scheduling criteria into one in order to schedule both DDMRP and non-DDMRP products on the same resource
How are we dealing with DDMRP and its „infinite capacity“ approach?

- DDMRP is by definition assuming *infinite capacity*.

- One could say „*DDMRP is storing capacity via its buffers*“ (i.e. DDMRP buffer represents stored capacity at a decoupling point).

- There are two distinctive connected planning steps that deal with the „*infinite capacity*“ assumption – Sales & Operations Planning and Demand Driven Scheduling.

  - Sales & Operations Planning as an earlier planning step is – among others – already balancing supply and demand in the tactical period. I.e. at an aggregated and bucket oriented view supply shall match demand.

  - Demand driven scheduling as a subsequent planning step is solving in the operational period supply and demand matching issues.
DDMRP and Deployment (short-term distribution)

Requirement

• The resulting DDMRP distribution supply elements shall be used as input for the deployment planning process (usually also executed on a daily basis)

• The buffer status of the next downstream decoupling point shall be translated & included as a priority in the deployment order (for deployment planning). That priority can later also be used in transportation load building (e.g. certain orders might be moved out into the future for as full truck load, others (e.g. in red status) not).

• It shall be possible to combine DDMRP and non-DDMRP planned products in the deployment run. Similar to scheduling DDMRP and non-DDMRP products, deployment priorities shall be aligned.
**Product View: SAP demand-driven replenishment & other SAP IBP applications**

**Product View**

- IBP for Demand
- IBP for Sales and Operations Planning
- IBP for Inventory
- IBP (Order based) Response & Supply
- S/4HANA Production Planning & Detailed Scheduling *

* PP/DS is not part of SAP IBP
DDMRP and IBP for Demand (incl. Demand Sensing)

• “You (can) configure (the buffer levels) based on forecast – you execute based on actual demand”

• In detail: (Daily) automated calculation of buffer levels (step 2 of the DDMRP process) is among others based on individual part properties – incl. ADU (Average Daily Usage). ADU can use (in case of using future demand signals) forecast.

![Diagram showing DDMRP and IBP for Demand](image)

(ADU operator profile in IBP demand-driven replenishment)
The outcome of Sales & Operations Planning is a business plan – incl. among others a \textbf{consensus (constrained) forecast} and information about \textbf{potential pre-build}.

In case of a forward looking or blended ADU, we recommend to use the \textbf{consensus constrained S&OP forecast} for the ADU calculation to \textbf{derive the buffer levels}. This forecast reflects the tactical estimated sales (potentially including capacity constraints or planned uplifts to reach financial goals).
IBP for Demand-Driven Replenishment and IBP for Inventory
DDMRP vs. Inventory Optimization

- Common question: “What is the difference between DDMRP and Inventory Optimization (IO)?”

- Comparing DDMRP with IO is like comparing ⚪️'s with ⚫️'s!

- DDMRP is an end-to-end modelling, planning & execution process, while IO is one planning / process step in a forecast driven approach.

- One can plan one product location combination either using the DDMRP methodology or use inventory optimization being part of a forecast driven approach.

- DDMRP and „Classic“ MRP-based Planning (incl. using Inv. Optimization) can co-exist in a supply chain and we expect companies to use both approaches depending where they fit best.
DDMRP and IBP *(order based)* Response & Supply

- One can plan a subnetwork of product location combinations *either* using the DDMRP methodology – *or* with other *order-based* supply & distribution planning heuristics or optimization algorithms.

- DDMRP and other *(order-based)* planning approaches can co-exist in a supply chain and we expect companies to use both approaches depending where they fit best.
Plan: S/4HANA PP/DS shall schedule the planned orders based on the buffer status. \(^{(1)}\)

For further information on **Demand Driven Scheduling** in S/4HANA PP/DS – please consult the current roadmap.

Implementation partners can already today integrate the buffer status into PP/DS and use it as scheduling criteria (though not out of the box).
Vision of DDOM scenario across SAP IBP / S/4 Core and embedded PPDS

Assumptions
- **DDMRP** Replenishment Planning orders in **S/4HANA** are existing
- Integration of MRP elements to PPDS
- Demand Driven scheduling in PPDS using DDMRP priority

Existing Functionality  
To be implemented

This is the current state of planning and may be changed by SAP at any time without notice.
Outlook of DDMRP in SAP IBP and SAP S/4HANA

Adaptive Enterprise Model

This is the current state of planning and may be changed by SAP at any time.

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Roadmap
SAP Integrated Business Planning for demand-driven replenishment
Product road map overview – Key innovations

**New roadmap link:**
https://roadmaps.sap.com/board?PRODUCT=67838200100800006742&range=CURRENT-LAST#Q2%202020
# Planned Buffer Status Monitoring app

## Decoupling Points (159)

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SAP Integrated Business Planning for demand-driven replenishment
Direction update

Buffer positioning and sizing
- Algorithm improvements to DDMRP strategic inventory positioning and buffer calculation
- SAP Fiori app “Manage Buffer Profiles” for configuration of buffer profile master data
- Support phase-in / phase-out in ADU calculation

Demand-driven sales and operations planning
- Buffer calculations and buffer visualizations at an aggregate level
- Scenario planning capabilities
- Order frequency variance and flow index KPI

Demand-driven planning
- DDMRP-specific deployment capabilities within general deployment framework
Agenda

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DDMRP and Connected Planning Processes

Roadmap
Further information

On the **Topic**
- Website: [http://www.demanddriveninstitute.com/](http://www.demanddriveninstitute.com/)
- Book: Demand Driven Material Requirements Planning (DDMRP), Version 3 (2019), Carol Ptak & Chad Smith
- Book: The Demand Driven Adaptive Enterprise, Carol Ptak & Chad Smith

On the **SAP IBP for demand-driven replenishment Solution**
- [SAP Help for IBP](https://help.sap.com) (IBP 2005 release)
- [IBP Roadmap](https://help.sap.com) (IBP 2005 update)
Thank you.

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