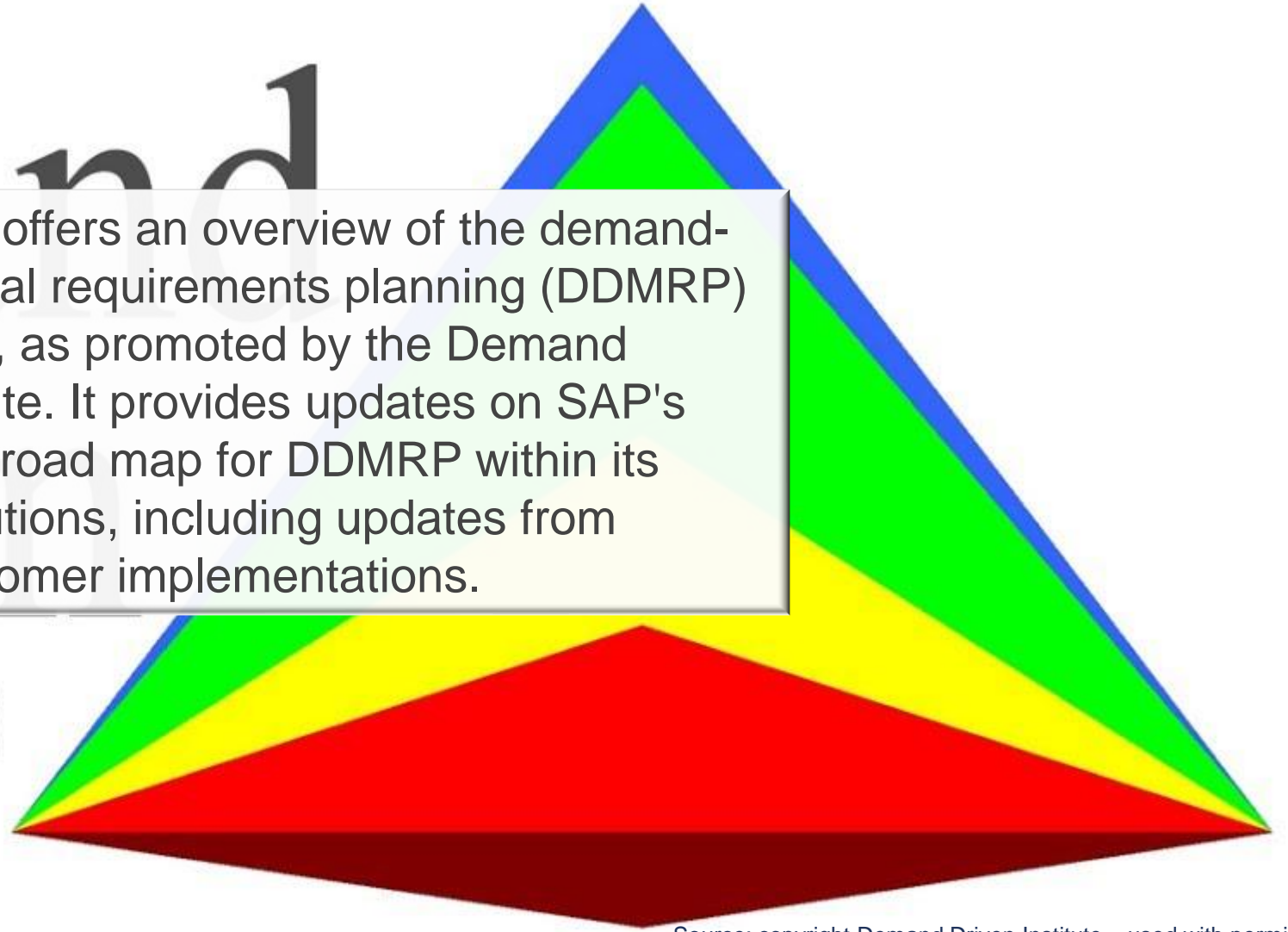


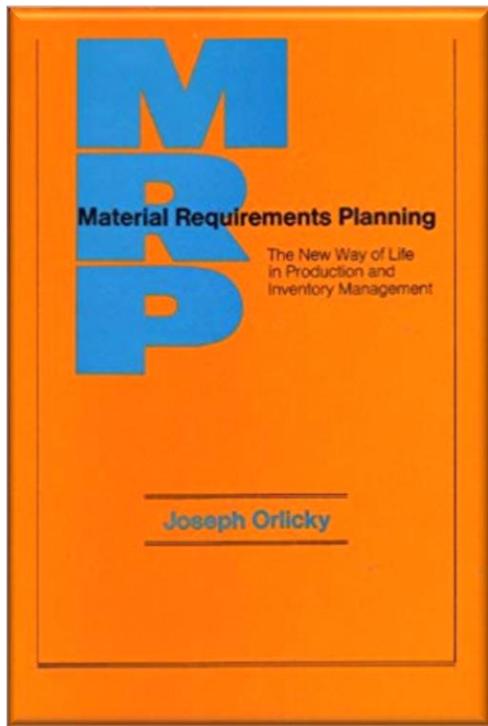
# Demand Driven MRP

This session offers an overview of the demand-driven material requirements planning (DDMRP) methodology, as promoted by the Demand Driven Institute. It provides updates on SAP's strategy and road map for DDMRP within its planning solutions, including updates from ongoing customer implementations.

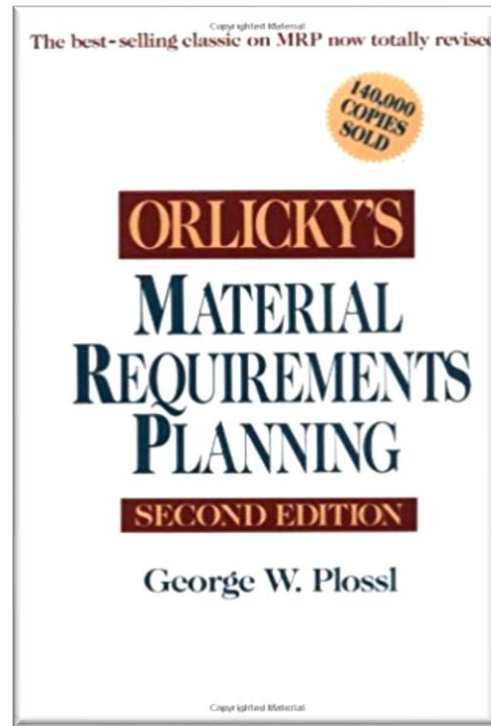


Source: copyright Demand Driven Institute – used with permission

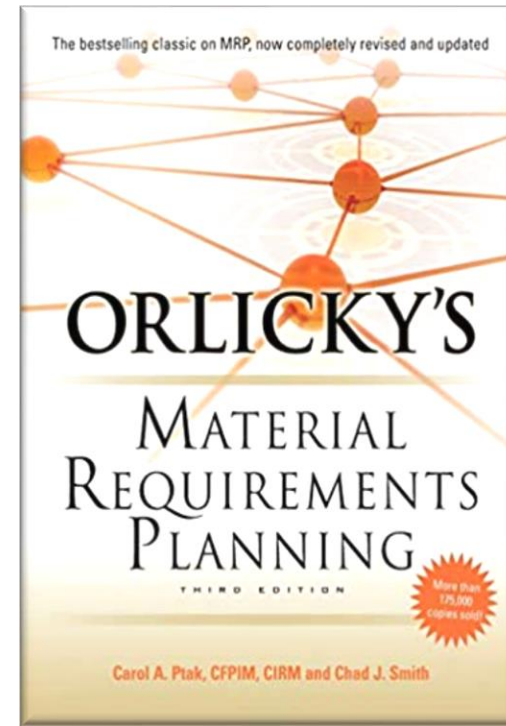
1975



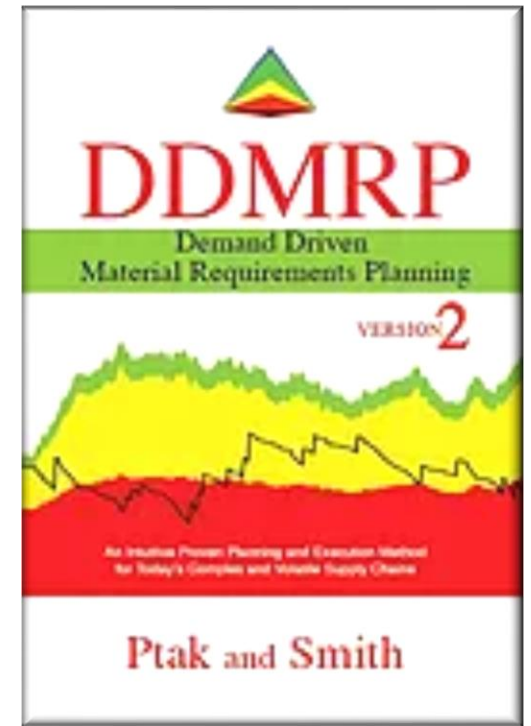
1994



2011



2016



# What's Wrong with MRP?



# Chaos Theory (butterfly effect)



# Chaos theory billiards break



# The Bullwhip Effect

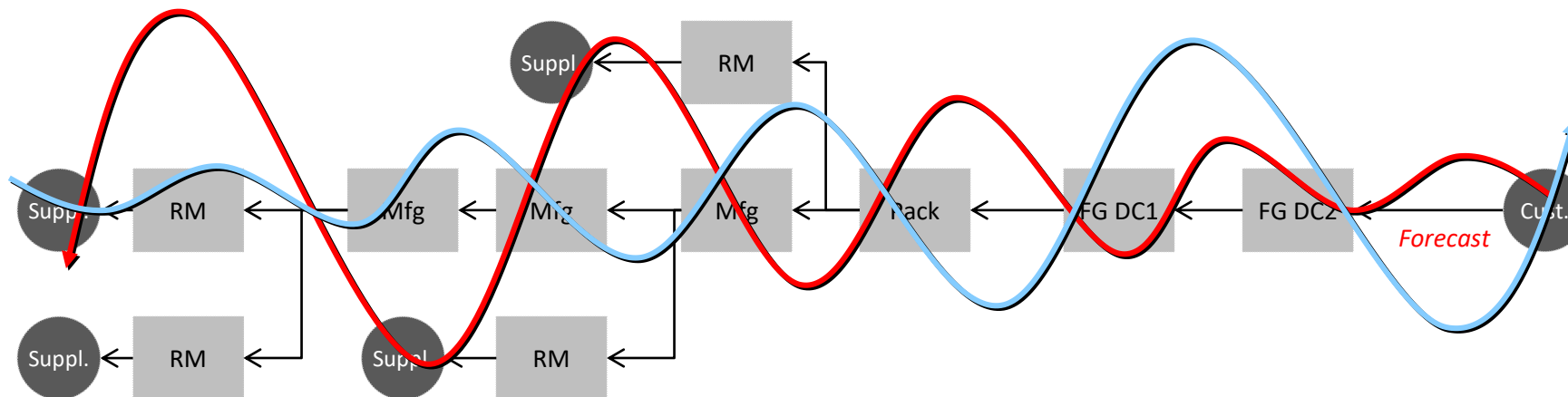


## Reality!

Forecasts are **wrong**, demand is **volatile**, and lead times **vary**

**Traditional planning** facilitates the amplification of variability in the supply chain

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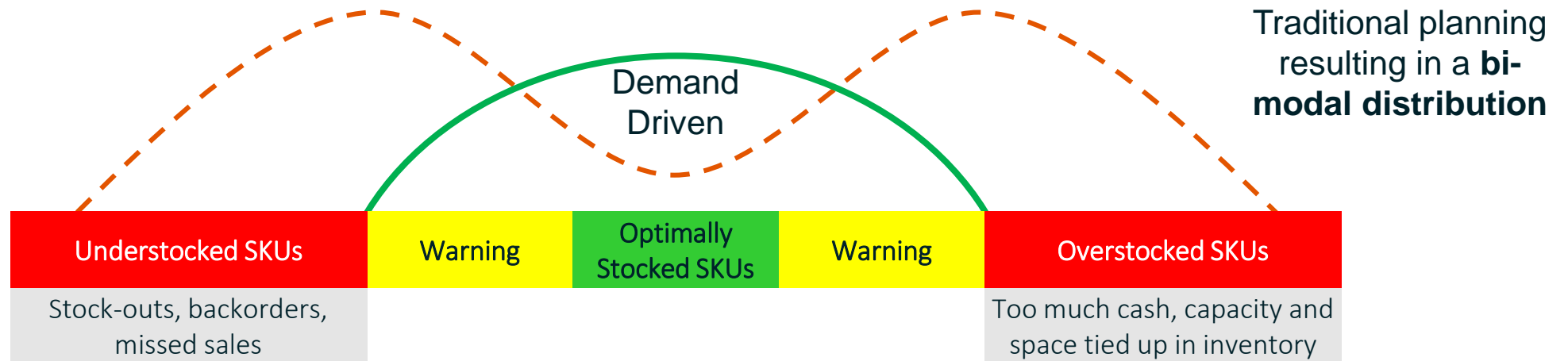
# The world has changed since MRP was introduced in the 1950s...



# Classic (forecast-driven) planning

## What I Have

- *I have too much stock of the products I don't need.*
- *I have too little stock of the products I need.*
- *I have high expedite or over-time expenses*
- *Overall I have too much stock. Nevertheless, I cannot fulfill my customer orders (in time and quantity)*



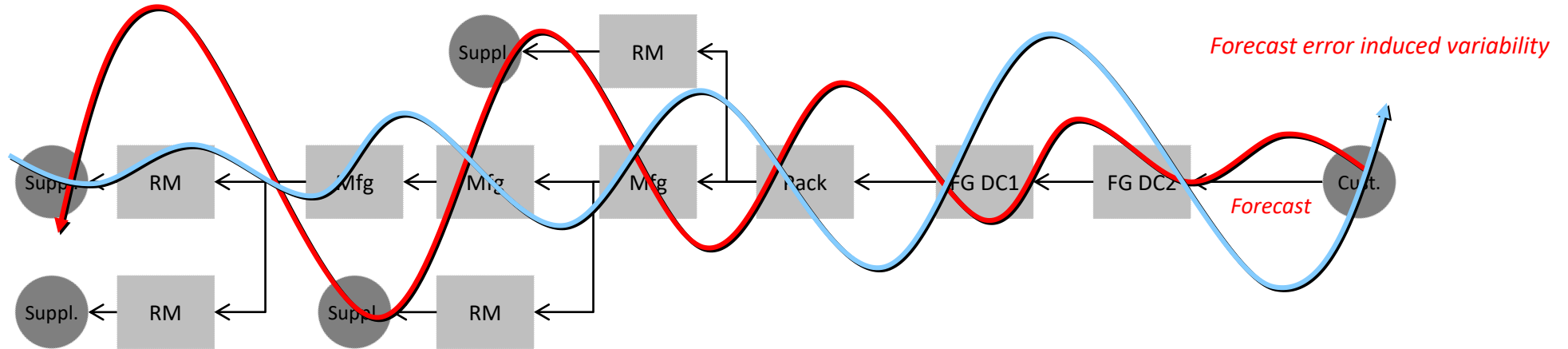
## What I want

- *Best possible customer service levels ...*
- *... at lowest possible (total supply chain) costs*

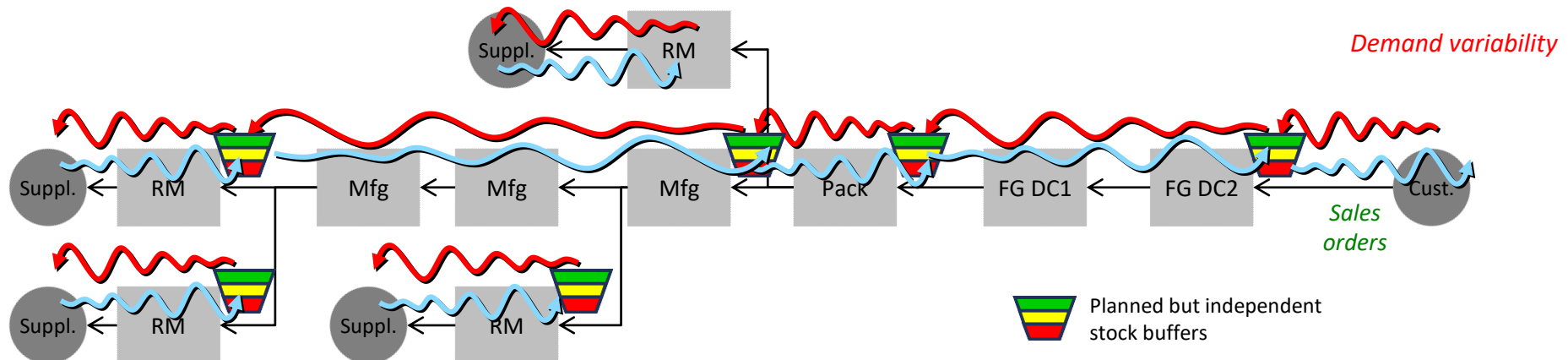


# A move towards Demand-Driven Planning can dampen variability and its amplification (bull-whip) in today's volatile world

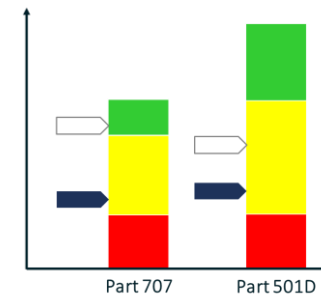
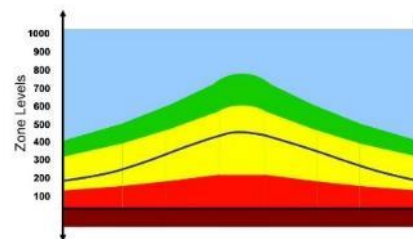
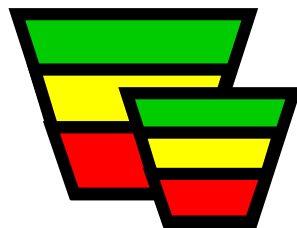
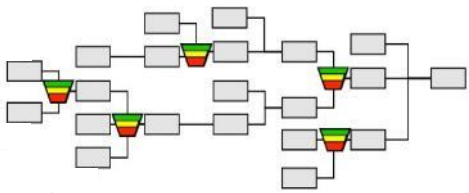
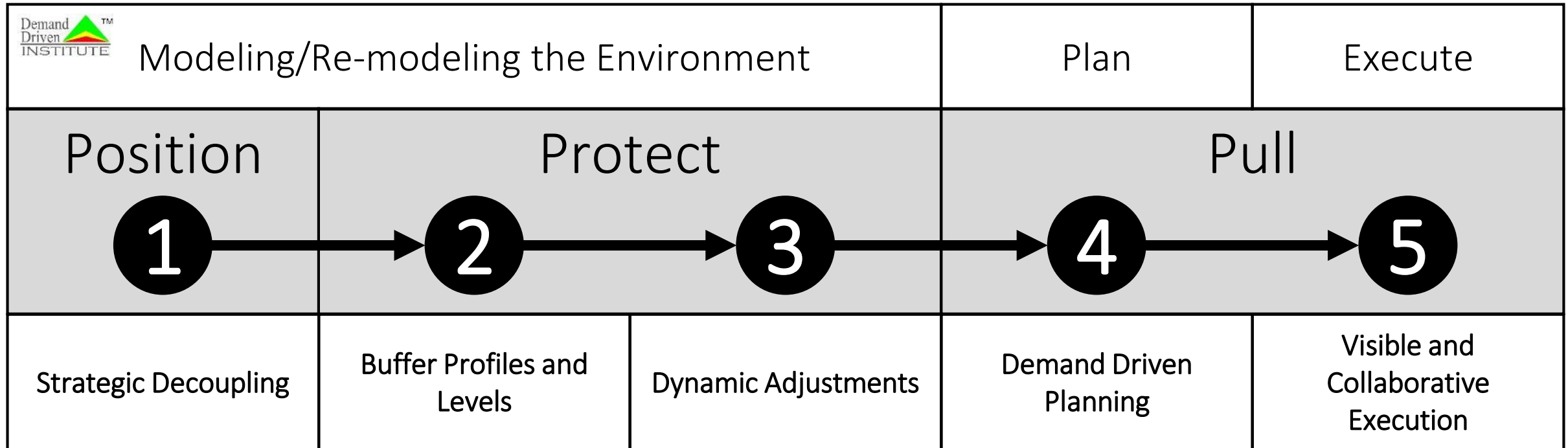
Traditional planning facilitates the amplification of variability in the supply chain



DDMRP uses strategically positioned stock buffers and pull replenishment to achieve stable material flow

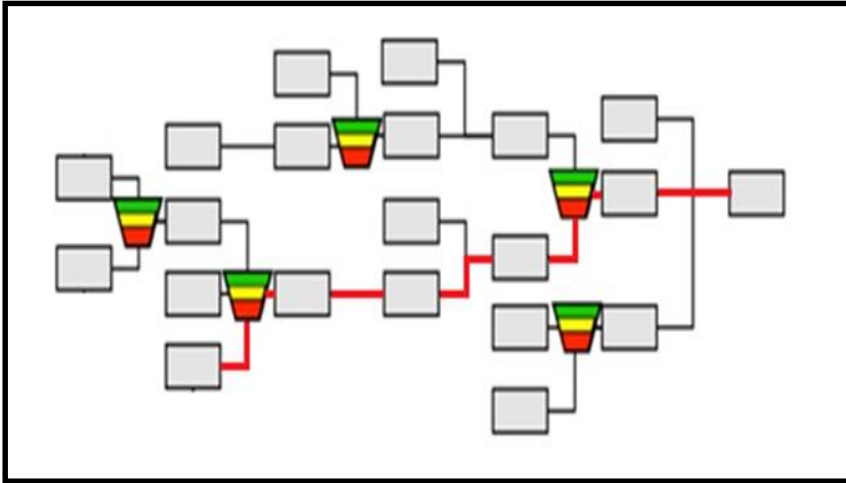
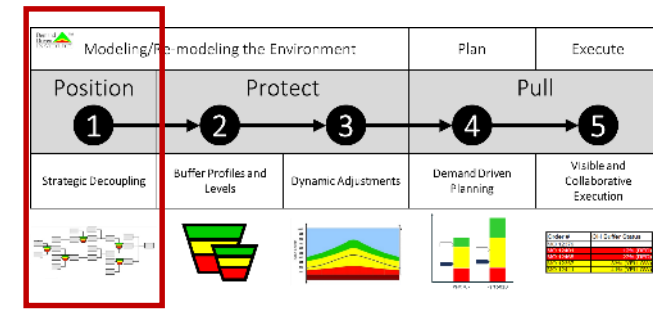


# Five components of Demand Driven MRP form the basis of a demand driven operating model



Order #	OH Buffer Status
MO 12379	
MO 12401	12% (RED)
MO 12465	27% (RED)
MO 12367	33% (YELLOW)
MO 12411	41% (YELLOW)

# As a first step, decoupling points within the product structure and supply chain have to be placed strategically

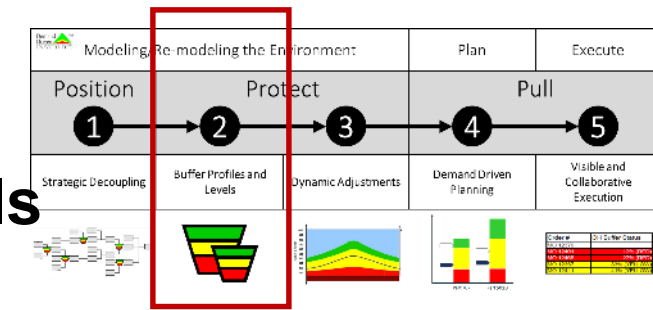


- ▶ It has to be decided where inventory buffers should be positioned
- ▶ This question must be answered before sizing the inventory
- ▶ Related to Bills of Materials as well as facilities/locations



Factors influencing location of decoupling points

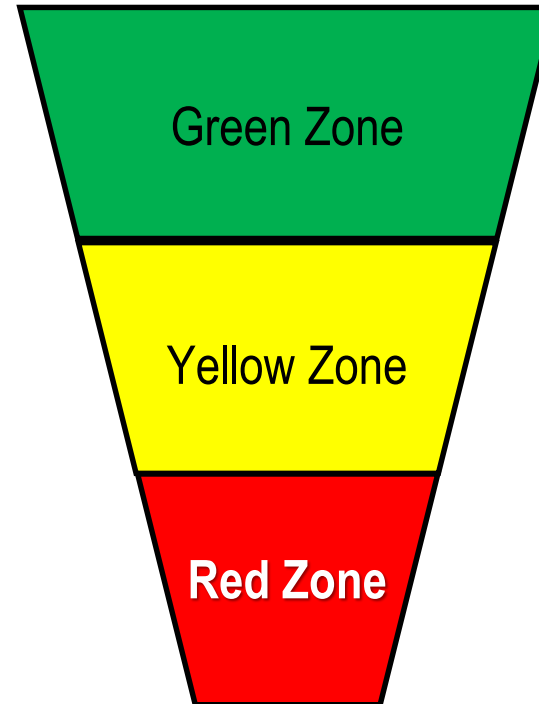
# Replenishment buffers are calculated based on individual part properties and buffer profiles, resulting in buffer levels for each part/location decoupling point



Individual Part Properties  $\times$  Group Settings (Buffer Profiles) = Zone and Buffer Levels for Each Part

Lead Time
Minimum Order Quantity (MOQ)
Location (dist. parts only)
Average Daily Usage (ADU)

Item Type
Lead Time Category
Variability Category

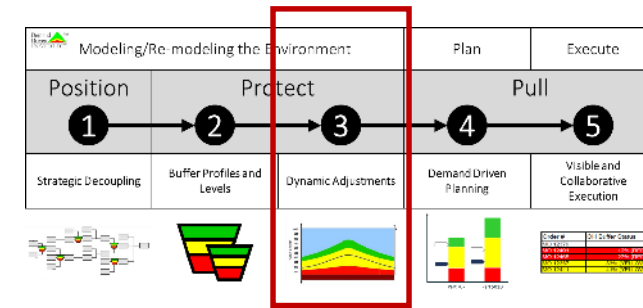


The heart of the order generation aspect of the buffer, determining the frequency of order generation and the minimum size of each order

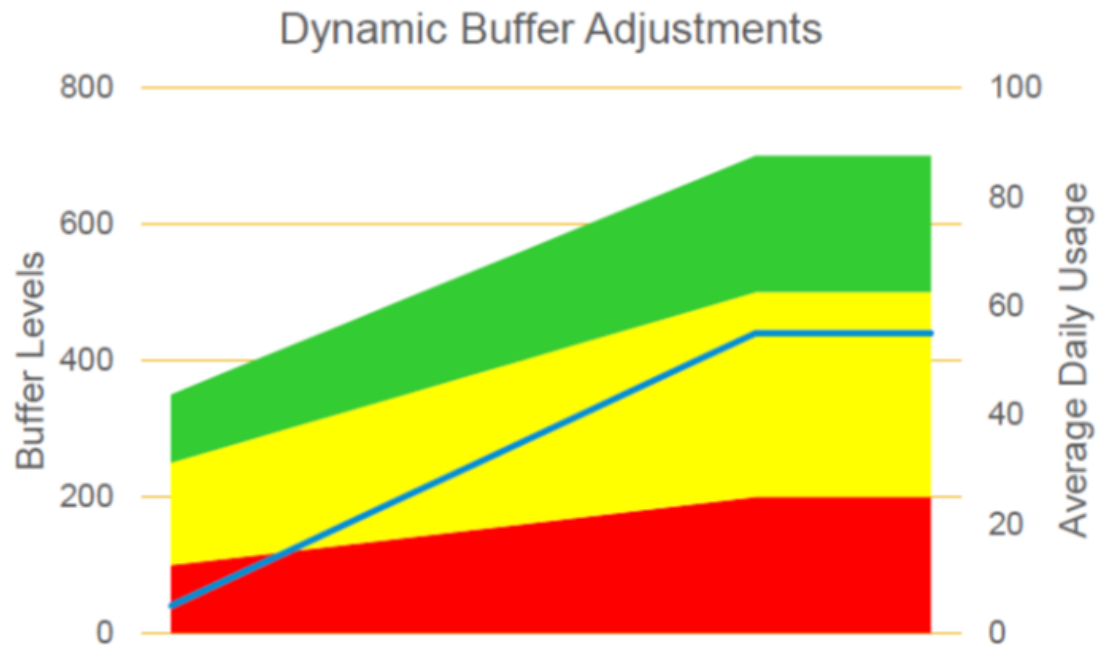
The heart of the demand coverage in the buffer

The safety embedded in the buffer position

# Dynamic adjustments

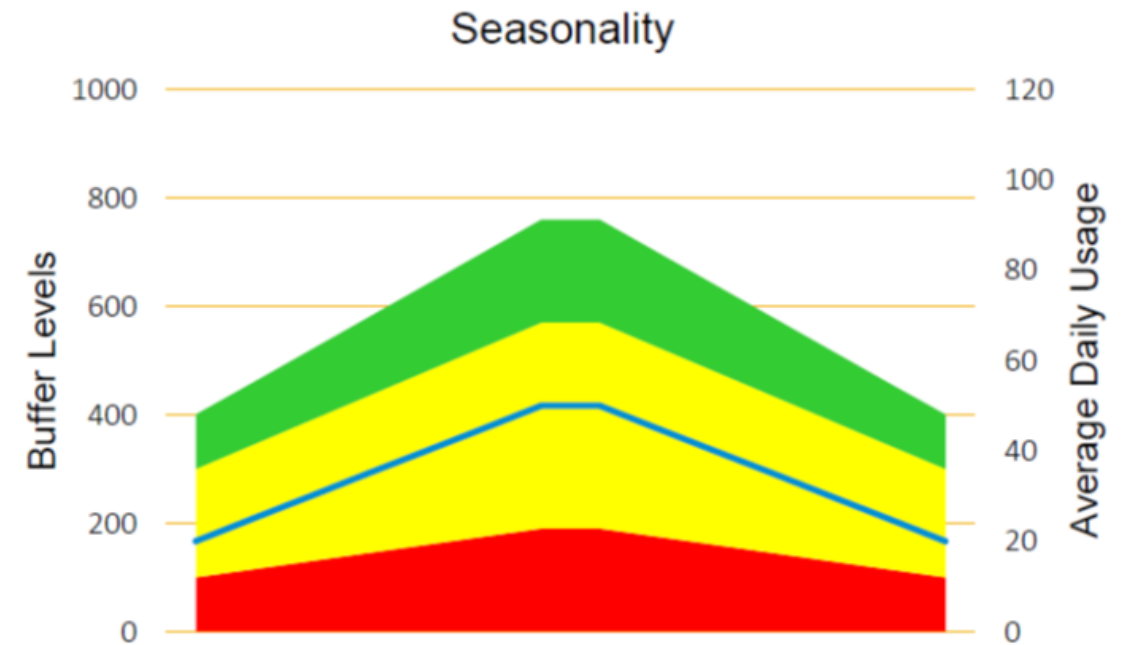


## ADU-based recalculation of the buffer

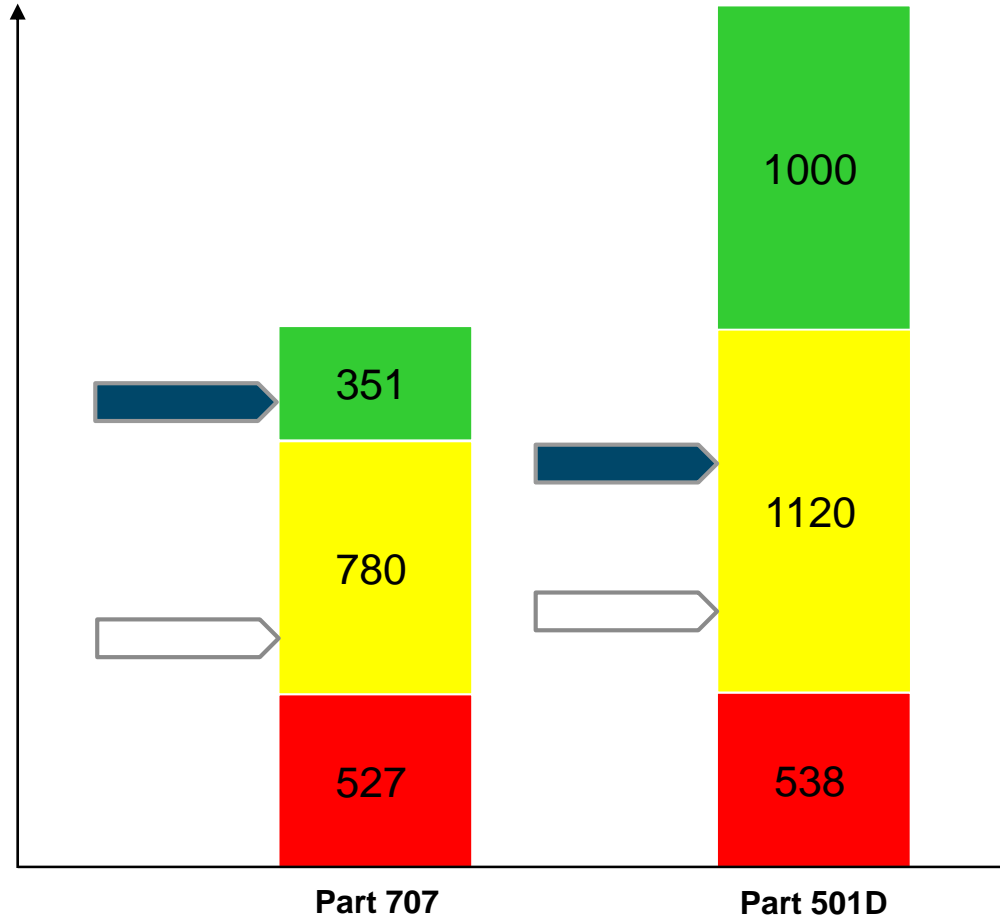
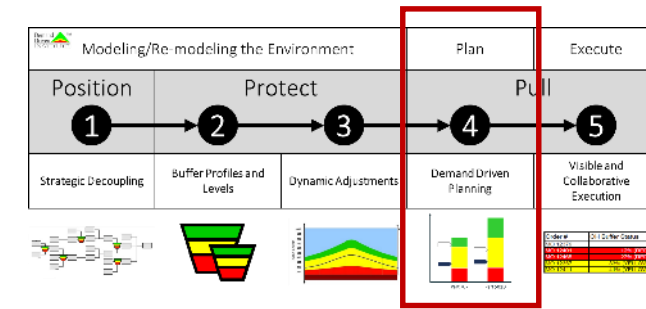


„Forecast used for the buffer calculation“

## Manual adjustment of the buffer



# Supply for a part is determined by its Net Flow Position relative to its buffer and zone levels



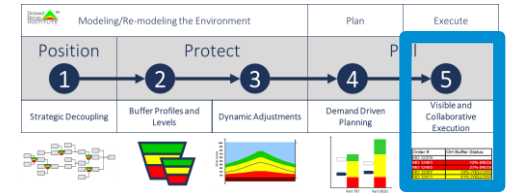
 Net Flow Position  
 Actual on-hand

**Net Flow** position =  
 On-hand + On-order -  
 "Qualified sales order demand"

- ▶ Depending on the buffer level, different actions are possible
  - ▶ Green: No action
  - ▶ Yellow: Place new order
  - ▶ Red: Expedite open supply and/or place new order
- ▶ Recommended Order quantity is the quantity to bring the available stock position to the top of green

DDMRP Planning						
Part	On Hand	Open Supply	Demand	Net Flow Position	Recommend Supply Qty	Action
707	650 (39%)	1100	350	1400 (84%)		
501D	700 (26%)	800	200	1300 (49%)		

# Supply against a part is generated by its net flow position relative to its buffer- and zone levels



Orders prioritized by buffer status

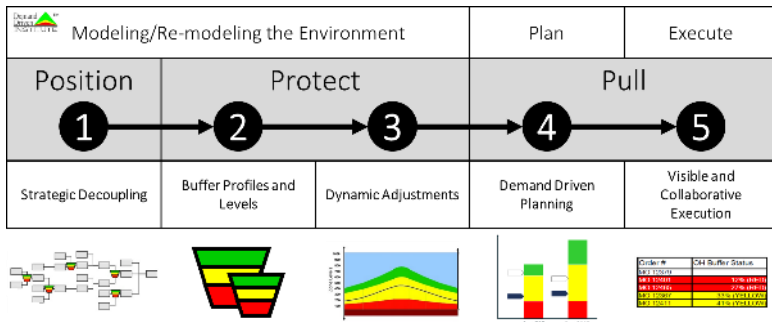
Order #	OH Buffer Status	Due Date	Customer
PO 275-44	3%	05/16	Super Tech
PO 281-21	17%	05/14	Super Tech
PO 276-54	27%	05/12	Super Tech
PO 280-89	47%	05/12	Super Tech
PO 279-84	54%	05/12	Super Tech






*The two orders that likely would have been deferred have highest priority!*

## Benefits

- Generate clear visibility for **relative priorities** to determine **execution priority**
- Avoid manual workaround or disconnected subsystems and massive daily efforts of analysis and adjustments for actual priority determination
- Provide sequence for orders in manufacturing
- Make full use of strategically positioned decoupling points / stock buffers

# The Demand Driven Institute states key benefits and substantial improvement potentials by the use of DDMRP



- 
**Improved customer service:**  
 Users consistently achieve a high on time fill rate performance
- 
**Lead time compression:**  
 Lead time reductions have been achieved in several industry segments
- 
**Right-sized inventory:**  
 Inventory reductions are achieved while improving customer service
- 
**Lowest total supply chain cost:**  
 Costs related to expedite activity and false signals are largely eliminated
- 
**Easy and intuitive:**  
 Planners see priorities instead of constantly fighting the conflicting messages of MRP

Source: Demand Driven Institute



# SAP considers DDMRP as a strategic topic in SCM that generates a unique value proposition for it's customers

- ▶ SAP is embracing the Demand-Driven Adaptive Enterprise Model



Available today!



Planned with 1905 release

- ▶ SAP along with CAMELOT ITLab (Strategic Development Partner) is co-developing DDMRP in SAP IBP
- ▶ The new module will extend the capabilities of SAP IBP and allow companies to apply the new paradigm and a state-of-the-art Demand-Driven approach to their supply chains

# Solution options for customers considering deploying DDMRP in SAP technology



## E2E coverage of DDMRP in S/4 HANA today

### Most suitable for customers having:

- ▶ S/4HANA implemented or planned in short-term
- ▶ one S/4HANA box
- ▶ Not a SAP IBP customer and is not considering investments in IBP
- ▶ Network and production focus



## E2E coverage of DDMRP in SAP IBP with ECC integration - 1905 release

### Most suitable for customers having:

- ▶ Will be covered by a new SAP IBP module – Existing DDMRP related functionalities will move to the new module
  - ▶ Current approach is time-series based and order-based is planned in future roadmap
- ▶ ECC landscape
  - ▶ Not a S/4HANA customer today nor planned in short-term
  - ▶ SAP IBP customer or is planning SAP IBP deployment
  - ▶ Networked companies with focus on finished goods planning



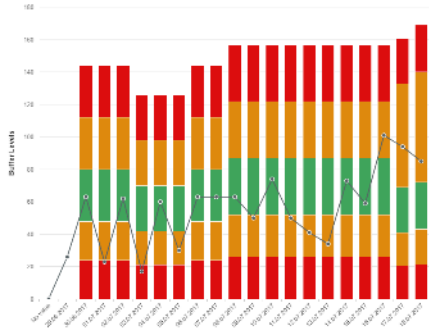
## E2E coverage of DDMRP through S/4 HANA and SAP IBP with 1908 release

### Most suitable for customers having:

- ▶ Steps 1-3 covered in SAP IBP
  - ▶ Steps 4-5 covered in S/4HANA
- ▶ multi S/4 HANA landscape
  - ▶ Network and production focus

# SAP Demand-Driven Replenishment

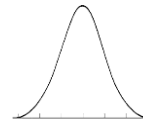
## The End-to-End Process Flow in S/4HANA



Prioritization, Alerting, Monitoring

### Analytics

	A	B	C
X			
Y			
Z			

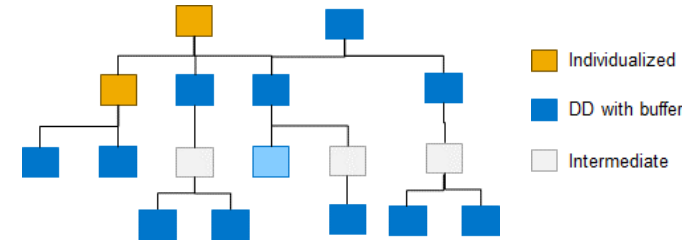


Lead Time

### Classification

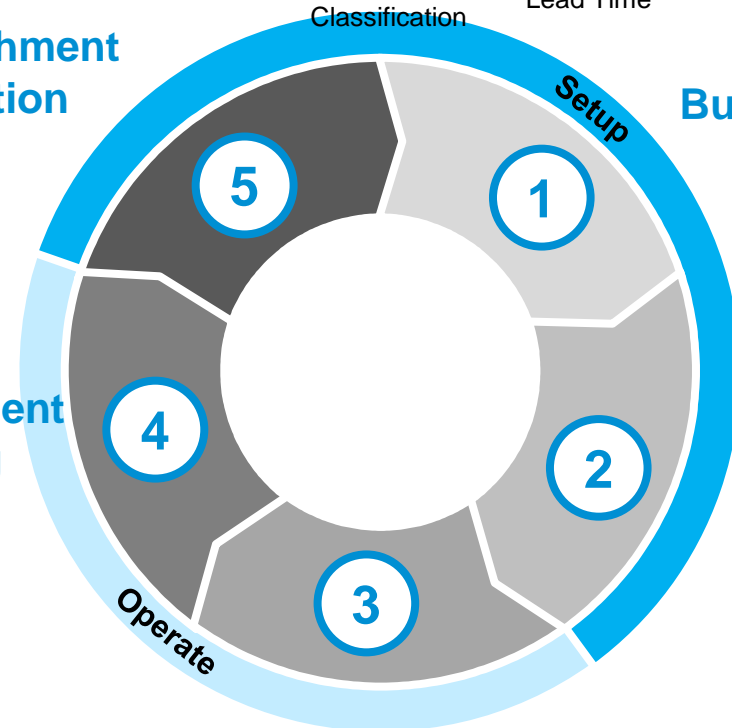
### Replenishment Execution

### Buffer Positioning (Strategic)



- Individualized
- DD with buffer
- Intermediate

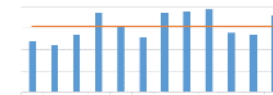
### Replenishment Planning



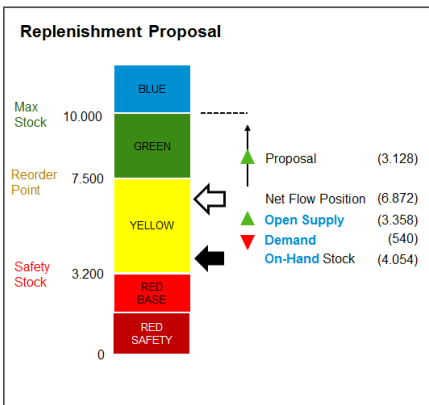
### Buffer Level Management (Operational)



### Buffer Adjustments (Operational)



Average Daily Usage



# Step 1 – Buffer Positioning

## S/4HANA Analytics for Demand Driven Replenishment

The screenshot displays the SAP S/4HANA Analytics for Demand Driven Replenishment interface. The top navigation bar includes a user profile icon, a back arrow, a home icon, the SAP logo, and a 'New Job' dropdown menu. On the right side of the navigation bar are search, refresh, help, and menu icons.

The main content area is divided into two sections:

- Product Selection Criteria:** This section contains several input fields:
  - Product:** A multi-select field containing 'MZ-FG-B1', 'MZ-SG-S1', and 'MZ-RM-P3'.
  - Product Group:** An empty input field.
  - \*Plant:** An input field containing '1710'.
  - MRP Area:** An empty input field.
  - Number of Days (Past):** An input field containing '10'.
- Parameters:** This section is highlighted with a red border and contains two sub-sections:
  - Thresholds for Value (ABC) Classification:** This sub-section includes a checked checkbox for 'Usage Value in %' and three input fields for classification thresholds: 'A (High): 70', 'B (Medium): 20', and 'C (Low): 10'.
  - Thresholds for BOM Usage (PQR) Classification:** This sub-section includes a checked checkbox for 'BOM Usage' and three input fields for classification thresholds: 'P (High): 3', 'Q (Medium): 2', and 'R (Low):' (which is currently empty).

Classify Materials by Value, BOM Usage, and Variability (not shown)

# Set the Decoupling Points

Product	Plant	MRP Area	MRP Type	Value Indicator	Variability Indicator	Lead Time Indicator	BOM Usage Indicator	Horizon for Past (in Days)	Lot Sizing Procedure
<input checked="" type="checkbox"/> Z-FG-B1	1710	1710	PD	A (High)	X (Low)	G (Long)	R (Low)	0	H1
<input type="checkbox"/> Z-RM-P1	1710	1710	PD	C (Low)	X (Low)		R (Low)	0	EX
<input type="checkbox"/> Z-RM-P2	1710	1710	PD	C (Low)	X (Low)		R (Low)	0	EX
<input checked="" type="checkbox"/> Z-RM-P3	1710	1710	PD	C (Low)	X (Low)	G (Long)	R (Low)	0	H1
<input checked="" type="checkbox"/> Z-SG-S1	1710	1710	PD	C (Low)	X (Low)	G (Long)	R (Low)	0	H1
<input type="checkbox"/> Z-SG-S2	1710	1710	PD	C (Low)	X (Low)		R (Low)	0	EX

Mass Change

MRP Type: D1

Value Indicator: Keep Existing Value

Variability Indicator: Keep Existing Value

Lead Time Indicator: Keep Existing Value

BOM Usage Indicator: Keep Existing Value

Horizon for Past (in Days): 10

Lot Sizing Procedure: Keep Existing Value

Minimum Lot Size:

Apply Changes Cancel Restore

Assign Buffers to Material/Locations (MRP Type = D1) based on Classification

Set horizon for calculating ADU

Derive Decoupled Lead Times based on where buffers are positioned

# Step 2 - Buffer Sizing

## Review and Adopt Buffer Level Proposals in a Worklist

Manage Buffer Levels

Standard \*  
Filtered By (2): Editing Status, Product

Buffers (24)

Product	Plant	Max. Stock Today	Buffer Levels (Historical and Proposed)	Average Daily Usage (Historical and Future)	Change in DLT	Change in Variability	Information	Actions
<input type="checkbox"/> FXP_BIKE_11 FXP_Bike_11_DESC	0001 eCATT Plant	Current: 240 EA Proposed: 1.080 EA Change: 350% (+840 EA)	570 → 1.080 	25 → 45 	150% (6 Days)	0% (0.00)		Adopt Ignore
<input type="checkbox"/> FXP_BIKE_22 FXP_Bike_22_DESC	0001 eCATT Plant	Current: 240 EA	240 → 240 	25 → 25 	0% (0 Days)	0% (0.00)	Last proposal adopted 104 days ago	Adopt >
<input type="checkbox"/> FXP_BIKE_23 FXP_Bike_23_DESC	0001 eCATT Plant	Current: 480 EA	1,130 → 240 	25 → 25 	0% (0 Days)	0% (0.00)	Demand and zone adjustments exist Last proposal adopted 104 days ago	>
<input type="checkbox"/> FXP_GEAR_12 FXP_Gear_12_DESC	0001 eCATT Plant	Current: 221 EA	221 → 221 	20 → 20 	0% (0 Days)	0% (0.00)	Last proposal adopted 103 days ago	>
<input type="checkbox"/> FXP_GEAR_23 FXP_Gear_23_DESC	0001 eCATT Plant	Current: 221 EA	20,000 → 221 	0 → 20 	0% (0 Days)	0% (0.00)	Last proposal adopted 22 days ago	>
<input type="checkbox"/> FXP_TYRE_11 FXP_Tyre_11_DESC	0001 eCATT Plant	Current: 768 EA	768 → 768 	80 → 80 	0% (0 Days)	0% (0.00)	Last proposal adopted 104 days ago	>

Buffer ID

Proposed Change

Drivers for Change

Adopt Ignore

Adopt

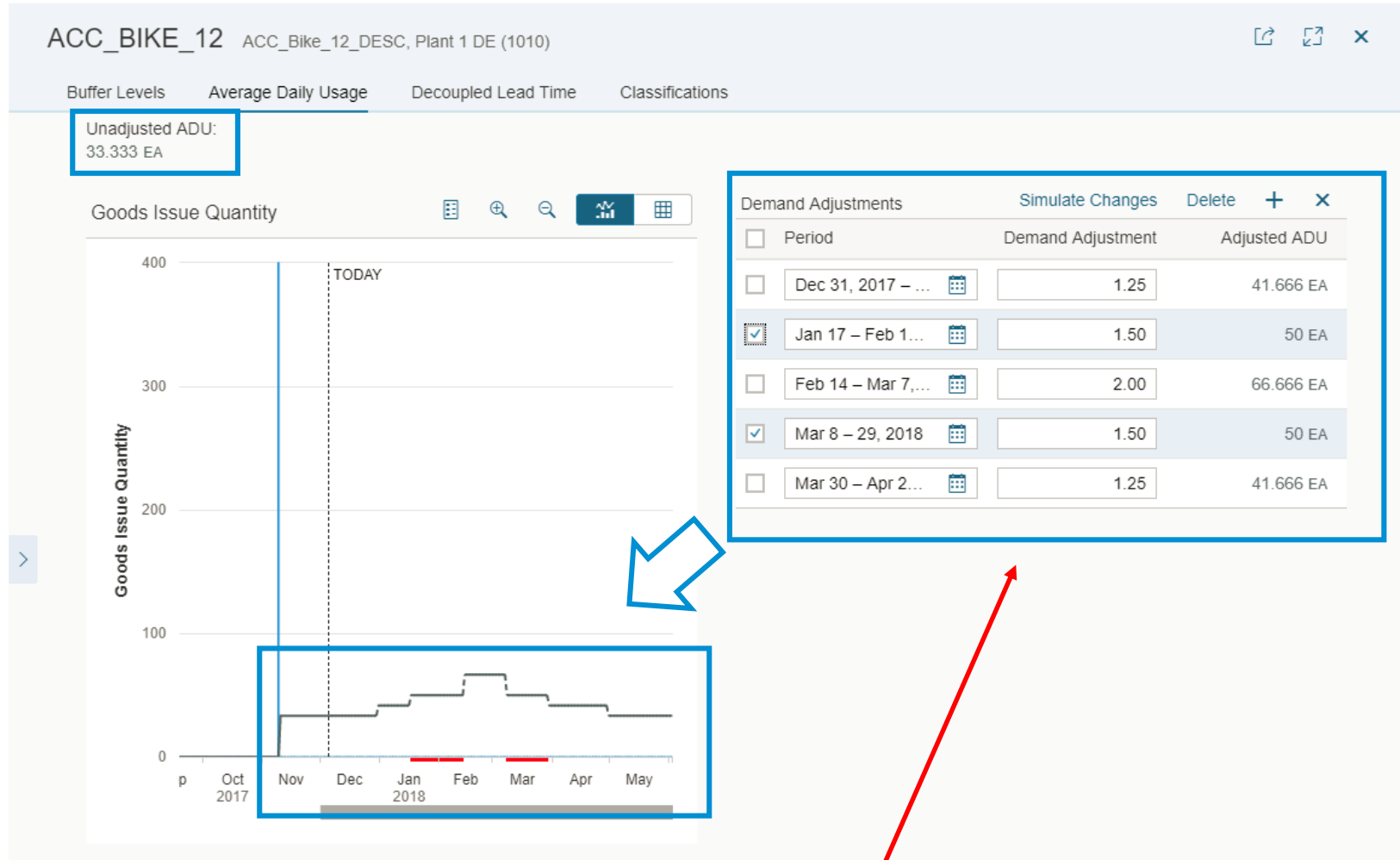
>

Take action here ...

... or navigate into details and decide there

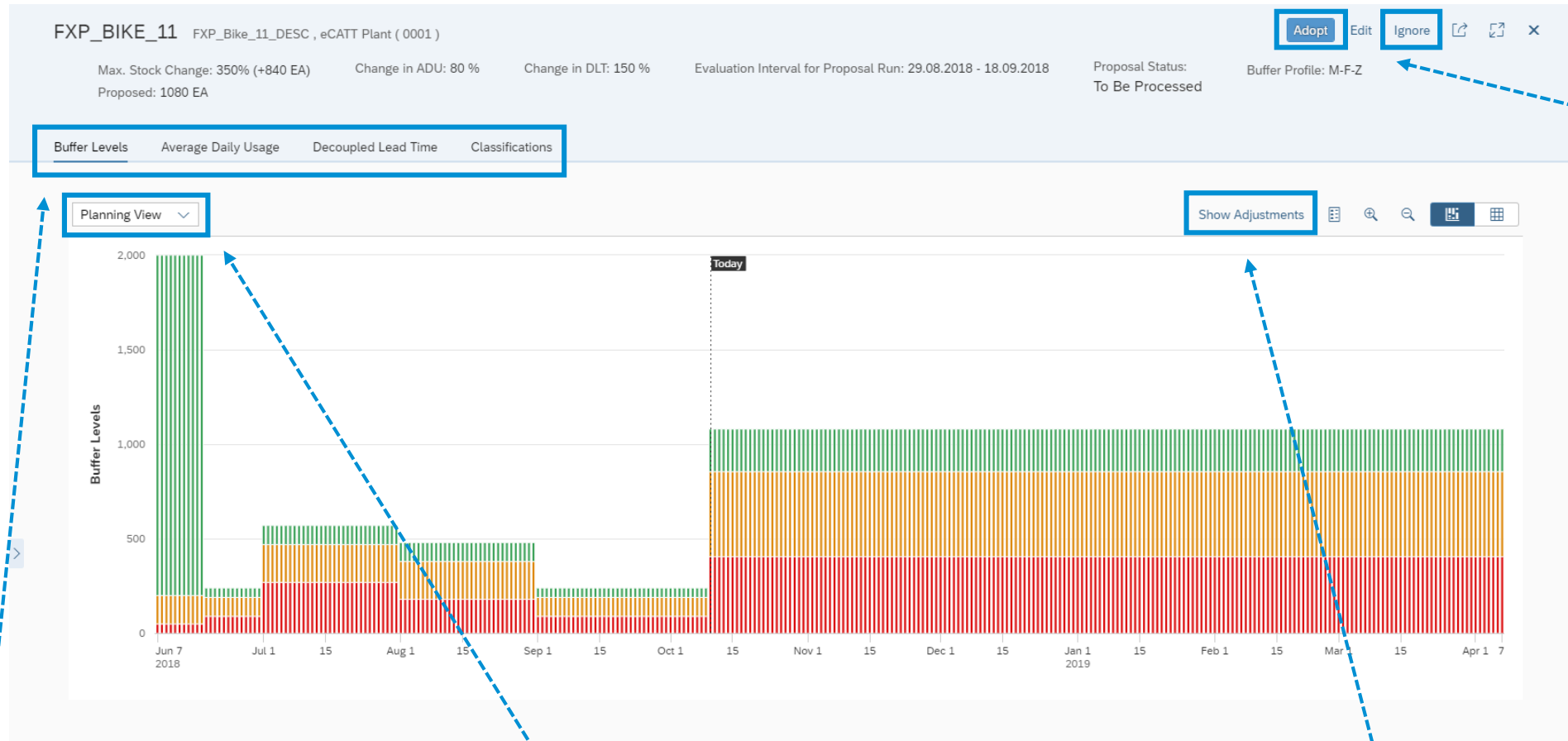
# Step 3 – Dynamic Buffer Adjustments

## Details on Time-Dependency of Average Daily Usage



# Buffer Sizing

## Review the resulting Time-Dependent Buffer Levels



Decision whether to adopt

Buffer Level Details and the main input Parameters

More Views available

Possibility to maintain Zone Adjustment Factors (in "Edit" mode)



# Step 4 – Replenishment Planning

## Monitor the Planning Priority and Net Flow Position, Option to Create Supply

The image shows a navigation menu with three options: 'Manage Buffer Levels' with a value of 0, 'Replenishment Planning By Planning Priority' with a value of 3, and 'Replenishment Execution By On-Hand Status' with a value of 16. A blue arrow points from the 'Replenishment Planning' option to the main table in the adjacent image.

Buffers to be replenished, sorted by the Planning Priority, i.e. Net Flow Position / Max Stock

The main table displays a list of buffers to be replenished, sorted by Planning Priority. The columns are: Product, Product Description, Planning Priority, Net Flow Position, Proposed Quantity, and Planning Action. The 'Create Supply' button is highlighted in the Planning Action column. A blue starburst icon is placed over the '223 EA' value in the Net Flow Position column for the ACC\_GEAR\_12 product.

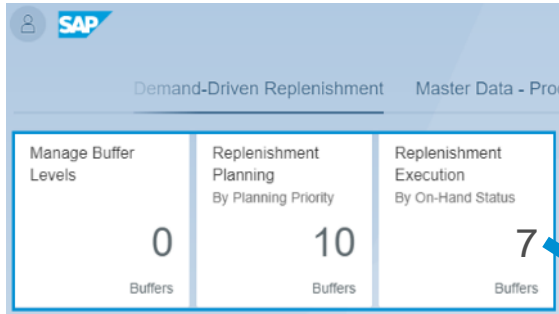
Product	Product Description	Planning Priority	Net Flow Position	Proposed Quantity	Planning Action
<input type="checkbox"/> ACC_BIKE_12	ACC_Bike_12_DESC	27.00 %	491 EA	1,296 EA	Create Supply >
<input type="checkbox"/> ACC_GEAR_12	ACC_Gear_12_DESC	73.00 %	223 EA	84 EA	Create Supply >
<input type="checkbox"/> ACC_GEAR_11	ACC_Gear_11_DESC	81.00 %	299 EA	69 EA	Create Supply >

... or navigate into object page for detailed planning by clicking on a line

Quick action to create supply here ...

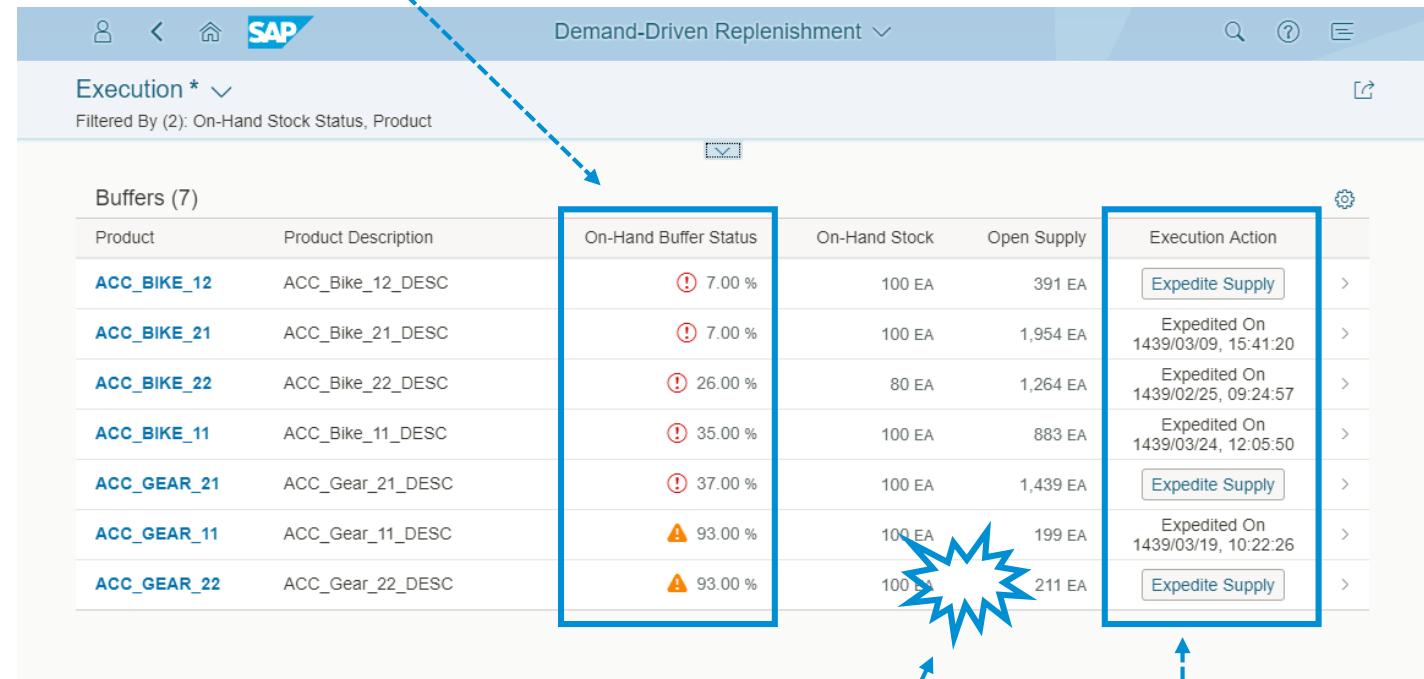
# Step 5 - Demand-Driven Execution

Replenishment Orders are prioritized based on the On-Hand Buffer Status of the downstream buffer



The screenshot shows the SAP Demand-Driven Replenishment interface. It features three main navigation options: 'Manage Buffer Levels' with a value of 0, 'Replenishment Planning By Planning Priority' with a value of 10, and 'Replenishment Execution By On-Hand Status' with a value of 7. A blue arrow points from the '7' in the third option towards the main table in the adjacent screenshot.

Buffers with critical fill level, i.e. physical stock below a certain threshold, sorted by On-Hand Buffer Status = Physical Stock / Safety Stock



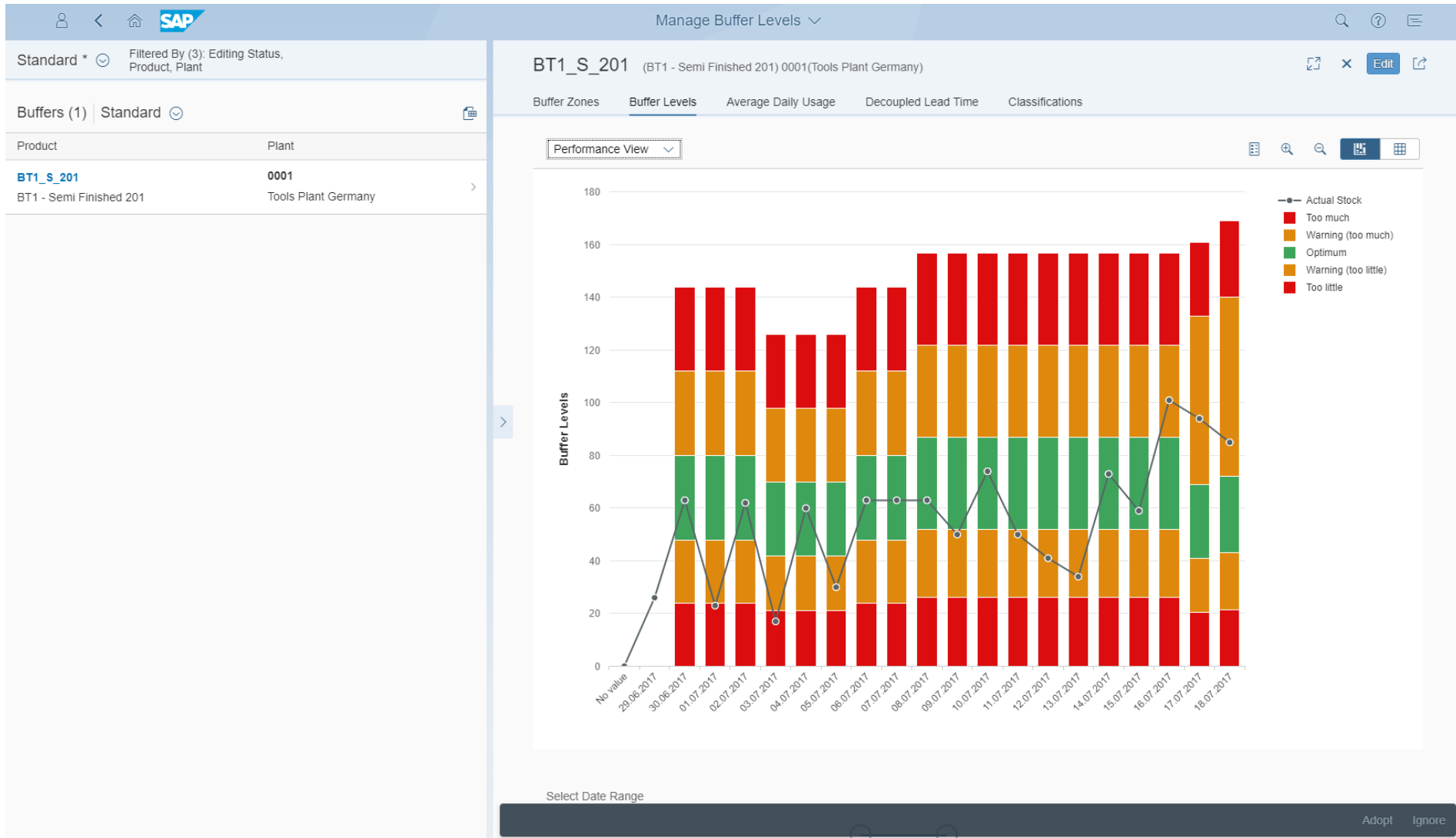
The screenshot displays the 'Execution' view of the SAP Demand-Driven Replenishment system. The table is filtered by 'On-Hand Stock Status' and 'Product'. It lists seven buffers, each with its product code, description, on-hand buffer status (indicated by a percentage and a warning icon), on-hand stock, and open supply. The 'On-Hand Buffer Status' column is highlighted with a blue box. The 'Execution Action' column is also highlighted with a blue box, showing 'Expedite Supply' buttons and 'Expedited On' timestamps for each buffer. A blue starburst icon is placed over the 'ACC\_GEAR\_11' row, with a dashed arrow pointing to it from the text below.

Product	Product Description	On-Hand Buffer Status	On-Hand Stock	Open Supply	Execution Action
ACC_BIKE_12	ACC_Bike_12_DESC	7.00 %	100 EA	391 EA	Expedite Supply
ACC_BIKE_21	ACC_Bike_21_DESC	7.00 %	100 EA	1,954 EA	Expedited On 1439/03/09, 15:41:20
ACC_BIKE_22	ACC_Bike_22_DESC	26.00 %	80 EA	1,264 EA	Expedited On 1439/02/25, 09:24:57
ACC_BIKE_11	ACC_Bike_11_DESC	35.00 %	100 EA	883 EA	Expedited On 1439/03/24, 12:05:50
ACC_GEAR_21	ACC_Gear_21_DESC	37.00 %	100 EA	1,439 EA	Expedite Supply
ACC_GEAR_11	ACC_Gear_11_DESC	93.00 %	100 EA	199 EA	Expedited On 1439/03/19, 10:22:26
ACC_GEAR_22	ACC_Gear_22_DESC	93.00 %	100 EA	211 EA	Expedite Supply

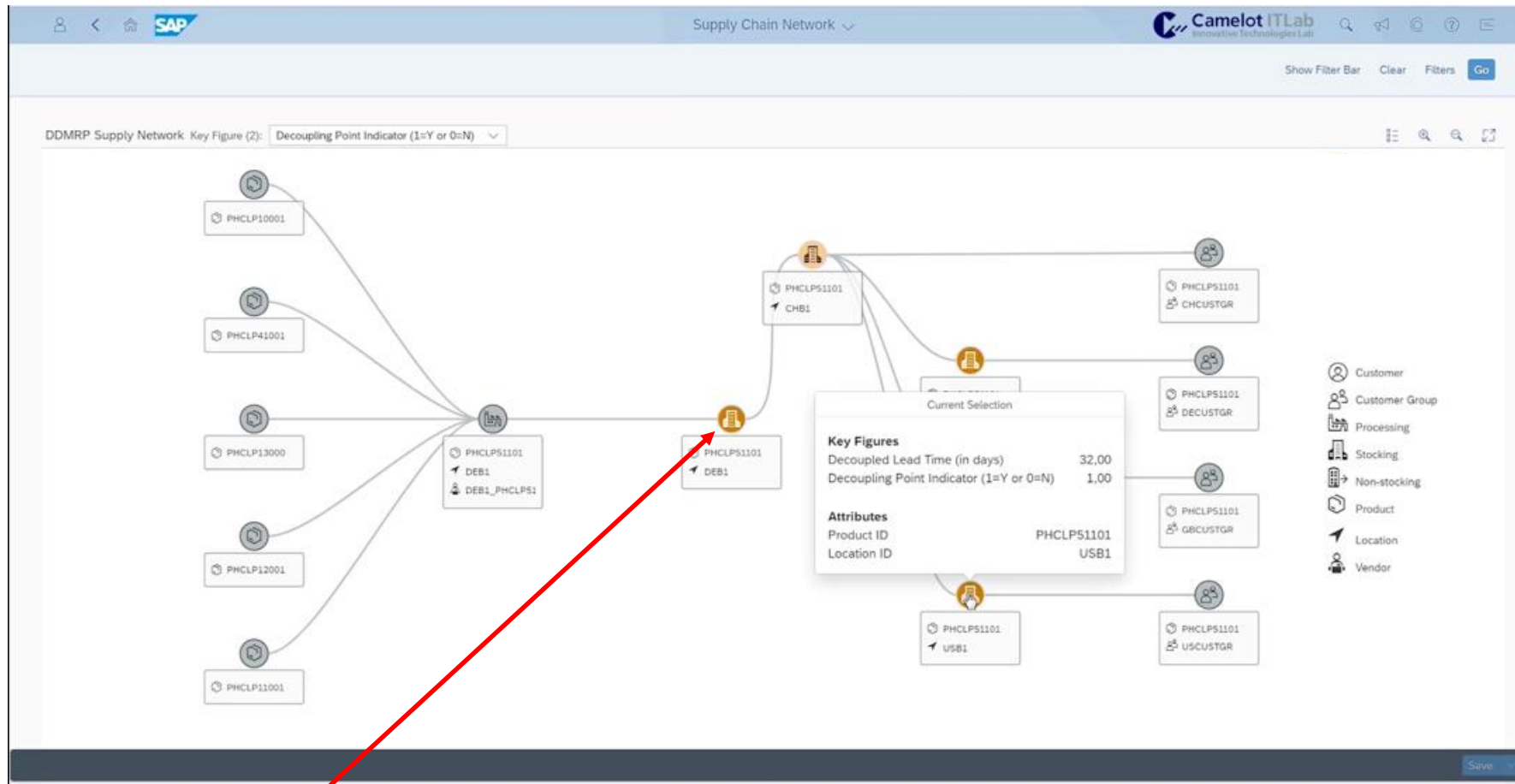
Quick action to expedite existing supply (orders) here ...

... or navigate into the object details for a comprehensive picture by clicking on a line

# Step 5 – Buffer Monitoring



# Step 1 – Strategic Inventory Positioning - IBP



Decoupling Point

# Step 1 – Strategic Inventory Positioning - IBP

CHB1 decoupled

Planning Area Name: CAM3BRDS  
 Planning Area Description: CAMELOT 3B DDMRP RDS  
 Version: Baseline  
 Operator Status: Created

Total Results

	Baseline	Scenario	Delta
Decoupled Lead Time (in weeks)	1,47	1,47	0,00
Average On-Hand	4.371.824,27	4.371.824,27	0,00
Average On-Hand Value	4.895.054,30	4.895.054,30	0,00

Filtered Results

	Baseline	Scenario	Delta
Decoupled Lead Time (in weeks)	2,21	2,21	0,00
Average On-Hand	11.301,38	11.301,38	0,00
Average On-Hand Value	118.664,56	118.664,56	0,00

Decoupling Points (5)

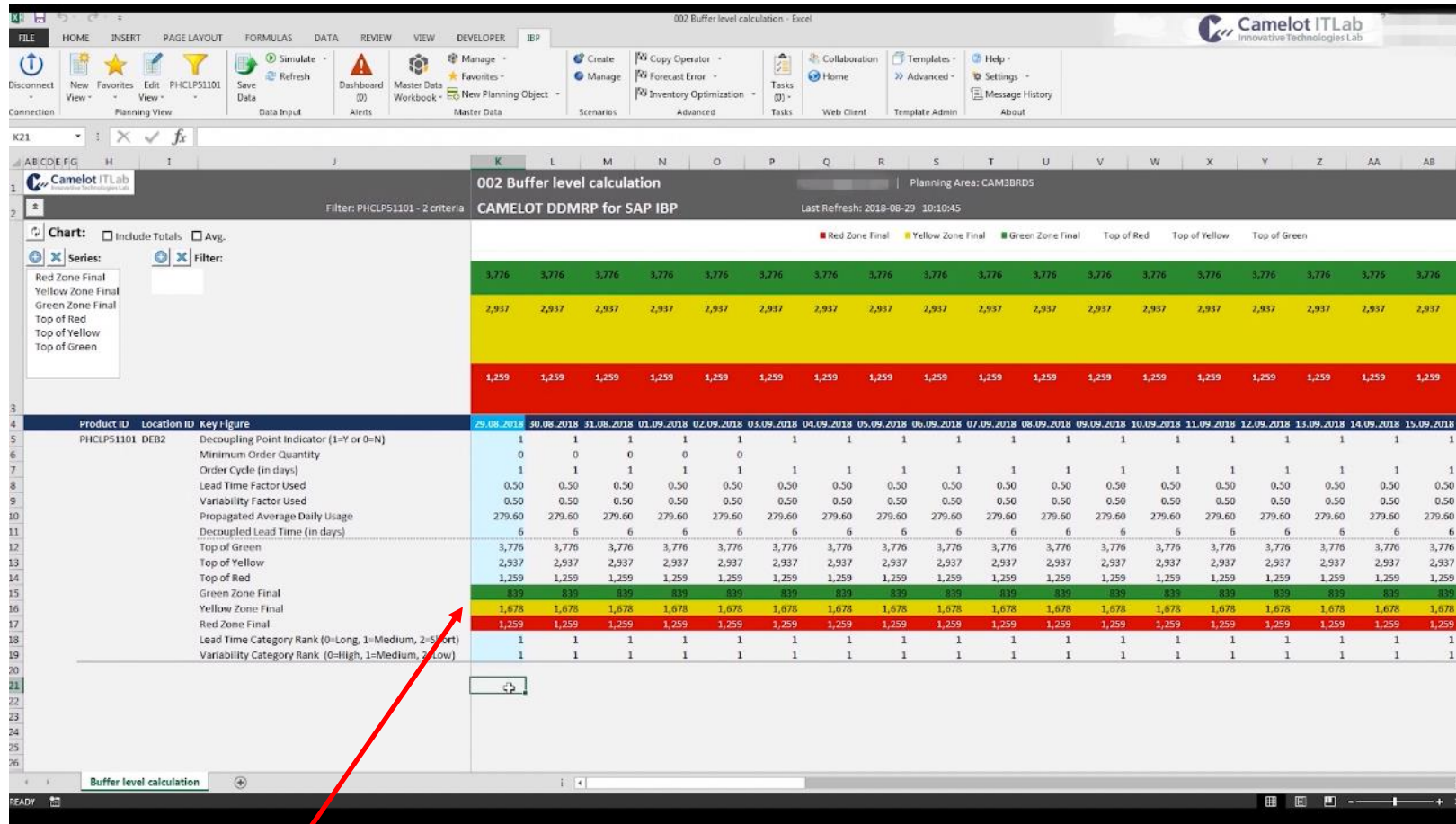
Filtered By: Product From / To

Product ID	Location ID	Buffer Pro...	Decoupling Point		Decoupled Lead Time (in weeks)			Average On-Hand			Average On-Hand Value		
			Baseline	Scenario	Baseline	Scenario	Delta	Baseline	Scenario	Delta	Baseline	Scenario	Delta
PHCLP51101	CHB1		✗	⊗	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
PHCLP51101	DEB1	MMM	✓	⊙	0,42	0,42	0,00	1.147,68	1.147,68	0,00	12.050,71	12.050,71	0,00
PHCLP51101	PEB2	MMM	✓	⊙	1,85	1,85	0,00	3.635,70	3.635,70	0,00	38.174,85	38.174,85	0,00
PHCLP51101	GBB1	MLM	✓	⊙	2,00	2,00	0,00	2.537,00	2.537,00	0,00	26.638,50	26.638,50	0,00
PHCLP51101	USB1	MLM	✓	⊙	4,57	4,57	0,00	3.981,00	3.981,00	0,00	41.800,50	41.800,50	0,00

Save Scenario Start Scenario Reset

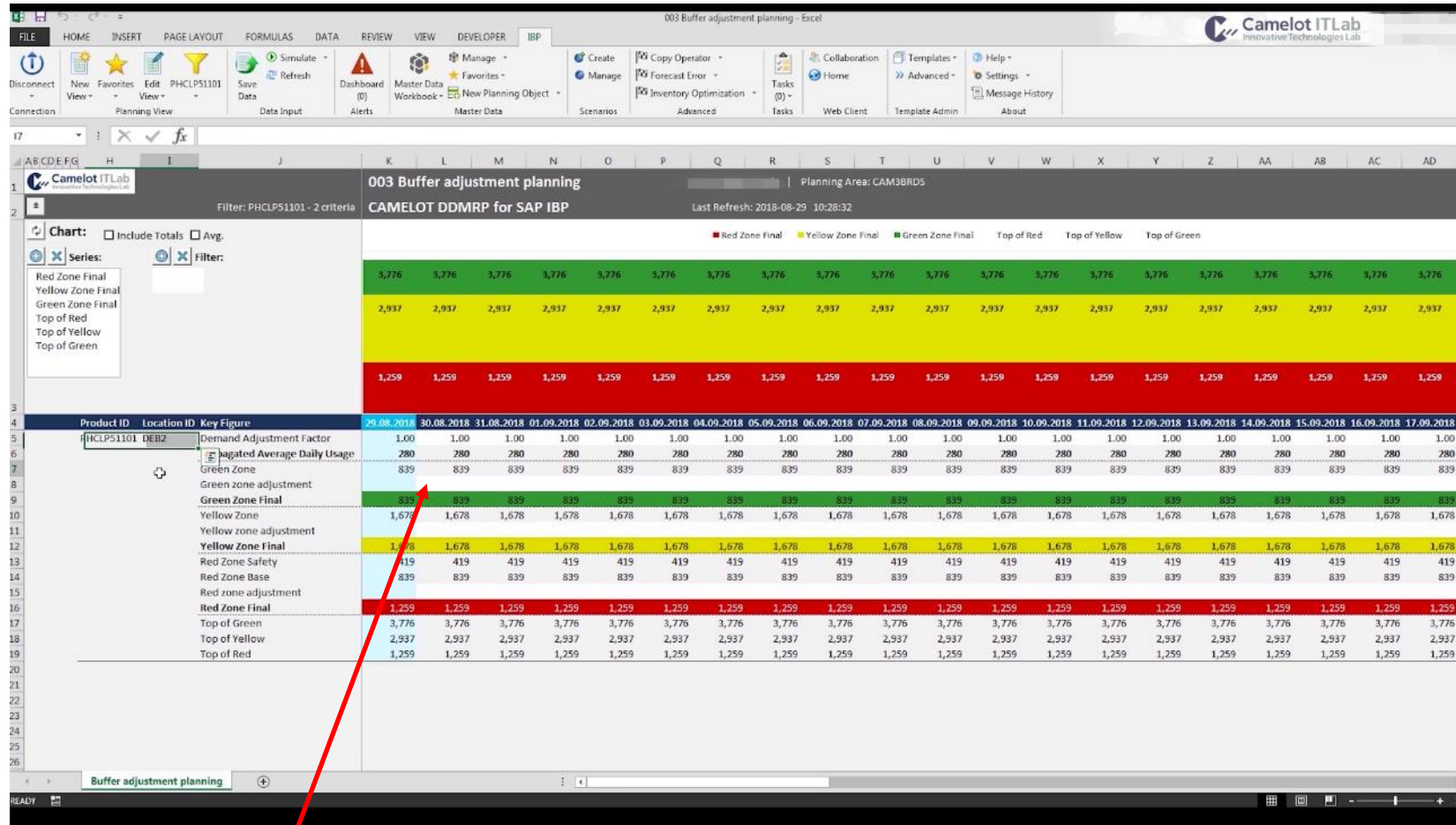
Proposed Decoupling Points; Simulate Manual Changes

# Step 2 – Buffer Profiles and Levels - IBP



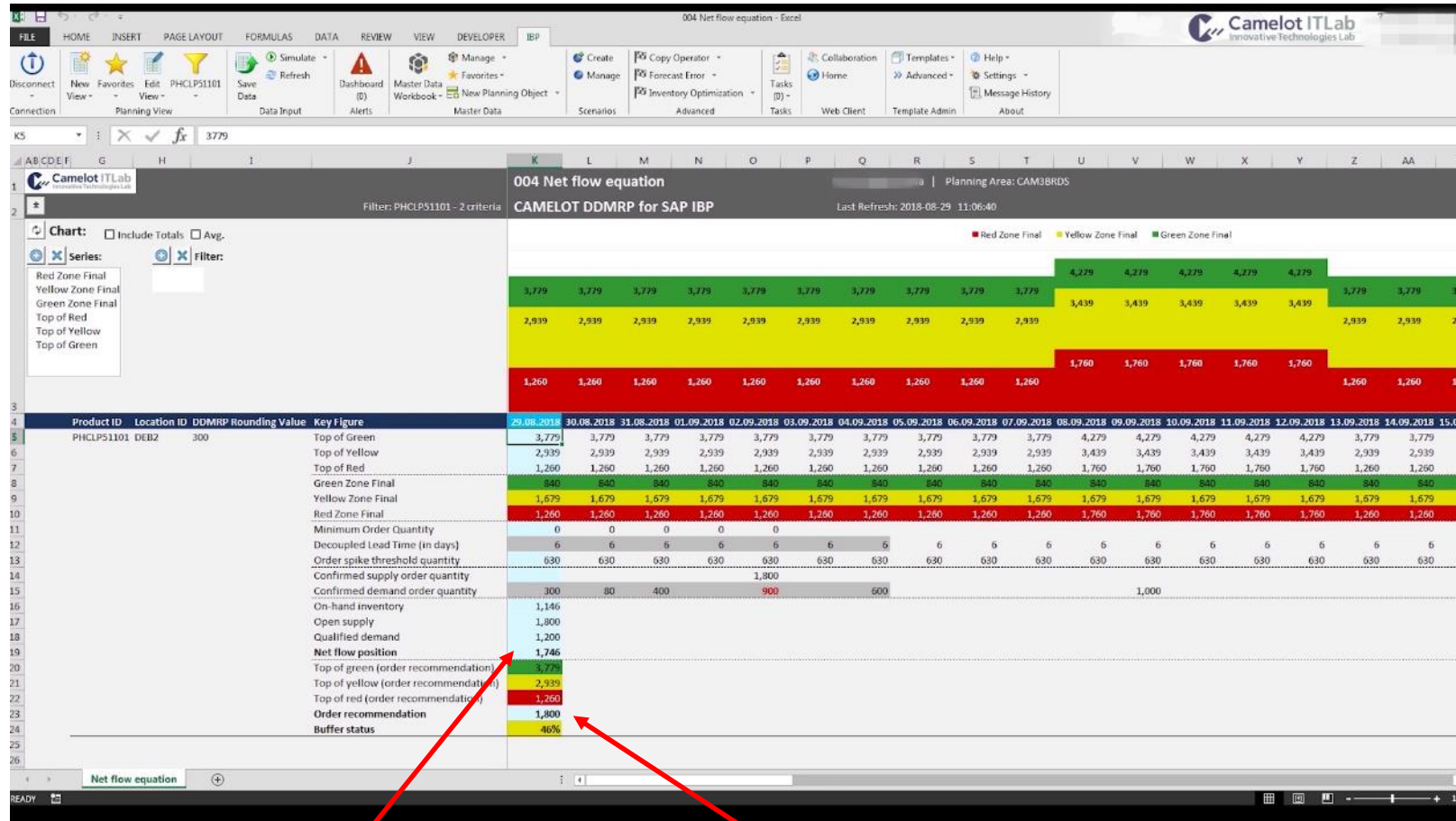
System Calculated Buffer size

# Step 3 – Dynamic Adjustments - IBP



User time-dependent adjustments

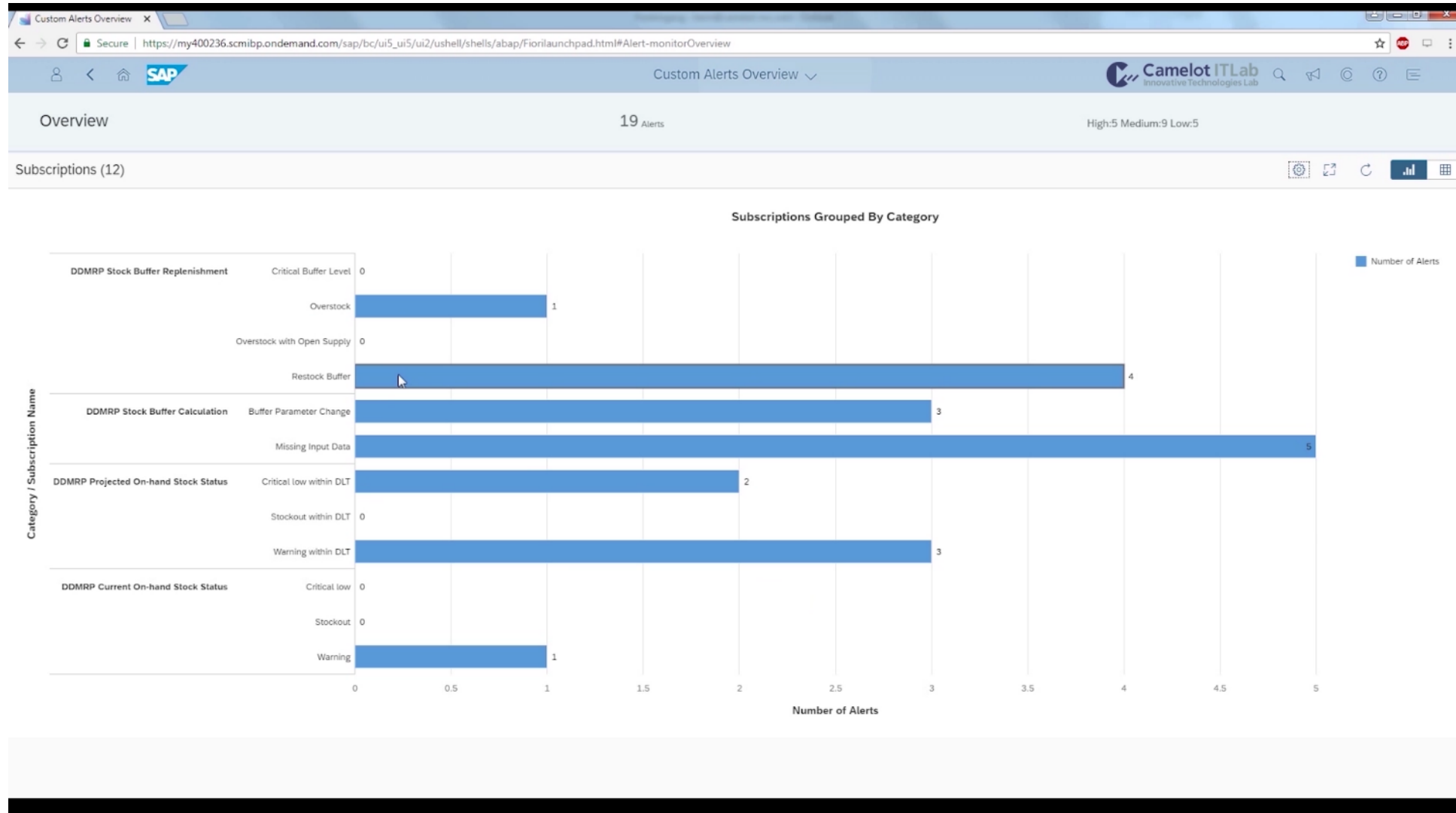
# Step 4 – Demand Driven Planning - IBP



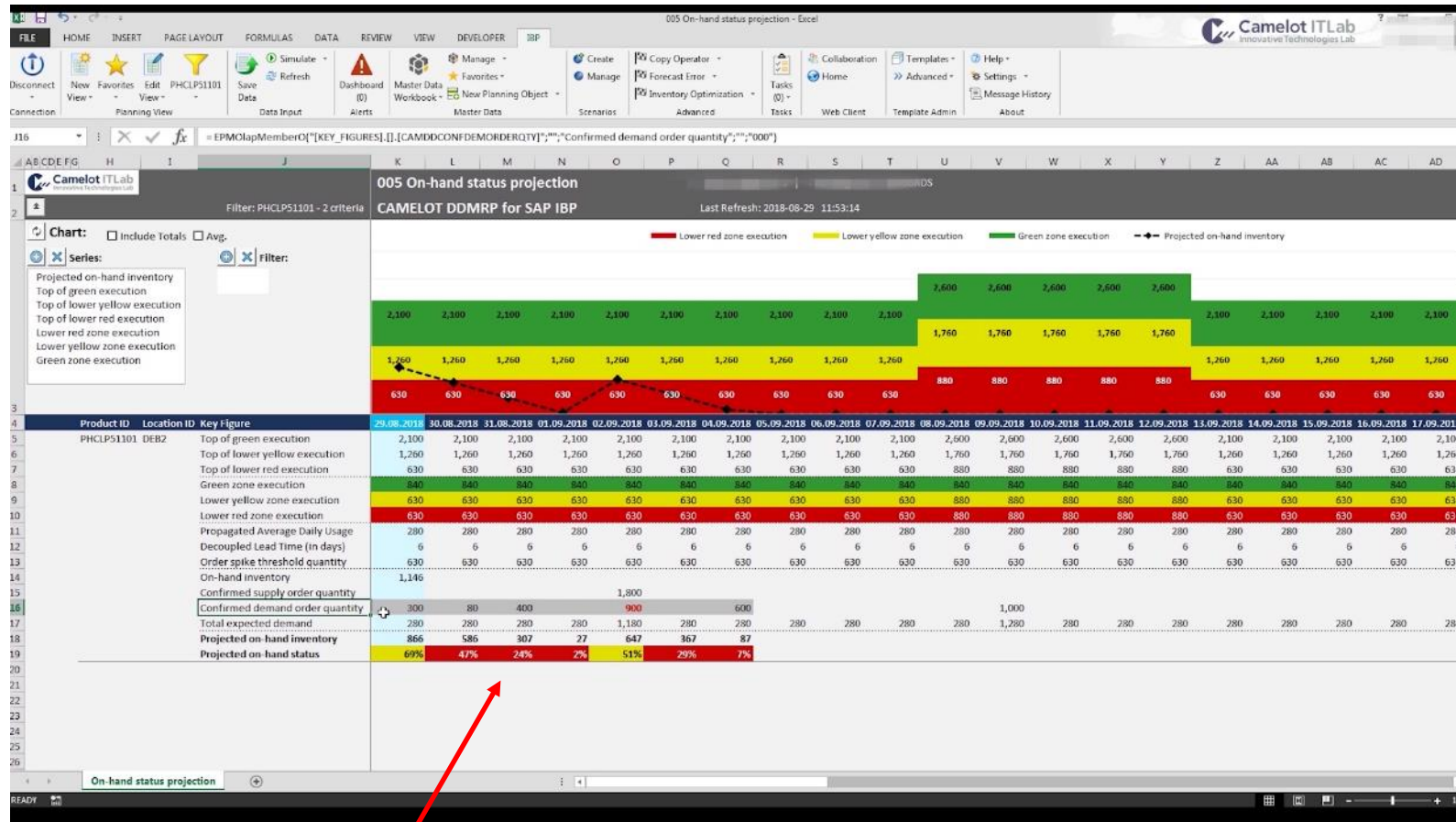
Based on Net Flow Position, Propose Replenishments



# Step 5 – Visible and Collaborative Execution

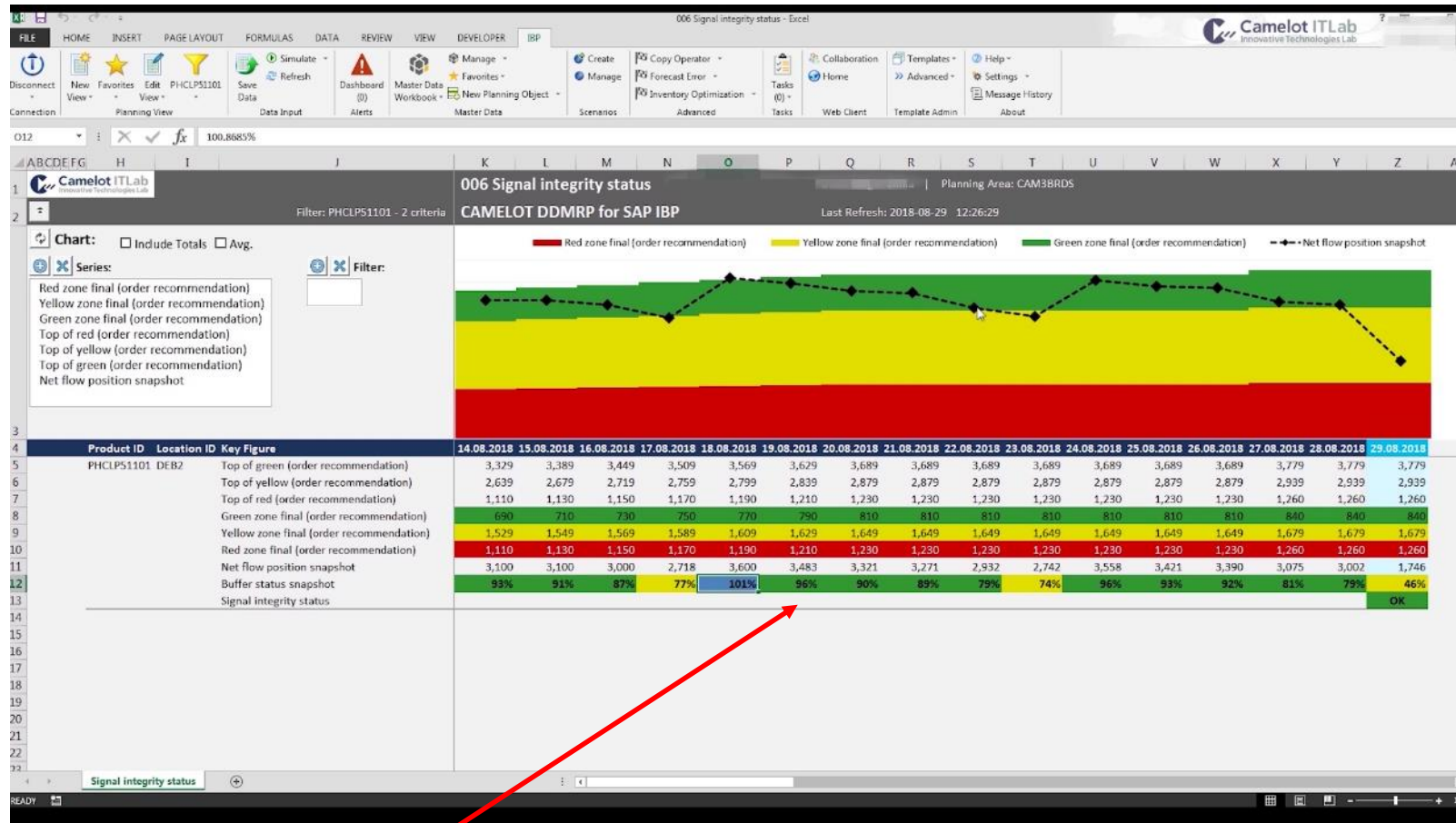


# Step 5 – Visible and Collaborative Execution



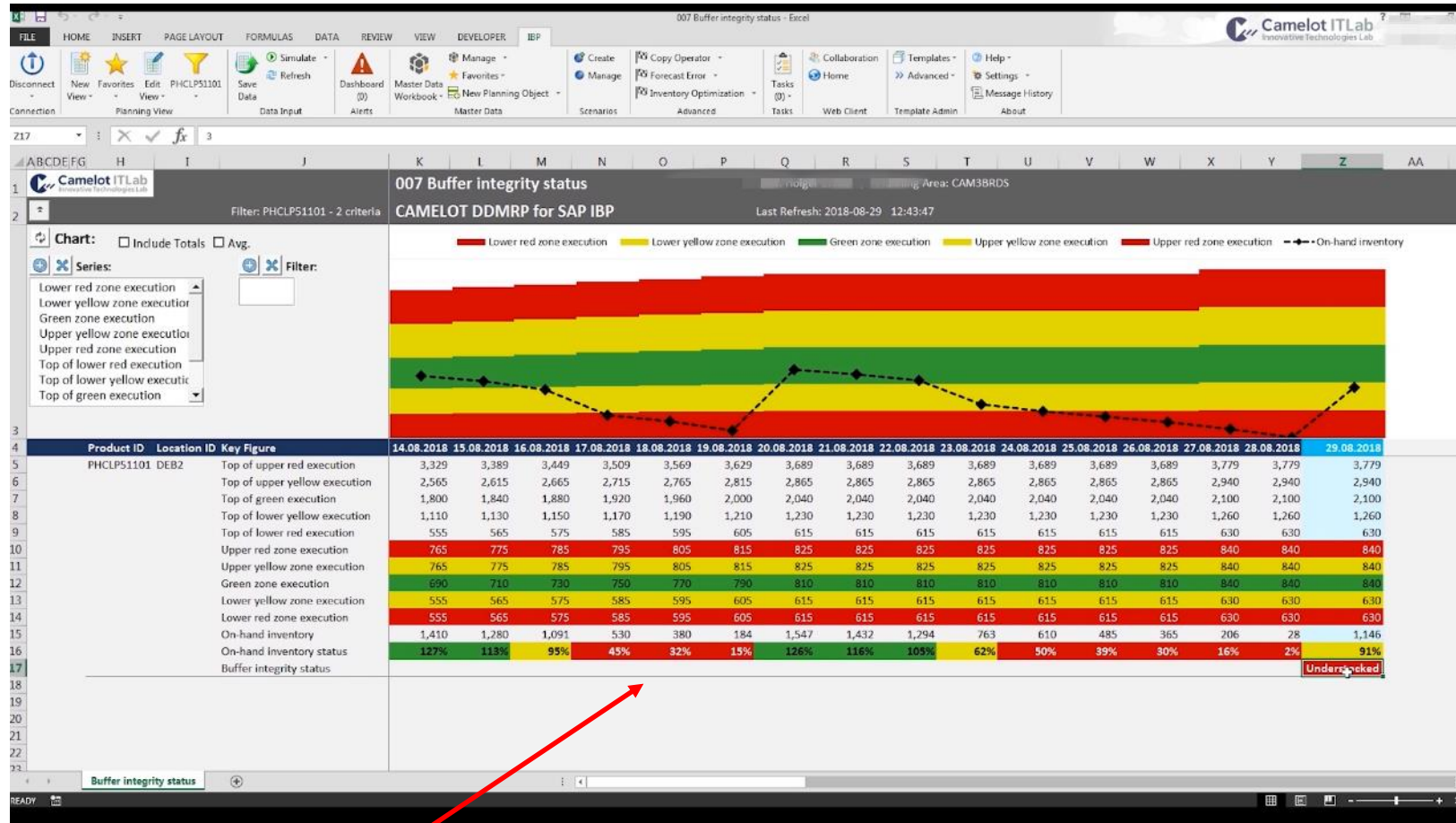
Execution Monitoring / Alerting: buffer levels going low

# Step 5 – Visible and Collaborative Execution



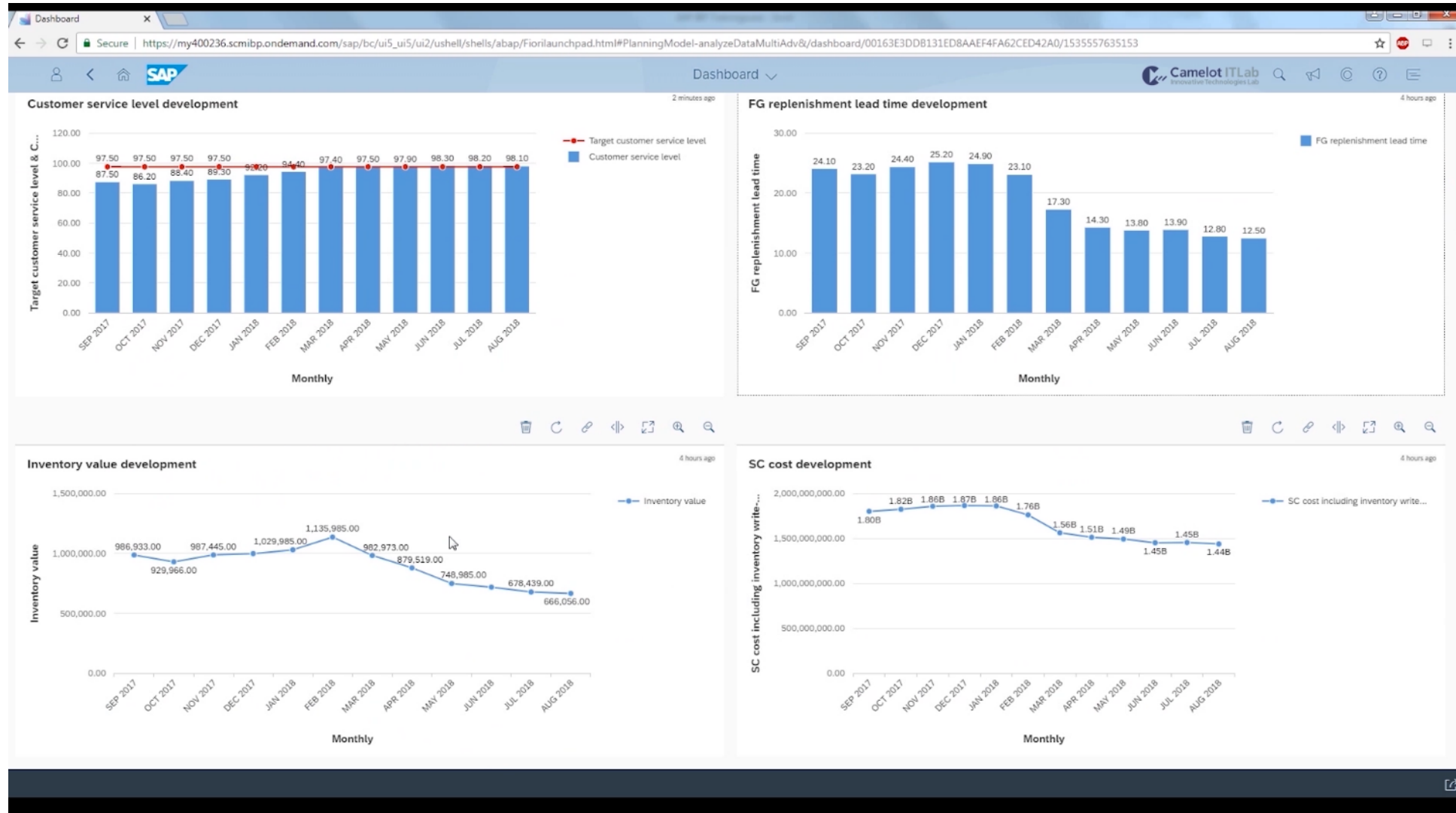
Historical Analytics: planning view - net flow position tracking in the green/yellow

# Step 5 – Visible and Collaborative Execution



Historical Analytics: execution view - on hand inventories drifting in the red

# Step 5 – Visible and Collaborative Execution



# Helpful Links

## On the Topic

- Website: <http://www.demanddriveninstitute.com/>
- Book: <https://www.amazon.com/Demand-Driven-Material-Requirements-Planning/dp/0831135980>
- “Precisely Wrong” video: <https://vimeo.com/219437991>
- Introduction to DDMRP: <https://vimeo.com/208396607>

## On the SAP Solution

- [SAP Help for S/4HANA Demand-Driven Replenishment](#)
- [SAP Best Practices Explorer](#), “Buffer Level Management (1Y2)”
- [Roadmap](#), navigate: “Products and Solutions” → ERP and Digital Core → SAP S/4HANA (Cloud)

# Thank You!



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