Leverage Production Planning Functionality within PPDS to Maximize Throughput and Increase Capacity

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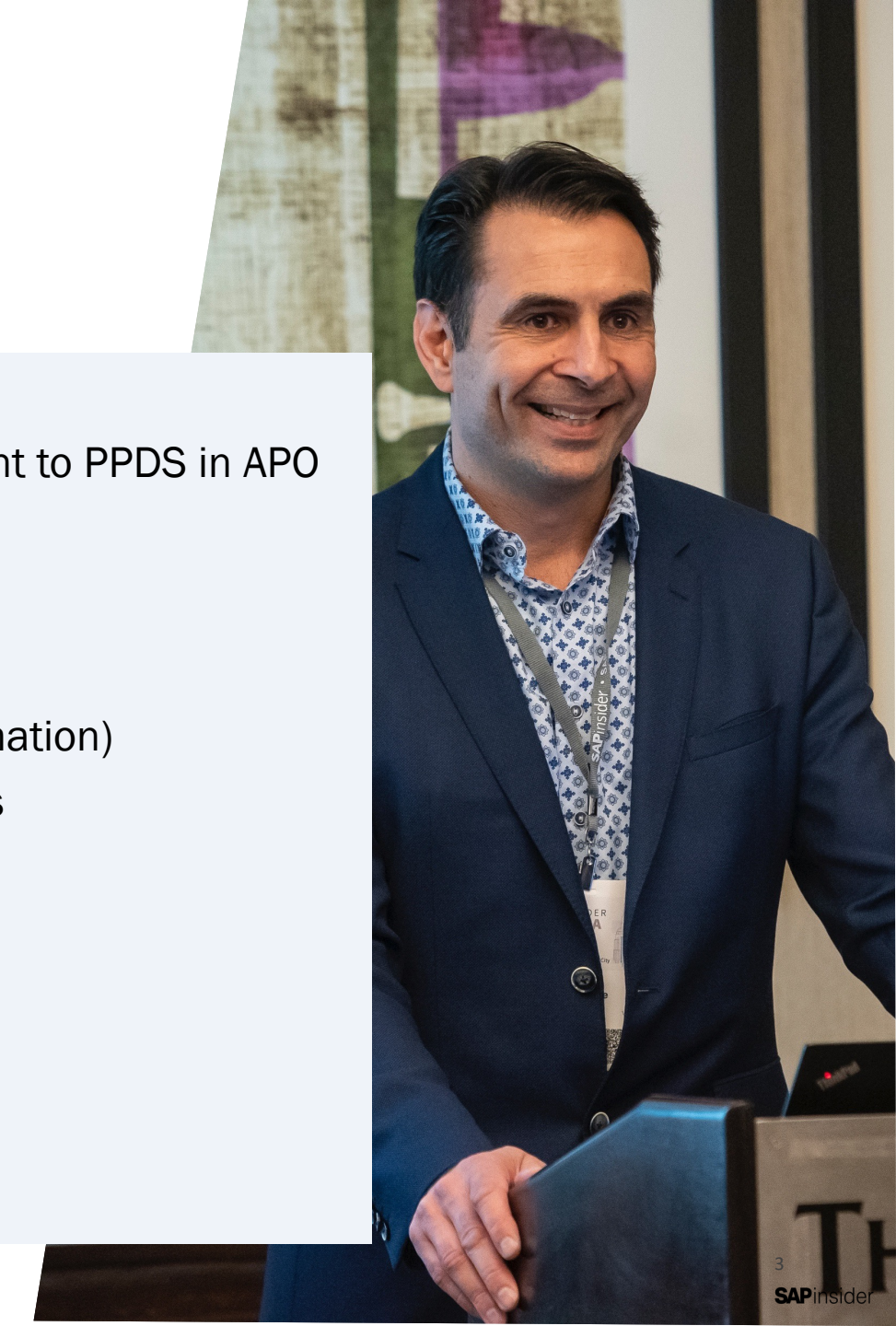
In This Session

For customers already having SAP APO and starting to transition into S/4HANA and IBP, there is several areas to address:

- Get an overview of the production planning and detailed scheduling (PP/DS) features and functions delivered with ePPDS in S/4HANA
- How do we migrate the current APO PPDS installation into S/4 HANA, while at the same time leveraging the new capabilities within embedded PPDS (ePPDS) in S/4HANA.
- What are the key considerations to consider and which pitfalls to avoid

What We'll Cover

- What is ePPDS in S/4HANA and how is it different to PPDS in APO
- Features and Process Flow of ePPDS
- How is the new Integration
- Examples of new Fiori apps
- APO vs. IBP and ePPDS (SCM Solution Transformation)
- Implementing ePPDS Best Practices and Pittfalls



What is ePPDS in S/4HANA and how is it different to PPDS in APO

Production Planning and Detailed Scheduling (PPDS) was crated as a component of SAP Advanced Planning and Optimization (SAP APO)

Its primary objective is to generate procurement proposals that meet product requirements and optimize scheduling for resources. PPDS is one of the supply chain planning components in SAP APO together with Demand Planning (DP), Supply Network Planning (SNP), and Global Available to Promise (GATP).

With the release of SAP S/4HANA, SAP have repositioned its product offerings and the PPDS functionality is now available within the core of SAP ERP.

The new embedded PPDS (ePPDS) in SAP S/4HANA includes the finite capacity planning and sequencing capabilities of SAP APO. The integrated PPDS functionality provides several benefits, such as simplified integration of master and transactional data, the ability to execute finite capacity planning and sequencing algorithms of PPDS from the MRP Live. Additionally, new Fiori apps are introduced in S/4HANA for graphical capacity monitoring, shift maintenance, and capacity leveling using a Gantt chart.

ePPDS in S/4HANA offers various features to bring your production planning and detailed scheduling to the next level

Alert Monitor

With the Alert Monitor, you have your entire supply chain under control, from the customer to the supplier.

Heuristics and Optimization

The optimization and heuristic functions reduce your manual planning effort in daily business to a minimum

Detailed Planning Board

The interactive detailed planning board enables intuitive production planning including simulation and visualization of changes in real time.

Finite Planning

The finite planning logic improves the quality of your production plan by allowing material requirements planning to take available capacities into account at the same time.

Enhanced Tank Planning

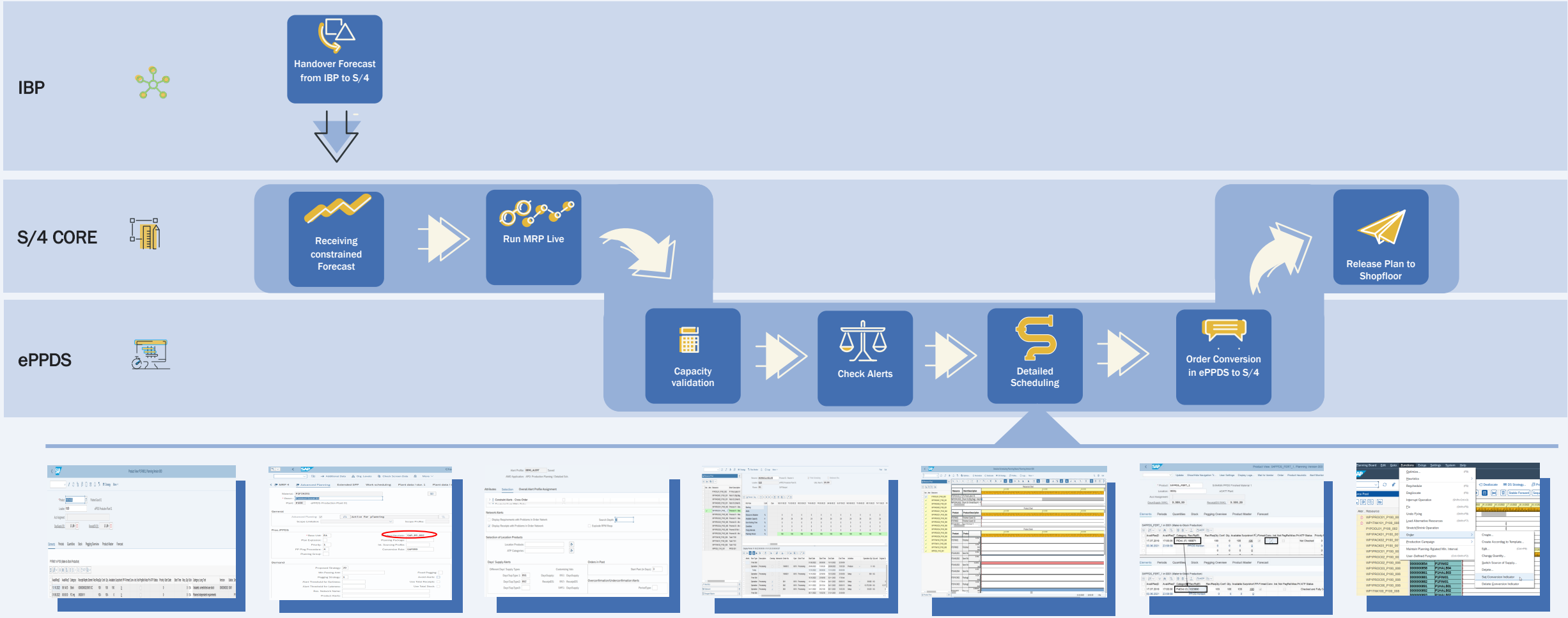
Tank Planning in ePPDS supports the planner to optimize the storage tank utilization e.g Fill level

Data Management

The integration of ePPDS in the S/4 HANA simplifies the management of master and transaction data for you and guarantees data consistency through real-time transmission.

The ePPDS in S/4 HANA offers you many functions for reducing your manual planning effort to a minimum and at the same time gives you full transparency across your internal supply chain.

Detailed Scheduling Process in SAP S/4HANA ePPDS



Short term capacity validation

Process flow

Capacity validation → Check Alerts → Detailed Scheduling → Order Conversion in ePPDS to S/4

Short term capacity adjustments

1

Latest capacities increasing the production schedule quality

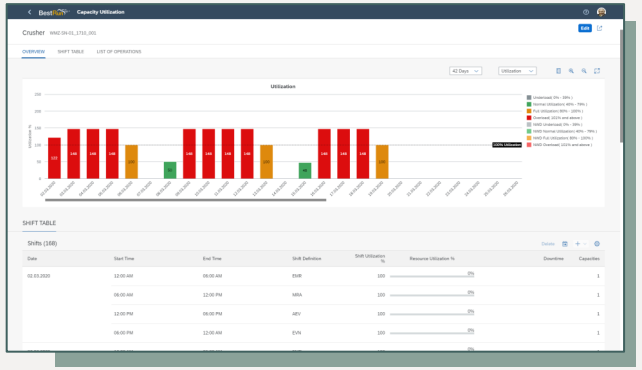
Demonstrated steps:

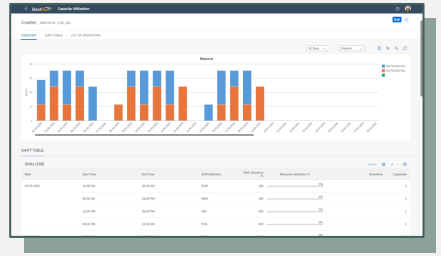
- Maintain necessary resource downtimes
- Maintain latest and correct shift models
- Check capacity conflicts

Key takeaways:

- Short term downtimes can be considered in ePPDS
- Correct capacity reflection in ePPDS highly increase the production schedule result
- Capacity view in ePPDS support detection of capacity conflicts

System preview



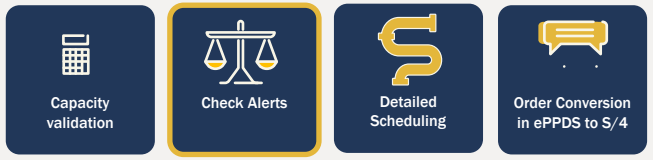


Extended functions

- Multiple resource types to fit specific capacity reflection needs
- Web-based Fiori apps for detailed graphical capacity views
- Finite Heuristics for ad-hoc rescheduling

Exception based planning based on Alerts

Process flow



Exception based planning based on Alerts

2

Alerting gives transparency to focus on critical exceptions

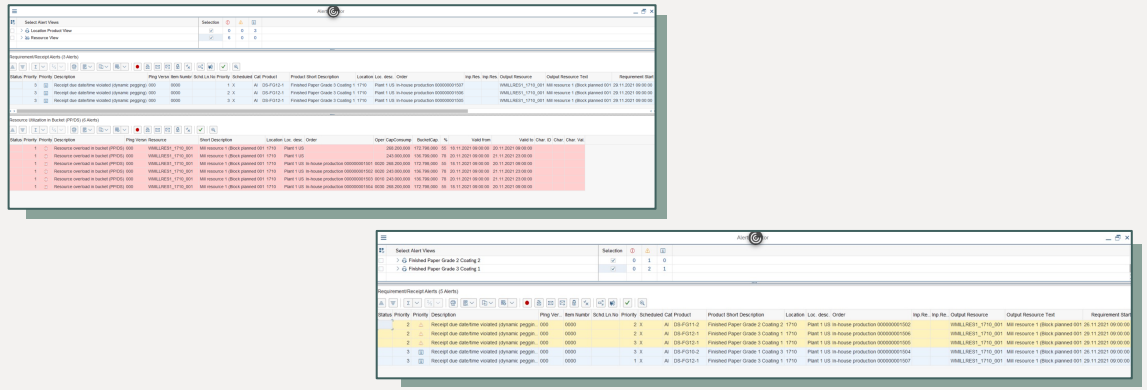
Demonstrated steps:

- Alert Monitor for supporting exception based planning
- Visibility across raw material requirements and goods receipt / issue
- Pegging gives transparency across all BoM levels

Key takeaways:

- The Alert Monitor gives transparency where to solve constraints within each BoM level
- Raw material requirements can displayed visually in Gantt Chart or in the Product view
- Pegging connects SFG's with FG's and bring them into dependency

System preview



Extended functions

- Days of supply visibility & alerting
- Alerting on component level to support the procurement process
- Visibility of material shortage in web-based Fiori

Detailed Scheduling

Process flow

Detailed Scheduling

3

A feasible plan can be supported by using heuristics

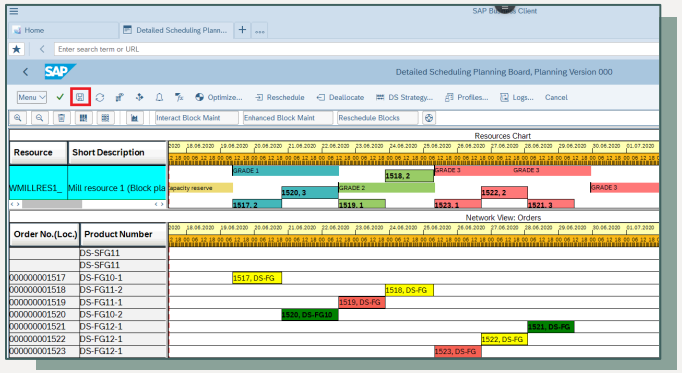
Demonstrated steps:

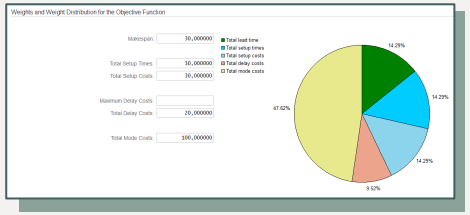
- Features to support the quality of the production plan
- Solving planning conflicts by moving orders to another resource
- Manual drag & drop for exception based rescheduling based on alerting

Key takeaways:

- Setup Matrix, Alternative resources support the planning process
- Resources with same characteristics are inter-changable
- Small planning conflicts can be solved with manual drag & drop of orders (exception based)

System preview





Extended functions

- > 40 Heuristics for Detailed Scheduling
- Time dependencies between operations can be displayed in ePPDS
- Block planning reduces set-up times

Release Detailed Schedule

Process flow

Release Detailed Schedule

4

Orders can be converted directly in ePPDS

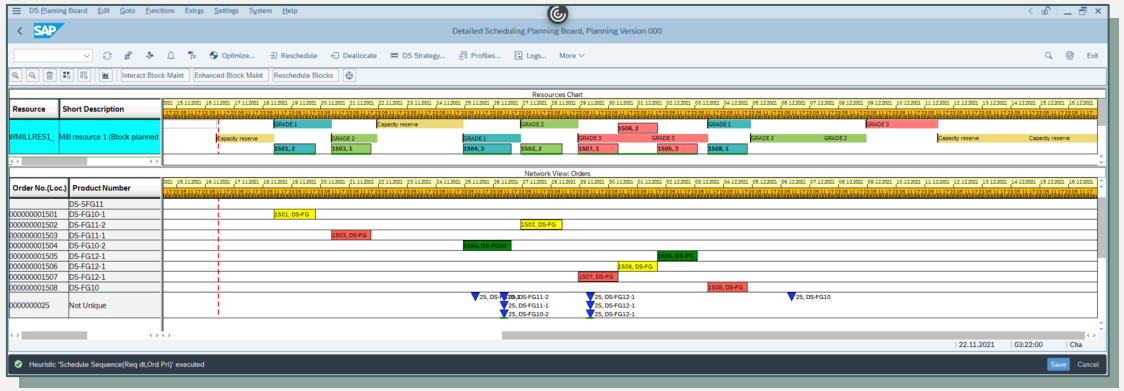
Demonstrated steps:

- Release of process orders within fixed horizon
- Production Orders can be directly converted in the planning board
- Status update directly visible in ePPDS

Key takeaways:

- Process orders can be directly released within the desired horizon
- Production Orders can be directly converted in the planning board
- Status update directly visible in ePPDS

System preview

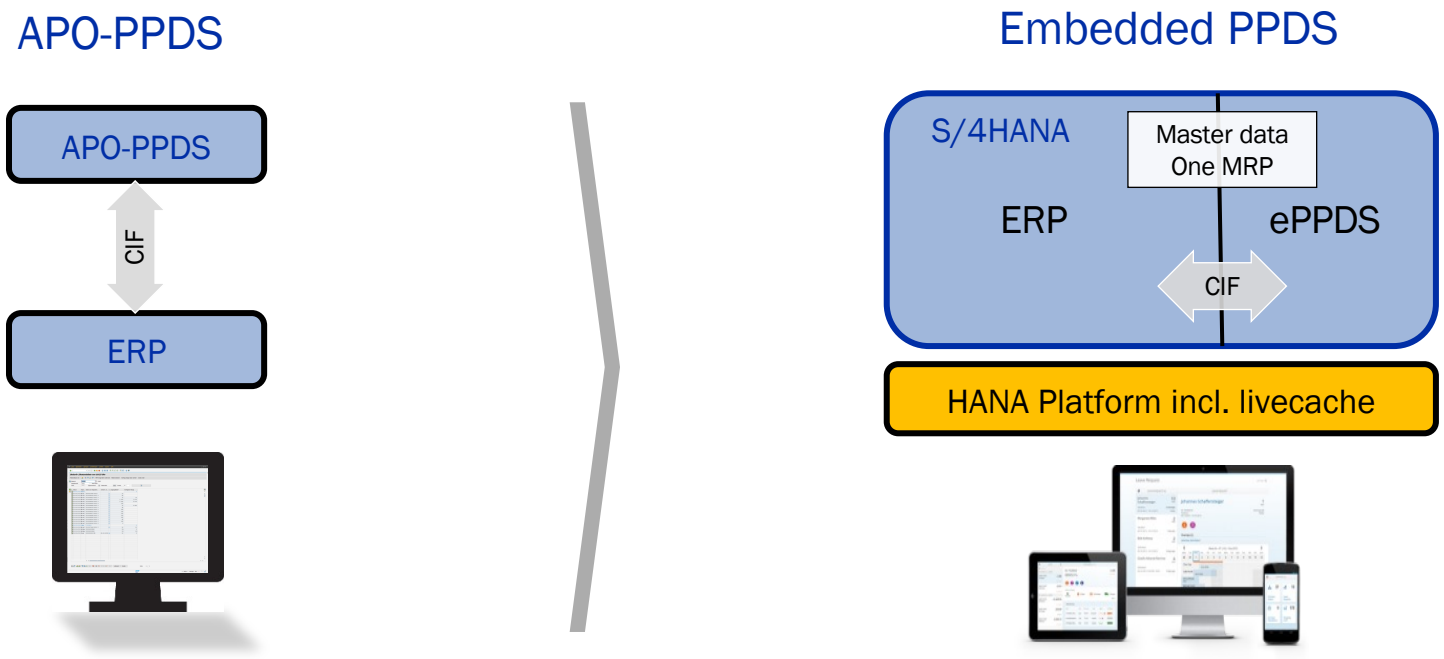


Extended functions

- Fixing intervals can protect the most current plans from disruptions
- Order backlogs can be automatically resolved via heuristic
- Automatic release of process order within defined horizon

System Architecture & Data Transfer

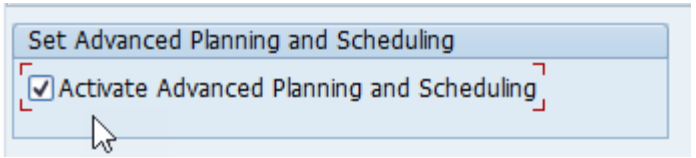
The Core Interface (CIF) does still exist, but is much more simplified compared to APO

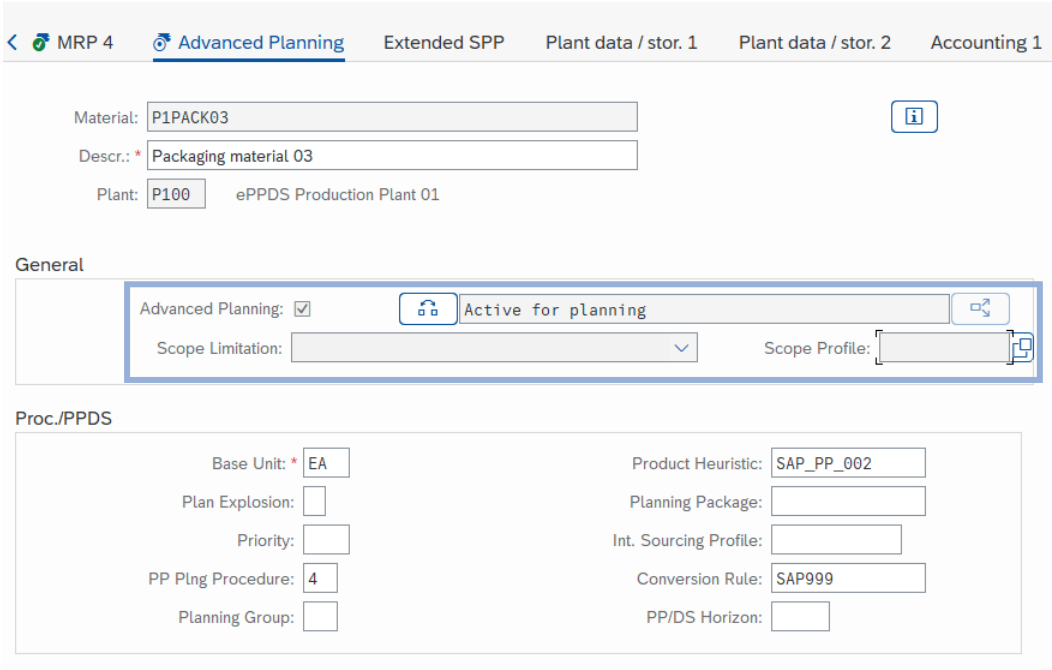


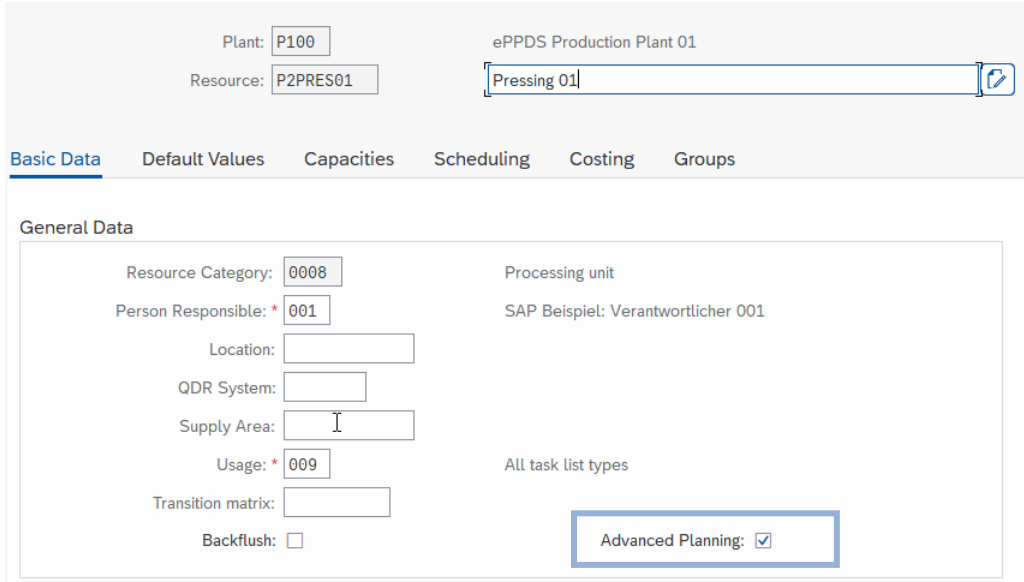
Master Data is activated for Planning in ePPDS via a simple checkmark

Once Advanced Planning is activated in configuration, it opens of for additional features on the master data

- **New tab on the material master for advanced planning**
- **Checkmark on the Resource/Workcenter**
- **Locations and production version are transferred via a job**



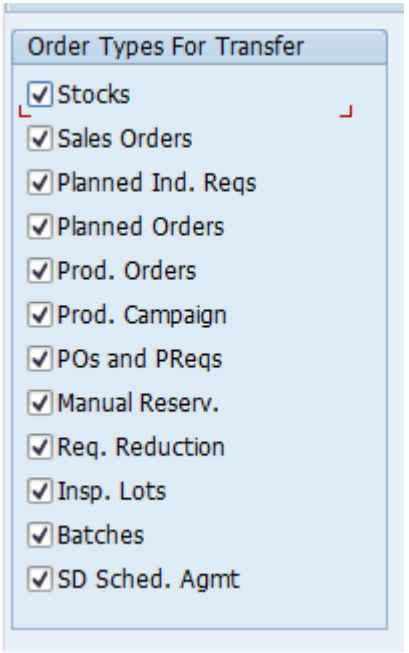


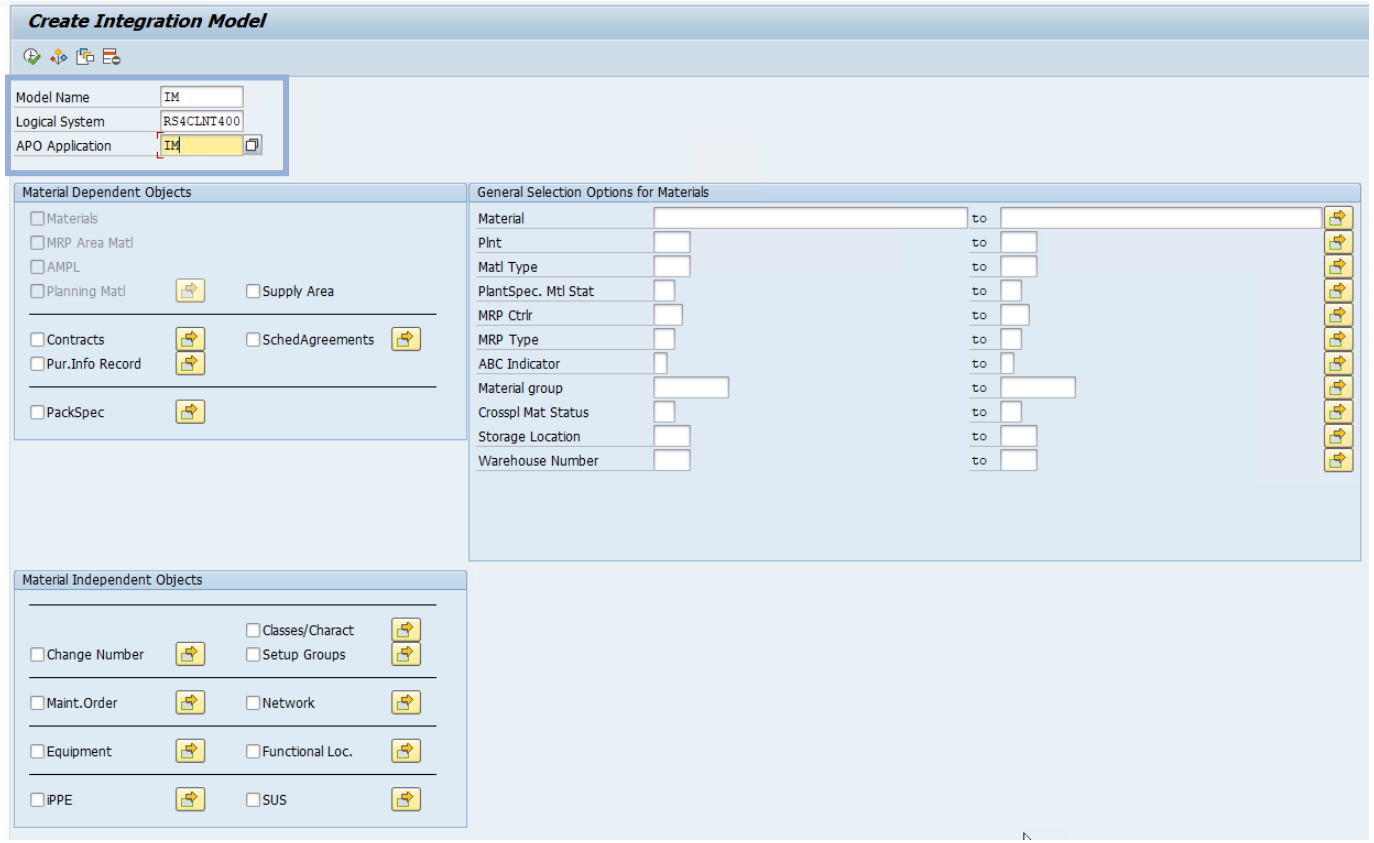


No need for Integration Models for transactional data

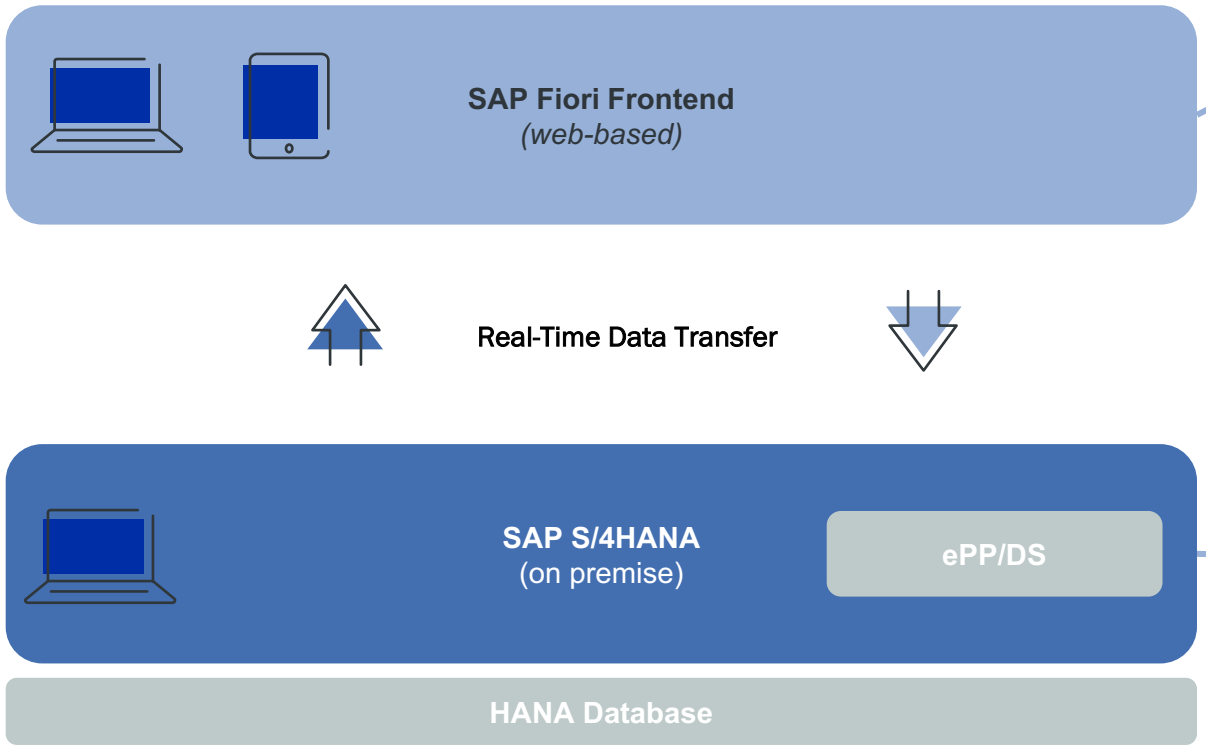
Transactional data don‘t need Integration Models either, the different order types are just selected and then all orders for „Advanced Planning“ material/plant combinations are transferred

Only a few areas need Integration Models such as purchasing info records, characteristics and setup groups,

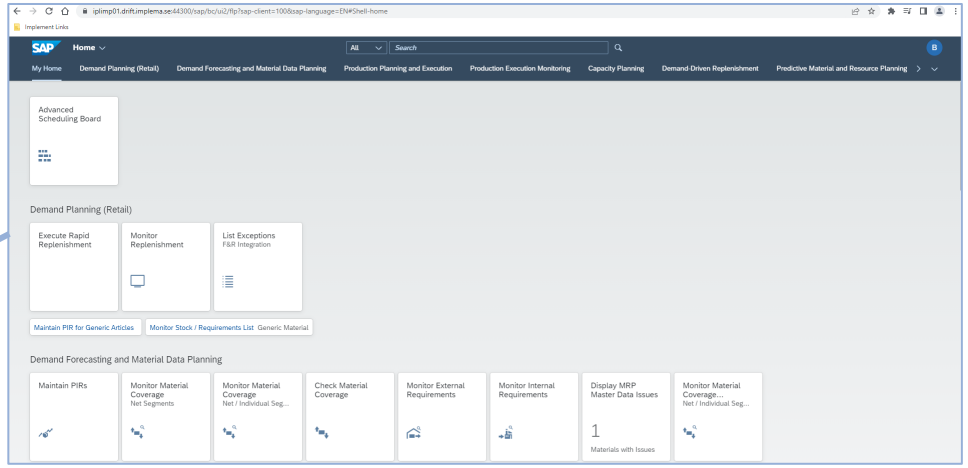


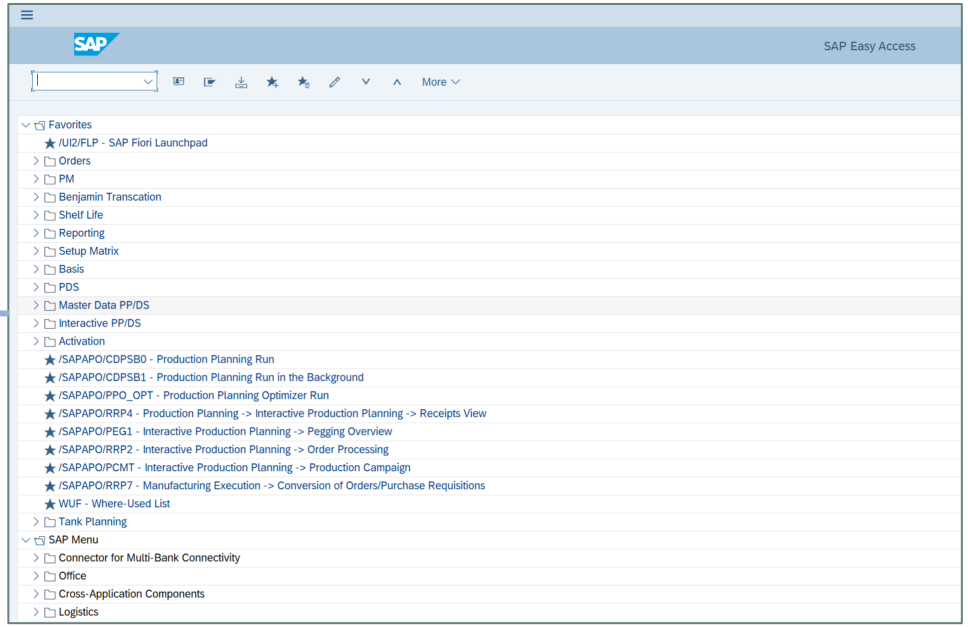


Work with the SAP Fiori front-end as alternative to SAP GUI



>1000 Apps for Manufacturing / Supply Chain





ePPDS comes with Fiori Apps to support the daily Production Planning and Detailed Scheduling Process

1 **Monitor Material Coverage** — Stock/ Requirement

2 **Manage Material Coverage** — Stock/ Requirement

3 **Schedule MRP Runs** — Stock/ Requirement

4 **Detect MRP Situations** — Stock/ Requirement

5 **Monitor internal requirements** — Stock/ Requirement

6 **Monitor external requirements** — Stock/ Requirement

7 **Monitor Capacity Utilization** — Capacity

8 **Manage Workcenter Capacity** — Capacity

9 **Advanced Scheduling Board** — Production Planning

10 **Schedule Production** — Production Planning

11 **Manage Production Orders** — Shopfloor

12 **Manage Production Operations** — Shopfloor

13 **Process pMRP Simulation** — Simulation

14 **View Supply Shortages** — Analytical

Fiori Lighthouse Apps

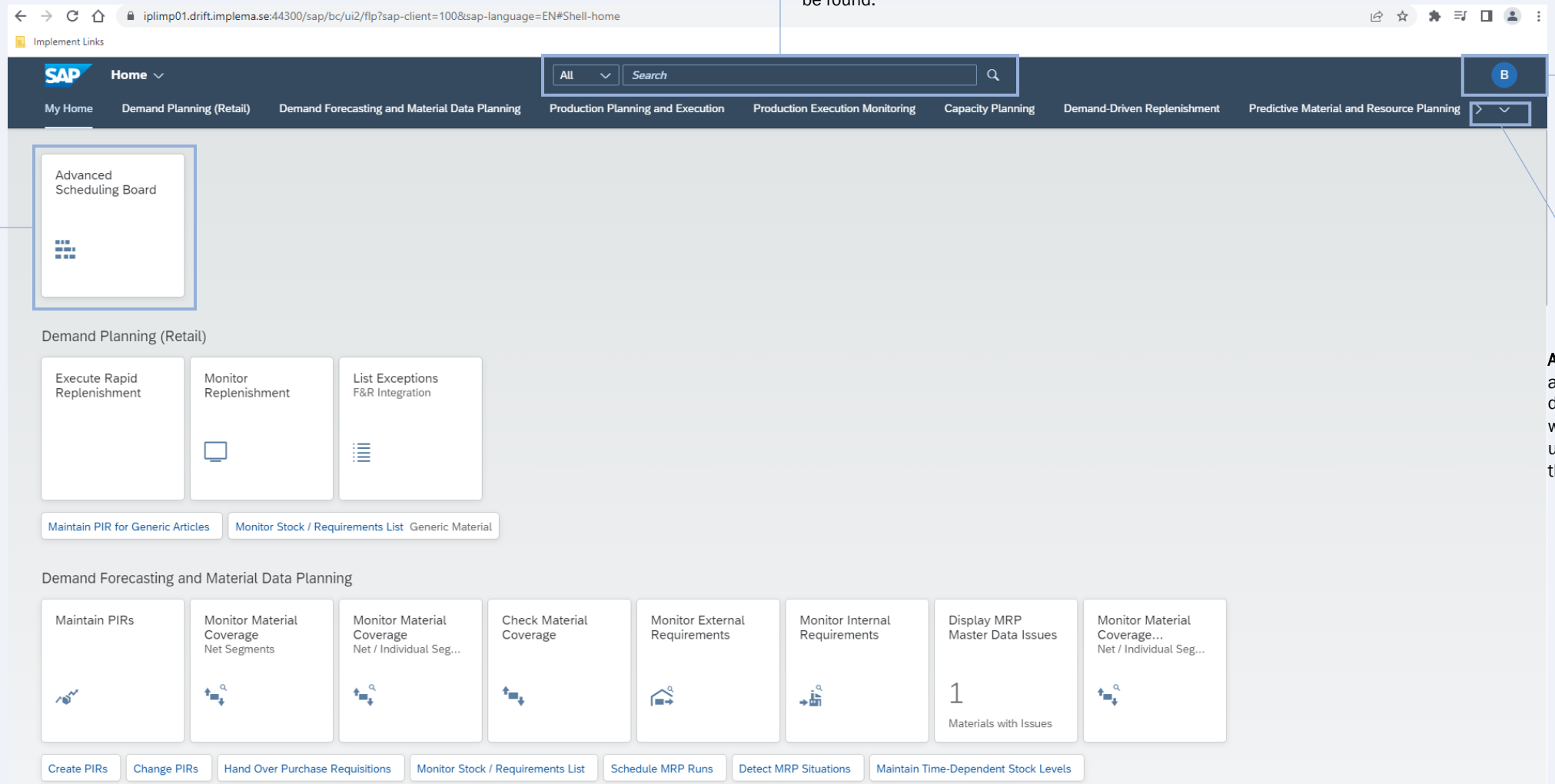
Fiori Launchpad

Search Bar: Global Fiori search bar, here all different apps can be found.

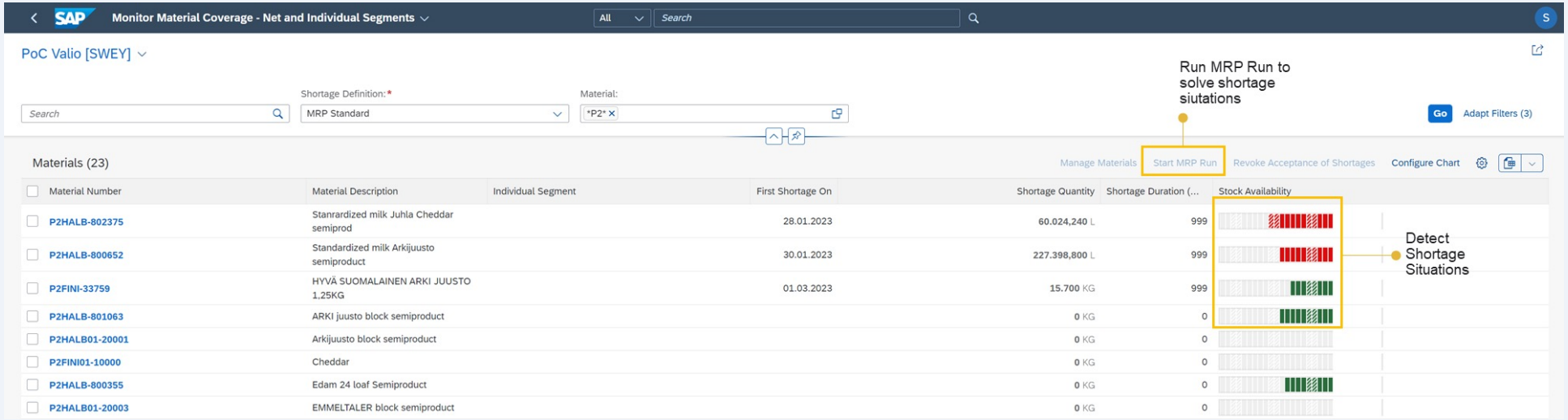
Profile: Setup the profile and customize SAP Fiori for the user.

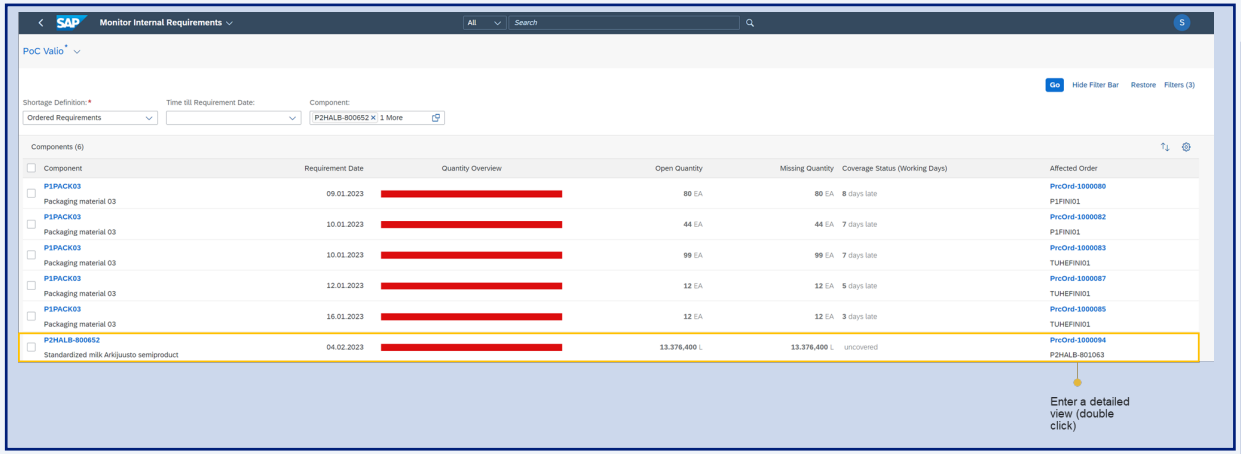
Favourites: Like in the GUI it is possible to add favourite tiles in the top of the start screen.

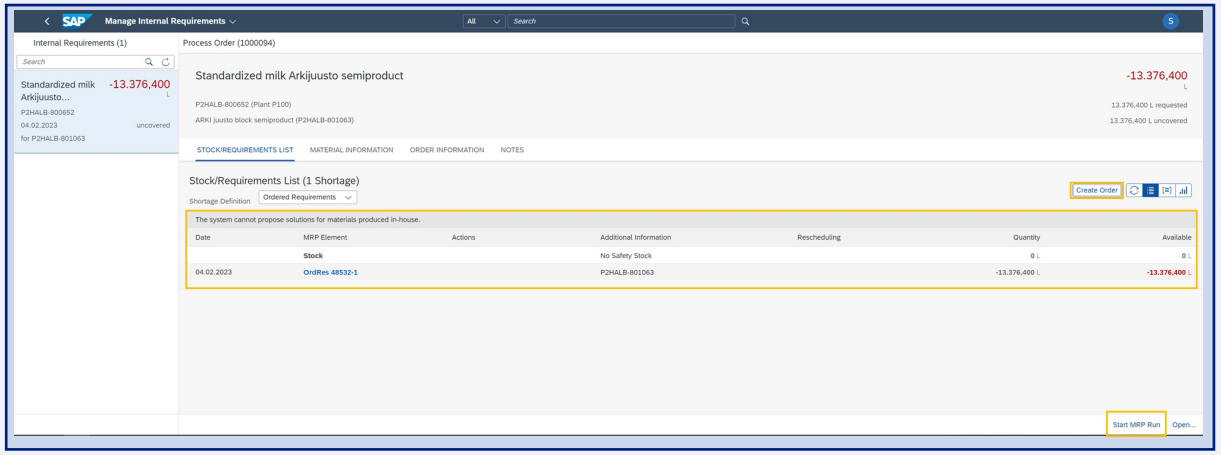
App Groups: The apps in Fiori is divided into groups, which helps the user to navigate to the desired ones.



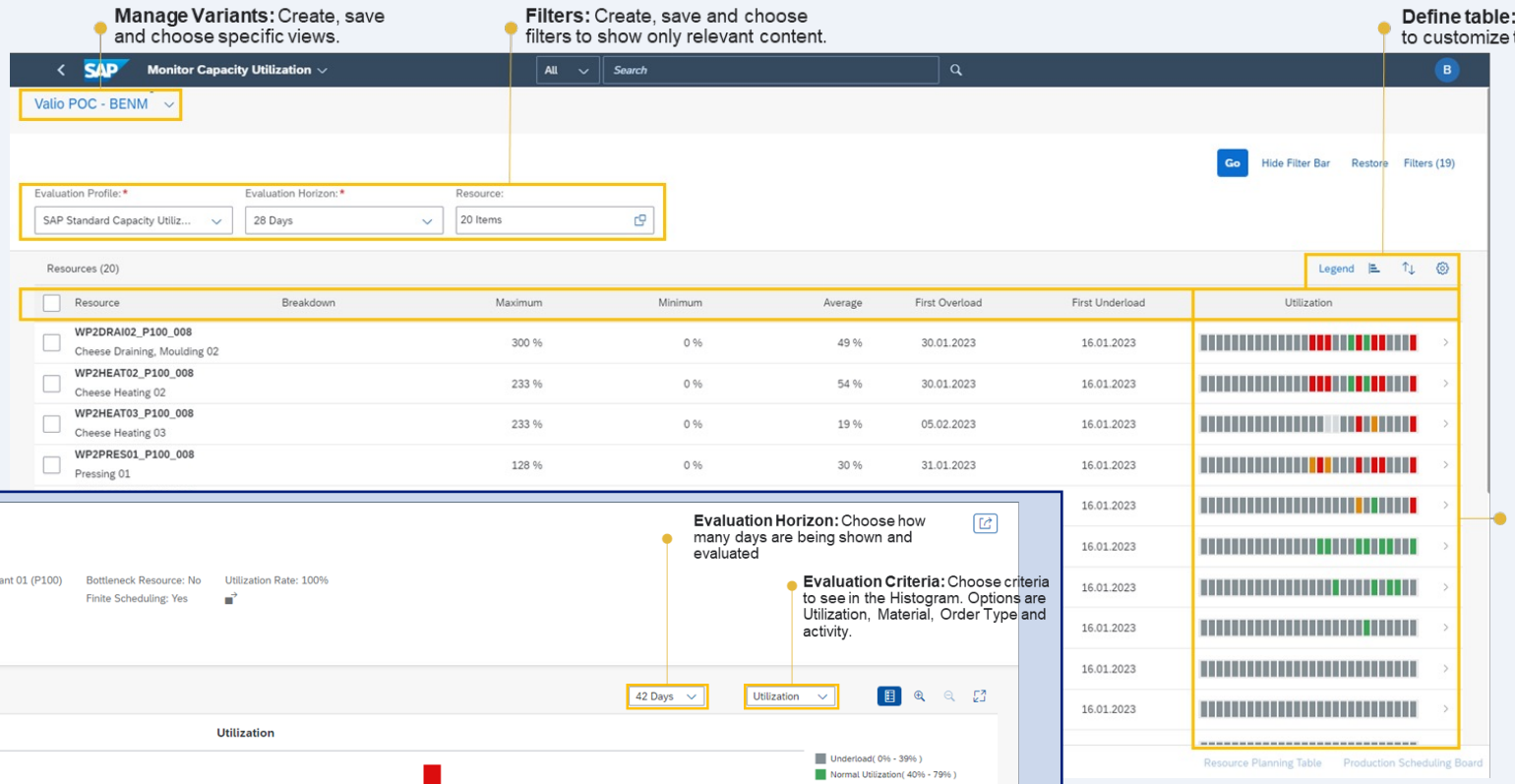
Monitor Material Coverage – Shortage Situation can be monitored and solved directly in Fiori

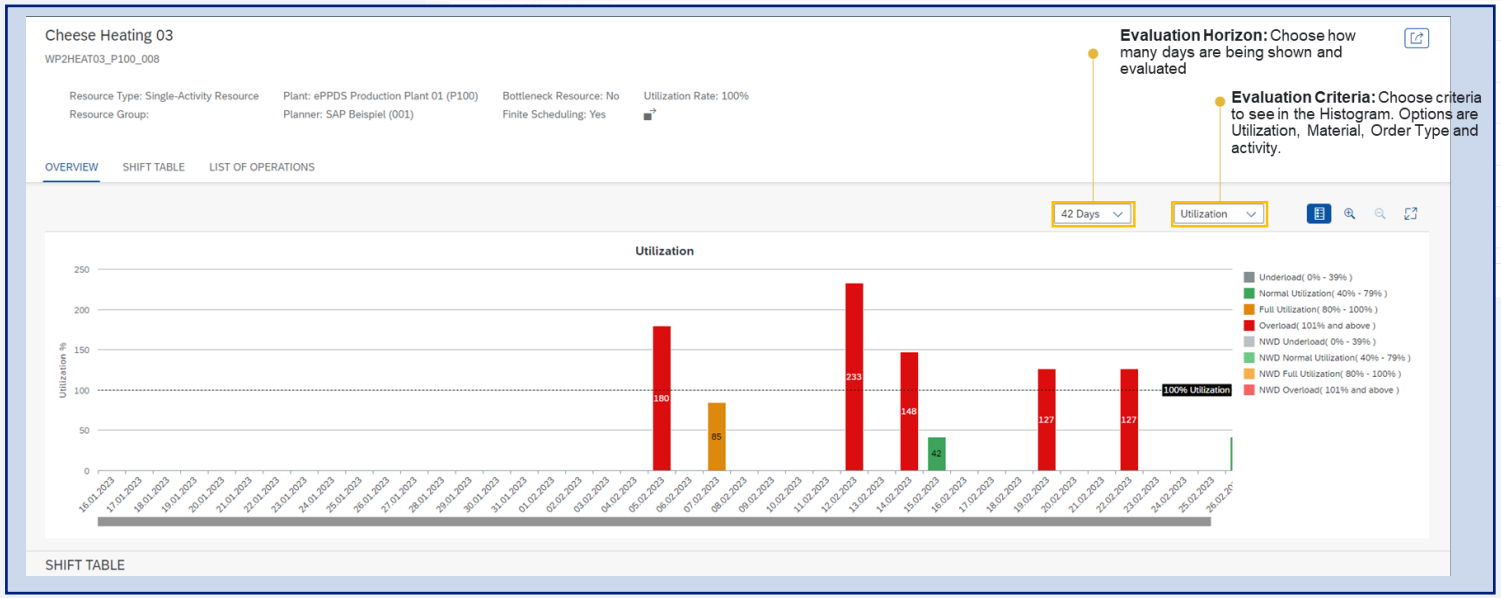






Monitor Capacity App – evaluate capacity consumption and potential overloads





Utilization: Showing the utilization on the chosen resources on each day for the number of chosen days in the Evaluation Horizon.

Click one of the resources to se a more specific view and data in a histogram.

Advanced Scheduling Board Fiori App – new features & capabilities with S/4HANA 2022

Select View: Selecting and saving views and filters on the planning board.

Filtering: Various filters can be applied to show only relevant content in the planning board.

Execute Heuristics: Deciding a priority for how SAP must schedule orders. Relevant for scheduling

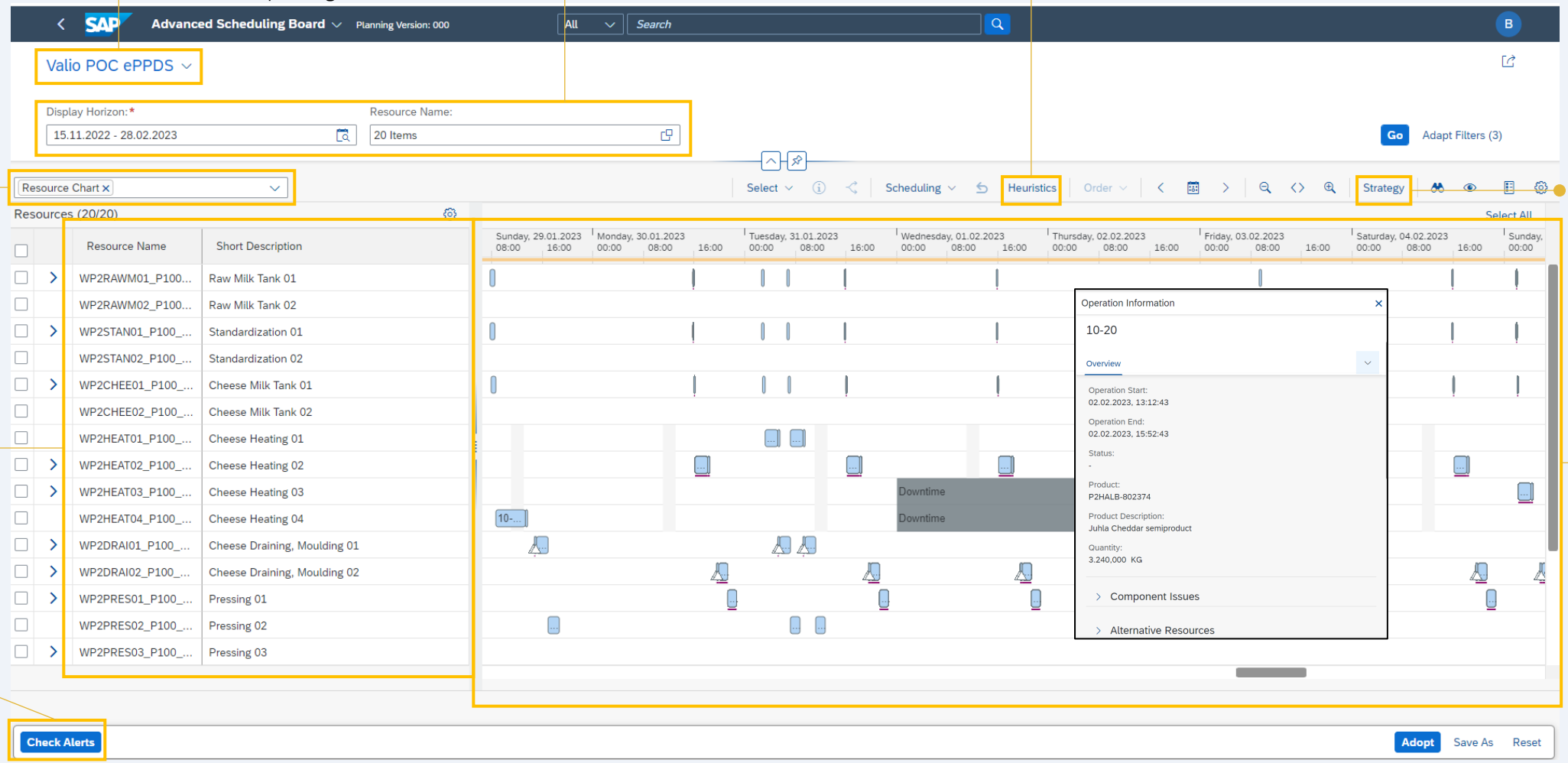


Chart selection: Choose which charts to view. Ressource, order, product, operation, product stock and ressource utilization charts are available.

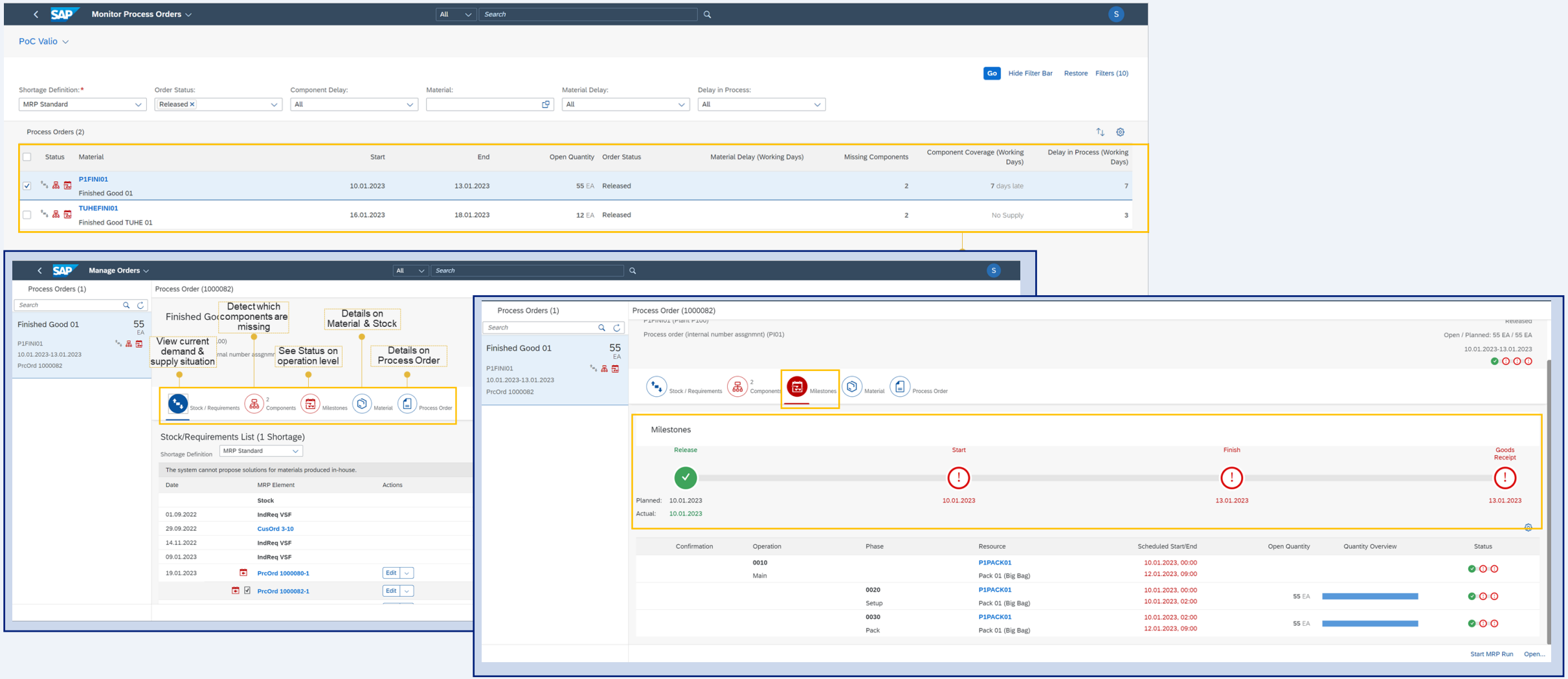
Ressource Chart: Showing an overview of selected resources..

Check Alerts: Check if there are any alerts for the created schedule.

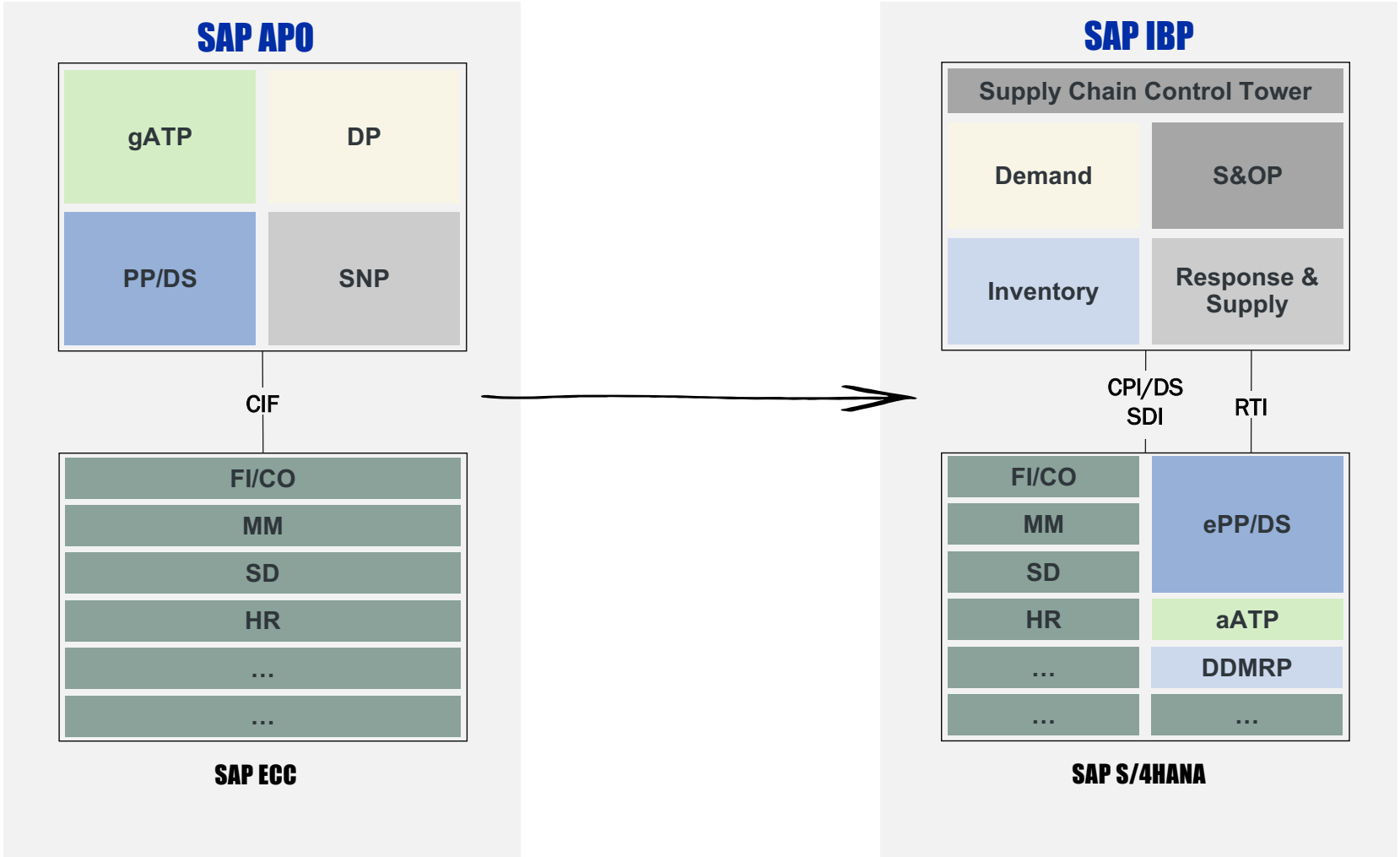
Strategy: Defining the planning stategy. Schedule mode, forward/backward planning. Determines how orders are sequenced.

Scheduling Board: Graphical overview of orders, operations, downtimes and timeline. This is where orders are planned and impact is overviewed.

Monitor Process Orders – Helps the Planner to track critical Process Orders



APO Planning functions are split between SAP IBP and SAP S/4HANA



What are the strengths of the different SAP Production Planning systems?

IBP Time-series planning

Works great for...

- Full network optimization (source of production, production levelling of peaks or seasonal demands, stock projections and impact on warehouse capacities)
- Master Production Schedule simulations (frequency, MIN/MAX limits for individual or group of products)
- Inventory target optimization & simulations
- Rough allocation of volumes in constrained situations at different levels of aggregation or with different priority-setting strategies

Key characteristics

- Time bucket planning (day or week is lowest level)
- Aggregated constraints (highly flexible modelling of constraints)
- Integration on daily level (typically either via CI-DS or directly as a copy from order-based planning using RTI)

IBP Order based planning

Works great for...

- Network planning across production & distribution using finite planning heuristic
- Operational deployment and distribution planning including transport load building
- Detailed shelf life requirements planning utilizing stock on hand batch information
- Linking the tactical & operational plans towards execution
- Creating product allocations for linkage to order management processes

Key characteristics

- Planning at order level per day
- Switchable constraints at a pre-defined level (i.e. production resource level, transport resource)
- Real-time integration towards ECC and S/4
- Synchronized planning interface with S/4 ePPDS

S/4 ePPDS

Works great for...

- Plant-centric MRP planning (i.e. MRP at single plant)
- Detailed scheduling & sequencing of orders
- Alerting on short time capacity situations
- Monitoring production progress

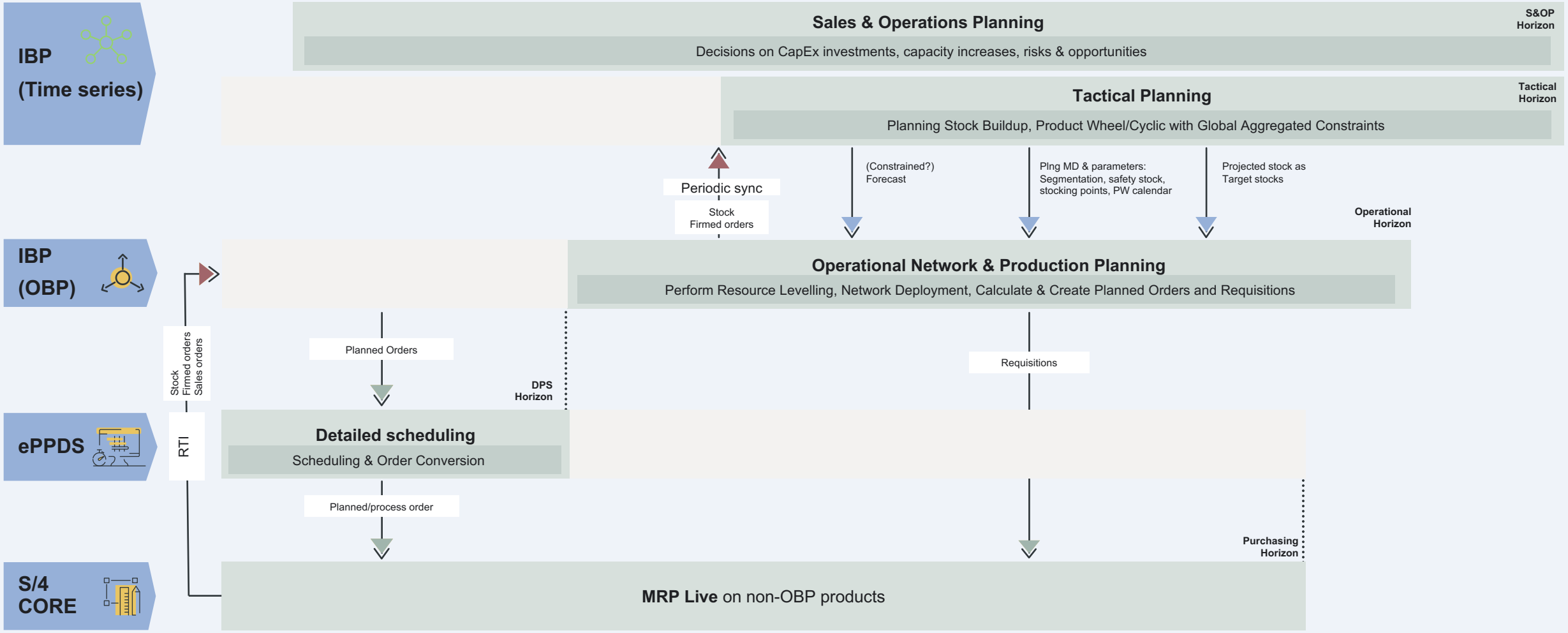
Key characteristics

- Planning at the most detailed level (hours and minutes)

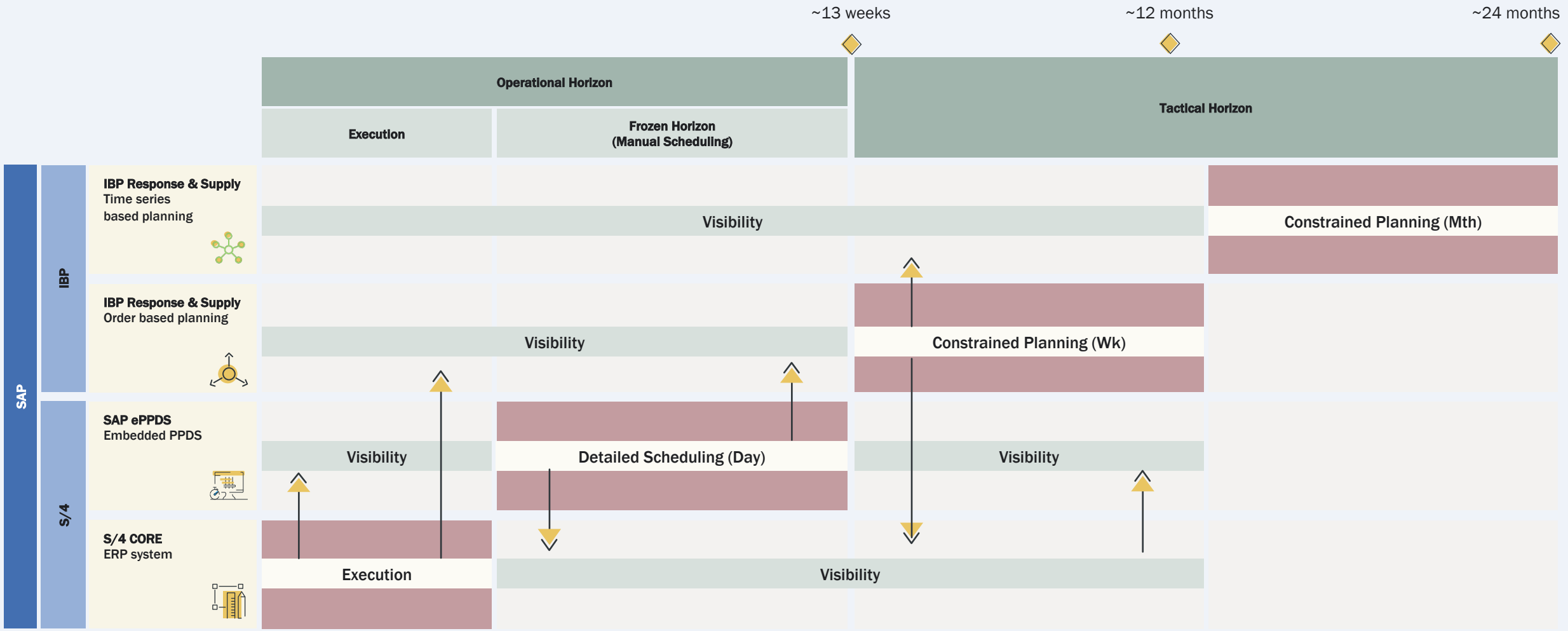
System Landscape combined with the planning decisions taken

Horizon	System	Typical decisions…
Sales & Operations Planning	IBP Response and Supply (Time-Series)	• Customer and product segmentation • Balance planning parameters with desired service levels (SLA) • Define calendars to support long-term planning • Review and balance overall capacities across sites, warehouses and logistics • Long-term component planning
Tactical Planning	IBP Response and Supply (Order-Based Planning)	*Tactical planning resides either within Time-Series or within Order-Based Planning, depending on business process and the decisions to be taken* • Conduct capacity levelling and seasonal build where needed • Define priorities if constrained cf. parameters / rules from S&OP • Provide input for purchasing – long lead time components • Respond to changes in balancing and allocation
Operational Planning		• Calculate production plans (creation of planned orders, shelf life considerations, etc.) • Calculate distribution plans (creation of requisitions, transport load building, etc.) • Set shift requirements and coordinate with site / warehouse *Some operational planning tasks could reside within S/4 or ePPDS, depending on the business process and decision to be taken*
Scheduling & Execution	S/4HANA ePPDS	• Schedule orders based on input from operational planning • Break down requirements to components • Call off on components • Exception handling cf. predefined priorities • Deployment and transportation planning of actual quantities

In a mixed landscape with both IBP and ePPDS we recommend the following system landscape



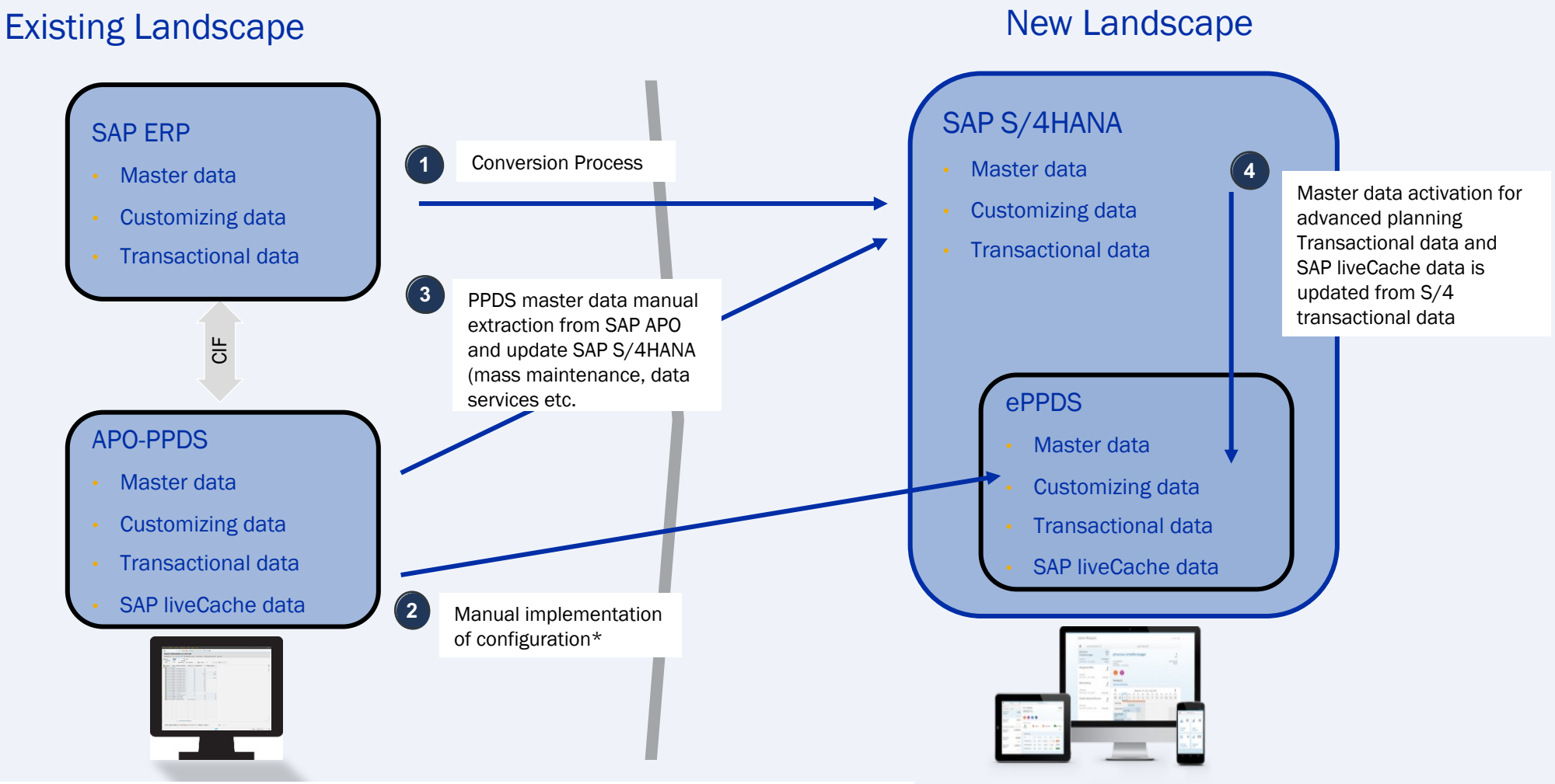
In a mixed landscape, which is the leading planning engine and how is the visibility across, over the different horizons?



Implementing ePPDS

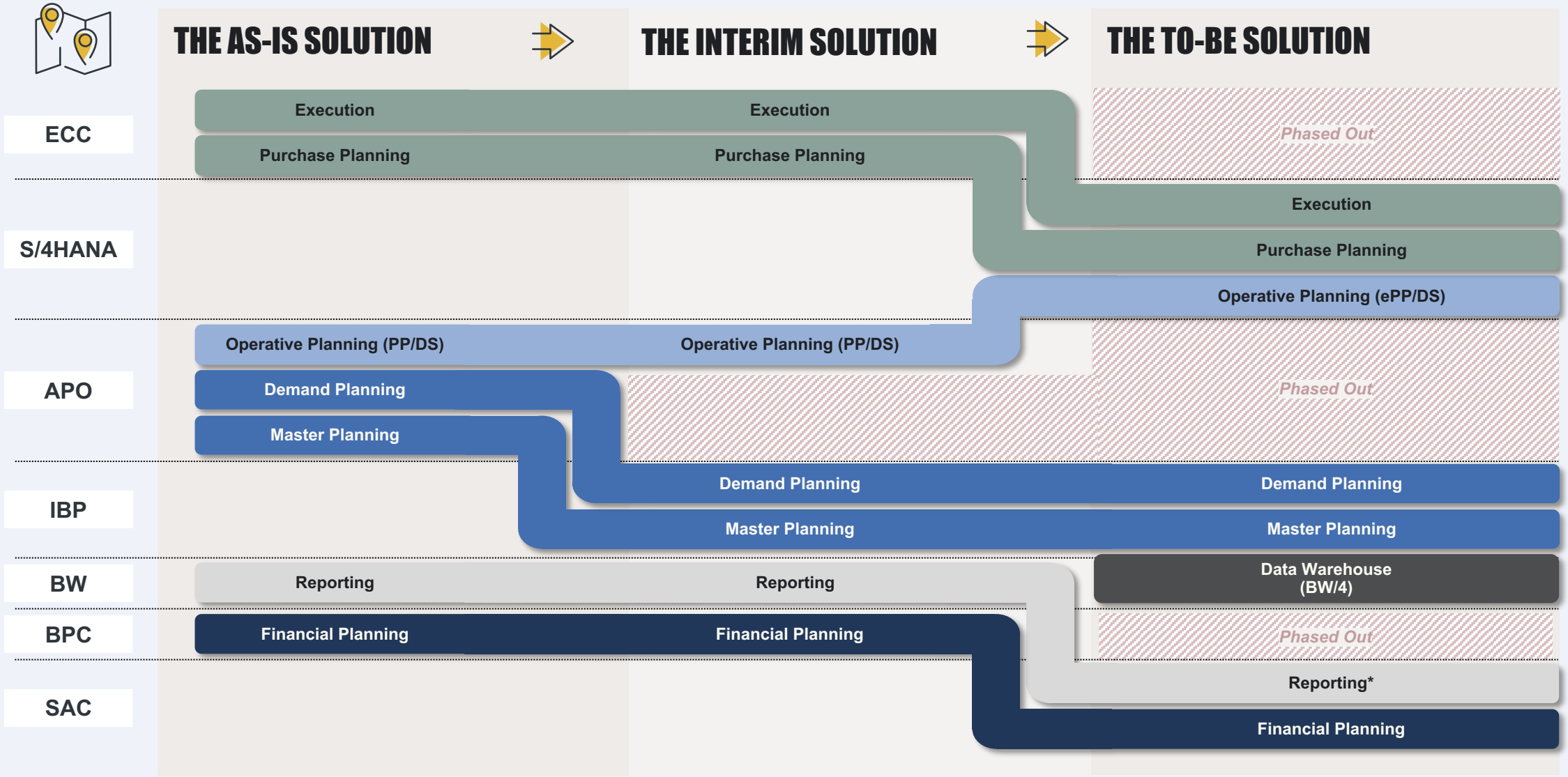
- Migration from SAP APO linked to SAP ERP to SAP S/4HANA with embedded PPDS
- Understanding Integration Options, Tasks and Limitations from APO to ePPDS

Migration from SAP APO linked to SAP ERP to SAP S/4HANA with embedded PPDS



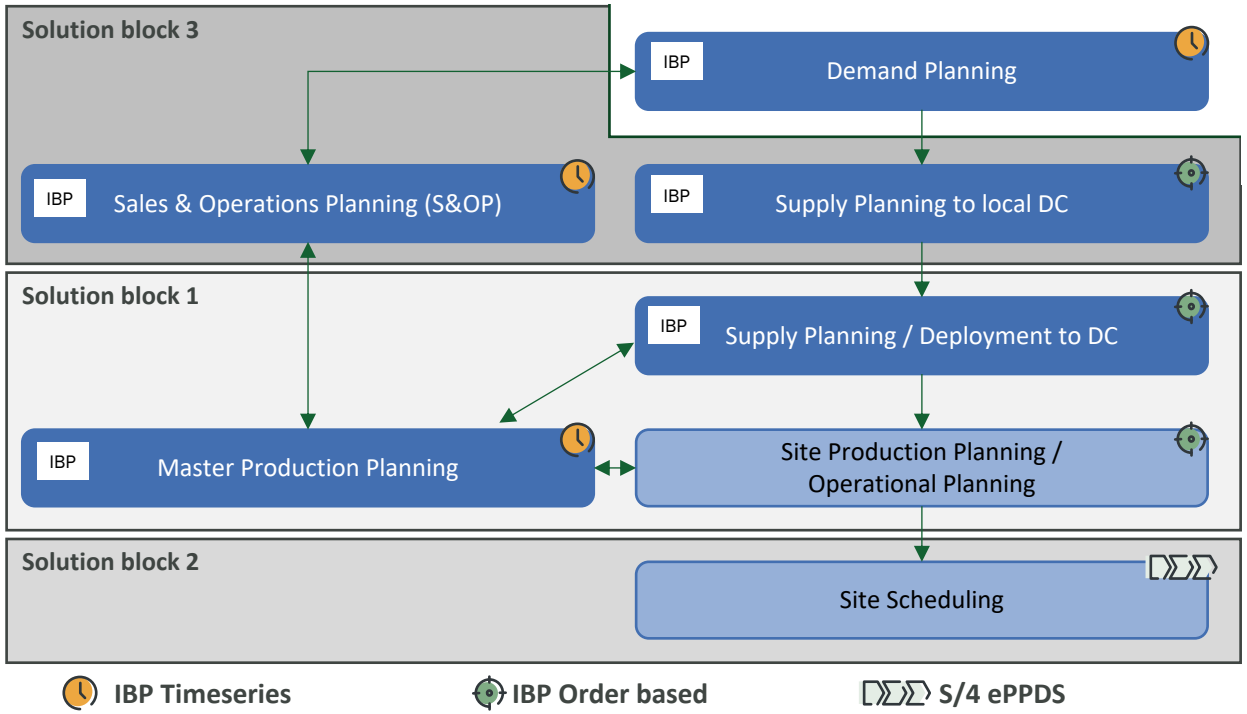
*Evaluate if the Production Planning and Detailed Scheduling solution should be rebuild from scratch (“Green field”)

Sound easy, but how do you do this when your company is using SAP APO in many areas...(and have many sites)



The logical sequence of functional rollout is based on the dependency between the OVERALL solution blocks

Overall solutions block and dependencies…



… leading to logical rollout sequence…

Solution block 1

- The site production planning is a prerequisite for the site scheduling to take place
- The site production planning is dependent on the signals from supply planning out of site as well as master production planning
- (Demand Planning for international is also in solution block 1 – most likely integrated from APO, replenishment signal)

Solution block 2

- In order to get all sites into ePPDS before 2027, the rollout of scheduling needs to start asap

Solution block 3

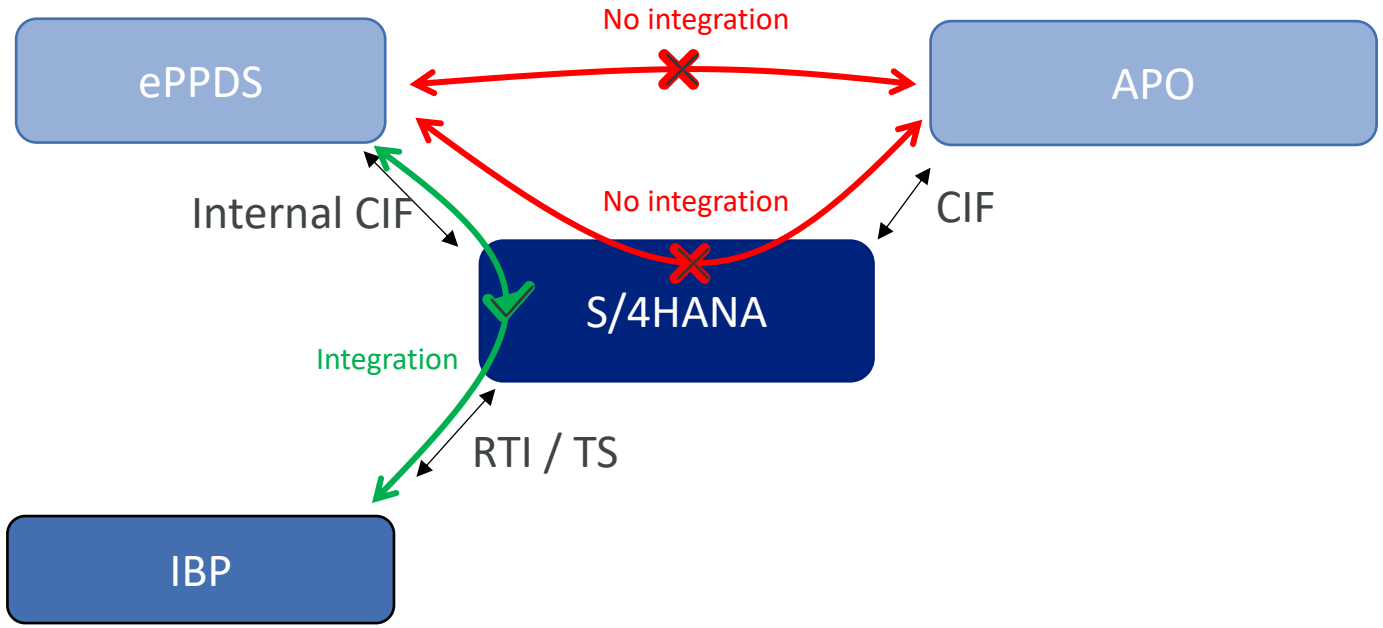
- Sales & Operations Planning is report based and can run as is until tactical/operational planning is in place (interfaces to be ensured)
- Supply planning to local DC's is independent and can be rolled out separately

The most simple way to avoid dependencies between the different solution elements, is to rollout 'top-down'. However, this sometimes do not fulfil expectations to time line nor *time-to-value*

Technical Implications for having APO and ePPDS running at the same time

SAP S/4HANA (core) can integrate to both ePPDS and APO…but there is no integration between APO and ePPDS

The concept of synchronized planning can integrate between IBP and ePPDS



This goes for <u>all</u> order elements – also for Forecast created in APO DP cannot be visible in ePPDS as planned independent requirements

This is not new and SAP has stated this up front, but many are not thinking about it before roll-out plans are made..

SAP Note 3073717 General Restrictions and Implementation Recommendations for Production Planning and Detailed Scheduling for SAP S/4HANA

Usage of "Side-by-Side SCM-APO" as a part of S/4HANA
Certain versions (refer SAP Note 2376061) of a "Standalone SCM-APO" system running side-by-side with SAP S/4HANA are supported (including all functions integrating standalone SNP, DP and PP/DS).
"Standalone SCM-APO" and PP/DS for SAP S/4HANA can be used together, but the data modelling should ensure that there is no data dependency.
Integration of orders generated out of "Standalone SCM-APO" to PP/DS for SAP S/4HANA or vice versa is not supported.
https://launchpad.support.sap.com/#/notes/3073717

And not a new issue either, the was also there in APO described in note 563806 under the section (1 SAP R/3 with several SAP APOs) since 2003:

Question: A client of an SAP R/3 system is to be operated with several SAP APO Systems. Does this cause problems?
Answer: In theory, this does not cause problems. **However, note the following: A planned order or production order (for example order 4711), and a PREQ (PReq 4712, pos 0010) or a sales order item can only be sent to a SAP APO system, in other words a PReq created in SAP APO system 1 is not copied to SAP APO system 2.** The SAP APO systems must plan different material/plant combinations.

This would cause problems because a transaction date that was sent from the R/3 system to both APO systems may transfer different updates in the retransfer from both APO systems. Even if the updates from both APO systems are the same, these cannot be processed in such a way that a consistent status is achieved afterwards.
https://launchpad.support.sap.com/#/notes/563806

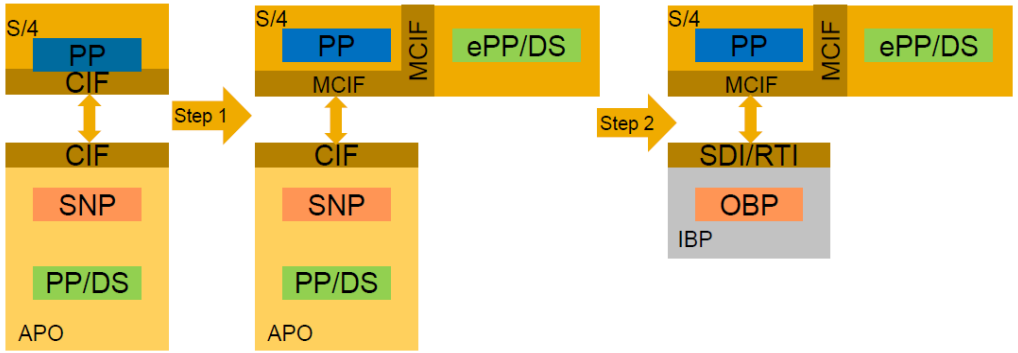
Also, the PPDS PP/DS Cookbook for S/4HANA state that this will not work

SCM-APO and embedded PP/DS for SAP S/4HANA can be used together, but the data modelling should ensure that there is no data dependency. **That means for example you should take care not to plan the same product-location combinations or the same resources in both PP/DS systems.** If you use SNP of SCM-APO and embedded PP/DS on S/4HANA for the same products and/or locations, there will be a lot of restrictions to be considered.

SAP SCM Consulting has developed a custom solution for Multiple CIF extensions

Purpose of MCIF:

Since it's not always convenient to perform the entire APO replacement within one project it could be preferable to split this process i.e. first implement S/4HANA ePP/DS with still functioning APO integration and only then proceed with IBP implementation. This scenario is not supported by standard means but can be enabled via MCIF Extensions Add-On.



Standard Multiple CIF was designed to support the integration of S/4 PP data with IBP and ePP/DS. MCIF Extensions Add-On implements the enhancements that allow also the integration of the same data with APO. Side-car scenario is supported as well. The usage of gATP functionality (like BOP) in APO also remains possible due to the data flows synchronization.

MCIF extensions allow to sync the creation/changes/deletion of the planned/production orders and their conversion/release/confirmation. The same applies to purchase requisitions/orders. The main supported data flows are depicted below.

A few things to be considered:

- **Is this an architectural setup we want to chase further?**
- **Will this change our recommendation to rollout in terms of value?**
- **What is the price of this custom development?**
- **Effort to implement and test vs. build?**
- **Does multiple also means APO, RTI, ePPDS**
- **Does this cover all transaction types or only PP? (only planned orders and Prc. Orders in material from SAP)**
- **Makes the rollout plan more flexible and less interdependent! (also to gATP and reporting)…**

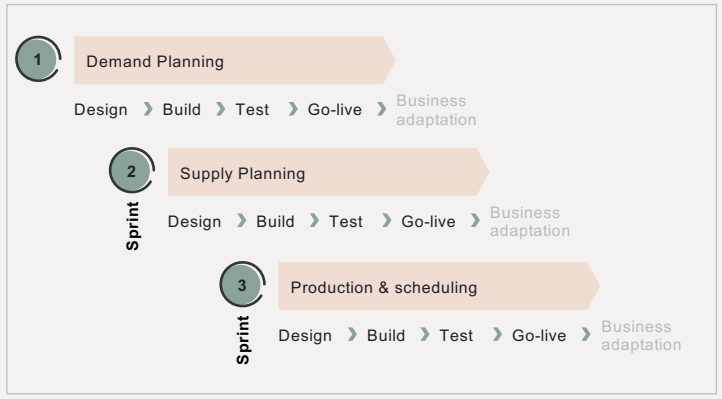
Depending on the company, its complexity and where benefits can be realized faster, different approaches are possible

A **typical approach** is to divide **go-lives by processes based time to impact**

For example, **a suitable approach for** a **company with low forecast accuracy** with their supply planning under control would be to start with demand planning before supply:

- Simpler solution
- Gives more time to prepare the next phases, e.g. related to integration (usually the critical path)
- Mobilizes the whole organization effectively, which creates commitment
- Allows to go through several rounds of demand review cycles and creates fast learning curve

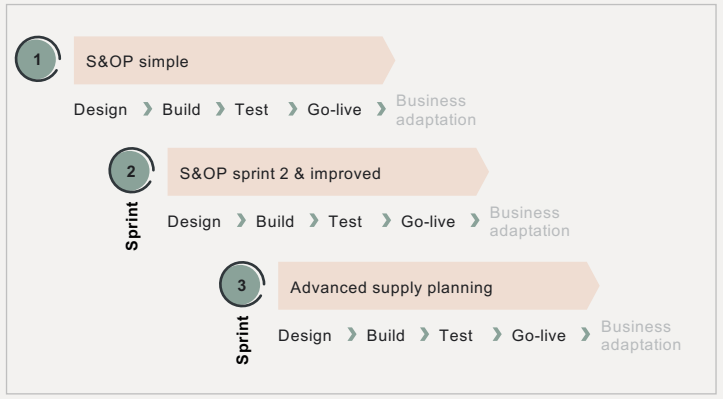
Illustration



Another approach is to implemented by **chunking it down based on functionality**

- The **focus** is put on **making** the **system functionality as simpler as possible with early go-lives**. For example, a company with low process and system maturity could start a simpler version of S&OP based on best practices, and then move to a more advanced process and model:
  - Simple forecasting methods
  - Time series before order-based
  - Heuristics before optimizer
  - Etc.

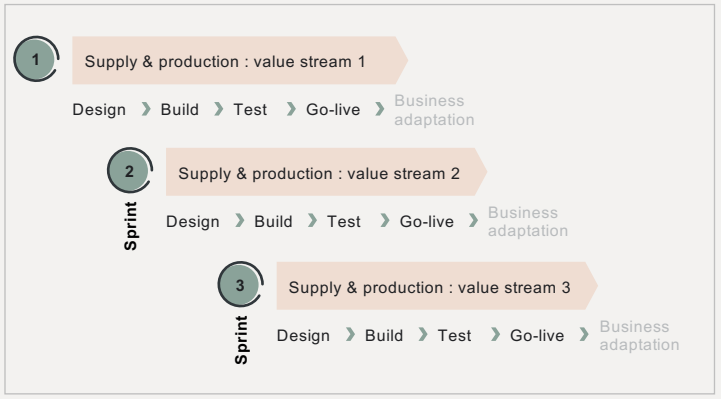
Illustration



Alternatively, we can also **slice the business** by **dividing** it **in a meaningful way**

- If processes are mature and supply planning would have the highest benefits but a big bang approach would be too complex, one could **go-live with different parts of the** network in the following way:
  - **Value stream based**: start with a number of product groups that make sense from a capacity standpoint, e.g. share the same product line
  - **Distribution network based**: start with a number of warehouses and go upstream
  - **Value chain based** : go-live with the Dairy first, starting to work with dependent requirements released from the legacy planning tool

Illustration for Value Stream



Wrap Up

- Where to Find More Information
- Key Point to Take Home
- Questions

Where to Find More Information

Links:

SAP Roadmap for Constraint-Based Production Planning

- https://roadmaps.sap.com/board?range=CURRENT-LAST&BC=6EAE8B27FCC11ED892E91CE972DC80CC#Q1%202023

Production Planning and Detailed Scheduling (PP/DS) via SAP Documentation

- https://help.sap.com/docs/SAP_S4HANA_ON-PREMISE/f899ce30af9044299d573ea30b533f1c/69f3055130534338e10000000a154ce5.html

Advanced Scheduling Board – Blog by Gayatree Bhattacharyya, SAP

- https://blogs.sap.com/2022/09/14/advanced-scheduling-board-f5460/

SAP Integrated Business Planning on the SAP Help Portal

- https://help.sap.com/viewer/p/SAP_INTEGRATED_BUSINESS_PLANNING

New features of SAP IBP – Blog by Implement Consulting Group

- https://implementconsultinggroup.com/article/new-features-of-sap-ibp-2211/

Book:

- Mahesh Babu MG, PP-DS with SAP S/4HANA (SAP PRESS 2020)

Key Points to Take Home

- The new embedded PPDS (ePPDS) in SAP S/4HANA includes the finite capacity planning and sequencing capabilities of SAP APO
- The integrated PPDS functionality provides several benefits, such as simplified integration of master and transactional data, the ability to execute finite capacity planning and sequencing algorithms of PPDS from the MRP Live.
- Additionally, new Fiori apps are introduced in S/4HANA for graphical capacity monitoring, shift maintenance, and capacity leveling using a Gantt chart
- Everything you could do in APO PPDS is also available in ePPDS gui version – this also goes for user exits and BADIs
- Embedded PPDS works out of the box compared to getting an external scheduling system and get this to integrate to ERP
- Integration with IBP makes it possible to have a real “Planners workspace”
- Ambitious Roadmap from SAP

Thank you! Any Questions?

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