

# SAP APO SNP (Supply Network Planning) – <u>Sample</u> training content and overview



### At the completion of this course, you will be able to:

- Understand the concepts of SNP and supply chain network
- Identify and resolve problems in the supply chain
- Set-up and configure a supply chain network model
- Create a model that represents your supply chain network and all relevant locations, resources, and relationships
- Develop queries and collect information about the supply chain
- Detect and resolve problems in the supply chain using the Alert Monitor
- Set-up SNP master data and configure SNP
- Perform SNP runs using SNP Heuristics, the SNP Optimizer, and Capable to Match
- Execute a Deployment run to determine the distribution of available supply
- Use the Transport Load Builder to create multi-product loads



- ERP Enterprise Resource Planning
- SAP Systems, Applications and Products in Data Processing
- ECC ERP Central Component
- SCM Supply Chain Management
- MRP Materials Requirements Planning
- MPS Master Production Schedule
- MPP Master Production Plan
- APO Advanced Planner and Optimizer
- S&OP Sales and Operational Planning
- **DP** Demand Planning
- **SNP** Supply Network Planning
- CTM Capability To Match



## Supply Chain / APO Terminology



- PP / DS Production Planning / Detailed Scheduling
- DC Distribution Center
- **API** Active Product Ingredients
- RM Raw Material
- FG Finished Goods
- STR Stock Transfer Requests



# **Sample Training content**



**Unit 1 - Supply Network Planning Concepts** 

- **Unit 2 Importance of Supply Network Planning**
- Unit 3 SAP APO Supply Network Planning books and terminology

- **Unit 4 Heuristics Material Planning**
- **Unit 5 Capacity Leveling**
- Unit 6 Alerts
- Unit 7 Real life SNP case and client demo and discussion
- Unit 8 Summary/Recap/Assessment

## What is SNP ?



- SNP is a SAP SCM/APO module help match a feasible replenishment plan to the demand plan
  - Balance mid to long term and facilitate critical and/or cross plant supply situations
  - Months 4-24
    - Dependent upon business requirements
    - View extended to 36 months to support long lead-time materials
- Role and Functionality Integration
  - Capacity Leveling
    - Backward/Forward scheduling
    - Select alternate resources and/or BOMs
  - Manage purchase requisitions / stock transfers
  - Fix orders
  - Safety Stocks

## **SNP** process overview









## Match a feasible replenishment plan to the demand plan



## **SNP** process overview





# Supply Network Planning standard functionality

TEKN KRET DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN

- Interactive Planning
  - Adjustment & Reconciliation of supply plan
  - "What-if?" scenarios
- Alerts
  - Exception Based Management
  - Alert Monitor
- Classical SNP- Functionalities
  - Considering Limited Capacities
  - Identifying the Source of Supply
  - Consider Bill of Materials

- Planning and Optimization Tools
  - Heuristic
  - Capable to Match (CTM)
  - Deployment
  - Constraint and cost based Optimization
  - Transport Load Building
  - Vendor Managed Inventory
- Integration
  - Feed of information from SAP R/3
  - Feed of data from Legacy systems
  - Transfer of Plans to R/3
  - Procurement, Production, Distribution and Transport
- Reporting
  - Availability of data for data warehouse solution
  - Download planning results to .xls

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The strength of SNP lies in selecting the source of supply as well as in determining the approximate production date

- SNP provide supply sites with:
  - Cross-plant and period-based Stock Transfer Requests (STR) which will be utilized across the full planning horizon to drive near-term production planning

• Capacity planning/leveling to clear resource overloads by moving orders or partial order quantities into previous or subsequent periods using forward or backward scheduling

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### Planning Book / Data View

Determines the content and layout of the interactive planning screen in APO and is used to view transactional data.

## **Planning Version**

Set of data in APO consisting of master data and transactional data. Supply Planners work in the active version.

## Production Horizon (Planning Time Fence)

Defined period of time where no automatic changes are carried out on planned orders by the heuristic algorithm and no new planned orders can be created via APO. Typically defined as the cumulative lead time of all BOM levels and must be defined in calendar days.

## Supply Network Planning Book

Planning book used when creating, modifying, or viewing Master Production Schedules.



# SNP Planning book data views



# **Example: Available Data Views in ZUS\_9ASNP94:**

# - CAPACITY\_PLAN

- Resource consumption
- Capacity leveling
- SNP\_PLAN
  - Inventory balances
  - Production plan
  - Heuristic
  - Deployment
  - Days of supply
- WHAT\_IF
  - Simulation planning

Planning book/data view	Description
🖙 🔂 ZUS_9ASNP94	
🗐 CAPACITY_PLAN	CAPACITY CHECK
🗐 SNP_PLAN	SNP PLAN
🗐 WHAT_IF	SIMULATION

## **SNP Planning book - Demo**

DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN

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# SNP Planning book view Plant perspective - Demo





# SNP Planning book view DC perspective - Demo







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### SNP Planning book view - Capacity T E K N planning perspective - Demo

DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN



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TEKN DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN

At the completion of this unit, you will be able to:

- Explain the function of the APO SNP heuristic algorithm.
- List and describe the 3 types of SNP heuristic algorithms.
- Execute the SNP heuristic algorithm.
- Use the key terms in this course.



- A heuristic is an algorithm which is activated within the SNP Planning Book that has a pre-defined set of parameters to influence the creation of an MPS planning solution.
  - It is similar to an MRP run.
- The plan generated from this algorithm is not necessarily feasible (unconstrained plan).
  - The algorithm looks at demand and does a netting calculation using current inventory levels, target days of supply, and safety stock to generate a plan.
- Planner must use capacity leveling to formulate a feasible plan based upon plant capacity.

# Factors Considered in the Heuristic Run

### **External Procurement Relationship**

Defines which vendor supplies which product.

### Lot Sizing

Lot-for-lot, fixed, target range of coverage, rounding profiles, rounding values.

### **Production Horizon**

Planning Time Fence.

### **Production Process Models**

Bill of Material (BOM) and Routing.

#### **Quota Arrangements**

Percentage of demand allocation to sourcing locations.

### Safety Stock

Quantity that should satisfy the unexpectedly high demand in the coverage period.

### **Target Days Supply**

Master data that controls inventory levels.

### **Transportation Lanes**

Valid movements in the supply chain that link plant to DC and DC to DC. Contain the transportation lead time.

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- 3 Types of Heuristic Algorithms:
  - Location System plans the specified product at the specified location. Planned orders are only created when running this algorithm at the manufacturing site.
  - Network System plans the specified product at all locations in the network where the product exists. The system explodes dependent demand for one BOM level. Planned orders are created for the specified product, but no other products.
  - Multi-level System plans the specified product at all locations in the network AND all products that have dependent demand resulting from the specified products. Planned orders are created for all products with dependent demand.



- Best Practices:
  - Use the Network Heuristic to plan Finished Goods.
    - Planned Orders for FGs will be created, deleted and modified.
    - Dependent Demand will be placed on RM Products.
  - Plan all FGs that use the same RM before planning the RM.
  - Use the Location Heuristic to plan RM Products.
  - If changes are made to the FG plan, the Location Heuristic should be re-run for the RM Product.
  - If site is using APO without PP/DS, need to plan at every level, i.e., FG, RM, API.
  - APO/SNP is "top-down" planning.



- Automated heuristic run:
  - Location heuristic automatically runs daily for the DCs.
    - Results:
      - Distribution demands are created at plants.
      - Forecast changes will be reflected at the plant via the updated distribution demands.
      - Planned Orders are not created, deleted or modified.
  - Alerts at the plant indicate target stock level violations and backlogs.

# Heuristic Algorithms Steps to Plan a FG



DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN

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# Heuristic Algorithms Steps to Plan a FG



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# Heuristic – <u>Time</u> Dependent Target Days of Supply Impact



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# Heuristic Algorithms – Steps to Plan a RM



DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN

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# Heuristic Algorithms – Steps to Plan a RM



DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN

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- Once the unconstrained demand plan has been released to Supply Network Planning, requirements can be generated for a desired location and the desired product(s) using the Heuristics planning run.
- Perform the following Captivate simulations:
- SNP\_Location\_RM.htm



Heuristic Algorithm: Net change planning run performed in APO that can be location or network specific.

**Lead Time:** Time to manufacture a product.

**Location Heuristic:** Algorithm planning run that generates stock transfers, purchase requisitions and planned orders for one location – DC or plant.

Lot Sizing: Parameters that control the quantity of planned orders created in production planning calculations.

**MPS Planning Solution:** Tool that enables supply planners to create a consolidated statement of production requirements for a period(s) in the future consisting of planned orders for certain quantities and specific due dates.

**Multi-Level Heuristic:** Algorithm planning run that generates stock transfers, purchase requisitions and planned orders for one product at all locations AND all products that have dependent demand resulting from the specified product.

**Network Heuristic:** Algorithm planning run that generates stock transfers, purchase requisitions and planned orders for one product at all locations.

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**Planned Order:** Request for a plant to trigger the production of a product in a certain quantity for a specific due date.

**Production Process Model (PPM):** Master data in APO comprised of a Bill of Material and a Routing.

**Quota Arrangement:** Method of splitting supply or demand requirements across locations.

**Safety Stock:** Quantity that should satisfy the unexpectedly high demand in the coverage period.

Target Stock Level: Amount of stock that should be maintained at a location.

**Transportation Lane:** Relationship between two locations (i.e., plant and DC) that defines the transit time, mode of transportation and the products that are valid to be shipped between the locations.

**Unconstrained Plan:** MPS schedule created by the heuristic algorithm that may not be feasible due to the lack of resource capacity.


- Heuristics create an unconstrained plan that meets safety stock, target days of supply and lead time requirements.
- Run network heuristics to plan finished goods.
  - The specified product is planned at all locations in the network where it exists.
- Run location heuristics to plan RM products.
  - The specified product is planned at a specific location.

**Sample Training content** 



- Unit 1 Supply Network Planning Concepts
- **Unit 2 Importance of Supply Network Planning**
- Unit 3 SAP APO Supply Network Planning books and terminology

- **Unit 4 Heuristics Material Planning**
- Unit 5 Capacity Leveling
- Unit 6 Alerts
- Unit 7 Real life SNP case and client demo and discussion
- Unit 8 Summary/Recap/Assessment



At the completion of this unit, you will be able to:

- Create a level plan for a single resource.
- Concurrently create a level plan for multiple resources.
- Use the APO automated capacity leveling algorithm.
- Use the key terms in this course.



**Capacity Leveling:** The constraining of a supply plan based on the capacity available at the manufacturing site producing the material. Capacity values are based on data transferred from R/3.

**Capacity Plan:** Result of the Master Production Schedule that indicates capacity requirements and utilization by time period.



- Supply Planner manually moves planned orders into time buckets.
- Supply Planner can immediately view the capacity consumption created by the planned order.
- This activity is useful when a product can only be produced on a single resource.

### Capacity Leveling – Single Resource

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- Supply planner manually moves planned orders into time buckets.
- Supply planner can immediately view the capacity consumption created by the planned order on the chosen resource.
- This activity is useful when a product can be produced on multiple resources.

### Capacity Leveling – Multiple Resources



### Step 1

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### Capacity Leveling – Multiple Resources



### Step 2

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# Activity 2 Exercise Capacity TEKN OF KRET Leveling: Single Resource Delivering passion through better supply chain

- After the unconstrained plan is generated, fit the plan to capacity.
- Perform the following Captivate simulations:
- SNP\_Capacity\_Leveling\_Manual.htm



### Capacity Leveling – Automated Algorithm



- APO capacity leveling algorithm automatically level loads a single resource based on user defined parameters.
- Algorithm attempts to move planned orders to time bucket close to where the overload is occurring.
- User defined parameters include:
  - Products that can have planned orders moved.
  - Time buckets to level.
  - Scheduling direction.
  - Priority rules.
- The algorithm is useful when creating a level plan for a resource that has many products with capacity requirements as well as many overloaded time buckets.

### Capacity Leveling Step 1 – Period Structure Settings



 Able to switch to different planning buckets by clicking in the Planning Book/Data View section. Override the standard settings with "current" settings.



# Capacity Leveling Step 2 – All or Selective Products



The Supply Planner has a decision to make at this point. Does he/she want Capacity Leveling to move planned orders for certain product(s) or is he/she indifferent about which planned orders are moved?





If Decision is to move planned orders for certain product(s), select the product(s).

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have planned	Resource capacity load in %	Total	%		142	
orders to move						

In this example, only planned orders for product APO-F00031860401E will be moved into another time bucket.

If Supply Planner does not want to specify products, then do not use CTRL or SHIFT to select any products. By default, algorithm will randomly choose which planned orders to move.

### Capacity Leveling Step 3 – Choose Time Buckets



Use **CTRL** or **SHIFT** to select time buckets that APO is "allowed" to move planned orders into

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- In this example, only planned orders for product APO-F00031860401E will be moved into 9/16/2002 time bucket.
- If planned orders cannot "fit" into the selected time buckets, APO will not move the orders into non-selected time buckets.

### Capacity Leveling Step 4 – Start Capacity Leveling





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### Capacity Leveling Step 5 – Select Scheduling Direction

Choose the **Scheduling direction** from the drop down menu

**Backward scheduling:** APO will search time buckets before the overloaded time bucket to determine if available capacity exists and if planned orders will "fit" into the time bucket. APO will not place planned orders inside the production horizon.

**Backward + forward:** APO will first search time buckets before the overloaded time bucket (up to the production horizon) to determine if available capacity exists and if planned orders will "fit" into the time bucket. If available capacity is not found, APO will search time buckets after the overloaded time bucket.

**Forward scheduling:** APO will search time buckets after the overloaded time bucket to determine if available capacity exists and if planned orders will "fit" into the time bucket. DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN

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### Capacity Leveling Step 6 – Set Maximum Load

DELIVERING PASSION THROUGH BETTER SUPPLY CHAIN

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### Capacity Leveling Step 7 – Select Settings





## Capacity Leveling Step 8 – Select Order Prioritization

**10 No priority**: Capacity leveling does not take into account any product or order priorities. This is the recommended setting if it is most important for you to have optimal resource utilization. Specifying a priority can have a negative effect on the capacity leveling results for optimal resource utilization.

**20 Order size:** Capacity leveling takes into account orders according to their size. For example, you can specify that during backward scheduling, large orders are moved to the earlier periods first.

**30 Product priority:** Capacity leveling takes into account the orders according to the priority specified for products in the location product master. For example, you can specify that during forward scheduling, unimportant products are first moved to later periods.

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### Capacity Leveling Step 9 – **Select Sort Sequence**



#### Capacity Leveling Step 10 – Select Planning Buckets Profile



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## Capacity Leveling Before and After



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#### After Capacity Leveling

Resource Loc	🕼 🔂 Design 🖓 Graphic	jo 🖩 🖪 🛛 🖉 🖬 🥸	8	17%	× QI Ø	🗈 🗇 Capacity le
	CAPACITY PLAN	Product	Un 09	3/02/2002	09/09/2002	09/16/2002
	🔍 Capacity	Total	н	81.60	95.20	95.20
	Capacity Consumption	Total	Н		92.35	51.08
		AP Load is spread	d over		72.62	51.08
		AP time buckets	and		19.72	
Selection profile		AP capacity is let	veled			
🚸 SNP_0010 🕅	Resource capacity load in %	Tot			97	53



- Identify a time bucket that has a resource overload. Execute "forward" capacity leveling for the time bucket with the resource overload.
- Perform the following Captivate simulations:
  - SNP\_Capacity\_Leveling\_Single.htm



### **Unit Recap**



- Capacity Requirements are defined in the PPMs.
- Use three methods of capacity leveling:
  - Manual leveling for a single resource.
  - Manual leveling for multiple resources concurrently.
  - APO automated algorithm.

**Sample Training content** 



- Unit 1 Supply Network Planning Concepts
- **Unit 2 Importance of Supply Network Planning**
- Unit 3 SAP APO Supply Network Planning books and terminology

- **Unit 4 Heuristics Material Planning**
- **Unit 5 Capacity Leveling**
- Unit 6 Alerts
- Unit 7 Real life SNP case and client demo and discussion
- Unit 8 Summary/Recap/Assessment



- At the completion of this unit, you will be able to:
- Explain the types of alerts in used in Supply Network Planning.
- View alerts in the APO Alert Monitor.
- Use the key terms in this course.



#### **Accessing Alerts**



- Alert monitor allows supply planners and material schedulers to monitor the state of the MPS plan according to exceptions.
- There are two ways to view the alerts:
  - From the MRP\_ALERT Data View in the appropriate planning book.



• From the Alert Monitor transaction.





- Supply planner SNP alerts:
  - **Resource overload** resource is loaded more than 100%.
  - **Backlog** projected inventory is less than 0.
  - Target stock level shortfall projected inventory is less than the target stock level (for products with safety stock).
- Supply planner DP alerts:
  - **DP sales pace** sales are on pace to exceed forecasts.
  - **Missing proportional factor** percentages to use when allocating forecasts to a DC are missing.
  - Missing Demand Planner ID indicates when Demand Planner
     ID has not been assigned to product with a forecast.



- Material scheduler alerts:
  - Daily backlog projected inventory for RM product is less than 0.
  - **Over supply** projected inventory for RM product exceeds days of supply threshold set in APO product master data.
- Distribution planner alerts:
  - **Deployment needs to be executed** indicates when supply exists at the plant that does not have an allocation created.
  - Unrestricted Stock < 10 Days of Supply indicates when a DC to DC transfer may be necessary.

### **Alert Monitor**





### **Alert Monitor**

 $\begin{array}{c} \mathsf{T} \in \mathsf{K} \times \mathsf{N} \bigoplus \mathsf{K} \times \mathsf{R} \in \mathsf{T} \\ \mathsf{Delivering passion through better supply chain} \end{array}$ 

#### • Alert "Favorite"

- "Favorite" includes an "SDP Alert Profile".
- SDP Alert Profile:
- Selects type of alerts to display.
- Indicates planning book.
- Chooses data view.
- Chooses selection ID (filters products for which user will see alerts).

Favorite is required for each combination of alert type, planning book, data view and selection ID.

SDP Alert Prof.	PREMA	RIN-PRO	remari	n Prod	ucts a	alerts
🖃 Select all a	lerts	R	Desele	ect all		
Description				St	anda.	
Backlog (DB alert)					<b>E</b>	Var
Target stock level exceeded (DB alert)					ī	Var
Target stock level shortfall (DB alert)						Var
Safety stock shortfall (DB alert)						Var
Resource overload in bucket (DB alert)					<u>.</u>	Dev
Insufficient resource utilization in bucket (DB alert)				ert)		Dev
Res. utilization in bucket = 100% (DB alert)						
DP macro status alerts						
Demand Planning - Macro message alerts						
DP Sales Pace (DB Alert)					ī	Var
					_	
Different text for MiniA	ops					
Message class						
Message						
Object selection /						
Planning book ZUS_9ASNP94				SN	P INT	ERAC
Data base alerts /						
Data view	S	NP_PLAN				
Character.Selectio	n P	REMARIN	ALERTS			

### Activity 2 Exercise Alert Monitor



- Use APO to view alerts in the alert monitor.
- Perform the following Captivate simulations:
- SNP\_Alerts.htm



### **Unit Recap**



- Alert messages in APO quickly direct supply planners and material schedulers to potential issues.
- Alert favorites are created to "filter" the types of alerts visible to each user.

**Sample Training content** 



- Unit 1 Supply Network Planning Concepts
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- **Unit 4 Heuristics Material Planning**
- **Unit 5 Capacity Leveling**
- Unit 6 Alerts

Unit 7 - Real life SNP case and client demo and discussion

Unit 8 - Summary/Recap/Assessment


- In-class exercises for different topics
- Real hands on the SAP APO system
- Discuss real life experience / client case studies
- Round table discussion / interaction /forums within the class
- Get prepared for SAP APO/SCM certifications
- Mock up interview tips, questions and preparations

**Sample Training content** 



- Unit 1 Supply Network Planning Concepts
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#### Unit 8 - Summary/Recap/Assessment



### At the completion of this course, now you are able to:

- Understand the concepts of SNP and supply chain network
- Identify and resolve problems in the supply chain
- Set-up and configure a supply chain network model
- Create a model that represents your supply chain network and all relevant locations, resources, and relationships
- Develop queries and collect information about the supply chain
- Detect and resolve problems in the supply chain using the Alert Monitor
- Set-up SNP master data and configure SNP
- Perform SNP runs using SNP Heuristics, the SNP Optimizer, and Capable to Match
- Execute a Deployment run to determine the distribution of available supply
- Use the Transport Load Builder to create multi-product loads



### At the completion of this course, you are able to:

- Describe your roles and responsibilities in the Master Production Scheduling process using SAP APO for Supply Network Planning.
- Navigate and organize data in the SAP APO Planning Book.
- Create, change and display a Master Production Schedule using SAP APO for Supply Network Planning.
- Level load a plant using the Capacity Leveling functionality of SAP APO for Supply Network Planning.
- Create and change a planned order in SAP APO for Supply Network Planning; either manually or through Heuristics.

## Assessment





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# THANK YOU

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