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Demand Planning with SAP®APO - Concepts and Design

- ▶ Step-by-Step Explanations with Easy to Follow Instructions
- ▶ Combination of Theory, Business Relevance and ,How-to' Approach
- ▶ APO DP Concepts and Design using a Business Scenario
- ▶ Centralized Process Flow Diagram to Illustrate Integration

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2 APO as an SAP SCM solution

It is essential to understand and appreciate SAP APO and SAP SCM in general while learning about Demand Planning (DP). In this chapter, we will focus on the context of SAP SCM and SAP APO. DP is a module within APO wherein APO is a component of SAP SCM. DP takes its input from several other modules and components and vice-versa. The tasks and actions executed within DP have consequences on many functions of SAP APO and SAP SCM. For instance, the demand plan output from APO DP decides the supply network plan in APO SNP. Similarly, APO DP decides the production plan in APO PP/DS. The contextual knowledge of APO and SCM will essentially help understand and appreciate DP as we progress through this book.

We begin by introducing different components of SAP SCM and their functionality in brief. Next, we will focus on SAP APO, wherein we describe the different business processes that SAP APO espouses through its modules. We will explain different APO modules, their functionality, SAP APO integration to other systems, and an overview of SAP APO architecture.

SAP Supply Chain Management (SAP SCM) is the supply chain management solution from SAP that originally evolved from *SAP Advanced Planning and Optimization (APO)* Version 1.1 in 1998. Thereafter, other components were also added to *SAP APO* and formed *SAP SCM*. SAP SCM exists as a combination of multiple components as shown in Figure 2.1.

Therefore, SAP SCM is a superset of SAP APO. It is important to note that SCM as a business term includes both supply chain planning, as well as supply chain execution activities. However, SAP SCM mostly centers on planning activities with SAP APO as its core component. Other select execution modules in SCM are EM, SNC, EWM, and APO GATP. The main SCM execution solution from SAP lies in the SAP ERP solution SAP ECC, which has logistics modules like sales and distribution, materials management, production execution, etc. SAP ECC also has planning components albeit with limited functionality.

SAP SCM facilitates planning, optimization, collaboration, tracing and tracking, and warehouse management for complete management of the supply chain. In the process SAP SCM helps companies improve their return on investment and total cost of ownership.

SAP APO is a state-of-the-art and sophisticated planning solution from SAP that synchronizes demand and supply planning in the entire network and carries out production planning for the entire bill of material structure. SAP APO is the planning and optimization solution in SAP.

DP is the demand planning module from SAP APO. DP integrates with other modules in APO and helps provide an integrated planning solution. Let's dive in and take a closer look at different components in SAP SCM, APO as an SAP SCM solution and different aspects of SAP APO.

2.1 SAP Supply Chain Management

The SAP SCM solution is an umbrella solution that primarily includes planning, as well as execution activities. SAP SCM seamlessly integrates with other major solutions and applications, e.g., SAP BI, SAP ERP, and non-SAP systems as shown in Figure 2.1.

In this section, we will review the different SAP SCM components and provide a brief explanation of each.

Advanced Planning and Optimization (APO)

APO is the advanced planning and optimization solution component in SAP SCM. We review it in detail in *Section 2.2*.

Supplier Network Collaboration (SNC)

SNC is an SAP SCM component that facilitates collaboration with internal and external partners in the supply network. With SNC, we can collaborate with suppliers, customers, and contract manufacturers. From a system integration perspective, SNC establishes seamless integration with SAP ERP, i.e., SAP core execution system through SAP Process Integration (PI) technology. Collaboration primarily uses web technology and warrants minimal investments from partners (i.e., only a web browser).

Collaboration with suppliers includes: purchase orders, advanced shipping notifications, invoices, incoming shipments, release processing, Kanban, supplier managed inventories, replenishments, forecasts, etc.

Collaboration with customers includes: vendor managed inventories, forecasts, promotions, replenishments, and advanced shipping notifications.

Collaboration with contract manufacturers includes: procurement, work orders, sub-contracting purchase orders, advanced shipping notifications, invoices, incoming shipments, supply network, and inventories.

Extended Warehouse Management (EWM)

EWM facilitates flexible, automated, and optimized warehouse management support for multiple goods movement and inventory management activities for warehouses. EWM is particularly suitable for companies that have high volume goods movements, process-oriented storage control, complex warehousing activities, and complex goods movement networks. EWM increases warehouse management productivity and offers centralized warehouse monitoring.

EWM is primarily an execution-oriented module and includes planning activities as well. EWM seamlessly integrates with other logistics and fulfillment processes like transportation management, logistics execution, global trade management, global available to promise checks, and event management.

EWM carries out warehouse management activities for inbound processes, outbound processes, storage and operational processes. EWM also offers cross-functional warehousing activities such as resource and labor management, cross docking, yard management, material flow system, etc.

Event Management (EM)

EM facilitates visibility on processes, assets, and performances across the entire supply network through monitoring, notification, adjustment, collaboration, and analysis of business events.

EM is able to integrate and communicate across multiple technologies, architectures, and platforms and is in a position to provide seamless visibility for the entire business network for both supply chain planning and supply chain execution.

Forecasting & Replenishment (F&R)

F&R is the SAP Forecasting and Replenishment solution in the SCM space. F&R executes forecasting on a near real-time basis with the objective of maintaining an optimum inventory across distribution centers and retail stores across the entire supply network. This is coupled with automated multilevel replenishment planning and ordering capabilities of the goods to increase productivity, decrease order fulfilment costs, and increase service levels.

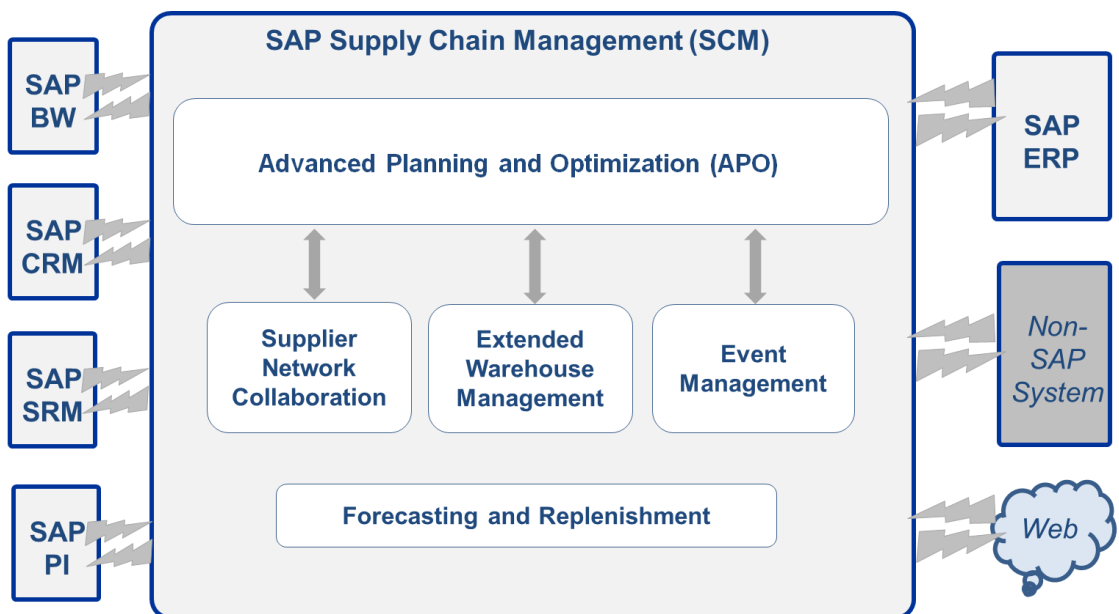


Figure 2.1: SAP SCM components and interfaces


All of the components explained above and shown in Figure 2.1 often interact with one another depending on the business requirements. Furthermore, the entire SAP SCM system integrates with the SAP ERP execution system, big time, for master and transactional data. SAP SCM also integrates with other SAP systems like SAP BW, SAP CRM, SAP

SRM, and SAP PI depending on the business need. SAP SCM can also integrate with web applications, as well as non-SAP systems.

2.2 SAP APO

SAP APO is the Advanced Planning and Optimization component of SAP SCM. The acronym APO stands for *Advanced Planning and Optimization*. SAP APO provides collaboration, planning, and optimization across the entire supply chain network.

APO: Not a standalone system



APO cannot exist as standalone system, as it needs a backend ERP system for input data and also eventually to pass planning data back to the ERP system for execution.

SAP APO helps to address supply chain challenges by providing a robust and sophisticated planning solution.

SAP APO integrates seamlessly with other major components of SAP SCM as depicted in Figure 2.1. However, SAP APO also integrates with SAP systems, non-SAP systems, and the web as shown in Figure 2.2.

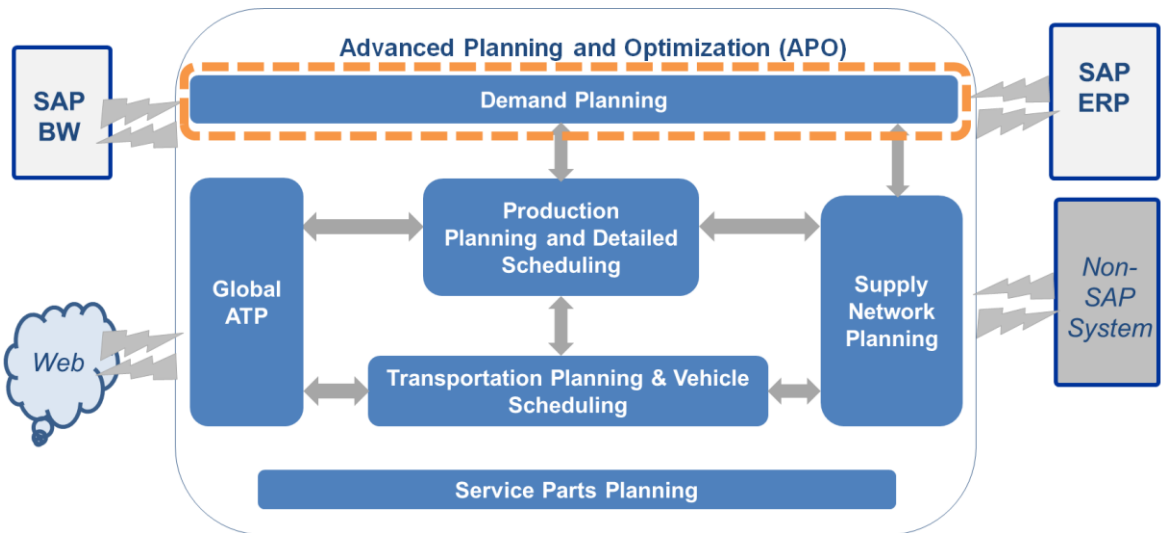


Figure 2.2: SAP APO modules and interfaces

It is important to understand that APO represents an advanced planning and optimization component. This is precisely because we do get a miniature version of planning in ERP itself. The planning functionality in SAP ERP is quite generalized and is not as comprehensive as SAP APO. Needless to say, the SAP APO optimization functionality that reinforces the planning output does not exist in SAP ERP.

In this section, we will look at the different business processes and modules that pertain to SAP APO, the building blocks of SAP APO, its integration with the core execution system like SAP ERP, integration with different peripheral systems, integration with non-SAP systems, and finally SAP APO architecture.

2.2.1 Business processes and modules in SAP APO

SAP APO addresses multiple business processes through its modules, features, and functionality. Custom enhancements to SAP APO address specific business functionality needs for individual companies. In some instances, SAP APO co-exists with other technology applications that carry out very different business processes. We will look at some of the broad business processes that SAP APO handles in the following section and in Figure 2.3. This will also provide an understanding of the demand planning business process and DP module in the entire context of APO.

Let's take a closer look at Figure 2.3. At a very high level, there are five main entities in a supply chain: supplier, manufacturer, distributor, retailer, and consumer.

Please note that consumer is different from customer in the sense that the consumer is the one who finally uses or consumes the product and does not engage in moving products in the supply chain through selling or transporting. Customer in contrast is a relative term.

TV customer vs. consumer



A TV manufacturer is a customer of the supplier of TV parts, the TV distributor is a customer of the TV manufacturer, and the TV retailer is a customer of the TV distributor. However, the person purchasing the TV in order to use it for watching at home is a consumer.

Typically, products and/or services flow from the supplier through the consumer as shown in the diagram in Figure 2.3.

Product demand comes from the consumer to the retailer and that constitutes *independent demand* of the product. That, in turn, creates *dependent demand* on the distributor. The distributor then creates dependent demand of the product to the manufacturer. However, independent demand can also come from other companies directly to the distributor or directly to manufacturer. The Demand Planning module in APO carries out the business process of planning independent demand. Using APO DP, we can carry out statistical forecasting, promotion planning, new product lifecycle planning, collaborative demand planning, etc.

Based on the planned independent demand explained above, actual independent demand in the form of sales orders and dependent demand arising in the supply network we can carry out the business process of supply planning to meet the total demand arising in the network. The *APO Supply Network Planning* (APO SNP) module handles the business process of supply planning and dependent demand generation for the network. Through APO SNP we can handle unconstrained supply network planning, constrained supply net-

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