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Marc Hoppe

# Sales and Inventory Planning with SAP® APO

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*Optimized supply chain management enables you to react flexibly and quickly on a global level to ever-changing market requirements. This chapter outlines the challenges and their solutions from the planning viewpoint, and also describes the structure of this book.*

# 1 Introduction

## 1.1 Definition of Supply Chain Management (SCM)

The term *supply chain management* (SCM) refers to the inter-enterprise process of coordinating the flows of material and information along the entire logistics chain (or supply chain), throughout the entire value creation process. The objective of SCM is to structure the whole process—from raw materials acquisition to end-customer sales—in a manner that optimizes time and money. It ultimately involves intensified cooperation between all the parties involved in a supplier-customer relationship. The structure of this kind of relationship is usually more complex than a supply chain, as most suppliers have multiple customers, and most customers have multiple suppliers. Therefore, the term *supply networks* is also used. Nevertheless, information-processing systems are required to manage this level of complexity.

## 1.2 Market Challenges Facing the Supply Chain

As you know, economic and technological environments are continually changing. The current pace of change in the economy and enterprises has its roots in the ongoing process of globalization, the speed of development of information and communications technologies, and intensifying customer requirements.

These constant pressures are forcing enterprises to forge new paths: optimizing the whole value creation process throughout the enterprise, reducing product lifecycles, and expanding their range of products. Increasingly, enterprises see themselves as using their specific core competencies to develop new services on an ongoing basis to create optimal customer benefit, instead of belonging to one specific industry.



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In light of this trend, it is important for enterprises to be flexible and to be able to adapt internal company business processes to changing market conditions. At the same time, most innovations and new services cannot be created without integration and cooperation with business partners. Therefore, enterprises have to structure their supply chains in a global and flexible manner.

One business that reflects this kind of global and flexible supply chain perfectly is the international automobile production industry. This industry is based on a division of labor, and so, companies in different countries acquire parts from suppliers in their own country, and assemble these parts to form subassemblies or full assembly groups. These assemblies are then sent to one global location, where they are used to build the end product. This process requires that an incredibly high number of variants, suppliers, production processes, and procurement processes be coordinated and integrated. Moreover, this complex structure has to be able to react quickly to new market requirements, quality problems, and other external factors. This is just one of the many challenges that face enterprises today.

The primary goal of this supply chain (i.e., SCM) is to arrive at a global optimum. Ideally, this optimum maximizes the benefit to the customer in terms of price, service, and so on, while minimizing the costs to the enterprise.

There are still serious inefficiencies along the entire supply chain, especially within the interfaces between enterprises and departments. The biggest of these inefficiencies is the total duration of the manufacturing process, known as the *throughput time*. Ninety percent of this time is consumed by storage and transport. Another negative influence on cost is the so-called *bullwhip effect*, which refers to the element of uncertainty in demand forecasts that increases dramatically from one interface to the next when forecasts are managed separately for each enterprise or department. This uncertainty about expected sales incurs increased costs, due to the need to maintain safety stocks, delivery delays, poor capacity usage, and so on.

## 1.3 From Material Requirements Planning (MRP) to Supply Chain Management

The optimization potentials described in the previous section can be unlocked with a new information structure that enables the enterprise to make and implement enterprise-level decisions in real time. However, the



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ERP systems that are most commonly used today are suitable for mapping these kinds of processes. This is where new technological solutions like SAP SCM come into play.

The first generation of *material requirements planning* (MRP) systems calculated material requirements by exploding the relevant bills of material (BOM) using the bill of material processor for MRP. This approach planned quantities and deadlines only. There was no resource allocation as such, and order processing was either nonexistent or only partially existent.

In most cases, independent, individual plans were created at each separate, unsynchronized level of planning and execution. The individual planning steps were carried out sequentially; that is, demand planning, followed by MRP, and then capacity requirements planning. Not only did this lead to long processing times in the planning stage, it also meant that contradictory goals existed concurrently, which made a unified and consultative approach to planning impossible. While the main goal of Production was to leverage capacities, the Sales department focused on ensuring deliverability by maintaining stocks. Often, procurement or production orders that had already been placed were postponed by shop floor control staff in the last planning stage, in order to optimize the operation sequence of the orders in accordance with production criteria. From this, we can discern that available capacities were taken into account very late in the production process, and all prior planning steps were based on limitless production capacities. Exact planning and production data from external suppliers and partners was likewise absent from the planning process.

Additional production resources were subsequently included in the planning phase with the extension of the MRP concept that is known as *MRP II*. As before, MRP was an important part of the approach, but now, this step was followed by other, sequentially executed steps such as capacity requirements planning and scheduling. Besides customer requirements, the anonymous planned independent requirements created in a production program were now also considered in calculating independent requirements. Cross-plant requirements planning and distribution planning were executed in other planning systems. It must be noted, however, that the MRP II planning concept has the following disadvantages:

- Long planning duration, because the planning steps are executed sequentially.
- Long planning cycles mean that planning results are out of date.



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- Static throughput times increase the overall throughput time and lead to *thoughput time syndrome*.
- Planning and scheduling is based on unlimited resource availability.
- Poor capacity utilization, resulting in no sensible way of resolving bottlenecks.
- Special production principles (such as workshop production) are not properly supported.

Although the MRP II planning concept has been extended to include control stations, third-party advanced planning and scheduling (APS) systems, and concepts such as load-oriented order release, these new developments have not solved its structural planning problems. The disadvantages outlined above have therefore led to the emergence of a new generation of planning systems, known as *supply chain management* (SCM) systems. The concept of SCM is to process information and make it available in real time, and to use the Internet for information exchange.

The potential for success of SCM and SCM planning is based on the planning deficits of the *production planning and control* (PPC) and MRP II concepts. These deficits created a demand for certain functions, the most important of which are as follows:

- Cross-plant planning, including supplier and customer plants
- Simultaneous material and capacity requirements planning, i.e., capacity restrictions should be considered simultaneously rather than sequentially
- Extended planning functions with optimization tools for better capacity utilization, especially in bottlenecks
- Aggregation option for hierarchical planning

SAP responded to these demands by developing SAP Supply Chain Management (SAP SCM). With its component SAP Advanced Planner and Optimizer (SAP APO), SAP SCM is a complete *advanced planning and scheduling* (APS) system that facilitates simultaneous material and capacity requirements planning, and provides genuine optimization functions. Another of its benefits is that it enables close real-time integration with the back-end system, *SAP Enterprise Resource Planning* (SAP ERP).



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## 1.4 Planning as a Critical Process

This book deals in detail with one of the critical processes of the complex world of supply chains: planning.

The planning phase is the one in which fundamental decisions are made about how and with what materials the challenges described in Section 1.2 are to be tackled and solved. While planning will never be an exact science, as it usually deals with assumptions about the future, it still makes sense to optimize it as much as possible, as the quality of the execution depends on the quality of the planning. The better the planning, the better the execution phase can react to ever-changing requirements. Also, the more reliable data there is about the future, the smaller the uncertainty factor.

A concept known as *rolling planning* is one answer to this need. Rolling planning is a generic instrument that is used in almost all planning processes and on almost all planning levels. When it is used, the planning process is repeated either at specific time intervals or when major data changes are made. The result is that there is always a plan that contains the most up-to-date information, which means that scenarios can be simulated and decisions can be made in advance. Because planning is repeated on an ongoing basis, the future is approached step by step, and new circumstances can therefore be taken into account with every repetition. The planning horizon (long-term, medium-term, or short-term; see Section 2.2.1) is also used in this process to anticipate changes in the distant future. If particular circumstances make this necessary, within a rolling planning, it is possible to take action on a short time frame.

## 1.5 Target Group and Structure of this Book

The focus of this book is on processes in demand planning and inventory planning. The SAP SCM solution, and its SAP APO component in particular, are used in this book to illustrate these processes and to explain them in detail, with the goal of enabling all parties involved in the planning processes to evaluate and use this planning tool in their own planning processes. Specifically, this book is aimed at department managers, MRP planners, demand planners, consultants, project leaders, and IT managers who are interested in the topic.

After this introductory chapter, **Chapter 2** briefly describes the SAP SCM solution and its SAP APO component.



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**Chapter 3** deals with the basics of demand planning with SAP APO-DP (Demand Planning). It describes the technical structure, master data, and components required to execute demand planning with SAP APO.

**Chapter 4** describes the actual process of executing demand planning with SAP APO. This chapter explains the forecasting procedure, product lifecycle planning, promotion planning, and the other planning functions of SAP APO-DP.

**Chapter 5** presents the basics of the SAP APO-SNP (Supply Network Planning) component. Here, you will learn about the settings, master data, and basic correlations between inventory, procurement, and distribution planning.

**Chapter 6** focuses on supply network planning in detail. It deals with planning processes, the main planning procedures, safety stock planning, optimization measures, and final planning for customer delivery.

The technological architecture and other integration issues are described in **Chapter 7** in the context of the SAP SCM components.

The book concludes with **Chapter 8**, which provides an overview of the most important activities of implementation projects for the components SAP APO-DP and SAP APO-SNP.

The **appendices** include a list of acronyms and a comprehensive glossary.

**Marc Hoppe**
Hamburg, Germany, March 2007



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*The configuration of demand planning and its planning books determines the manageability, the flexibility, and the performance of demand planning. A well thought-out concept will ultimately save a lot of time and money during implementation. This chapter will show you how to build the optimal technical foundations.*

# 3 Demand Planning with SAP APO-DP—Basic Principles

## 3.1 Overview of the Administration of Demand Planning

The *Demand Planning* (DP) component of SAP Advanced Planner and Optimizer (SAP APO) is a complex, high-performance, and flexible instrument that supports the sales/requirements planning process in your company. User-specific planning layouts and interactive planning books allow not only the inclusion of various departments, but also of other companies, in the forecast creation process.

The configuration of demand planning is an important factor for a successful implementation of the system. This is performed, as it is also done for the Supply Network Planning component (see Chapter 5, *Inventory Planning with SAP APO-SNP—Basic Principles*), with the Supply and Demand Planning (S&DP) Administration Workbench.

The entire administration of the demand planning component and the components required for configuring the planning area are summarized in Figure 3.1.

First, we will give you a brief overview of the terms detailed in the figure and their relationships; then, they will be described in greater detail in the following sections.

1. Before you can begin the planning process, you must decide what *key figures* you want to use for demand planning. Key figures contain data that is shown as a numeric value—either a quantity or a monetary value. Examples of key figures that are used in demand planning are planned demand and historical sales. You can save key figures both in an InfoCube and in



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the liveCache. You usually save key figures with historical data, that is, *actual key figures*, in the InfoCube. You save planning key figures in the liveCache. You also save those planning key figures that are to be *firmed* (i.e., fixed) in the InfoCube.

2. You must then decide what characteristics you want to use as planning levels and for selection. A *characteristic* is a planning object such as a product, location, brand, or region. The master data of the demand planning or the supply network planning comprise the allowed values of the characteristics, known as the *characteristic values*. Characteristic values are actual names. For example, the characteristic "Location" can have the values Hamburg, London, and New York. As part of the administration for Demand Planning (DP) and the Supply Network Planning (short description: S&DP Administration), you create a basic *planning object structure* for the characteristics that you want to use. A basic planning object structure contains all plannable characteristics for one or more planning areas. It is the structure on which all other planning object structures are based. The characteristics can be standard characteristics or those that you have created in the Administrator Workbench.
3. Once you have determined the key figures and characteristics, you must store additional information in the planning area. This includes, for example, the *storage buckets profile*, in which you determine the periods in which data is saved for a given planning area in the Demand Planning or in the Supply Network Planning; or the planning versions, in which different datasets can be saved for simulation purposes. Furthermore, you must ensure that the base unit of measure and the basic currency are assigned for the planning area.
4. You have defined the planning area when this information is assigned to the *planning area*.
5. You can then create individual user or department planning books. *Planning books* determine the content and layout of the interactive planning screen. You can use them to design the planning screen so that it corresponds to your planning requirements. A planning folder is based on a planning area.
6. Finally, you create the master data for Demand Planning (this cannot be seen in Figure 3.1). The master data of the Demand Planning determines the levels on which demand plans in your company are created, changed, aggregated, and disaggregated. For instance, your master data can comprise all products, product families, regions, and customers that are to be



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planned in your company with the APO Demand Planning, as well as all corresponding combinations of these (e.g., which customers buy what products in which regions). Once you have created the master data, the implementation of the Demand Planning can begin.

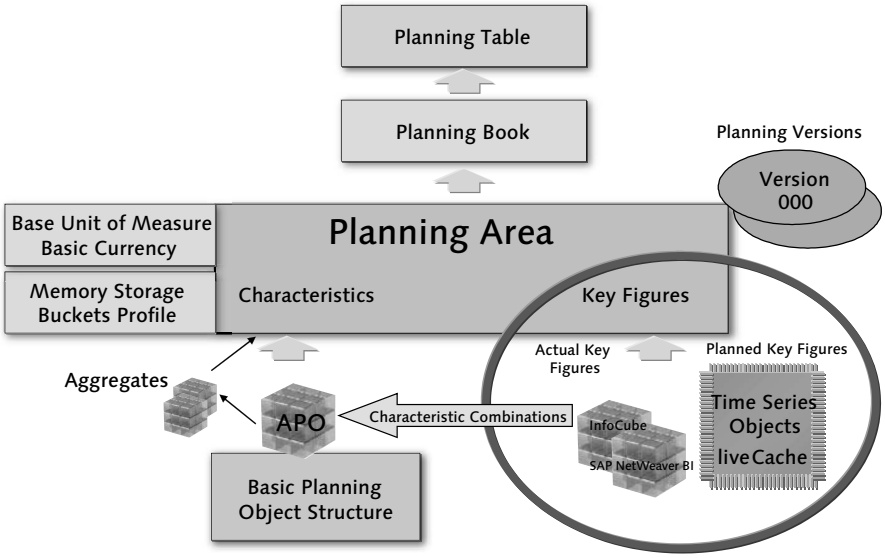


**Figure 3.1** S&DP Administration (Source: SAP)

In the next section, we will describe in detail the configuration of the planning area with the Administrator Workbench.

## 3.2 Configuring the Administrator Workbench

The planning area and the corresponding key figures and characteristics are configured in the Administrator Workbench. In the following section, we will provide you with an overview of this tool. You will get to know the InfoCube, the key element for Demand Planning, and you will learn how to save the required key figures and characteristics in the InfoCubes.

### 3.2.1 Overview

The Administrator Workbench is the tool for controlling, monitoring, and maintaining all processes linked to data procurement and processing in the SAP Business Information Warehouse (SAP NetWeaver BI, in former



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Releases SAP BW); it is contained in SAP SCM 5.0. The InfoCubes are also created here (see Section 3.2.3). When you call the Administrator Workbench using the menu path **SAP APO • Demand Planning • Environment • Administrator Workbench**, a navigation menu appears to the left of the screen (see Figure 3.2).

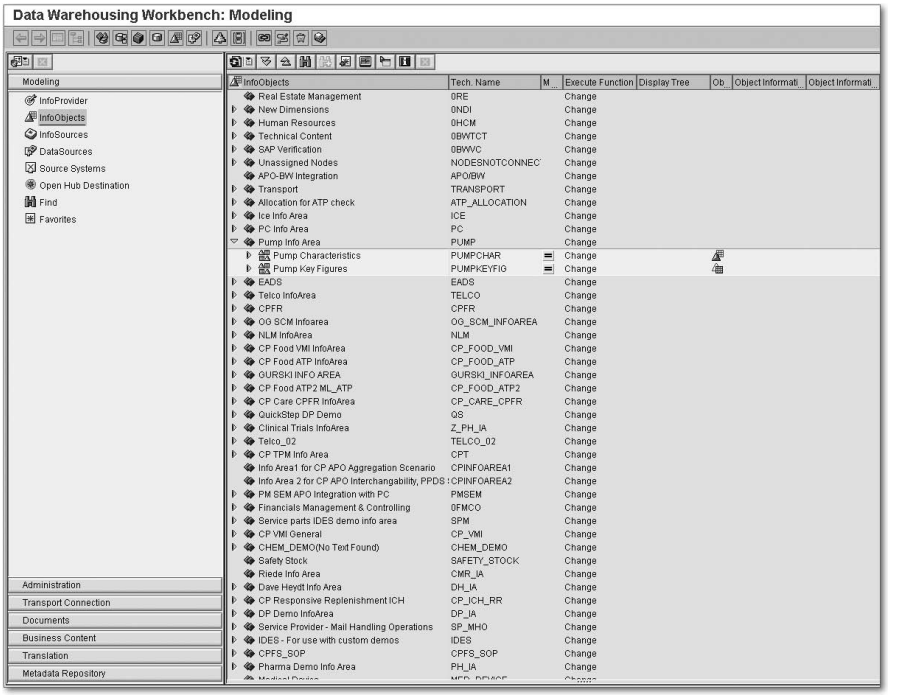


**Figure 3.2** Administrator Workbench

With the buttons in the left navigation area, you can open the individual areas of the Administrator Workbench. The system will display the views and functions that are available in this area. By clicking on these views and functions, you can call them up in the right screen area.

The Administrator Workbench is used in SAP APO to create the data objects required for the Demand Planning, to enable data to be loaded from different data sources, and to monitor the data loading operations and the data updates. In this way, data extracted for the Demand Planning from different data sources (SAP ERP systems and SAP-external sources) can be imported into the SAP NetWeaver BI of the SAP APO system, which is then permanently stored in the data store. The Demand Planning can then access this data at any time.



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By using the Business Content delivered by SAP, you can dispense with the bulk of the configuration work inherent in a business intelligence (BI) system, and therefore also for SAP NetWeaver BI in the SAP APO system. The Administrator Workbench is used to activate the Business Content delivered by SAP.

If it becomes necessary to create new SAP NetWeaver BI objects for specific requirements, this task can be easily executed with the functions of the Administrator Workbench. This may become necessary if special historical data from non-SAP systems is to be used for the Demand Planning. The integrated SAP NetWeaver BI component in SAP APO represents an important technical basis for integrating the most varied data sources into SAP APO in a very flexible way.

### 3.2.2 InfoObjects and Other Relevant Terms from SAP NetWeaver BI

The basic data storage medium in SAP NetWeaver BI[1] are the *InfoObjects*, which are business system evaluation objects (customers, sales, etc.). InfoObjects are divided into characteristics, key figures, units, time characteristics, and technical characteristics (such as request numbers, for example). They map the information necessary to build data targets in a structured form. You should therefore think of InfoObjects as a generic term for key figures and characteristics in SAP NetWeaver BI.

SAP NetWeaver BI InfoObjects (beginning with "0") and APO InfoObjects (beginning with "9A") are delivered in the standard SAP system. When you create your own InfoObjects, you can decide whether you want to create SAP NetWeaver BI or APO InfoObjects. While it is irrelevant whether you create SAP NetWeaver BI or APO InfoObjects for characteristics, this is not the case with key figures (i.e., you should create APO InfoObjects). Otherwise, you won't be able to fix any values or quantities for this key figure.

The *characteristics* of an InfoObject are reference objects (keys) whose dimensions generate relationships (e.g., "City" and "Country" are geographic dimensions of "Customer"). Characteristics can carry master data (texts, attributes, and hierarchies) that must be loaded from the source systems. *Time characteristics* are characteristics that are assigned to the dimension "Time", so their dependencies are already known, because the time in the system is predefined. The *technical characteristics* of an InfoObject have only

1 See also Egger, Fiechter, Rohlf: *SAP BW Data Modeling*. SAP PRESS, 2005.



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an organizational significance within SAP NetWeaver BI. For example, the request number is taken when requests are loaded, so it helps to find the request again.

The *key figures* of an InfoObject form the data component, that is, they return the values to be evaluated. These are quantities, amounts, or numbers of items. We still require their *units of measure*, so that these values actually signify something.

Figure 3.3 illustrates the data flow over the InfoObjects from the source system SAP R/3-LIS into the Business Information Warehouse (BW) of the APO system, and from there into the APO component *Demand Planning*.

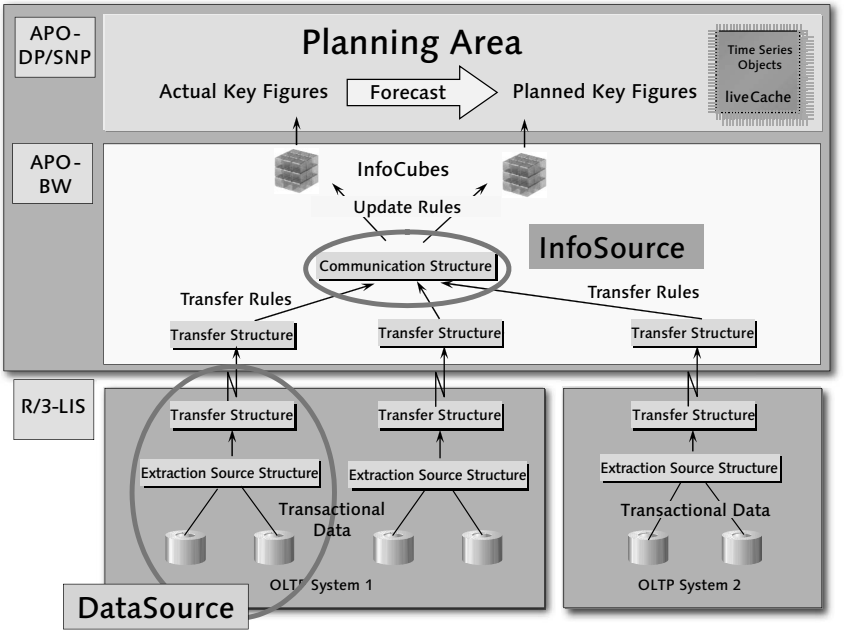


**Figure 3.3** Data Flow into the APO System (Source: SAP)

1. First, we use the *DataSources*, which extract the data through an extraction structure from the source systems (in Figure 3.3, this is SAP R/3-LIS) and transfer it using a transfer structure into the target system.
2. By applying transfer rules, related InfoObjects are then logically grouped into *InfoSources* using a communication structure. Finally, the data is updated if necessary using update rules into the data targets (*InfoCubes*).
3. The data in the InfoCubes is the actual historical data, on which the SAP APO Demand Planning component bases its forecast in the *planning area*.



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Other additional key terms are as follows:

- *InfoCatalogs* are user-definable and are used to organize characteristics and key figures.
- *Navigation attributes group and select actual and planned data*. Typical navigation attributes include the Material Requirements Planning (MRP) controller or customer group, which don't represent a separate planning level, but instead are used for the grouping. SAP NetWeaver BI navigation attributes can be used for the planning. You can only use SAP NetWeaver BI hierarchies for evaluation using SAP NetWeaver BI queries.
- *Data target* is a generic term for objects into which data is loaded. Data targets are the physical objects that are necessary for modeling the data model and loading the data.
- *InfoCubes* are data targets. They are assigned to an InfoArea and describe (from a reporting perspective) what is a self-contained dataset for an operational business area. They can also be *InfoProviders*, if reports and analyses are executed on them in SAP NetWeaver BI. InfoCubes are supplied with data from one or several InfoSources or *Operational Data Store* (ODS) objects (BasisCube), or from an external system (RemoteCube).
- *InfoAreas* help to organize the objects in the Business Information Warehouse.
  - Every InfoCube is assigned to an InfoArea.
  - InfoObjects can also be assigned to different InfoAreas via InfoObject catalogs.
- All systems that provide data for SAP NetWeaver BI are described as the *source system*. They can include the following:
  - SAP systems from Basis Release 3.0D
  - SAP NetWeaver BI systems
  - Flat files for which the metadata is maintained manually and the data is copied to SAP NetWeaver BI through a data interface
  - Database system into which data is loaded from a database supported by SAP without using an external extraction program through DB Connect
  - External systems for which the data and metadata transfer is performed using staging *Business Application Programming Interfaces* (BAPIs)

  You determine the type of source system in the Administrator Workbench in the source system tree with the function **Create**.



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- An *InfoSource* in SAP NetWeaver BI describes the volume of all available data for a business transaction or a type of business transaction (e.g., cost center accounting). An InfoSource is a set of logically related information combined into a unit. InfoSources can comprise either transaction data or master data (attributes, texts, and hierarchies).

  An InfoSource is always a set of logically related InfoObjects. The structure that stores these InfoObjects is called the *communications structure*.

  When an InfoSource is activated, the transfer structure and the communication structure are created in APO-BW. Transfer structures always exist in pairs in a source system and the corresponding APO Data Mart system. Through the transfer structure, the data is transported from a source system in the format of the original application into an APO Data Mart and it is copied there using transformation rules to the communication structure of the InfoSource. The communication structure is source-system-independent and contains all fields of the InfoSource that it represents in the APO Data Mart.
- The *transaction data* that is copied into InfoCubes using extractors can come from very different modules. Because of the way the system has developed historically, very different extraction mechanisms are required for copying this transaction data.

### 3.2.3 InfoCubes

You save the actual data and archive planned data in the database in the InfoCubes. If you have an external data warehouse such as SAP NetWeaver BI, you transfer the planning-relevant data to the InfoCubes of the Demand Planning (DP Data Mart). You can also extract the aggregated data from the SAP ERP system to import it from Excel, SAP NetWeaver BI, and legacy systems.

InfoCubes are essentially the data repository of the Demand Planning. Figure 3.4 shows three dimensions (of a possible total of 256):

- Period
- Customer
- Product (a product or master data hierarchy was created for this dimension)

InfoCubes create a multidimensional data model on the database server of the APO Data Mart. The multidimensional character of an InfoCube allows



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the user to filter data in many ways ("Slice & Dice" function). The facts are managed in separate fact tables and the dimensions are grouped in separate dimension tables. Both table types are relationally linked to each other. Individual dimension characteristic values can be subdivided in the form of master data tables. This ultimately creates a star-shaped arrangement of master data, classification data, and hierarchy data tables around the central fact table. During the analysis, the system first reads the data from the surrounding smaller tables, so that the access time for the large fact table is shortened.

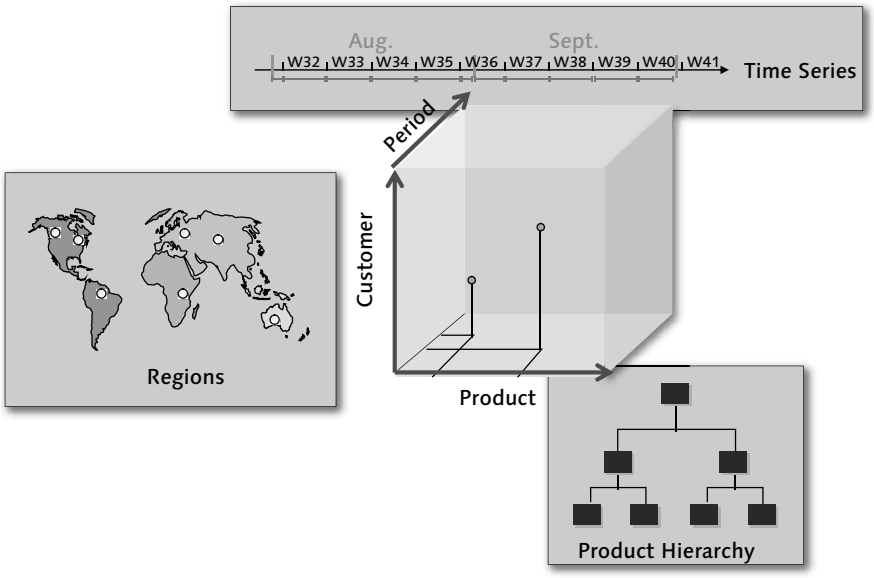


**Figure 3.4** Data Structure of an InfoCube (Source: SAP)

The *fact table* contains the key figure data for the individual characteristic value combinations. Examples for key figures are currency, quantity, or number fields (e.g., order quantity and turnover).

The fact table is referenced using the "artificial" dimension key (DIM-ID). Because artificial keys are formed to link the dimension with the fact table, changes to the master data table can be made relatively easily, that is, without having to recreate the "natural" key each time. The evaluation produces a quantity, initially through the selections in the dimension tables. This quantity is then selected directly by the artificial key from the fact table.

*Dimension tables* enable you to structure the characteristics of an InfoCube. The characteristics should be distributed on the dimensions in such a way



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that the dimension tables are kept as small as possible and access to the fact table performs optimally (key reduction).

From a technical point of view, the characteristics of the dimension table form the "edges" of the "data die," which is saved as an InfoCube in the Data Mart. The dimensions are linked with the fact table through dimension keys. The data of the fact table is accessed through the selection of the characteristics and their (characteristic) values from the dimension table and by the generation of a corresponding SQL instruction, with which the fact table is accessed.

This database plan, which is described as a *star schema* (see Figure 3.5) guarantees efficient analysis possibilities and offers flexible solutions that can be adapted easily to changing operational requirements.

Note the following when considering what characteristics should be included in your InfoCube for the Demand Planning (see also Section 3.3):

- Characteristics determine the levels on which you can aggregate data.
- Characteristics determine the levels on which you can maintain data.
- The characteristics of the InfoCube must correspond to the planning levels of the Demand Planning (the InfoCube can contain more characteristics, but not fewer).
- Characteristic 9AVersion must be contained in the InfoCube.

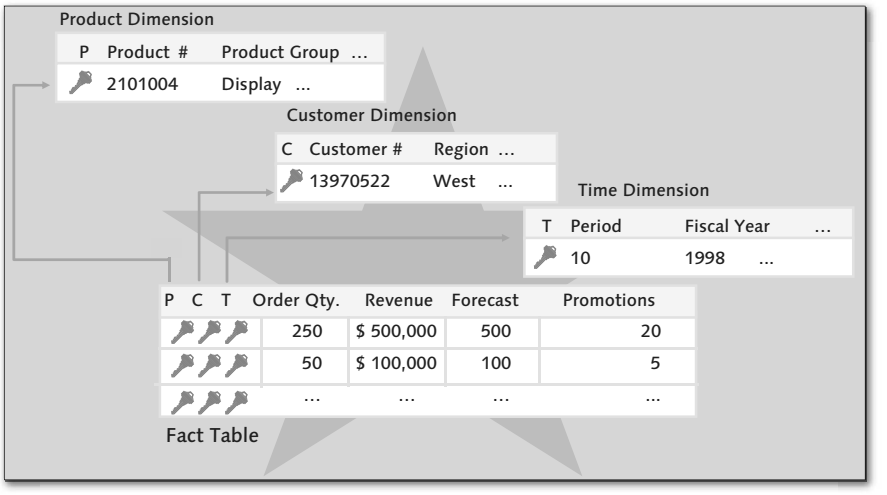


**Figure 3.5** Star Schema of an InfoCube, Consisting of Fact and Dimension Tables (Source: SAP)



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When you create an InfoCube, you must focus on the key figures and characteristics that you need for the planning. Then, you have to group your characteristics in dimensions (time dimension and quantity dimension). According to your entries, the system automatically generates a star schema in the database.

### 3.2.4 Saving Key Figures and Characteristics in the InfoCube

Once you have created the InfoCube(s) in the Administrator Workbench, you can save key figures and characteristics.

First you need to decide which key figures should be saved in InfoCubes and which key figures should be saved in the liveCache. Generally, you save the actual data of the Demand Planning in an InfoCube (together with old planned data) and the current planned data in the liveCache.

You then create the key figures that you want to use for the planning and that you have not already created in an InfoCube; to do this, in the Administrator Workbench, choose **Tools • Edit InfoObjects**. The screen shown in Figure 3.6 is displayed.

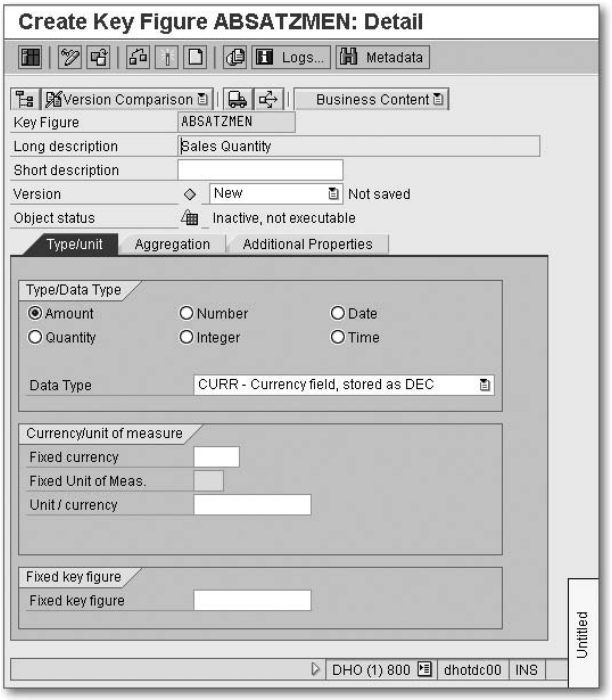


**Figure 3.6** Fixed Key Figure



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If you want to be able to fix the values of a key figure in the interactive planning, enter the key figure in which the fixed values are to be saved in the **Fixed key figure** field on the **Type/unit** tab.

The system is delivered with *standard characteristics*, for example:

- 9AMATNR for product
- 9ALOCNO for location

If you intend to use additional APO applications as well as the Demand Planning, you must work with these standard characteristics. If the characteristics that are delivered are insufficient for your requirements, you can create your own. To do this, in the Administrator Workbench, choose **Tools • Edit InfoObjects**.

For characteristics that you want to use for selection and navigation, but not as planning levels, create attributes and assign these to a characteristic that you want to use for planning. This procedure allows you to plan several characteristics with optimal system performance. For example, you assign the attributes *Sales Employee* and *Priority* to the characteristic Customer.

## 3.3 Configuring the S&DP Administrator Workbench

Once you have defined the general characteristics and key figures in the Administrator Workbench, you must now assign the characteristics in the Supply and Demand Planning (S&DP) Administration of SAP APO to the basic planning object structure and then create the so-called *planning area*. The planning environment in which you can perform the demand and requirement planning is then fixed.

### 3.3.1 Overview

You now configure the demand planning in the S&DP Administration. First you create a basic planning object structure in which you define all characteristics that are relevant for the Demand Planning. You can later determine several planning areas (e.g., for different company departments) from a basic planning object structure. You then assign key figures and other settings to the planning area. Ultimately, you have created the technical foundation that will enable you to begin the process of demand planning.



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### 3.3.2 Creating the Basic Planning Object Structure

A basic *planning object structure* contains all plannable characteristics for one or more planning areas. In the Demand Planning, the characteristics can either be standard characteristics or characteristics that you have created yourself in the Administrator Workbench. Characteristics determine the levels on which you can plan and store data. Special characteristics are required for Supply Network Planning (SNP), for the characteristics planning, and for the forecast of secondary requirements; these characteristics can be included if required in the basic planning object structure.

The use of additional characteristics for SNP is not planned. The basic planning object structure 9ASNPBAS is an example of such a structure with the correct characteristics for SNP and can be used as a template.

The basic planning object structure is the structure on which all other planning object structures are based. Other planning object structures represent aggregates and standard SNP planning levels.

A basic planning object structure is an element of the definition of a planning area. The existence of a basic planning object structure is therefore a prerequisite for creating a planning area.

To edit basic planning object structures, you must branch into the administration for S&DP. To do this, choose **Demand Planning** or **Supply Network Planning • Environment • Current Settings • Administration Demand Planning and Supply Network Planning**. Here you can edit the planning areas and basic planning object structures.

To edit basic planning object structures, you must choose **Planning Object Structures** from the **F4** input help of the selection button on the top-left of the screen (see Figure 3.7).

You must perform the following steps to create the basic planning object structure:

1. In the context menu, choose **Create Basic Planning Object Structure** (cannot be seen in the figure). Enter the name of the new basic planning object structure and some descriptive text (see Figure 3.8).
2. On the **Configure Planning Object Structure** screen, you assign characteristics from the **Template** table to the **Planning Object Structure** table.
3. Save your basic planning object structure.



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4. Finally, you must also activate the planning object structure using the context menu. The planning object structure is then available for your planning.

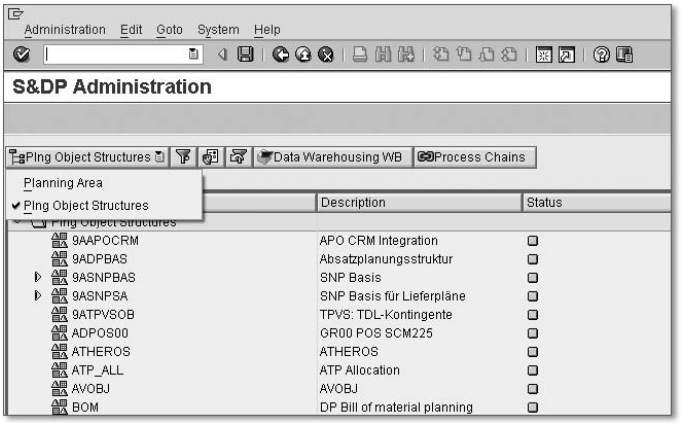


**Figure 3.7** Calling the Planning Object Structure

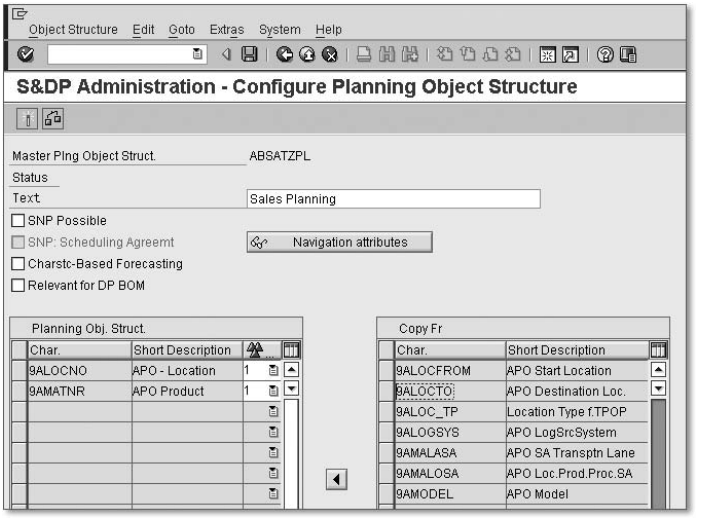


**Figure 3.8** Configuring the Planning Object Structure

### 3.3.3 Creating Characteristic Value Combinations

A *characteristic value combination* is a group of characteristic values with which you want to plan. We also use the shorter term *characteristic combination* to describe this group of values. Data can only be planned if you have defined such a combination.



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Characteristic value combinations are planned for basic planning object structures. The combinations then apply to all planning areas based on this planning object structure.

Under **Demand Planning** or **Supply Network Planning • Environment • Current Settings • Administration Demand Planning and Supply Network Planning**, you select the corresponding basic planning object structure and then choose from the context menu **Create Characteristic Combination**.

The **Maintain Planning-Relevant Characteristic Combinations** screen shown in Figure 3.9 is displayed.

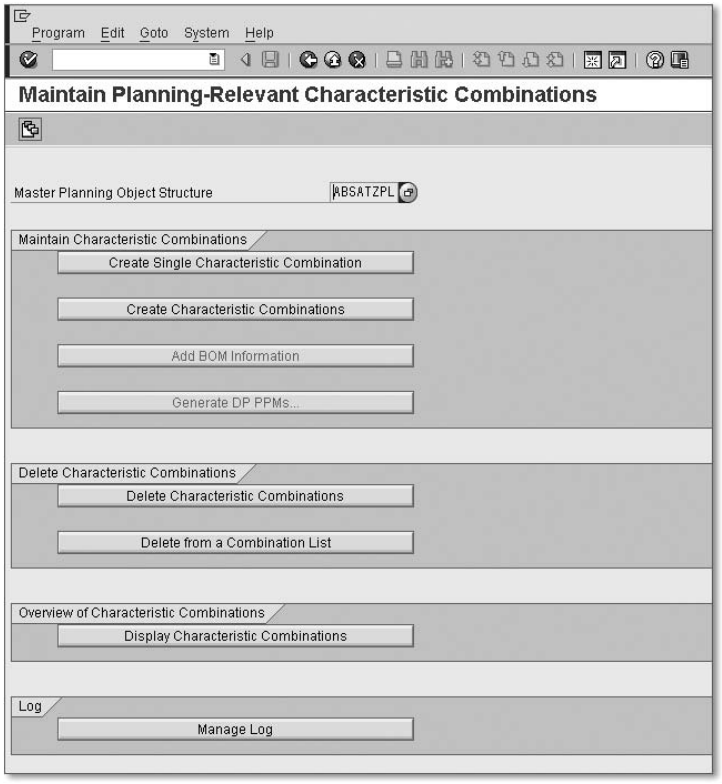


**Figure 3.9** Maintaining Planning-Relevant Characteristic Combinations

Here you can perform the following activities, among others:

- **Create Single Characteristic Combination**
  You use this option if no InfoCube contains suitable data, or the combination of the values is new, if you are dealing with a new product, for example.



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- **Create Characteristic Combinations**
  You use this option to create characteristic combinations that are based on the content of an InfoCube. The system checks what combinations of values are contained in the InfoCube and generates them for the basic planning object structure. What is important here is that the same characteristics are then finally contained in the InfoCube and in the basic planning object structure. The InfoCube can contain more characteristics than the basic planning object structure. Bearing in mind the aforementioned restriction, you can use every InfoCube you like to create combinations.
- **Delete Characteristic Combinations**
- **Display Characteristic Combinations**
- **Realignment** (not shown in the figure)
  New characteristic value combinations can be formed during the course of business. For example, your company introduces new products, or products are manufactured in another location. SAP provides a tool for reorganizing data (realignment) that you use to create the new characteristic value combinations automatically (see Section 4.4).

Another method for maintaining several characteristic value combinations is to edit the combinations in a flat file (e.g., a Microsoft Excel file), upload this file into an InfoCube, and then use this InfoCube to create the characteristic value combinations.

To create characteristic value combinations, proceed as follows:

1. Click on the **Create Characteristic Value Combinations** button and the screen shown in Figure 3.10 opens.
2. In the **Create Characteristic Combinations** field group, select **Generate Immediately**. The system generates the new characteristic value combinations directly from the data source specified in the field group **Data Source**.
3. When you click on **Execute**, the system generates the characteristic combinations. You will then receive the message "Planning Object Successfully Created."
4. You can view the created characteristic combinations using the **Display Characteristic Combinations** button (see Figure 3.9 and Figure 3.11).



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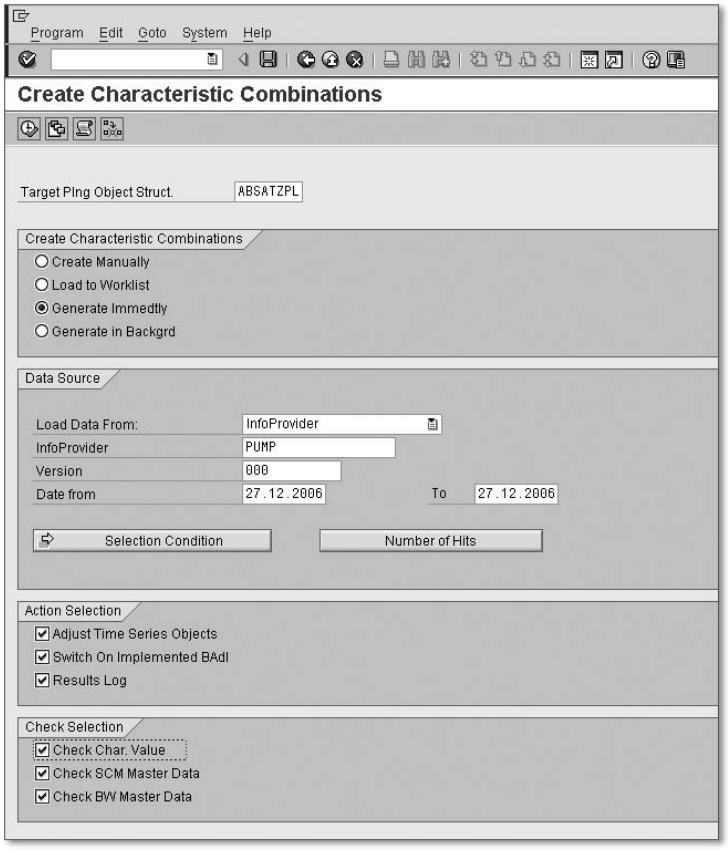


**Figure 3.10** Creating Characteristic Combinations

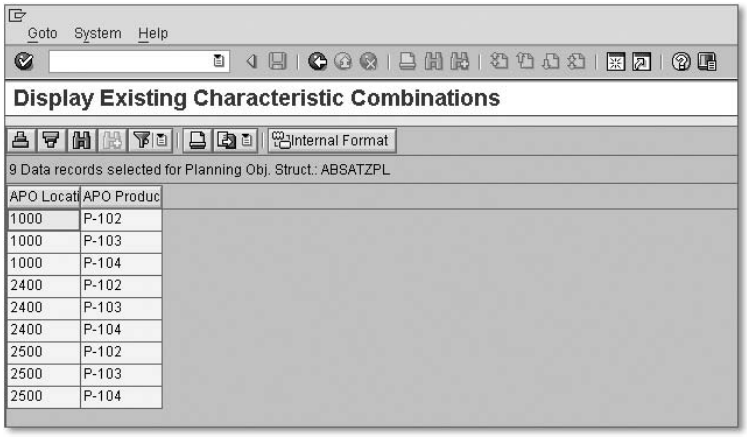


**Figure 3.11** Displaying Existing Characteristic Combinations



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### 3.3.4 Configuring the Planning Area

Planning areas form the central data structures for the Demand Planning and for the Supply Network Planning and are the foundation for planning books. The planning area is created during the configuration of the two components. The end user finally works actively with the planning book (see Section 3.4) and not with the planning area. The liveCache objects in which data is saved are based on the planning area and not on the planning book.

The planning area contains the following information:

- Unit of measure in which data is planned
- Currency in which data is planned (optional)
- Currency conversion type for displaying planned data in other currencies (optional)
- Memory storage buckets profile that specifies in what periods data is stored in this planning area
- Aggregate levels on which data can be stored (in addition to the lowest detail level) to improve performance
- Key figures that are used in this planning area
- Settings that specify how the individual key figures are disaggregated, aggregated, and saved
- Assigning key figures to aggregates

Supply Network Planning is delivered with predefined planning areas. You can also define your own planning areas.

You assign a planning area to a basic planning object structure, to which characteristics and aggregates are assigned. You then assign the key figures with which you want to work directly in the planning area.

You will now learn how to create period splits and planning areas, without which a planning area would be incomplete.

#### Period Split

There are two different period splits: One is for storing data (memory storage buckets profile), the other for planning the data (planning buckets profile). Both can be created using the SAP APO Easy Access menu and assigned to the planning area.



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### Creating the Memory Storage Buckets Profile

First create the storage buckets profile that determines the periods in which data is stored for a given planning area in the demand planning or in SPN. From the SAP APO Easy Access menu, choose **Demand Planning • Environment • Current Settings • Periodicities for Planning Area**. The screen shown in Figure 3.12 opens.

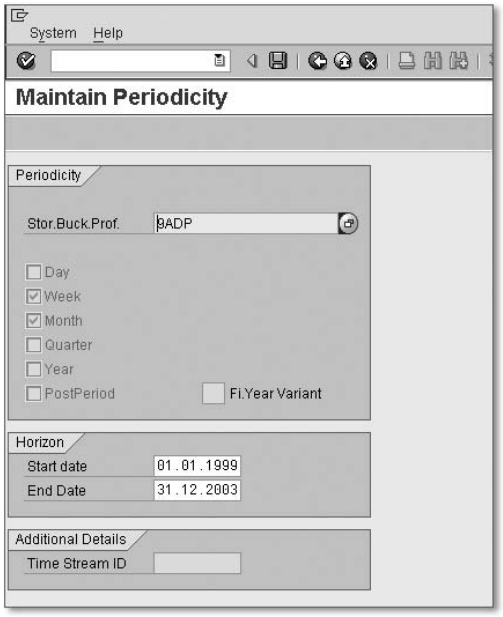


**Figure 3.12** Maintaining Periodicity, Memory Storage Buckets Profile

**Note**

If you include months and weeks in the memory storage buckets profile, the data for those parts of a week that fall in different months are stored separately, e.g., data for the 30th and 31st of October (Monday and Tuesday) are stored in a different period than data for November 1st to the 3rd (Wednesday to Friday).

### Creating the Planning Buckets Profile

The *planning buckets profile* defines the periods in which data is displayed and planned. You can use different planning buckets profiles for the past and the future. Specifically, the planning buckets profile defines the following:

- What time units are to be used for the planning
- How many periods of the individual time units are to be used



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- The sequence in which you want to display the periods with the different time units in the planning table

Using the SAP APO Easy Access menu, create the planning time buckets profile with **Demand Planning • Environment • Current Settings • Maintain Time Buckets Profile for Demand Planning and Supply Network Planning** (see Figure 3.13).

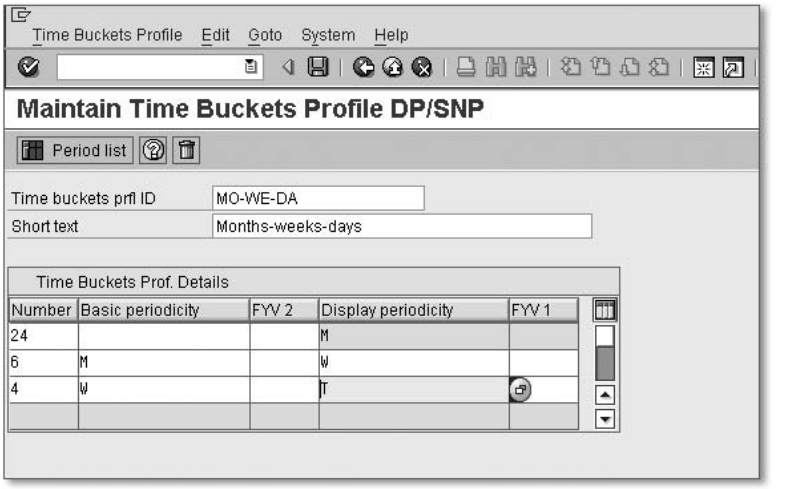


**Figure 3.13** Maintaining Periodicity, Planning Buckets Profile

The time horizon comprises two years in the example shown. Of these two years, the first six months are shown in weeks. The first four weeks of the first month are shown in days. As we can see, the remaining 18 months are shown in months.

The first line defines the entire length of the time horizon. The following lines define the various sections of the horizon. You make entries in the columns **Number** and **Display periodicity**. The content of the other columns is displayed automatically as soon as you press **Enter**. If you want to see precisely what periods are displayed, click on the **Period list** button (see Figure 3.13).

Once you have created the planning buckets profile, you can use this profile to define the future planning horizon and the history horizon by entering them in a planning book. The system shows the horizon in the interactive demand planning; here it begins with the smallest period and ends with the largest. The future horizon begins with the smallest period, at the start date of the planning horizon, and ends—moving forward in time—with the larg-



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est period. The history horizon begins with the smallest period on the day before the beginning of the future horizon and ends—moving backward in time—with the largest period.

For a single planning book you may have several planning buckets profiles and thus several planning horizons. The planning buckets profile is linked to the data view within the planning book. You could for example have three data views for three users, with a different planning buckets profile applying for each view: Marketing plans in months, sales in months and weeks and logistics in weeks and days. To release the demand plan in daily periods to Supply Network Planning, you use a daily buckets profile, that is, a planning buckets profile, that only contains periods with the time unit "Day".

### Creating the Planning Area

To now create the planning area, proceed as follows:

1. From the SAP APO Easy Access menu, choose **Demand planning • Environment • Current settings • Administration Demand Planning and Supply Network Planning**.
2. In the view that is displayed of the **Planning area**, choose the planning area node and from the context menu, choose **Create planning area**. The dialog window for creating the planning area opens (see Figure 3.14).

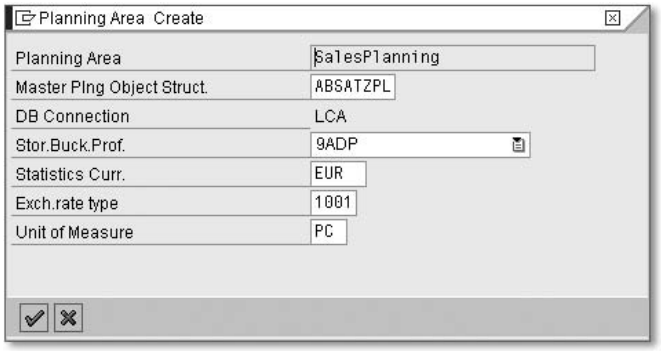


**Figure 3.14** Creating the Planning Area

3. Assign a name for the new **Planning Area**, and enter the **Master Planning Object Structure**, a **Storage Buckets Profile** and a **Unit of Measure**. You can also specify a **Statistics Currency** and an **Exchange Rate Type**.
4. Click on **Execute**. You are then in the screen **Change Planning Area** (see Figure 3.15).



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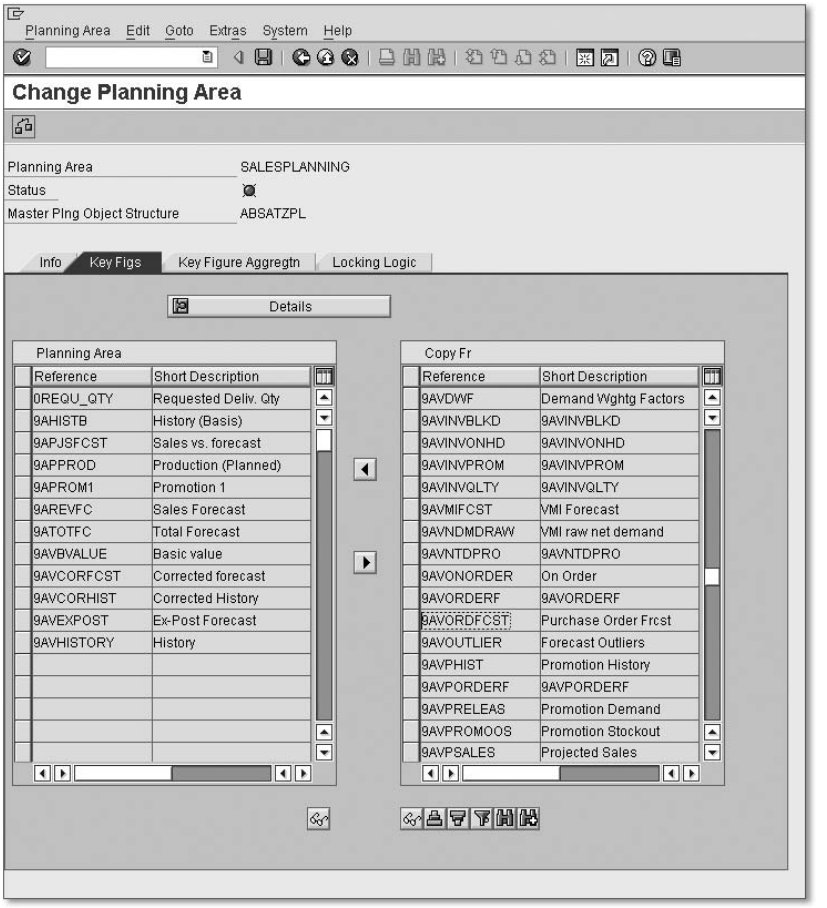


**Figure 3.15** Planning Area, "Key Figures" Tab

5. On the **Key Figs** tab, you assign the key figures to the planning areas. In the right-hand table **Template**, you can view all of the key figures that are available in the system. Select the desired key figures and click on the top-most arrow to copy them to the **Planning Area** (table on the left). The system creates a planning object for each key figure at the detail level and on each aggregate level.
6. Save your entries.

You can change a planning area as long as you have not yet created any time series objects for the planning areas. Before you can work with a planning area, you must create time series objects. This process is also called "initializing the planning area." The system creates a network, consisting of characteristics and key figures in the liveCache.



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### Creating Time Series Objects

Proceed as follows to create time series objects:

1. Choose the desired planning area and from the context menu, select **Create time series objects**. The dialog box in Figure 3.16 opens.
2. In the **Create Time Series Objects** dialog box, enter the planning version and make your date entries.

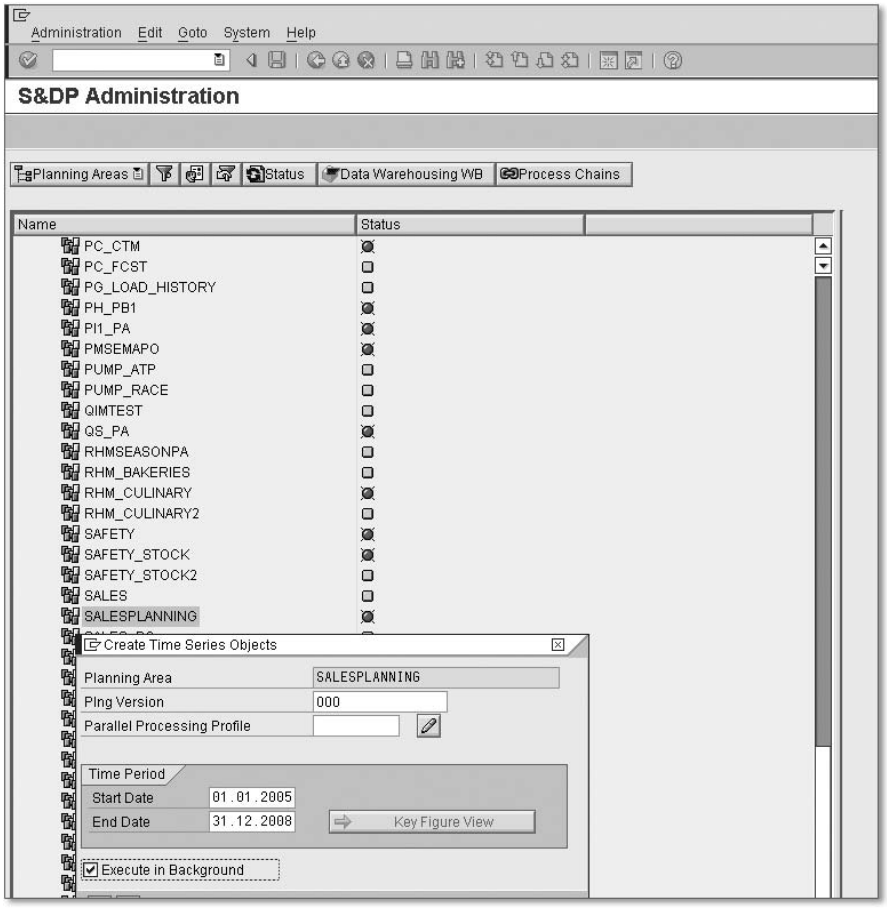


**Figure 3.16** Creating Time Series Objects

3. Click on **Execute**, so that the time series objects are created. If the time series objects have been successfully created, the message "Planning version successfully initialized" appears, and the status symbol behind the planning area changes to "green" (see Figure 3.17).



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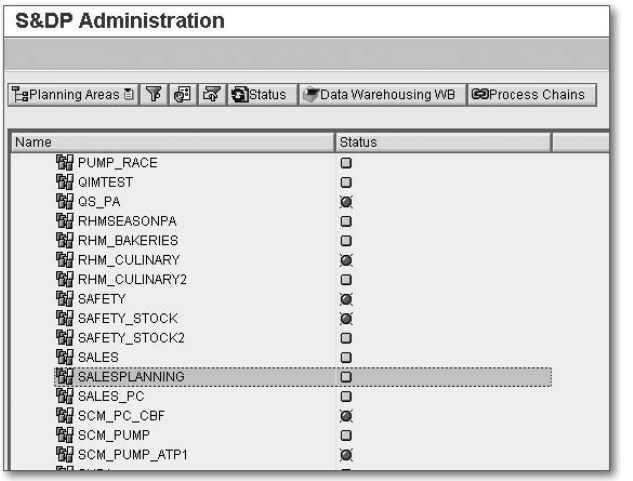


**Figure 3.17** Time Series Objects Successfully Created

## 3.4 Planning Books

The most important tool of the demand planner is the *planning book*. With it, you can design the content and layout of the interactive planning screen so that it corresponds to your planning requirements. In the planning book, you select characteristics and key figures that the demand planners require for their tasks. Each book can contain several views in which you can compose key figures for detailed analyses and planning tasks (see Figure 3.18). In each view, you can also define the planning horizon and the period split.

You can create one or several planning books by selecting the characteristics and key figures from the planning area. The number of planning books for a planning area is unlimited. Individual planning books can be created for each user or for user groups. Each planning book can contain various key figures. This can in turn produce different data views on the planning area. For that reason, it is also possible, given the different data views, for users to be able to plan different planning horizons. The planning table is then the interface that the planner sees on the screen.

You can define the following elements in a planning book:

- Key figures
- Characteristics
- Functions and applications that can be called directly from this planning book



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