

Reading Sample

The master data used for planning in SAP APO-PP/DS is usually transferred from SAP ERP but has different names and a different structure than the master data that already exists in SAP ERP. In this sample chapter, you'll learn about the different types of master data in SAP APO in the context of the Core Interface transfer.



"Master Data"



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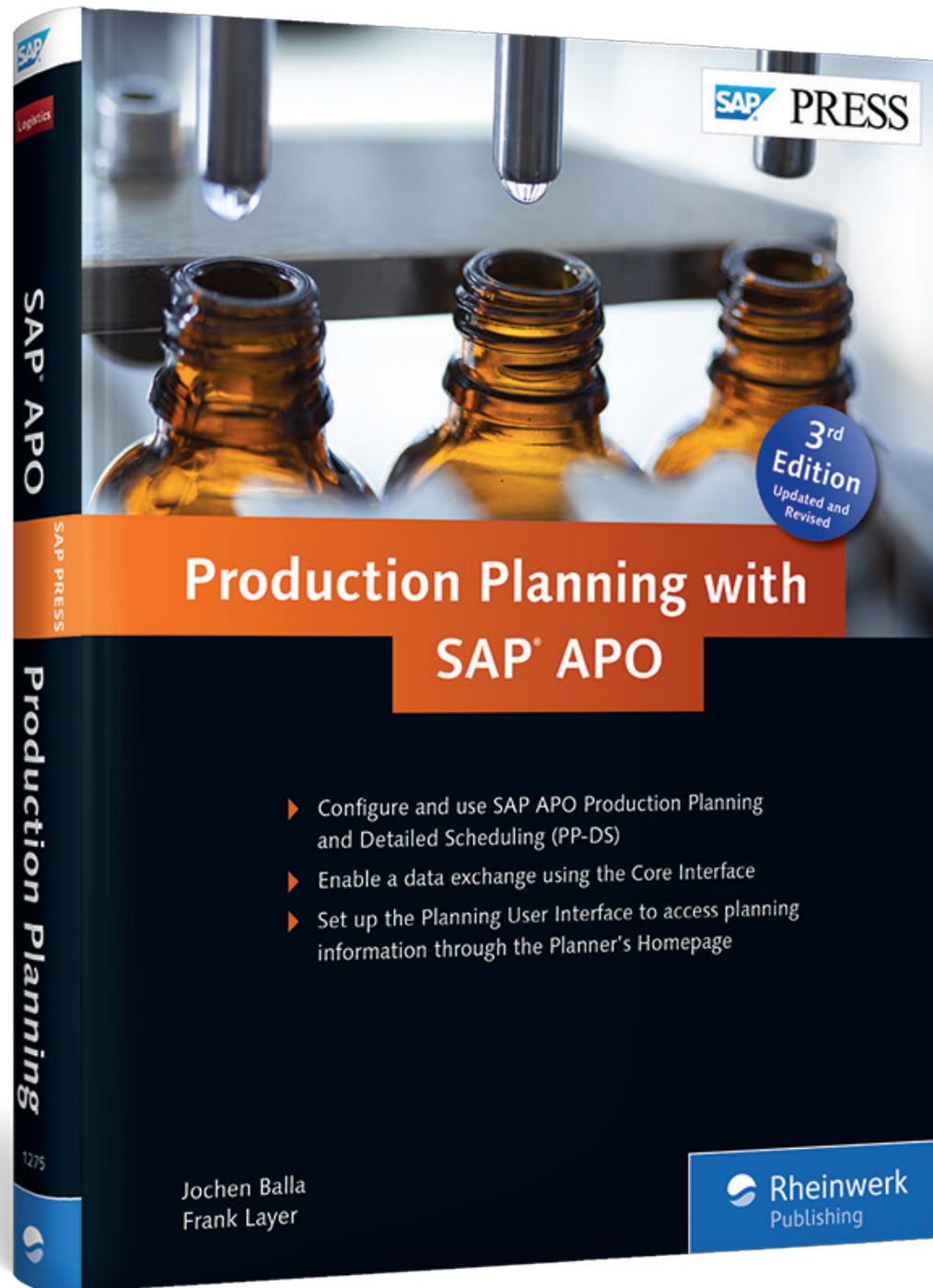
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The master data used for planning in SAP APO-PP/DS is usually transferred from SAP ERP but has different names and a different structure than the master data that exists in SAP ERP. In this chapter, you'll learn about the different types of master data in SAP APO in the context of the CIF transfer.

4 Master Data

In a system group, in which SAP APO is connected with SAP ERP via the Core Interface (CIF), SAP ERP is generally considered as the system that “maintains the master data.” But, SAP APO must provide the planning-relevant master data locally for advanced planning. In the following sections, we'll describe the central basic principles for master data management with regard to SAP APO-PP/DS, starting with the mapping of data from SAP ERP to SAP APO and finally pointing out exceptional local data maintenance.

4.1 Mapping Principle

In most cases, the master data in SAP APO isn't identical to the master data in SAP ERP. For example, material masters in SAP ERP are transferred to SAP APO as product masters, while production versions with routings and BOMs appear in SAP APO as production process models (PPMs) or production data structures (PDSSs), and so on. During the CIF transfer, the settings made in SAP ERP are processed by the CIF and mapped to the corresponding settings in SAP APO.

SAP APO master data generally has a less complex structure than master data in SAP ERP. You maintain SAP APO master data using the MASTER DATA menu option in SAP APO and often only require a single transaction to do so. While SAP ERP has a separate menu for material masters,

for example, all settings and actions relating to the product can be made in the same transaction in SAP APO.

Transfer of Customizing settings

The CIF transfer of SAP APO master data may include the transfer of SAP ERP Customizing settings. For example, a plant (which is typically selected in an integration model) is defined in Customizing in SAP ERP and transferred to SAP APO as a master data record.

[+]

Basis Customizing versus Application Customizing

Customizing settings of the SAP ERP *Basis* (such as factory calendars, units of measure, etc.) can be transferred to SAP APO using Customizing transport requests because the settings in the SAP SCM Basis correspond to a large degree to those in SAP ERP. SAP ERP application Customizing, in contrast, can't be transferred to SAP APO. Explicit exceptions to this rule are Available-to-Promise (ATP) Customizing and some other SAP ERP Customizing documents, which can be selected in an integration model.

4.2 Locations

Plants, DCs, customers, and so on

Plants, distribution centers (DCs), material requirements planning (MRP) areas, customers, and vendors in SAP ERP are mapped in SAP APO as locations with different location types (see Figure 4.1). All locations have the same basic structure, but they differ from each other at a more granular level based on their location type (e.g., additional views are available for certain location types in location maintenance).

Location types

Table 4.1 shows exactly how SAP ERP master data is mapped to location types in SAP APO during the CIF transfer.

SAP ERP Data	SAP APO Data Location with Location Type
Plant	1001 — Production plant
Distribution center (DC)	1002 — Distribution center
Storage location MRP area	1007 — Storage location MRP area

Table 4.1 Transfer of SAP ERP Data as SAP APO Locations with a Corresponding Location Type (Excerpt)

SAP ERP Data	SAP APO Data Location with Location Type
Customer (with transportation zone)	1010 — Customer
	1005 — Transportation zone
Vendor	1011 — Vendor

Table 4.1 Transfer of SAP ERP Data as SAP APO Locations with a Corresponding Location Type (Excerpt) (Cont.)

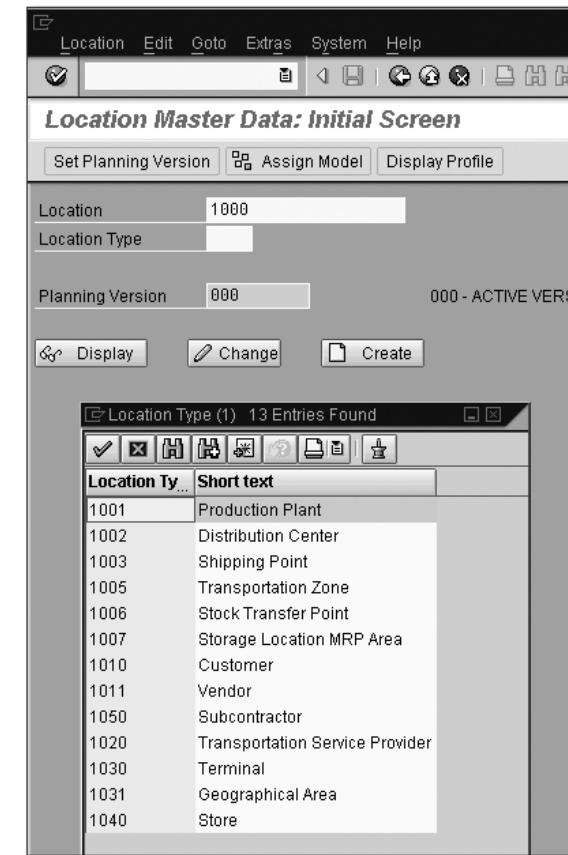


Figure 4.1 "Location" Transaction in SAP APO, Transaction /SAPAPO/LOC3, with Field Selection for Location Type

4.2.1 Transferring Plants and Distribution Centers

Plants are defined using the DEFINE, COPY, DELETE, CHECK PLANT setting in the enterprise structure Customizing settings in SAP ERP (see Figure 4.2).

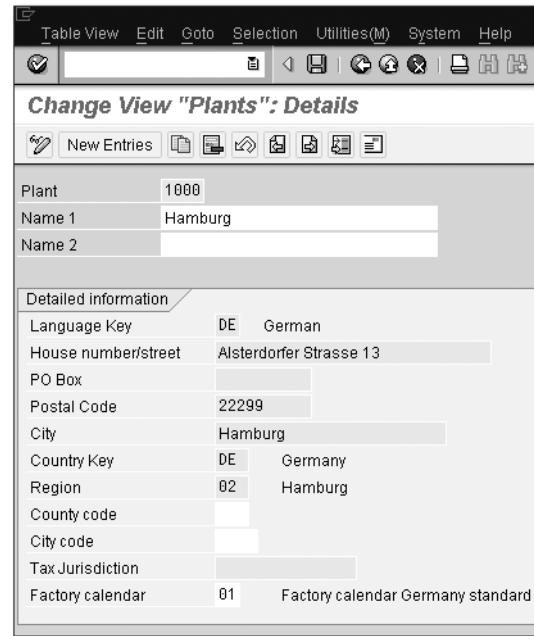


Figure 4.2 "Define, Copy, Delete, Check Plant" Customizing Setting in SAP ERP, Detailed Information for a Plant

Plant If a plant is contained in an integration model, it's transferred to the SAP Supply Chain Management (SAP SCM) system as a location with LOCATION TYPE 1001 (PRODUCTION PLANT). The basic settings for the plant, such as name, address data, time zone, and regional assignment, are transferred (see Figure 4.3).

!! Data Structures in SAP ERP and SAP APO

The data structures in the two systems aren't identical. For example, you can define the form of address keys (Mr., Mrs., etc.) in SAP ERP Customizing, while these keys are predefined in SAP APO. They can only be transferred if the form of address key is known in SAP APO.

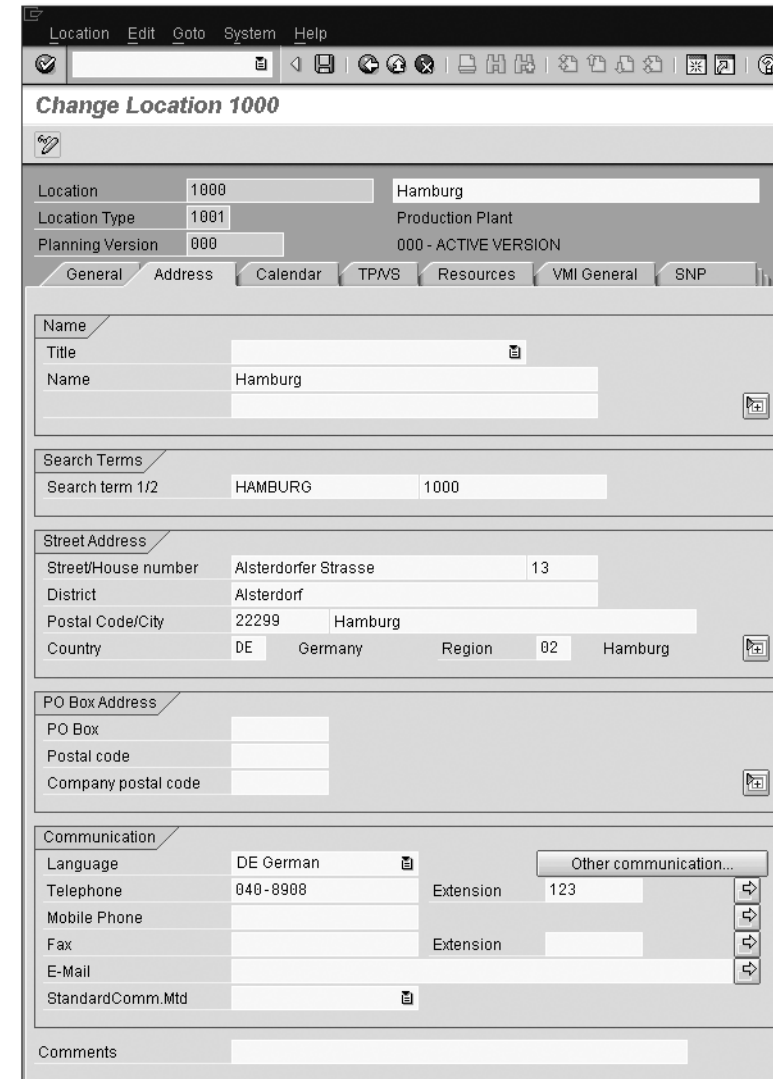


Figure 4.3 "Location" Transaction in SAP APO, Transaction /SAPAPO/LOC3, Changing a Location with Location Type 1001, "Address" View

In addition, the SAP APO location contains a range of SAP APO-specific settings that must be defined in SAP APO. Also, the short description of locations, unlike those of SAP ERP plants, can be maintained in more than one language.

CIF change transfers aren't possible for plants. If SAP APO-relevant data in a plant changes, the changes must be maintained separately in both systems.

Distribution center A distribution center (DC) in SAP ERP is simply a plant that is assigned the additional attribute DISTRIBUTION CENTER. This attribute was originally developed with SAP R/3 release 4.0 for *Distribution Resource Planning* (DRP) functions, and the corresponding setting must therefore be made in DRP Customizing (in the MAINTAIN ASSIGNMENT OF NODE TYPE – PLANT step in the basic settings for DRP).

The plant isn't changed from a functional standpoint (a different icon merely appears in the graphical applications of DRP).

[+] Distribution Resource Planning Functionality in SAP ERP

Due to its limited functional scope, the DRP functionality is rarely used in real life. Since SAP R/3 release 4.0, it hasn't been developed any further in SAP R/3 and SAP ERP.

A powerful cross-plant distribution resource planning was not developed until the release of SAP APO-SNP.

If you transfer plants to SAP APO that are defined in SAP ERP as distribution centers, these plants are transferred to location type 1002 (Distribution Center). The transfer of the individual SAP ERP plant settings is exactly the same as for production plants.

4.2.2 Storage Location Material Requirements Planning Areas

MRP areas As of SAP R/3 release 4.5, SAP ERP has MRP areas that can be used to differentiate planning. Besides mandatory plant MRP areas (type 1), you can also define storage location MRP areas (type 2) and subcontractor MRP areas (type 3) below the plant level in the Customizing settings for MRP.

► Storage location MRP areas

If storage location MRP areas are selected in an integration model, they are transferred to SAP APO as location type 1007, and their plant assignment is preserved. The receiving storage location contained in storage location MRP areas is also transferred to SAP APO as a corresponding sublocation (see Figure 4.4).

► Subcontractor MRP areas

Subcontractor MRP areas *can't* be transferred to SAP APO as such. Instead, the vendors themselves are transferred as locations.

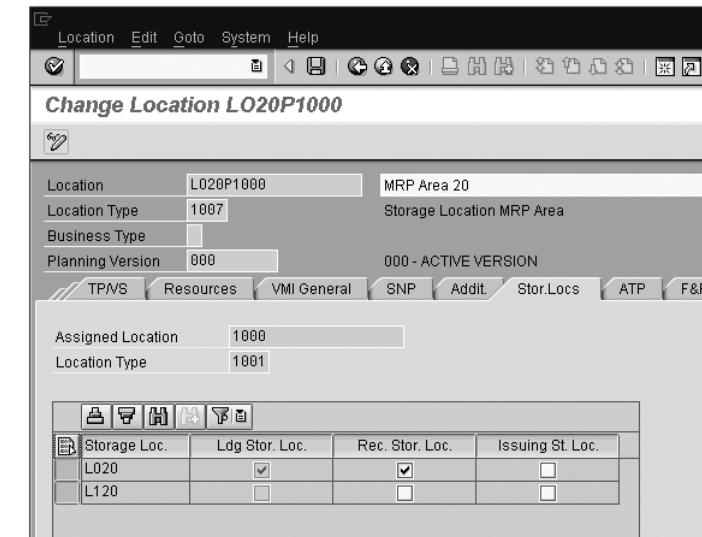


Figure 4.4 "Location" Transaction in SAP APO, Transaction /SAPAPO/LOC3, Changing a Location with Location Type 1007, "Storage Locations" View

The plant MRP data in an SAP ERP material master may include *MRP area segments* (on the MRP 1 tab), which are used for planning with MRP areas. If a material with MRP area segments is included in an active integration model, the MRP area data is also transferred. A location product is then created in SAP APO for each relevant MRP area, in addition to the location product of the plant.

MRP area segments

4.2.3 Customers and Vendors

Customers are maintained as Sales and Distribution (SD) master data records, which can be transferred to SAP APO for planning as locations with location type 1010. However, this is only necessary if the customer location is explicitly required for planning (e.g., for transportation planning for the customer). In normal production planning, this isn't usually required, and an SAP ERP sales order can be transferred to SAP APO without the customer.

Customers

If the customer contains a transportation zone in SAP ERP, an additional corresponding location with location type 1005 is automatically transferred with the customer.

Customers, like vendors (and unlike plants), are transferred to SAP APO with leading zeros. For example, SAP ERP customer 4711 appears in SAP APO as location 0000004711.

The screenshot shows the SAP APO 'Change Location' transaction for location 0000003000. The 'Address' view is active, displaying the following information:

- Location:** 0000003000, **C.E.B. New York**
- Location Type:** 1011, **Vendor**
- Planning Version:** 000, **000 - ACTIVE VERSION**
- Name:** C.E.B. New York
- Search Terms:** Search term 1/2: CEB
- Street Address:** Street/House number: 7890 Broad Street, Postal Code/City: 23459 New York, Country: US USA, Region: NY New York
- PO Box Address:** PO Box, Postal code, Company postal code
- Communication:** Language: EN English, Telephone, Mobile Phone, Fax, E-Mail, StandardComm.Mtd

Figure 4.5 "Location" Transaction in SAP APO, Transaction /SAPAPO/LOC3, Changing a Location with Location Type 1011, "Address" View

Vendors are maintained as purchasing master data records, which can be transferred to SAP APO as locations with location type 1011 (see Figure 4.5). Vendors must be transferred to SAP APO if planning of vendors is explicitly required as part of supply source determination.

Vendors

Customers and Vendors with Identical Names

[+]

Particularly relevant for the transfer of customers and vendors, a location must be identified by a unique name in SAP APO. This also applies if the location types differ. In other words, two locations can't have the same name in SAP APO, even if they have different location types.

This means that if a customer and vendor have the same number in SAP ERP (e.g., customer 1000 and vendor 1000), either the customer or the vendor must be renamed in the SAP APO inbound queue using a customer exit. Conflicts with production plants don't usually occur because plants are transferred without leading zeros and customers and vendors are transferred with leading zeros in their names.

4.2.4 External Procurement Relationships and Transportation Lanes

External procurement relationships can be transferred to SAP APO in the form of purchasing info records, delivery schedules, and contracts. They are mapped as corresponding external procurement relationships for purchasing management in SAP APO. Before you transfer external procurement relationships, you must ensure that the references will be recognized in SAP APO. Specifically, the source location (of the vendor), the relevant product, and the target location (the plant in which the product is to be procured) must exist in SAP APO.

The transfer of data to SAP APO includes the planned delivery times defined in SAP ERP and the purchase prices, including scale prices where relevant (see Figure 4.6). These prices can be used as opportunity costs for planning in SAP APO, so that the most favorably priced supply source can be selected for a specified lot size from several possible supply sources.

Opportunity costs for planning

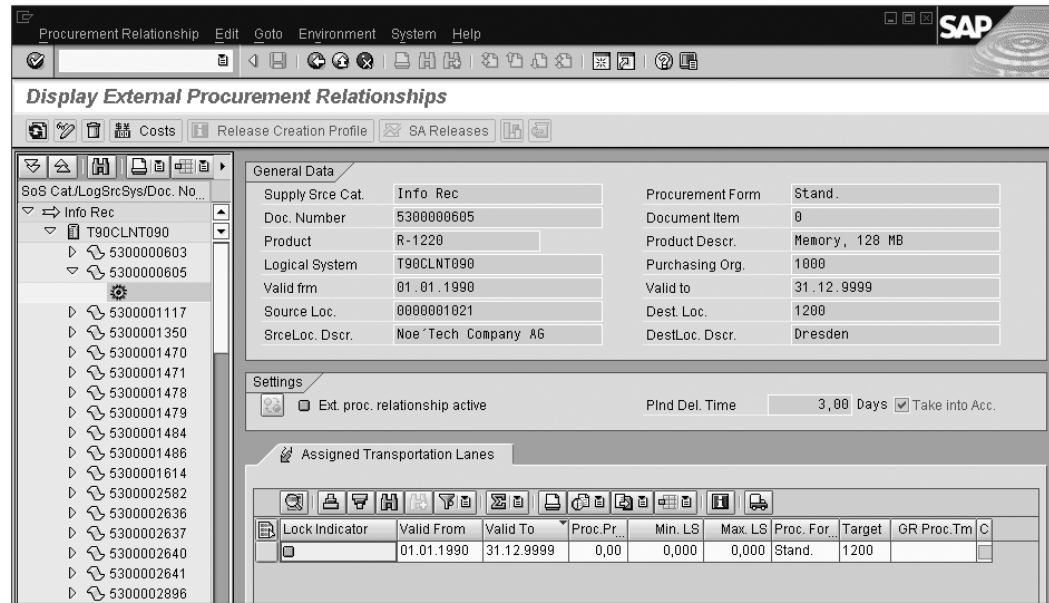


Figure 4.6 "External Procurement Relationships" Transaction in SAP APO, Transaction /SAPAPO/PWBSRC1, Displaying a Purchasing Info Record

Subcontracting If you intend to use subcontract procurement processing for procurement, the relevant data can be transferred to SAP APO using the CIF transfer. To do this, assign the production version with the subcontracting bill of materials (BOM) to the supply source in SAP ERP and select the SUBCONTRACTING PPM or PDS object in addition to the supply source in the integration model.

Quota arrangement and source list Quota arrangements can't be transferred from SAP ERP and must be created in SAP APO. SAP APO doesn't contain source lists. However, individual external supply sources can be deactivated in SAP APO, which will exclude them from automatic supply source determination.

Transportation lanes A transportation lane indicates that a product in SAP APO can be procured from another location. It may also contain additional information about the duration of transportation, itinerary, and means of transport, all of which play no role in SAP APO-PP/DS but are relevant for Transport Planning/Vehicle Scheduling (TP/VS) or SNP Transport Load Builder (TLB). The other location may be an alternative internal location (e.g., a different production plant) or an external location (e.g., an external vendor).

Transportation Lane

With the CIF transfer of an external procurement relationship, a corresponding transportation lane is automatically created, so you usually don't have to maintain any additional data for SAP APO-PP/DS processes.

As of SAP APO 4.0, stock transfers between different plants or DCs, as defined with a special procurement type in the SAP ERP material master, can also be automatically transferred to SAP APO as corresponding transportation lanes using the CIF transfer. Any existing transportation lanes that were created manually aren't overwritten in this case.

[+]

Special procurement type

4.3 Products

SAP ERP material masters are transferred to SAP APO as product masters. Provided that they aren't renamed using a customer exit, the SAP APO product has the same number as the SAP ERP material.

Length of the SAP APO Product Number

The length of the SAP APO product master number can be defined in SAP APO Customizing (DEFINE OUTPUT DISPLAY OF PRODUCT NUMBER). By default, an 18-digit product number is used as in SAP ERP.

[+]

In SAP APO, as in the material master in SAP ERP, the product description can be maintained in multiple languages, and all languages are transferred from SAP ERP. Like the material master in SAP ERP, the product master in SAP APO is divided into several different views. The data in these views falls into one of the following categories:

- ▶ **Header data** (PROPERTIES, UNITS OF MEASURE, CLASSIFICATION tabs) is of a general nature and isn't specific to any one location.
- ▶ **Planning data** for a product (DEMAND, LOT SIZE, PP/DS TABS, etc.) is location-dependent.

Product description

A product in a specific location is also referred to as a *location product*. Products are maintained in SAP APO in the PRODUCT transaction in the SAP APO master data (see Figure 4.7).

Many fields in the product master are automatically filled when the corresponding material master is transferred from SAP ERP. Other fields are SAP APO-specific and are usually maintained in SAP APO directly (i.e., if a customer exit isn't used). So, check whether a field in an SAP APO product master is maintained in SAP ERP before you change the data in SAP APO.

The screenshot shows the SAP APO 'Change Product' transaction for product T-F220 at location 1000. The interface includes a menu bar (Product, Edit, Goto, System, Help) and a toolbar. The main area is titled 'Change Product T-F220 for Location 1000'. Below the title, there are input fields for Product (T-F220), Base Unit (PC), Prod. Descript. (Pump PRECISION 102), and Location (1000, Werk Hamburg). A navigation bar contains tabs for Storage, ATP, SNP 1, SNP 2, Demand, Lot Size, and PP/DS. The main content area is divided into several sections: 'Planning Procedure' (PP Png Procedure: 4, Planning in Planning Run), 'Procurement Planning' (Part of a Package, Planning Package, Product Heuristic, Int. Sourcing Profile), 'Miscellaneous' (Show Production Unit, Planning Group: 20), 'Order Creation' (Plan Explosion: 5, Priority: 0, BOM Explosion Date), 'Horizons' (Opening Period: 10,00, Conversion Rule, PP/DS Png Time Fence, Adjustment Horizon, Rqmts Ascertain. Horizon, SNP Production Horizon: 4 W, PP/DS Horizon: 60, Forecast Horizon: 0), and 'Characteristic Based Deployment' (Depl. Char. Profile, Fair Share Rule: A, Pull Deployment Horizon: 100, Push Deployment Horizon: 100, SNP Checking Horizon: 10).

Figure 4.7 "Product" Transaction in SAP APO, Transaction /SAPAPO/MAT1, "PP/DS" View

Here and in the following sections, the lists of transferred settings aren't complete. Instead, we focus on outlining the central and most important contexts.

4.3.1 Header Data

The following general data is transferred from the material master in SAP ERP to the SAP APO product:

- ▶ Material group, gross weight, and volume (BASIC DATA tab)
- ▶ Transportation group (SALES: GENERAL/PLANT DATA tab)
- ▶ Units of measure (ADDITIONAL DATA tab)

Classification data (CLASSIFICATION tab) can also be transferred to the SAP APO product. However, classes and characteristics must be transferred to SAP APO first.

Classes and characteristics can be explicitly selected in an integration model and transferred from SAP ERP to SAP APO. In particular, you can transfer the material classification, that is, the class types in table MARA table (001: Material class, ..., 300: Configuration of material variant classes, ...).

Classes and characteristics

If you use the classification in SAP APO, you must take a range of restrictions and additional options into account, in particular in relation to industry-specific enhancements. For example, variant configuration isn't supported by PPMs, whereas it can, in contrast, be used with PDSs (see Section 4.5 in this chapter, and Chapter 7, Section 7.6).

4.3.2 ATP Settings

If you transfer the ATP settings from the SAP ERP material master to the SAP APO product master, some of the settings only make sense in SAP APO if the ATP Customizing settings are also transferred.

ATP Customizing can be explicitly selected and transferred in an integration model. In contrast to other master data, the model doesn't have to be active in the case of ATP Customizing. Rather, it's possible and indeed useful to deactivate the model after the SAP ERP settings are transferred, and to complete the settings in SAP APO. To prevent ATP

ATP Customizing

settings from being transferred again from SAP ERP by mistake, you can block imports from SAP ERP in the SAP APO-ATP Customizing settings. Table 4.2 shows exactly how the individual objects are mapped.

SAP ERP-ATP Customizing	SAP APO-ATP Customizing
Checking group	ATP group
Checking rule	Business event
Requirements class	Check mode
Scope of check	Check control with scope of check

Table 4.2 Transferring Various ATP Customizing Objects from SAP ERP to SAP APO

When the data is transferred to the product master, the settings listed in Table 4.3 are automatically copied from the MRP 3 tab of the SAP ERP material master.

SAP ERP Material Master	SAP APO Product Master
Availability check group	ATP group
Total replenishment lead time	Checking horizon
Customer requirements class of main planning strategy	Check mode

Table 4.3 Transferring Various ATP Settings from the SAP ERP Material Master to the SAP APO Product Master

ATP check in SAP APO If the ATP check is to be configured for a material in SAP APO, the ATP check object must be included in an active integration model for the material in question.

4.3.3 Requirements Settings

Requirements strategies Requirements strategies are maintained in SAP ERP using a strategy group that contains a main planning strategy in the MRP 3 tab.

If one of the standard strategies listed in Table 4.4 is entered as the main planning strategy, it can be transferred to SAP APO. However, the strategy keys may change in some cases. The main planning strategy in the SAP ERP strategy group is always the strategy that is relevant for transfer.

Strategy Description	SAP ERP Key	SAP APO Key
Anonymous make-to-stock	10	10
Planning with final assembly	40	20
Subassembly planning	70	20
Planning without final assembly	50	30
Planning with planning product	60	40
Make-to-order production	20	blank

Table 4.4 Different Strategy Keys in SAP ERP and SAP APO

If other strategies or keys are entered in SAP ERP, the relevant field in the SAP APO product master remains blank or unchanged.

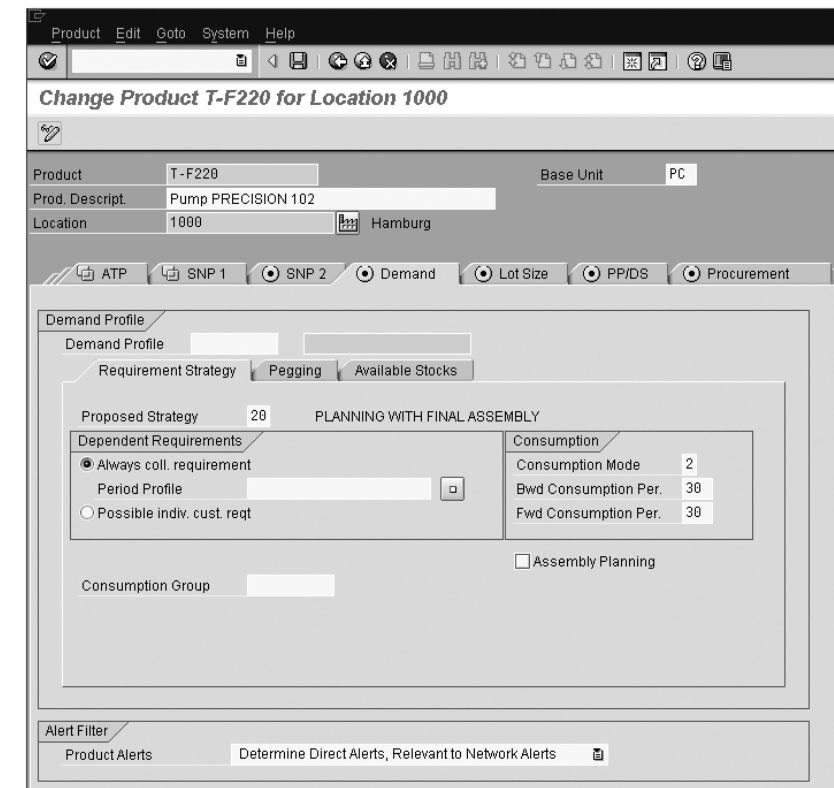


Figure 4.8 "Product" Transaction in SAP APO, Transaction /SAPAPO/MAT1, "Demand" View

Consumption The settings for consumption, consumption mode, and consumption periods are transferred from SAP ERP to SAP APO. Consumption mode 4 doesn't exist in SAP APO; the consumption periods in SAP APO, unlike those in SAP ERP, are specified in calendar days.

Individual/collective requirements The SAP ERP settings for INDIVIDUAL/COLLECTIVE REQUIREMENTS in the MRP 4 tab are also transferred. SAP ERP setting 2 corresponds to the ALWAYS COLL. REQUIREMENT indicator in SAP APO (see Figure 4.8), while setting 1 or blank corresponds to the POSSIBLE INDIV. CUST. REQ indicator.

4.3.4 Lot Size Settings

The lot size is set in SAP ERP using a lot-sizing procedure, which is defined in Customizing (Transaction OMI4) and entered in the MRP 1 tab of the material master. The procedures for lot-for-lot order quantity, fixed order quantity, and period lot sizes can be transferred to SAP APO (the relevant setting in the lot-sizing procedure is the lot size for the short-term period in each case).

The SAP APO product master contains all the settings for lot size. So, when the material master is transferred in a CIF transfer, SAP ERP Customizing is analyzed and transferred to the corresponding entries in the product master. These include special settings, such as the SAP APO period factor or the LOT SIZE ALWAYS indicator, which is transferred from the SCHEDULING or MTO LOT SIZE indicator in SAP ERP.

The following parameters are also transferred:

- ▶ MINIMUM LOT SIZE
- ▶ MAXIMUM LOT SIZE
- ▶ ASSEMBLY SCRAP
- ▶ ROUNDING VALUE
- ▶ ROUNDING PROFILE (the key only, rather than the profile itself)
- ▶ SAFETY STOCK
- ▶ SERVICE LEVEL
- ▶ REORDER POINT
- ▶ MAXIMUM STOCK LEVEL

Calculating the Assembly Scrap

[+]

The logic for using the assembly scrap is different in SAP ERP and APO.

- ▶ **In SAP ERP:**
procurement quantity = demand + demand × scrap
- ▶ **In SAP APO by contrast:**
procurement quantity = demand × 100 % ÷ (100 % – scrap)

Accordingly, the amount of assembly scrap is converted during the transfer.

4.3.5 Additional Settings

In addition to the settings discussed in the previous section, a range of other data is also transferred to SAP APO from the SAP ERP material master: PURCHASING GROUP, OPENING PERIOD FOR PLANNED ORDER from the SCHEDULING MARGIN KEY, PLANNING TIME FENCE, PROCUREMENT TYPE, PLANNED DELIVERY TIME, GOODS RECEIPT PROCESSING TIME, and so on.

SAP APO-Specific Settings

[+]

Other important settings, for example, for pegging and alerts or for the planning procedure, can't be derived from SAP ERP. If these are required settings, the fields are populated with default entries during the initial transfer. This is occasionally problematic (e.g., in the planning procedure).

After the initial transfer of a product master, analyze all field entries and use a customer exit to correct any problematic settings in accordance with your requirements and for all future transfers. Alternatively, you can extend the initial transfer to include product master mass maintenance, which corrects the problematic field contents after they have been transferred.

Finally, additional fields in the SAP APO product master can be activated in the SAP APO Customizing settings (the same applies to locations). If necessary, these fields can also be freely defined and filled from SAP ERP using a customer exit to derive additional information from SAP ERP materials.

Additional product and location fields

4.4 Resources

SAP ERP work centers or SAP ERP resources (in PP-PI) are mapped as *resources* in SAP APO. Multiple capacities with different capacity categories can be assigned to a work center or a resource in SAP ERP. These

individual capacities are transferred to SAP APO along with the work centers (see Figure 4.9).

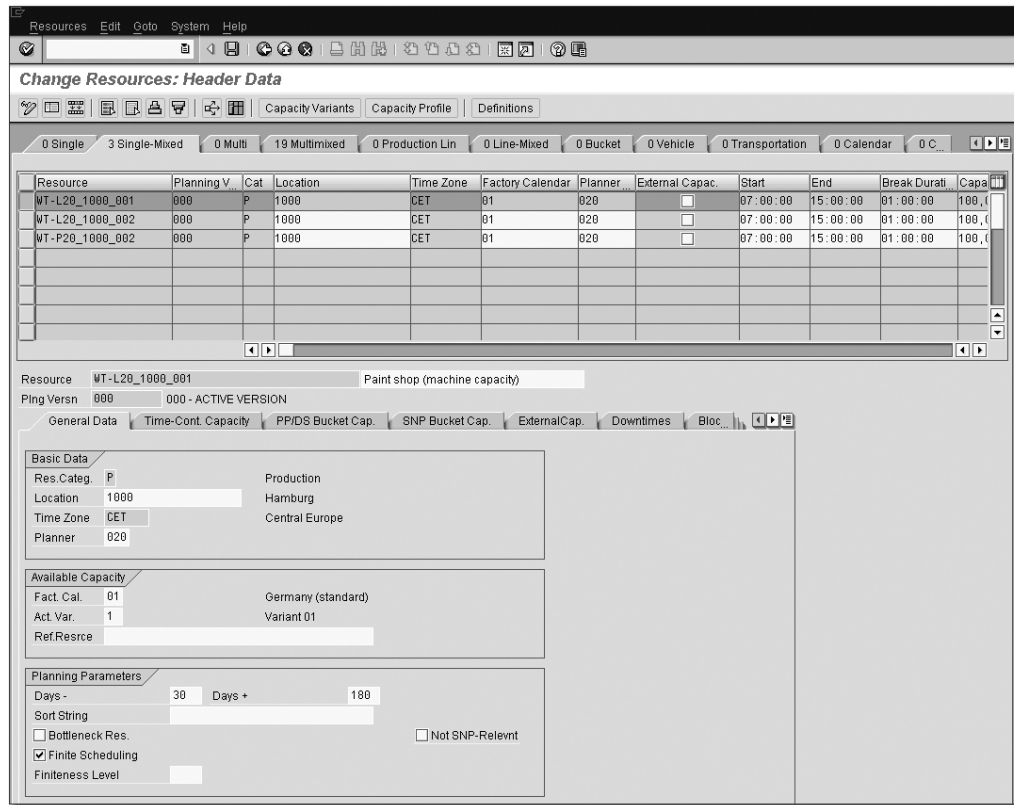


Figure 4.9 "Resource" Transaction in SAP APO, Transaction /SAPAPO/RES01

[+] Naming Convention: Resource Names

A separate resource is created in SAP APO for each individual work center capacity. The following naming convention is used to assign unique names to the resources in SAP APO: A "W" is placed immediately before the work center name. This is followed by an underscore and the plant ID, which is then followed by an underscore and the capacity category—for example, capacity category 001 of SAP ERP work center T-LACK in plant 1000 appears as WT-LACK_1000_001 in SAP APO.

Exceptions Reference resources and pool capacities can also be transferred. The naming convention is different in this case; a "W" isn't placed before the

name. As discussed in Chapter 3, the maintenance of resources can be completely confined to the SAP ERP system. SAP APO-specific settings can even be defined in the SAP ERP capacity and transferred from there.

4.4.1 Resources in SAP APO

Resources are used in SAP APO to support a diverse range of processes. So, different resource categories are used. In addition to the production resources that are relevant for SAP APO-PP/DS, you also have transportation resources, storage resources, and handling resources.

Production resources have the following additional attributes:

- ▶ **Single-activity resources**
Single-activity resources can only be occupied by a single activity at any given time.
- ▶ **Multi-activity resources**
Multi-activity resources can be occupied by several activities at the same time.
- ▶ **Mixed resources**
Mixed resources can be used for planning in both PP/DS and SNP.

For example, a capacity that can only be occupied by a single activity at any given time can be transferred to SAP APO as a single mixed resource. Up to SAP APO 3.1, you must use a customer exit for the CIF transfer of mixed resources (see SAP Note 329733). You must also activate a customer exit for the PPM (see SAP Note 321474).

Resource Categories Can't Be Changed Subsequently

The SINGLE or MULTI and MIXED attributes and the RESOURCE CATEGORY defined when the resource is first created in SAP APO can't be changed subsequently. The single-activity or multi-activity resource attribute is derived from the settings of the individual capacity categories. The use of mixed resources can be defined for the CIF transfer and is generally recommended.

The resource type to be used for the transfer of a capacity to SAP APO can be defined in the additional SAP APO data of the capacities in SAP ERP (or collectively for all capacities in Transaction CFC9 in SAP ERP Customizing). This means that capacities that can only be occupied by a single activity can technically also be transferred as multi-resources with

Resource categories

Production resources

[+]

Defining the resource type

only one capacity. The advantage of this is that any additional capacity assigned to the work center at a later stage can also be transferred to SAP APO immediately (otherwise, the SAP APO resource would have to be created again). However, setup time optimization can only be executed for single-activity resources in SAP APO.

4.4.2 SAP APO Resource Data

When you access the data belonging to an SAP APO resource, each planning version has a separate resource. So, to display the operational data, specify the planning version (e.g., active planning version 000). If you don't specify a planning version, the planning-version-independent resource is displayed.

Header data The settings for the standard available capacity (working time, breaks, rate of capacity utilization, number of individual capacities, etc.) from the header data are transferred from SAP ERP to SAP APO.

Intervals of available capacity Intervals of available capacity aren't transferred, but, as shown in Chapter 3, they can be used as external capacity for planning in SAP APO. If external capacity isn't used, intervals of available capacity can be defined in SAP APO directly. External capacity can be configured in the additional SAP APO data of the SAP ERP capacity.

Other SAP APO-specific settings, such as the finiteness level, or whether the resource is relevant for SNP, are similarly defined in the additional SAP APO data in SAP ERP.

[+] Master Data Maintenance for Resources in SAP ERP

All header data (including the additional SAP APO data) is included in change transfers for resources, which can also be configured as online transfers. This means that all header data can be maintained exclusively in SAP ERP.

4.5 Production Data Structures and Production Process Models

An SAP ERP production version with a routing and BOM or with a master recipe (in PP-PI) can be transferred to SAP APO as a PDS or as a PPM. Both objects must be selected in the integration model.

4.5.1 Production Process Model, Runtime Object, Production Data Structure, and SAP APO Releases

In earlier SAP APO releases, the PPM represented the only option for transferring production versions from SAP ERP to SAP APO. The transfer process is the same for PPMs as for other SAP APO master data. PPMs are transferred from SAP ERP and can then be supplemented or changed in SAP APO with SAP APO-specific settings. There are, however, two main restrictions with PPMs:

- ▶ There is *no* change management in PPMs. Changes can be transferred from SAP ERP to SAP APO with PPM change transfers. However, these changes take effect immediately. As a result, different change statuses with different date/time validities can't be mapped.

The only pragmatic option is to use various production versions with different time validities whose routings or BOMs are resolved at the validity start date.

- ▶ With PPM, you *cannot* map an SAP ERP variant configuration, whereas this can definitely be found in an industry-specific process (using the characteristics-dependent planning [CDP] configuration schema, see Chapter 7, Section 7.6).

These functions were not implemented in the PPM. Instead, an alternative data structure called a runtime object (RTO) was developed. The RTO is derived from Integrated Product and Process Engineering (iPPE), a complex master data structure used in the automotive field, which incorporates variants and change management. The iPPE RTO is a derivative of iPPE that reduces the runtime for planning (i.e., for the creation of planned orders).

During the CIF transfer, the RTO is derived from the SAP ERP production version (i.e., without iPPE), and variants and change management are taken into account. This alternative to using PPMs is available with some restrictions as of SAP APO 3.1 and with no restrictions as of SAP APO 4.0.

RTOs were originally referred to as iPPE-RTOs, and later became known as PP/DS-RTOs or simply RTOs. With SAP APO 4.1, the RTO was finally given a name all its own: production data structure (PDS).

Production process model (PPM)

Runtime object (RTO)

Production data structure (PDS)

[+] RTO and PDS: How to Change Them?

Depending on the desired data changes, the change transfer conception, and the release status of your system landscape, there are different options regarding how to maintain the specific fields of an RTO or PDS.

If you need to make specific changes to data, such as for costs or procurement priorities, use the corresponding customer exit or Business Add-In (BAI) during the transfer from SAP ERP or the SAP ERP change transaction for the PDS, PDS_MAINT. In addition to that, with SAP SCM 7.0 EHP2, the change Transaction /SAPAPO/CURTO_EDIT is available in SAP APO.

4.5.2 Release-Dependent Notes for Runtime Objects or Production Data Structures

The following properties and restrictions apply to using a PPM, RTO, or PDS:

► **For phantom BOMs**

Phantom BOMs can only be mapped completely and at multiple levels (if required) using an RTO or PDS. With a PPM, the components of a phantom BOM are simply exploded and assigned to the PPM directly.

► **For SNP**

Up to SAP APO 4.0, an SNP-PPM can't be derived from an RTO. An SNP-RTO doesn't exist.

► **For operation splits**

As of SAP APO 4.0, mandatory splitting can be mapped with a PPM, whereby a shorter operation duration is transferred to SAP APO, and the capacity requirements are merged.

► **For overlapping**

As of SAP APO 4.0, required overlapping can be mapped with a PPM (see SAP Note 604878, also for flow manufacturing). As of SAP APO 5.0, overlapping operations in the routing can be mapped with a PDS.

As of SAP APO 4.1, a PDS can also be used in the following areas:

- PP/DS subcontracting
- SNP (including subcontracting, but excluding variants and change management)

- Capable-to-Match (CTM) (including subcontracting)
- Block planning and CDP
- DP

Since SAP APO 5.0, it's also possible to define SAP APO-specific settings in SAP ERP to extend the data for the PDS transfer. This means that, as with resources, all master data can be maintained in SAP ERP in an ideal scenario (see Figure 4.10).

Additional SAP ERP data for PDS

[+] PPM versus RTO/PDS

The most important point to consider when deciding whether to use a PPM or an RTO/PDS is that the PDS is the most up-to-date master data structure. So, use a PDS unless one of the restrictions listed previously necessitates the use of PPM instead.

The screenshot shows the SAP ERP transaction 'Maintain Additional Data for Production Data Structures'. The main table displays data for PDS source of supply in SCM. Below it, the 'Operat. Data' tab is active, showing a table with columns for Name of PDS Source of Supply in SCM, PD..., Costs, Priority, Discretiz., Cost Function, BucketOff, and Per.Factor.

Detail	Name of PDS Source of Supply in SCM	Material	Plant	Ver.	T	P	Costs	Costs	Costs	Costs	Priority	Discre...	Cost F...	Bucke...	
	T-F220	10000001		T-F220	1000	0001	N	P	0	0	0	0	0,00		0,00
	T-F220	10000001	S	T-F220	1000	0001	N	S	0	0	0	0	0,00		0,00
	T-F220	10000003		T-F220	1000	0003	N	P	0	0	0	0	0,00		0,00
	T-F220	10000003	S	T-F220	1000	0003	N	S	0	0	0	0	0,00		0,00
	T-F220	10000004		T-F220	1000	0004	N	P	0	0	0	0	0,00		0,00

Name of PDS Source of Supply in SCM	PD...	Costs	Costs	Costs	Priority	Discretiz.	Cost Function	BucketOff	Per.Factor	Name of PDS Sou	
T-F220	10000001	S	S	0	0	0	0,00			0,00	0,000

Figure 4.10 "Additional Data for Production Data Structures" Transaction in SAP ERP, Transaction PDS_MAINT

The lack of an RTO for SNP is perhaps the most serious restriction up to and including SAP APO 4.0. As of SAP APO 4.1, it's preferable to use a PDS for most applications.

4.5.3 Structure of the Production Process Model and Production Data Structure

A PPM has the same basic structure as a PDS (RTO) in SAP APO. An SAP ERP production version with a routing and BOM is transferred as a PPM or a PDS. The validities of these routings in terms of both period and lot size are based on the validities of the production versions. Different conventions are used for routing numbers in a PPM and a PDS. The routing number is an essential component of the PPM number (see Figure 4.11), while a PDS is identified by the product number (see Figure 4.12).



Figure 4.11 "Production Process Model" Transaction in SAP APO, Transaction /SAPAPO/SCC03

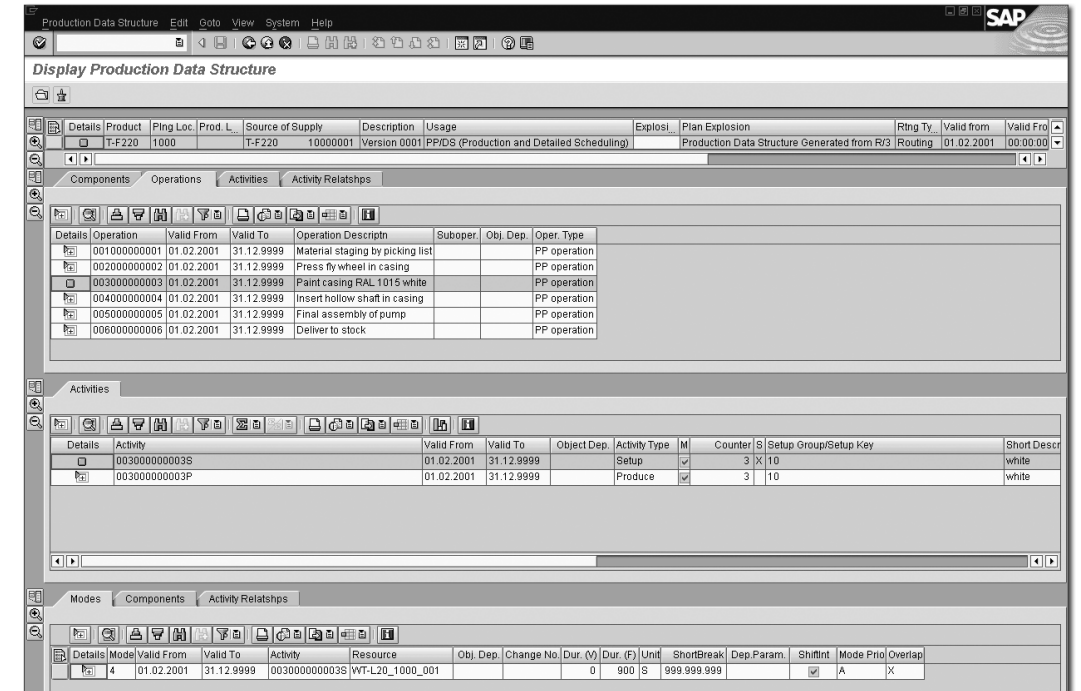


Figure 4.12 "Display Production Data Structures" Transaction in SAP APO, Transaction /SAPAPO/CURTO_SIMU

In SAP APO, a plan contains different operations. One operation contains up to three activities: a setup activity, a processing activity, and a teardown activity. These activities are linked by activity relationships, which define their logical sequence. Sequential processing can be defined by end-start relationships, for example.

Operations and activities

In addition, the activities are assigned components that are consumed (input components) or produced (output components, for the finished product or co-products).

Modes are used to assign resources to activities. A mode represents an option for executing an activity. A mode contains a primary resource and may also contain secondary resources, for example, a machine as a scheduling-relevant primary resource, and machine operators as a secondary resource (refer to Figure 4.11 and Figure 4.12). If several modes are assigned to the same activity, the activity can be executed in any one of these modes and also using alternative resources.

Mode

4.5.4 Transfer from SAP ERP

During the CIF transfer, the SAP APO structures are derived from similar structures in SAP ERP. Table 4.5 provides details of the exact relationships between these structures:

SAP ERP	SAP APO
Operation from routing: Operations are only transferred if they are scheduling-relevant, their operation durations aren't equal to zero, and the corresponding work centers are active.	Operation
Operation segments, which are defined at the work center using scheduling formulas.	Activity
Standard sequence of operations (operations are ordered by number and, within an operation, setup is followed by processing, which is followed by teardown).	End-start activity relationships
Work centers in operations: These may contain several capacities, of which only one is scheduling-relevant. The scheduling-relevant capacity is based on the primary resource, while any additional capacities appear as secondary resources.	Mode with a primary resource and possibly also secondary resources
Parallel sequence of operations.	Start-start activity relationships
Alternative sequence (requires a customer exit or BAdI, see SAP Note 217210).	Alternative modes (alternative modes can also result from a work center classification in SAP ERP)

Table 4.5 Structure Elements of an SAP ERP Routing and an SAP APO Production Process Model or Production Data Structure

Activity durations Activity durations are calculated using scheduling formulas in the SAP ERP work center (the formulas for the capacity requirement are irrelevant in this case). In SAP ERP, these scheduling formulas, together with the default values in the routing, define the duration of the individual operation segments. In SAP APO, the result of this scheduling is defined

as a variable duration, and a fixed duration is also defined. Primary and secondary resources always have the same duration. The variable durations are based on the "base quantity" of the PPM or PDS, that is, on the output quantity of the finished product.

The following items should also be noted in relation to the transfer of production versions to SAP APO:

Other important items

- ▶ **Output quantity**
The output quantity of the finished product, which is used, for example, as a basis for scheduling formulas, is derived from the base quantity of the BOM.
- ▶ **Direct procurement items**
Direct procurement items are transferred as stock items.
- ▶ **Setup keys and setup groups**
Setup keys and setup groups can be transferred to SAP APO from the operation details screen of the SAP ERP routing. For this purpose, the setup matrixes and setup keys, which can't be transferred from SAP ERP, must exist. Moreover, the setup matrix must be entered in the relevant resource in SAP APO.
- ▶ **Component indicator**
The COMPONENT indicator indicates the category of the component assigned to an activity, as detailed here:
 - ▶ M: Master output, header product of BOM
 - ▶ I: Input, "normal" BOM component
 - ▶ P: Phantom assembly
 - ▶ O: Output (quantity produced), co-product or by-product; in other words, a component with a negative quantity (the only difference between co-products and by-products in SAP ERP is the settlement rule, in that co-products are included in the settlement of the manufacturing order)
 - ▶ N: Configurable master output, variant configuration
- ▶ **Phantom assemblies**
If phantom assemblies are used in the PDS, they must be explicitly selected as BOMs in the integration model (in this case, there must be no production version for the header material in the phantom BOM).

If the phantom assembly is also planned as normal, it can also be transferred as a complete PDS.

Master recipes (in PP-PI) are transferred the same way as routings. However, there are some differences at a granular level.

Transferring a master recipe

In a master recipe, the operations represent logical groupings of phases, which are used to define the process steps to be executed. Therefore, operations, phases, and also secondary resources are all transferred to SAP APO as operations. The phases and secondary resources each contain an activity of the same name. The formula for in-house production in the assigned SAP ERP resource is relevant for scheduling a phase. In addition, the relationships between the phases in a planning recipe are transferred as activity relationships.

4.6 Mass Changes to SAP APO Master Data

In the previous sections, it was determined that SAP APO master data should ideally be maintained in SAP ERP. The main points in relation to the most important types of master data are summarized here:

► Product masters

Product masters contain settings that are maintained from SAP ERP and others that are specific to SAP APO. Append structures for master data tables and customer exits for the CIF transfer provide simple options for maintaining also the SAP APO-specific settings in SAP ERP. The change transfer can be executed in online mode.

► Resources

As of SAP APO 4.0, resources can be completely maintained in SAP ERP. If external capacity is used, no settings in SAP APO are required except for possible downtimes. The change transfer can be executed in online mode.

► PDSs

The PDSs can be maintained in SAP ERP as of SAP APO 4.1, and as RTOs as of SAP APO 4.0. SAP APO-specific settings are transferred using a BAdI (SAP APO 4.1), by entering values in additional fields in

SAP ERP (as of SAP APO 5.0), or in SAP SCM (as of SAP APO 7.0 EHP2). The change transfer is executed periodically.

► PPMs

The PPMs contain fields that can be maintained in SAP ERP, as well as other SAP APO-specific fields. The change transfer is executed periodically for the SAP ERP fields.

As you can see, data for product masters, resources, and PDSs doesn't have to be maintained in SAP APO in many cases. However, other types of master data, such as transportation lanes or quota arrangements, can only be transferred in part from SAP ERP or, in some cases, not at all.

As of SAP APO 3.1, a mass maintenance transaction is provided to simplify the maintenance of SAP APO master data (in Transaction MASS or MASSD, as with mass maintenance in SAP ERP). This allows you to change the following:

SAP APO master data mass maintenance

- External procurement relationships
- Locations
- PPMs
- Products
- Quota arrangements
- Resources
- Transportation lanes

You select the master data type to be maintained according to its object type. You then select the documents to be changed by specifying values for the individual attributes of a component (e.g., product masters can be selected by product name or procurement type). Finally, you define the attributes to be maintained (see Figure 4.13).

After you've selected the master data and attributes to be changed, you can set values for the individual attributes. These values are copied to the individual master data documents, where they can be changed manually at any stage. New values can be specified for several different attributes in a single step (refer to Figure 4.13).

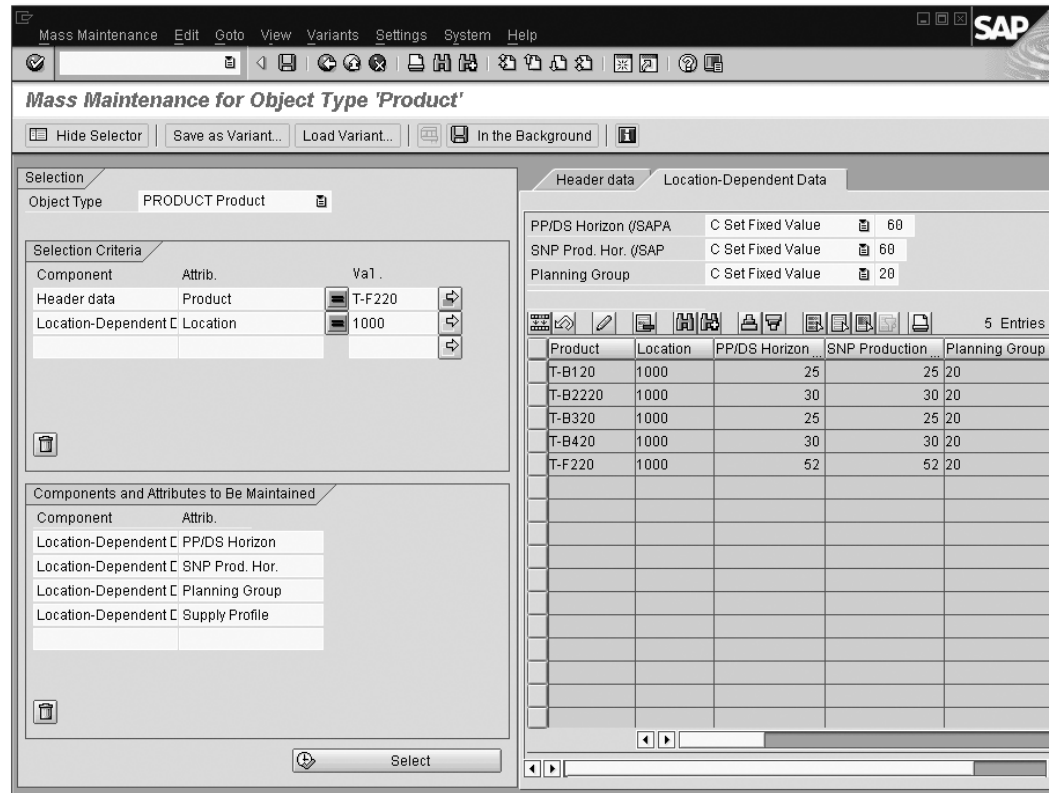


Figure 4.13 "Mass Maintenance" Transaction in SAP APO, Transaction MASSD

The field changes are updated when you save your changes. The changes can also be saved in the background to avoid long runtimes with large volumes of data.

4.7 Summary

The planning in SAP APO is based on SAP APO master data. These SAP APO master data elements usually have SAP ERP equivalents but a different structure and different names: product master, resource, PDS, and so on.

SAP ERP remains the main system for most documents. The CIF can be set (possibly using customer exits) so that the master data transfer from SAP APO is automated to a large extent. A distinction is made in the integration of individual document types (material masters to product masters, work centers to resources, routings/BOMs to PDSs, etc.).

Master data changes in SAP APO may only be implemented at the local level if the settings can't be derived from SAP ERP.

Finally, there is some alternative SAP APO master data, for example, PPM and PDS, or various resource types. Here you must decide with which master data you can map the respective process best. If in doubt, use the latest and most general solution.

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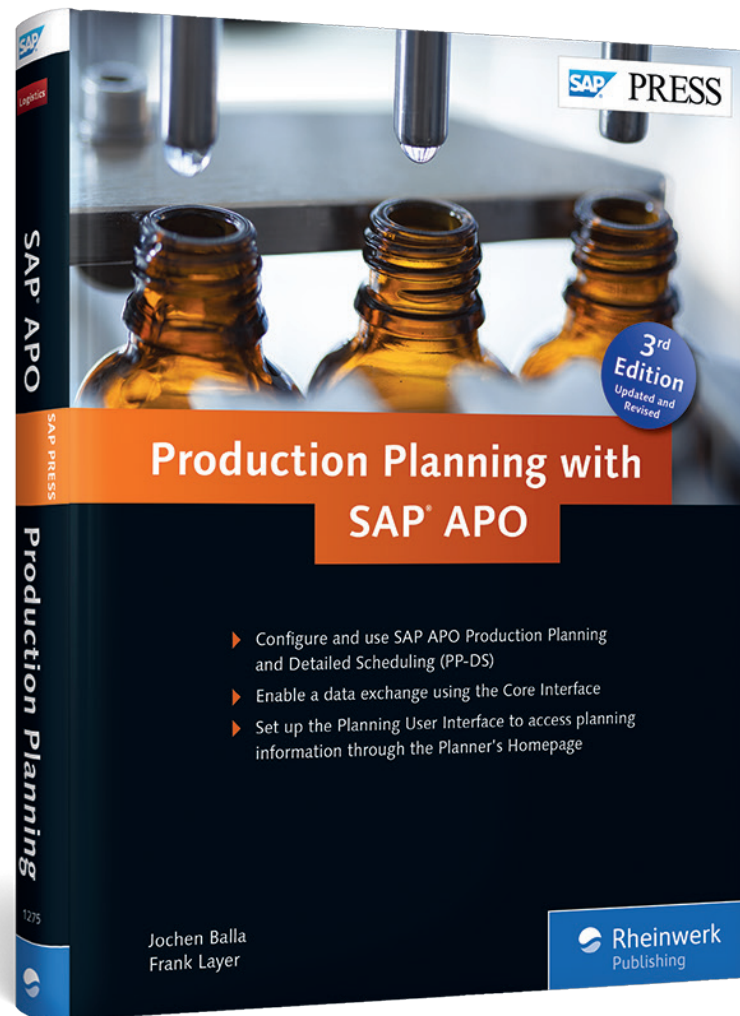
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