

SCM601

Processes in Logistics Execution

**PARTICIPANT HANDBOOK
INSTRUCTOR-LED TRAINING**

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Typographic Conventions

American English is the standard used in this handbook.

The following typographic conventions are also used.

This information is displayed in the instructor's presentation



Demonstration



Procedure



Warning or Caution



Hint



Related or Additional Information



Facilitated Discussion



User interface control

Example text

Window title

Example text

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Course Overview

TARGET AUDIENCE

This course is intended for the following audiences:

- Application Consultant
- Project Manager

UNIT 1

Logistics Execution in the SAP Business Suite

Lesson 1

Positioning Logistics Execution in SAP Solutions

3

Lesson 2

Positioning Logistics Execution in SAP ERP

9

UNIT OBJECTIVES

- Position logistics execution in SAP Business Suite
- Analyze how logistics execution is positioned in SAP ERP

Positioning Logistics Execution in SAP Solutions

LESSON OVERVIEW

This lesson explains the relationship between SAP Business Suite and its solutions. The lesson also clarifies the position of the logistics execution component in the SAP Supply Chain Management (SAP SCM) and SAP ERP applications.

Business Example

Your company wants to use SAP ERP to optimize its logistics processes. In particular, the company wants to examine how SAP ERP can support logistics execution functions. For this reason, you require the following knowledge:

- An understanding of SAP Business Suite
- An understanding of the classification of the SAP SCM and SAP ERP applications in SAP Business Suite
- An understanding of the components of SAP SCM and SAP ERP

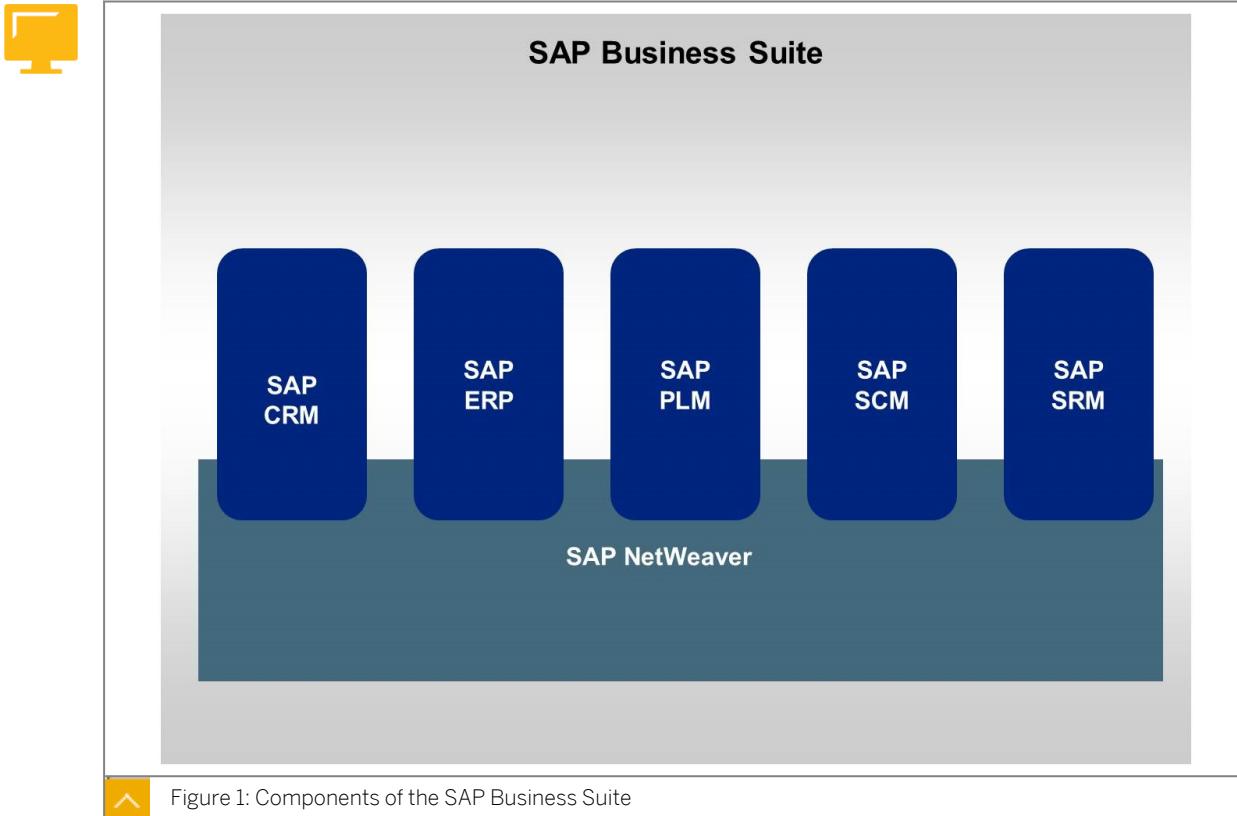


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Position logistics execution in SAP Business Suite

Definition and Structure of SAP Business Suite



SAP Business Suite includes a group of applications that address a broad spectrum of business requirements. Elements from this group can be combined, as required, with each other or with external products to map complex business scenarios. SAP Business Suite is a solution package that can be used in all industries. The technical architecture of SAP Business Suite is based on open standards so that different types of SAP and external systems can be connected to each other.

SAP Business Suite contains a group of solutions that are not industry-specific, but offer functions for specific business activities. These solutions support process control in a framework that goes beyond your company and your system landscape.



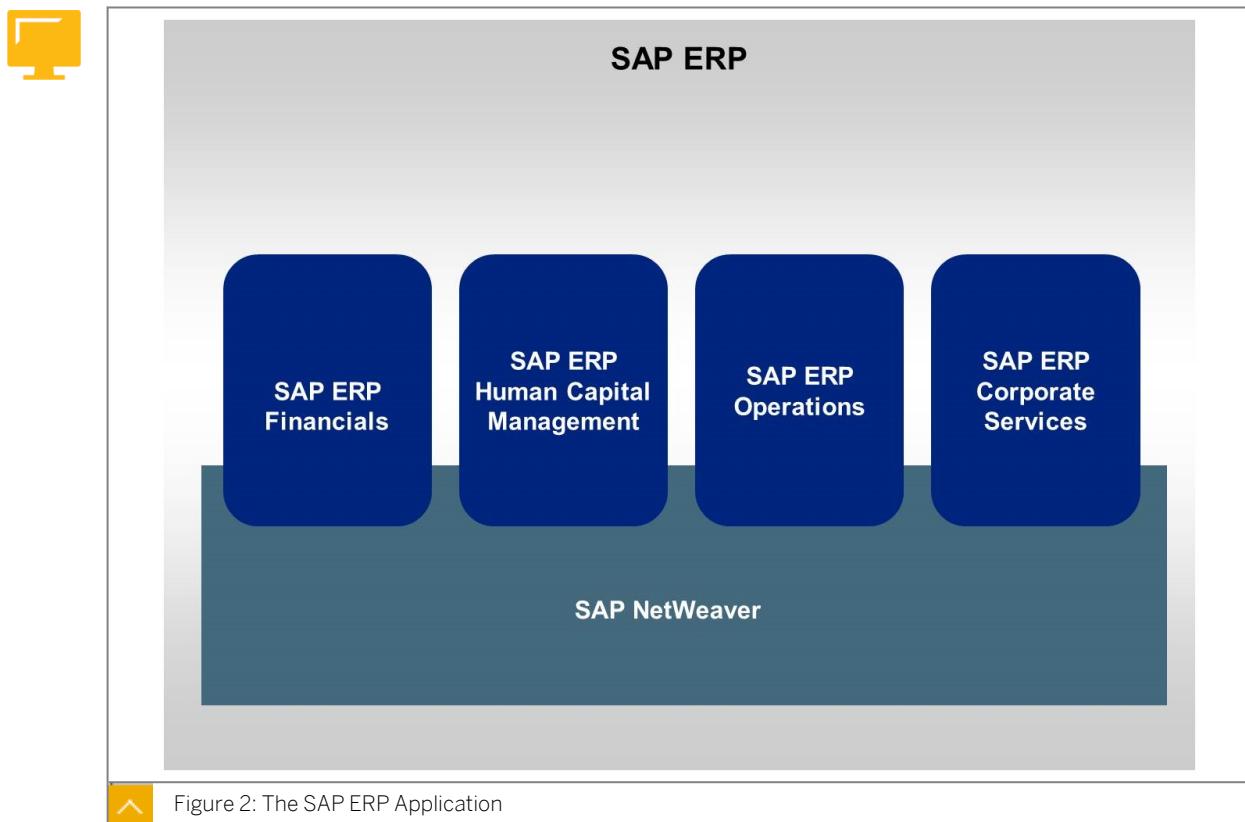
Note:

Many industries have specific requirements for the technical way in which systems map and control processes. Therefore, SAP also offers industry solutions, for example, SAP for Retail, SAP for Utilities, SAP for Oil and Gas, and so on. These industry solutions deal with systems that include additional industry-specific functions only. SAP also offers solutions that are specifically intended for small and midsize businesses.

The five key solutions shown in the figure are used for planning, controlling, and optimizing specific business activities in a global context. These key solutions group together a specific selection of company employees and partners. For example, the SAP Customer Relationship Management (SAP CRM) is used to maintain and enhance customer relationships. This means that office-based sales employees, field sales representatives, service providers such as call centers, and customers are integrated in a network.

The SAP NetWeaver technology platform forms the technical foundations of SAP Business Suite, both as an application and an integration platform. It also enables you to network complex and heterogeneous system landscapes across technology boundaries.

The SAP ERP Application



SAP ERP is part of SAP Business Suite.

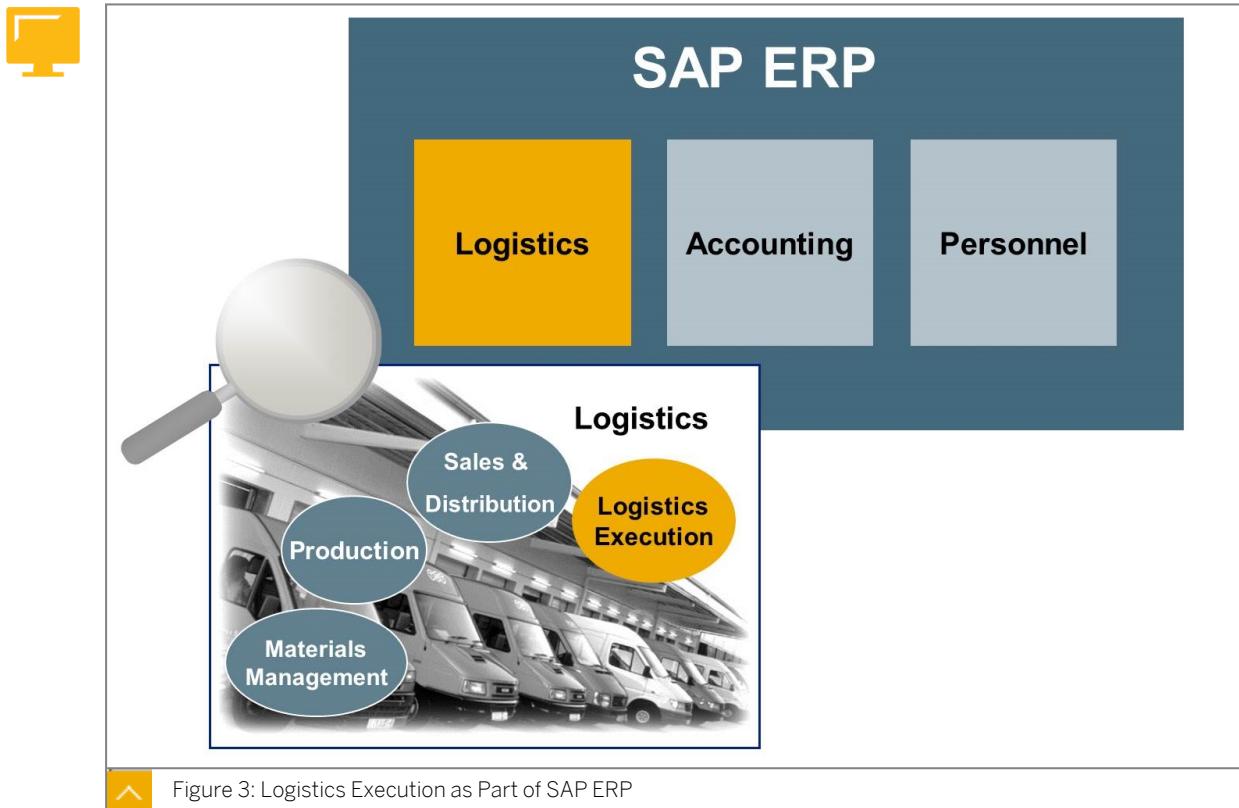
SAP ERP consists of the following applications:

- SAP ERP Financials
This application provides functions for financial and management accounting.
- SAP ERP for Human Capital Management (SAP ERP HCM)
This application provides functions for human resource management.
- SAP ERP Operations
This application provides functions for sales, logistics, manufacturing and procurement.
- SAP ERP Corporate Services
This application provides functions for central enterprise services.

SAP ERP also supports system administration for user management, configuration management, central database administration, and company-wide use of web services. The SAP ERP Operations solution for controlling logistics and production groups the functions of logistics execution under Procurement and Logistics.

As with other SAP solutions, SAP ERP is based on SAP NetWeaver.

Logistics Execution in SAP ERP



Logistics execution is an application component of SAP ERP. The SAP ERP application consists of various subcomponents, of which the most important relate to the logistics, accounting, and human resources areas.

The components that have a direct influence on processes are assigned to the logistics area.

These components are as follows:

- Materials management (MM)
- Sales and distribution (SD)
- Logistics execution
- Production

There are also application components that run alongside processes. These components include plant maintenance and quality management. There are also cross-process functions such as batch management, document management, and handling unit management.



Note:

These cross-process functions are integrated into the menu for Logistics under Central Functions, which is appropriate with regard to their cross-process nature.

The principal advantage of SAP ERP is the extensive integration of its components in the entire system. The individual business applications access the same master data and exchange transaction data throughout the process.

This integration becomes particularly noticeable when you work with the logistics execution component. Logistics execution is kept active by the data flow from components. For example, ordered goods or goods produced in-house are delivered and put away. A sales order is created by the sales and distribution process. This order is then delivered by picking goods from the warehouse, packing them, loading them, and finally transporting them to the recipient.

The SAP SCM Application

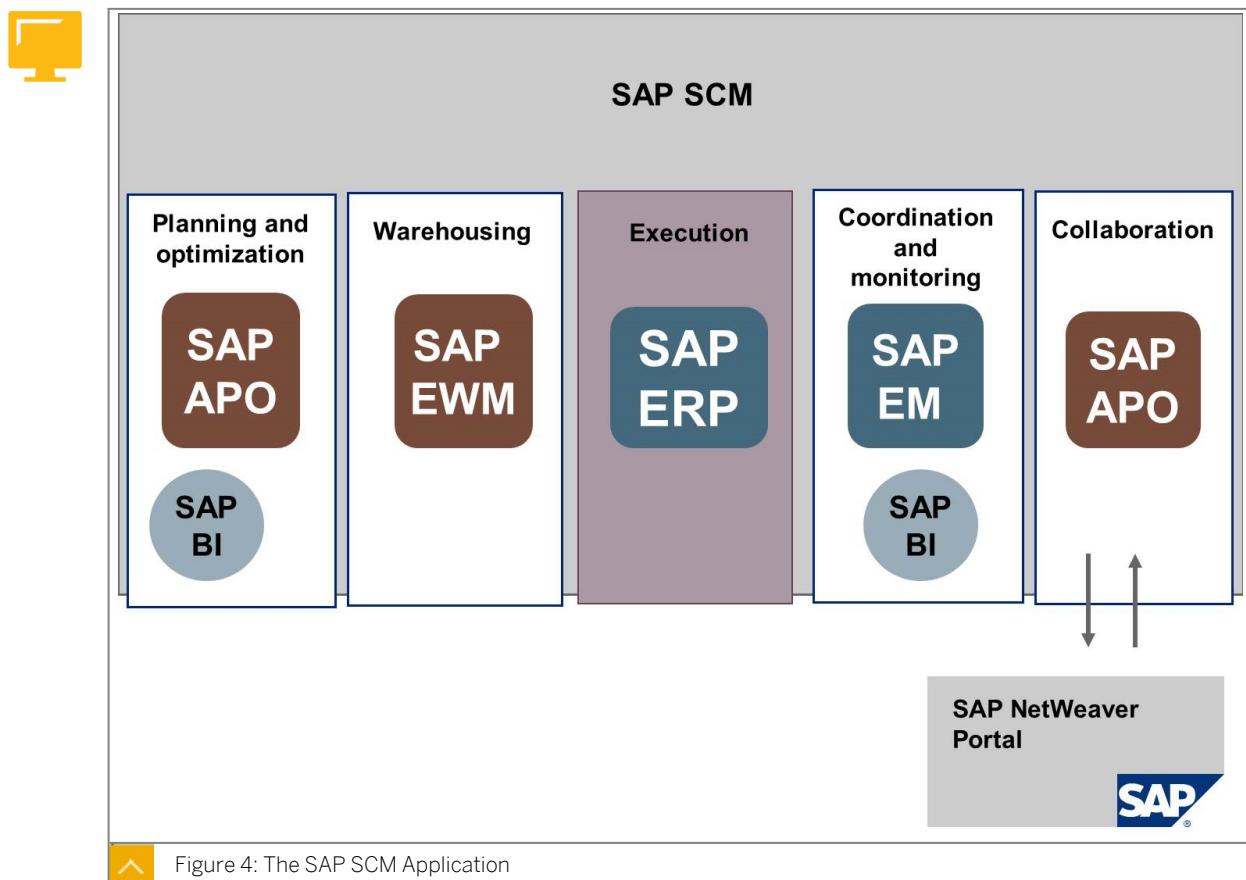


Figure 4: The SAP SCM Application

SAP SCM includes tools for planning, execution, and monitoring of complex procurement and distribution processes. You can compare planned and actual values to optimize processes. You can also evaluate the reliability of service providers. In 2006, SAP Extended Warehouse Management (SAP EWM) was added to the SAP SCM solution. With the SAP NetWeaver Portal component, companies around the world can collaborate across the Internet.

In the SAP SCM solution, planning, execution, and monitoring of individual process steps take place in different systems that are connected to each other.

Types of SAP SCM Applications

The SAP Advanced Planning & Optimization (SAP APO) component supports the following planning activities that occur in the supply chain management process:

- Demand planning
- Supply network planning
- Production planning and detail scheduling
- Deployment

These planning activities can interactively include external parties, such as suppliers, service providers, and customers.

The execution of the processes is mapped in the SAP ERP application. For example, production plans from SAP APO are converted to production orders, or planned shipments are scheduled and completed. SAP ERP provides master data, such as material or vendor masters, to SAP APO.

Planning data from SAP APO is used in SAP ERP as the basis for creating documents such as purchase orders, production orders, and shipments. Documents that are created in SAP ERP are then used as the basis for planning in SAP APO. For example, sales orders are used for demand planning.

SAP Event Management

To coordinate and monitor logistics processes, you can use the SAP Event Management application. This application processes messages that refer to the progress of logistics processes, updates the status of these processes, and triggers any necessary follow-on activities.

SAP Extended Warehouse Management

The SAP Extended Warehouse Management (SAP EWM) application is a decentralized Warehouse Management system that transfers data to and from an allocated ERP application. This means that at least two applications are required - an SCM application and an ERP application, which may or may not be an SAP application.

The main tasks of SAP EWM are as follows:

- Inventory management at the storage bin level
- Management and control of all physical goods movements in the warehouse with warehouse tasks and warehouse orders

SAP NetWeaver Business Warehouse

To optimize the process flow, you can use the SAP NetWeaver component, *SAP NetWeaver Business Warehouse (SAP NetWeaver BW)*. In this way, the data of the actual process flow from other SAP systems can be used as a basis for realistic planning in SAP APO.



LESSON SUMMARY

You should now be able to:

- Position logistics execution in SAP Business Suite

Positioning Logistics Execution in SAP ERP

LESSON OVERVIEW

The lesson gives an overview of the components and uses of logistics execution.

Business Example

Your company wants to use SAP ERP to optimize its logistics processes. In particular, the company wants to examine how this application can support logistics execution functions. For this reason, you require the following knowledge:

- An understanding of the components of logistics execution
- An understanding of how logistics execution functions in SAP ERP



LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Analyze how logistics execution is positioned in SAP ERP

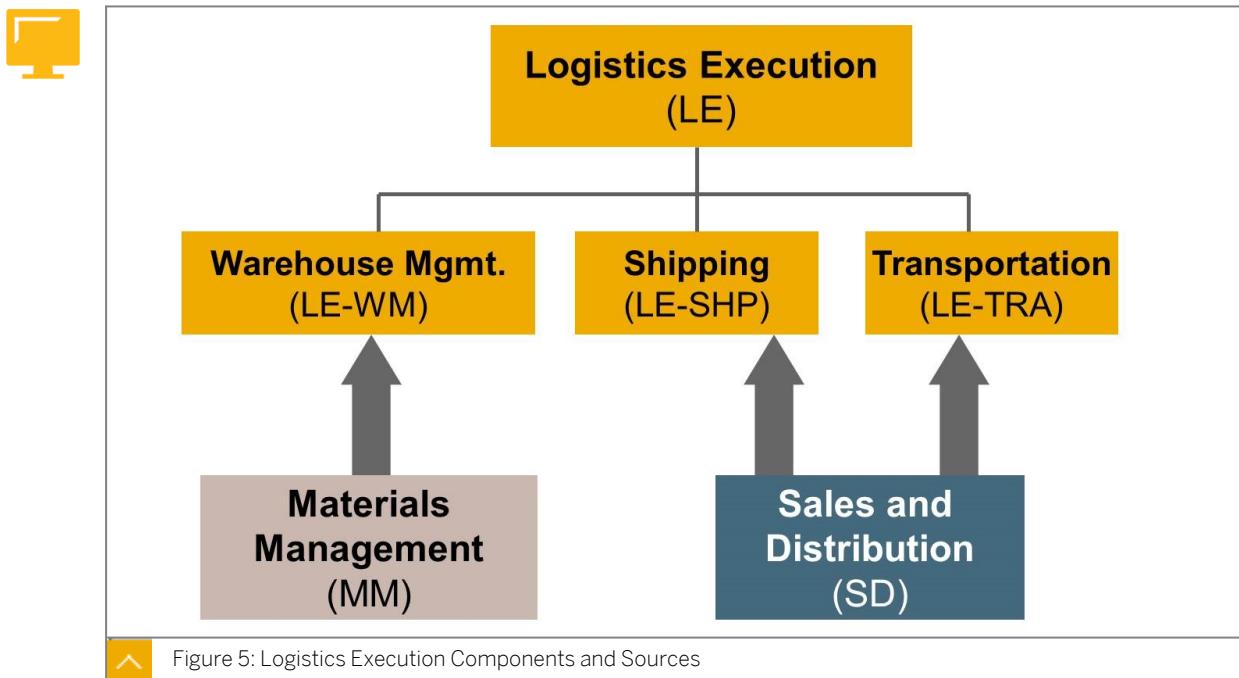
Logistics Execution Integration in SAP SCM and SAP ERP

SAP ERP uses its logistics functions to map the execution of procurement and distribution processes in SAP Supply Chain Management (SAP SCM) and SAP ERP. Logistics execution is the SAP ERP application component for specific functions of executable logistics.

Logistics execution is connected to production planning and control, materials management (MM), and sales and distribution (SD). However, you can use logistics execution outside the SAP ERP context as a separate system. That is why some publications refer to a Logistics Execution System. The main motive for using logistics execution in isolation is for security reasons.

If the system in which commercial processes are controlled fails at any time, executable logistics is still functional in its own, separate system. In this case, it is not necessary to connect the separate Logistics Execution System to a central SAP system.

Logistics Execution Components and Sources



Warehouse management was adopted from materials management together with shipping and transportation processing from sales and distribution. These functions already existed in the earlier version of SAP ERP before the introduction of logistics execution, but were assigned to other application components. These changes had an effect on the user menu and the structure of Customizing.

Several transactions are now available only in the new *Logistics Execution* area menu that has been created for SAP ERP and a new submenu that now exists in Customizing for configuring logistics execution processes in the system.

Functions of Logistics Execution

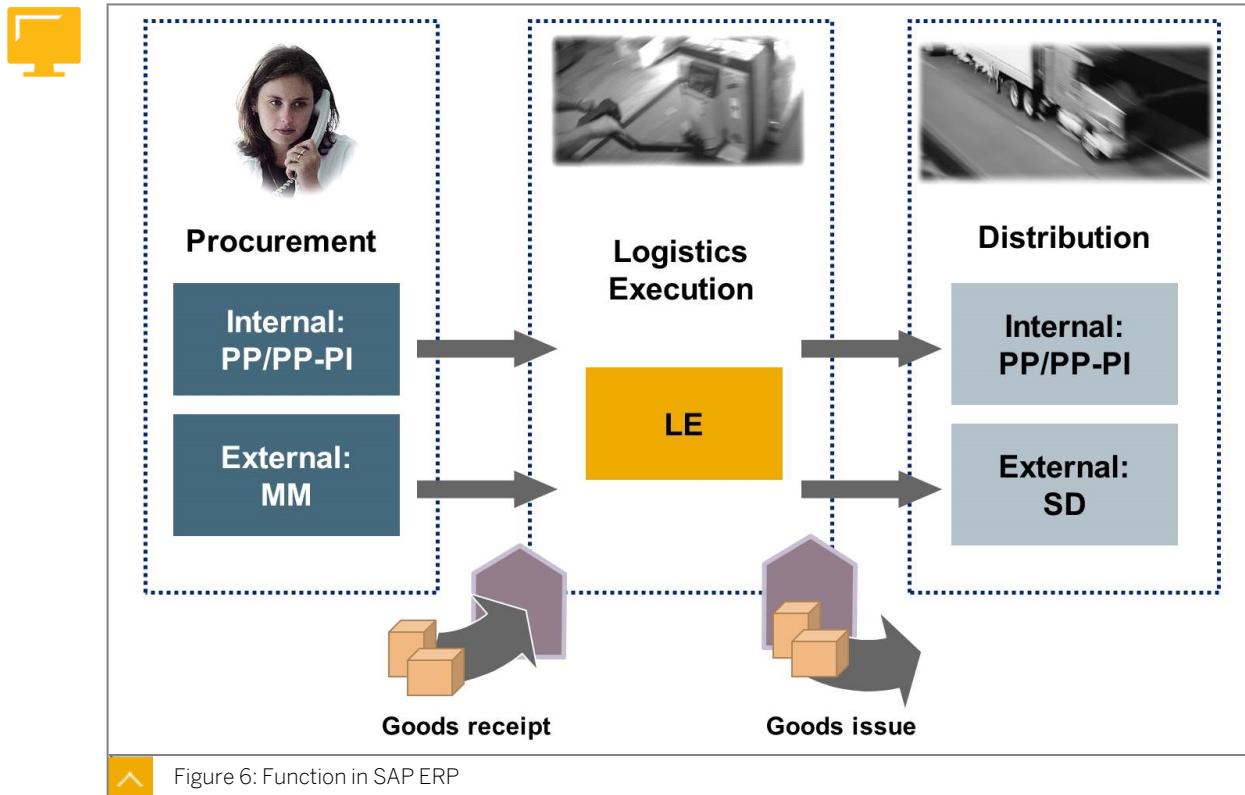


Figure 6: Function in SAP ERP

Logistics execution offers all the functions necessary for mapping the execution of logistics processes, with no industry-specific bias. The core functions of logistics execution always focus on complex goods receipt and goods issue processes.

In SAP ERP, logistics execution is the link between procurement and distribution, regardless of whether processes are internal or involve external parties (vendors, customers, or service providers).

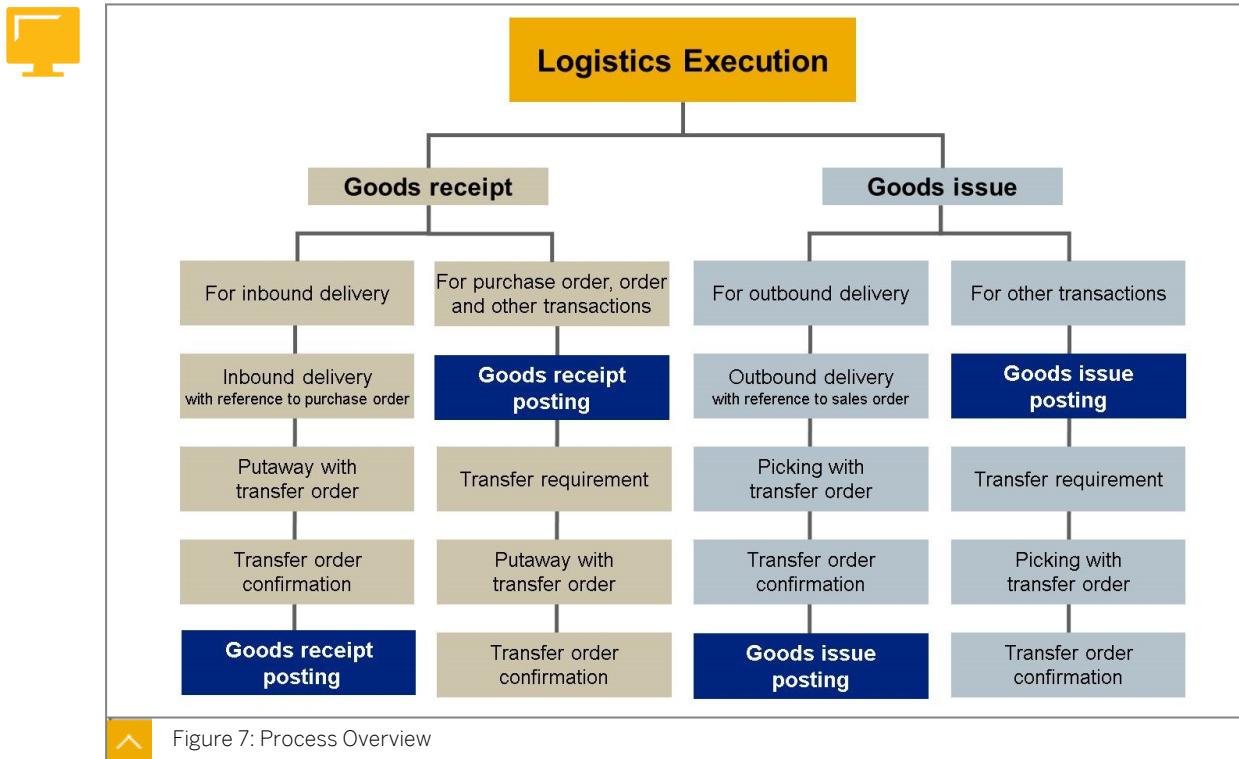
Materials that are produced in-house and goods that are procured externally are put away and removed from storage by using warehouse management, either to supply your own production or to deliver goods to industry or consumers.

The underlying organizational structures involved can be extremely complex. Logistics execution uses its own organizational units and master data that are integrated in the system of organizational structures in SAP ERP. You can use these structure elements to map various business situations.

Note:

To fulfil special requirements in certain areas, there are preconfigured interfaces to external systems. For example, you can connect a warehouse control unit for an automatic high-rack storage area or an external transportation planning system to SAP ERP.

The Basic Forms of Mapping Processes



Logistics execution offers you two basic means of mapping processes for good receipts and goods issues. You can create either a delivery posting or an inventory management posting (each with reference to a preceding document) at the start of the process.

The figure shows comparison between the document flow and technical posting processes for both goods receipt and goods issue.

If you work with deliveries, the warehouse management activities (creating and confirming transfer orders) are completed before the inventory management posting. The goods movement posting always refers to the delivery.



Note:

The transfer order is the document that you use to perform all material movements in the warehouse.

The inventory management posting can also be performed at the beginning of the process. This posting generates a transfer requirement, which is the basis for planning and posting the warehouse management activities. The putaway or stock removal by using transfer orders completes the process.



Note:

The figure displaying the processes is related to the corresponding user menu.

In many cases, the reason for the putaway or stock removal defines the means of mapping the process. For example, in the standard system, for goods receipts from production, you

can only use goods receipt posting for the work order with a subsequent putaway. For sales order processing, the stock removal refers to the outbound delivery.



LESSON SUMMARY

You should now be able to:

- Analyze how logistics execution is positioned in SAP ERP

Learning Assessment

- SAP customers and partners can find additional information in the SAP Service Marketplace web site by using their S-user ID.

Determine whether this statement is true or false.

- True
- False

- Which of the following products does not belong to the SAP Supply Chain Management (SAP SCM) application?

Choose the correct answer.

- A SAP Advanced Planning & Optimization (SAP APO)
- B SAP ERP
- C SAP Business Planning and Consolidation (SAP BPC)
- D SAP Event Management

- Logistics execution is part of which of the following solutions?

Choose the correct answer.

- A SAP ERP
- B SAP Business Planning and Consolidation (SAP BPC)
- C SAP Event Management

- Before being combined under the title logistics execution, the logistics execution components were assigned to which of the following SAP application components?

Choose the correct answers.

- A Materials management
- B Production planning and control
- C Sales and distribution
- D Logistics

5. Which of the following documents are specific to logistics execution?

Choose the correct answers.

- A Sales order
- B Inbound delivery
- C Transfer requirement
- D Material document
- E Transfer order
- F Outbound delivery

Learning Assessment - Answers

- SAP customers and partners can find additional information in the SAP Service Marketplace web site by using their S-user ID.

Determine whether this statement is true or false.

True

False

To access the SAP Service Marketplace web site, customers and partners need at least an S-user ID. Users with a C-user ID can also access the web site.

- Which of the following products does not belong to the SAP Supply Chain Management (SAP SCM) application?

Choose the correct answer.

A SAP Advanced Planning & Optimization (SAP APO)

B SAP ERP

C SAP Business Planning and Consolidation (SAP BPC)

D SAP Event Management

SAP BPC is used in the SAP ERP Financials solution.

- Logistics execution is part of which of the following solutions?

Choose the correct answer.

A SAP ERP

B SAP Business Planning and Consolidation (SAP BPC)

C SAP Event Management

Logistics execution is part of the SAP ERP solution.

4. Before being combined under the title logistics execution, the logistics execution components were assigned to which of the following SAP application components?

Choose the correct answers.

- A Materials management
- B Production planning and control
- C Sales and distribution
- D Logistics

Before SAP ERP, warehouse management was assigned to materials management, and shipping and transportation processing were assigned to sales and distribution.

5. Which of the following documents are specific to logistics execution?

Choose the correct answers.

- A Sales order
- B Inbound delivery
- C Transfer requirement
- D Material document
- E Transfer order
- F Outbound delivery

Deliveries, transfer requirements, and transfer orders are logistics execution documents.

Lesson 1

Positioning Organizational Units in Logistics Execution

21

Lesson 2

Creating Storage Bins and Displaying Quants

27

Lesson 3

Maintaining Material and Customer Master Records

33

UNIT OBJECTIVES

- Position the organizational units of logistics execution
- Create storage bins
- Display quants
- Create the warehouse management views in a material master record
- Maintain shipping-relevant data in a customer record

Positioning Organizational Units in Logistics Execution

LESSON OVERVIEW

This lesson introduces the subfunctions of logistics execution, such as warehouse management, delivery processing, and transportation processing. The lesson also explains the relationship between various organizational units.

Business Example

You want to set up goods receipt and goods issue processes in the company. To do so, you first need to enter in SAP ERP the relevant spatial and personnel factors, which include storage spaces, shipping departments, and internal transportation logistics in SAP ERP. For this reason, you require the following knowledge:

- An understanding of the central organizational units in logistics execution and their basic functions
- An understanding of the organizational subdivision of warehouse numbers
- An understanding of the position of the organizational units specific to logistics execution in the overall system of logistics

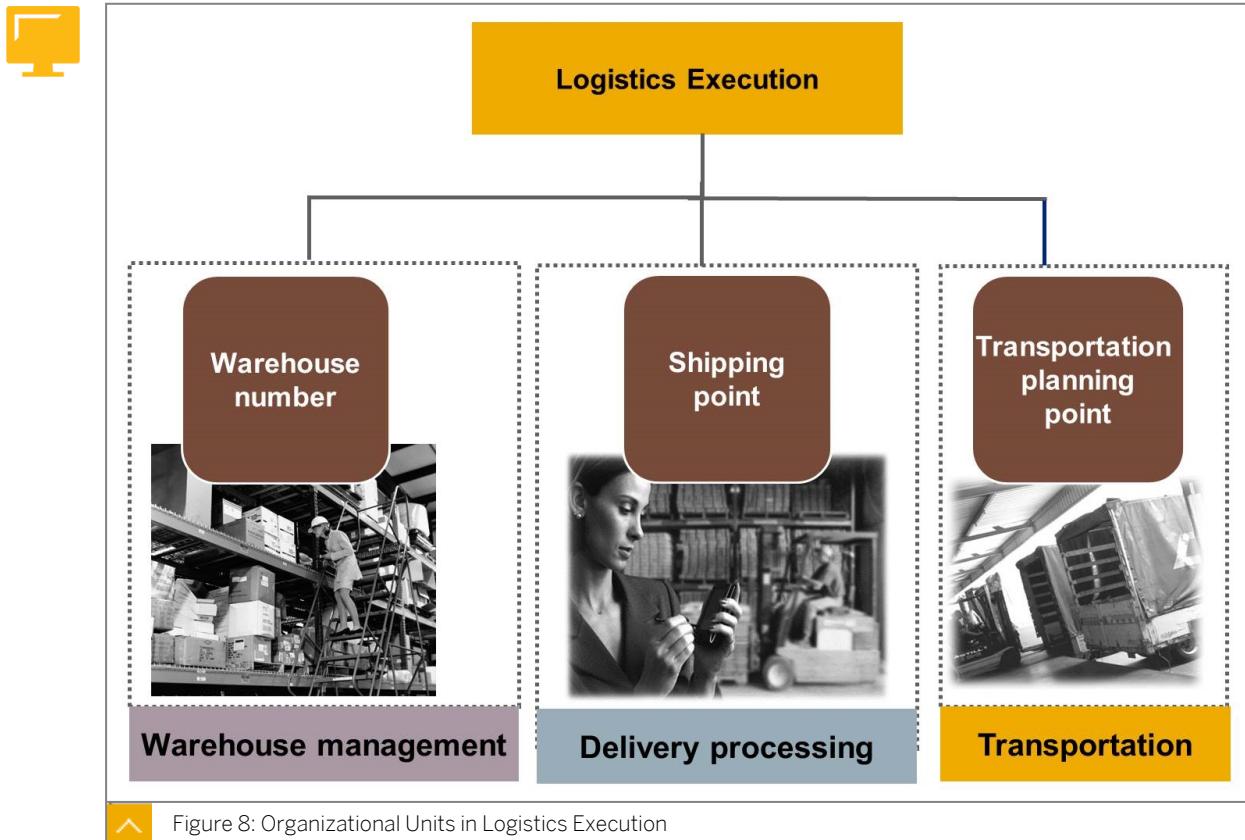


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Position the organizational units of logistics execution

Organizational Units in Logistics Execution



Each subfunction of logistics execution uses its own organizational units, which form the structural basis for process control. You define these organizational units in Customizing for the enterprise structure.

The organizational units in logistics execution are as follows:

- Warehouse number (warehouse management)

The warehouse number is the main organizational unit for the Warehouse Management system. This number is used to map a warehouse complex. In practice, the warehouse number often corresponds to a warehouse or warehouse building. Each warehouse number has a substructure. The largest part of process control is fixed in this substructure.

- Shipping point (delivery processing)

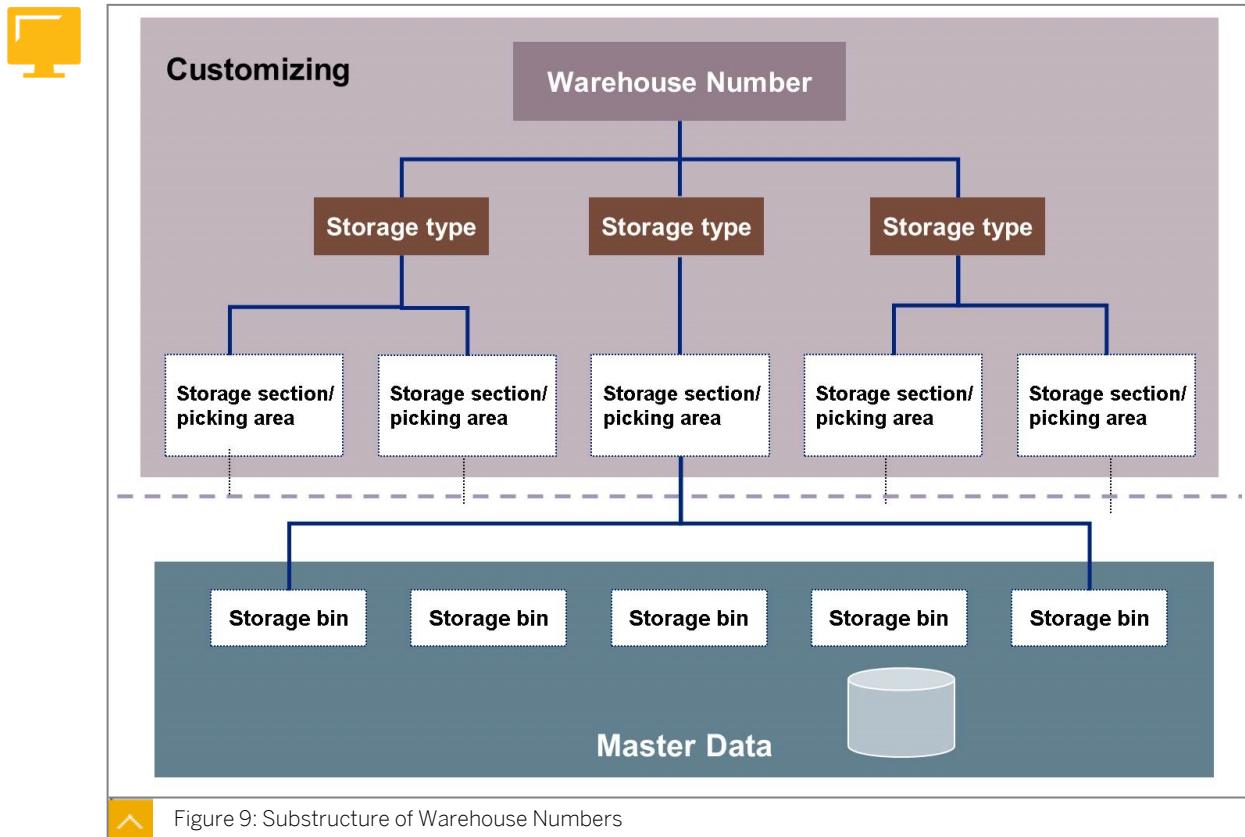
In SAP ERP, the shipping point organizational unit is used to map the location of shipping processing or the group of people responsible for shipping processing. If necessary for process control, you can create more than one shipping point.

Both spatial and technical process factors can be influential. For example, you can define a separate shipping point for each shipping type (air cargo, express delivery service, mail, and so on). The shipping point is essential for goods issue processes using outbound deliveries.

- Transportation planning point (transportation)

If you want to use transportation processing in SAP ERP, you need to know the transportation planning point. Similar to the shipping point, the transportation planning point can be either a location or a group of people. If required, you can define more than one transportation planning point. You can use the shipment type as differentiation criteria.

Substructure of Warehouse Numbers



Each warehouse number includes a number of subordinate organizational units (the number depends on your Customizing settings), storage types, and storage sections. All these elements are used to map the spatial relationships in the warehouse.

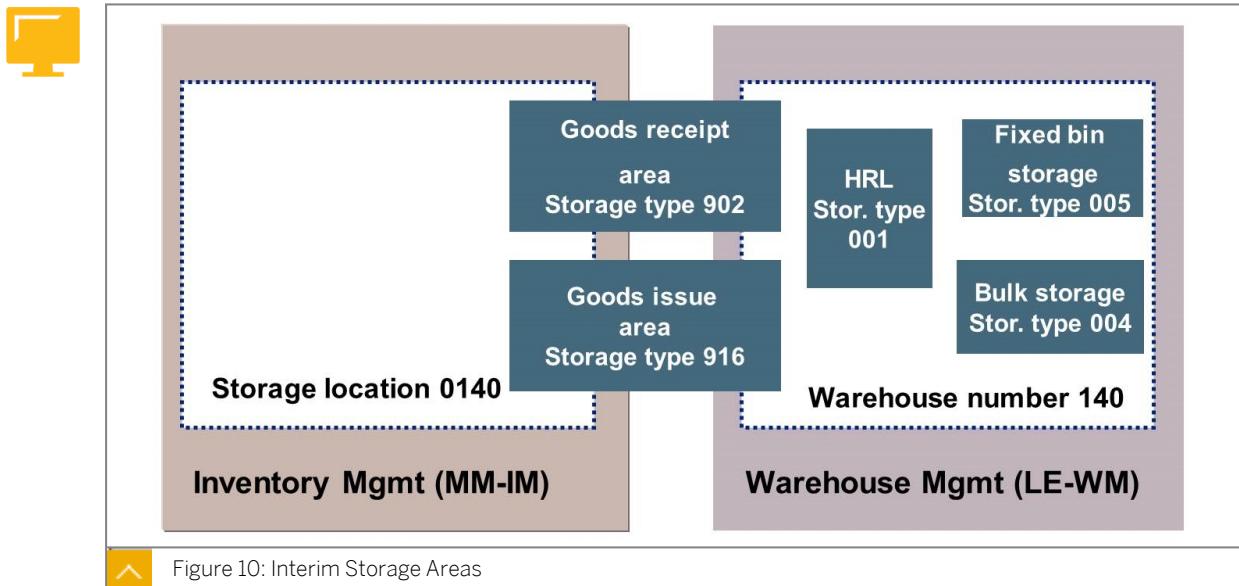
The storage type organizational unit is used to map storage spaces that are separated either spatially or organizationally, or that should be handled separately in SAP ERP.

The standard system already contains a number of preconfigured storage types, some of which are as follows:

- High rack storage
- Fixed storage bin
- Bulk storage

You can change these default values as required or create new storage types as additions or replacements. A main section of the Customizing settings for warehouse management is specific to storage types. A type of master data record is assigned to each storage type in Customizing. You make the basic settings for controlling putaway and stock removal processes separately.

Interim Storage Areas



In the standard SAP ERP system, interim storage areas can be recognized by their key (which starts with the number 9). These storage types form a type of bridge between warehouse management and inventory management. Typical examples of interim storage areas are goods receipt zones and goods issue zones.

Each goods movement that affects both warehouse management and inventory management is processed using an interim storage area.

The following objects can be used to subdivide storage spaces:

- Storage sections

You create storage sections within storage types to further subdivide the storage space. There are various criteria that you can use to divide the storage space into storage sections. The material to be put away in the storage type often plays a decisive role. For example, fast-moving items have to be moved to the front sections so that the items are readily accessible, and perishable goods must be stored in a refrigerated area.

Depending on the requirements, you can use indicators to create links between materials and storage sections. The system takes storage sections into account only during putaway.



Caution:

Even if there is no need to divide the storage space further, you must create at least one storage section per storage type.

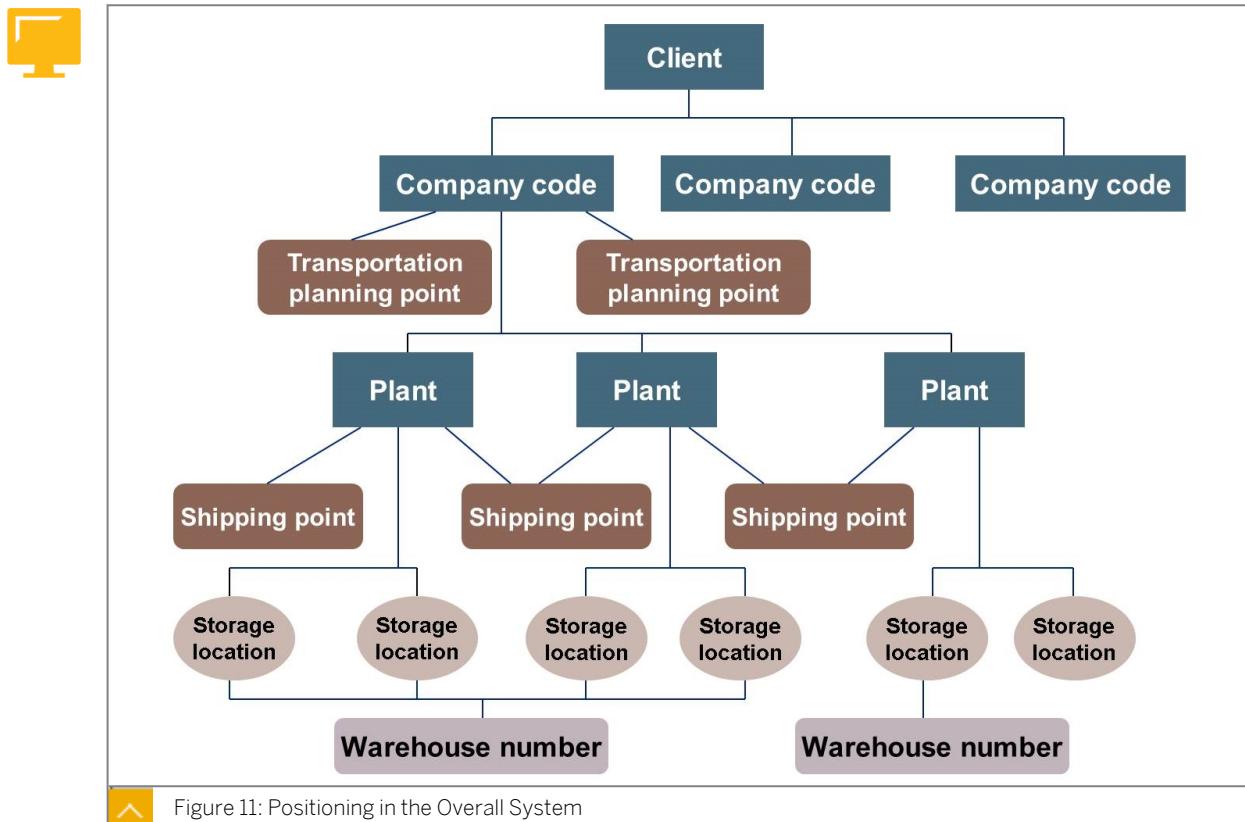
- Picking areas

Picking areas are part of the same hierarchical level as storage sections. You can use picking areas to divide the space in a storage type for stock removal reasons. In contrast to the storage section, a picking area is an optional factor.

- Storage bins

Storage bins are the exact location in the warehouse where goods are stored or can be stored.

Overall Position in Logistics Organizational Units



In Customizing, connect the organizational units that are specific to logistics execution to other, often higher level, organizational units to be able to map logistics processes.

The important units of the logistics organizational system are as follows:

- The transportation planning point
- The shipping point
- The warehouse number

Logistics Organization System – Units

Transportation Planning Point

The transportation planning point is usually assigned to a company code. This specific connection between the transportation planning point and the organizational unit (at which level the system calculates the balance, profit, or loss) is required for calculating and settling freight costs. You can connect a transportation planning point to only one company code.

Shipping Point

Shipping points are assigned to plants, which are organizational units that are used in various logistics applications and subapplications (such as production planning and control, plant maintenance, and inventory management). Plants are frequently used to map production locations or, more generally, used to map company subsidiaries.

A shipping point, if it corresponds to spatial factors, can be assigned to several plants within the same proximity. A plant can have more than one shipping point.

Warehouse Number

A warehouse number is always linked to at least one combination of plant and storage location. This means that a connection is created between warehouse management and inventory management because the storage location is the organizational unit for quantity-based inventory management.

You can use the functions of warehouse management only if you assign a warehouse number to a plant-storage location combination. However, you do not have to connect every storage location that has been created in a plant in inventory management to a warehouse number.

Certain stocks, such as packaging materials or consumable materials that are stored in fixed bins, do not require storage bin management. You can link several plant-storage location combinations to one warehouse number. In this case, the spatial situation is the most influential factor. However, you cannot simultaneously assign a plant-storage location combination to two or more warehouse numbers.



LESSON SUMMARY

You should now be able to:

- Position the organizational units of logistics execution

Creating Storage Bins and Displaying Quants

LESSON OVERVIEW

This lesson explains how to create storage bins and display quants.

Business Example

You want to manage material stock at the storage bin level. For this reason, you require the following knowledge:

- An understanding of the structure of a storage bin master record
- An understanding of how to create storage bins
- An understanding of how to display quants
- An understanding of how to check warehouse stock at the storage bin level

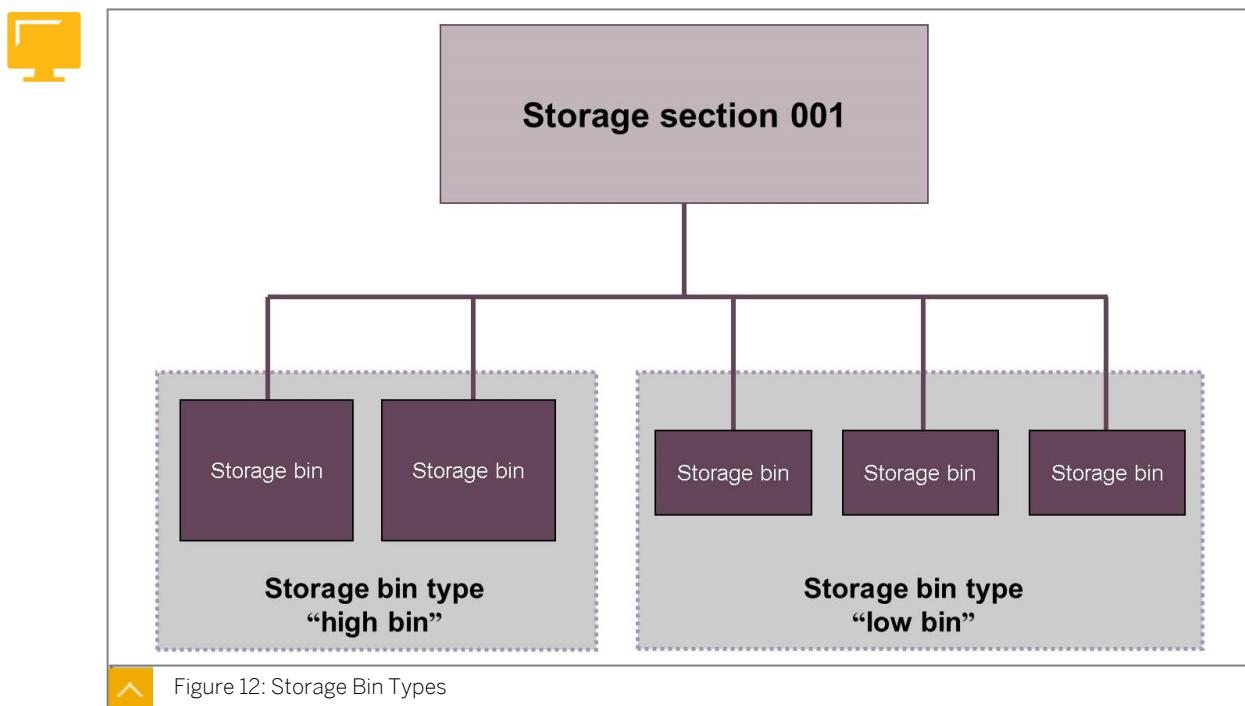


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create storage bins
- Display quants

The Storage Bin Master Record



Storage bins are always created in storage sections, which divide the area of a storage type according to various features, such as the inventory stock turnover or the warehouse temperature.

In the entire warehouse complex (defined by the warehouse number), the storage type represents a storage space. This storage space must be separated in SAP ERP at the organizational level and usually at a spatial level from other storage spaces, such as high rack, fixed bin, and bulk storage.

You can assign a storage bin type when you create a storage bin. This is particularly useful if the storage bins in a storage section have different dimensions. Bin types are categories that you define for each warehouse number in Customizing for *Warehouse Management* to specify the rough dimensions of storage bins (for example, bin width 1 m).

Depending on the settings at the storage type level, the system can take storage bin types into account during putaway. This means that you can avoid occupying storage bins with unsuitable load carriers. You can also assign the storage bins to be created at a picking area.

You can enter values for the maximum weight that can be placed on a storage bin. You can also use a neutral key number as an abstract representation of the total capacity of the storage bin. However, the system considers these values only if you have activated the relevant capacity check method in Customizing at the storage type level.

You can block storage bins wherever necessary. You can add this block, separately for putaway and stock removal, to a single storage bin master record or to a storage bin list. The system cannot access blocked storage bins during putaway, stock removals, and stock transfers.

The Quant

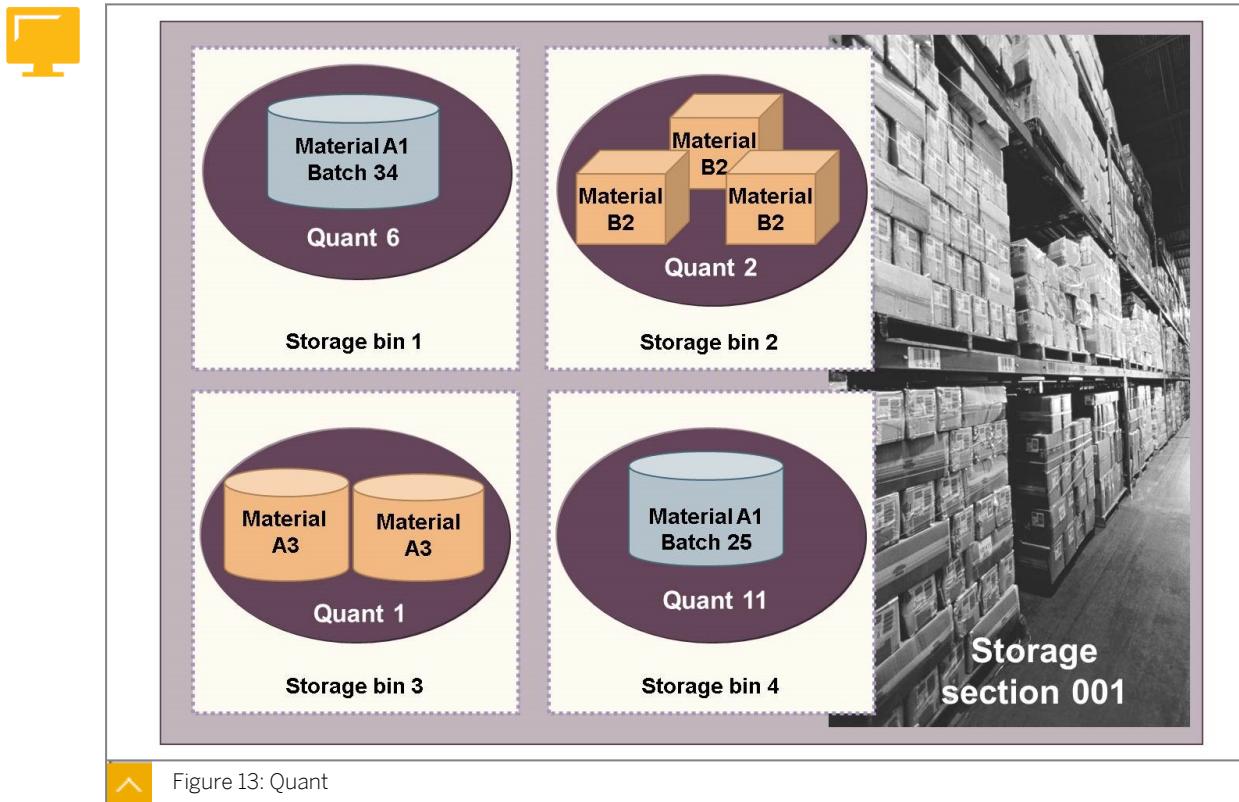


Figure 13: Quant

In SAP ERP, a quant refers to the contents of a storage bin. A quant is the material quantity in a storage bin. In the SAP ERP Warehouse Management system, you can view and move the materials in quants only. The actual material number is irrelevant, and so is the unit of measure. However, there are default criteria that the Warehouse Management system uses in putaways and stock removals to determine the material quantity that forms a quant in a storage bin.

The default criteria are as follows:

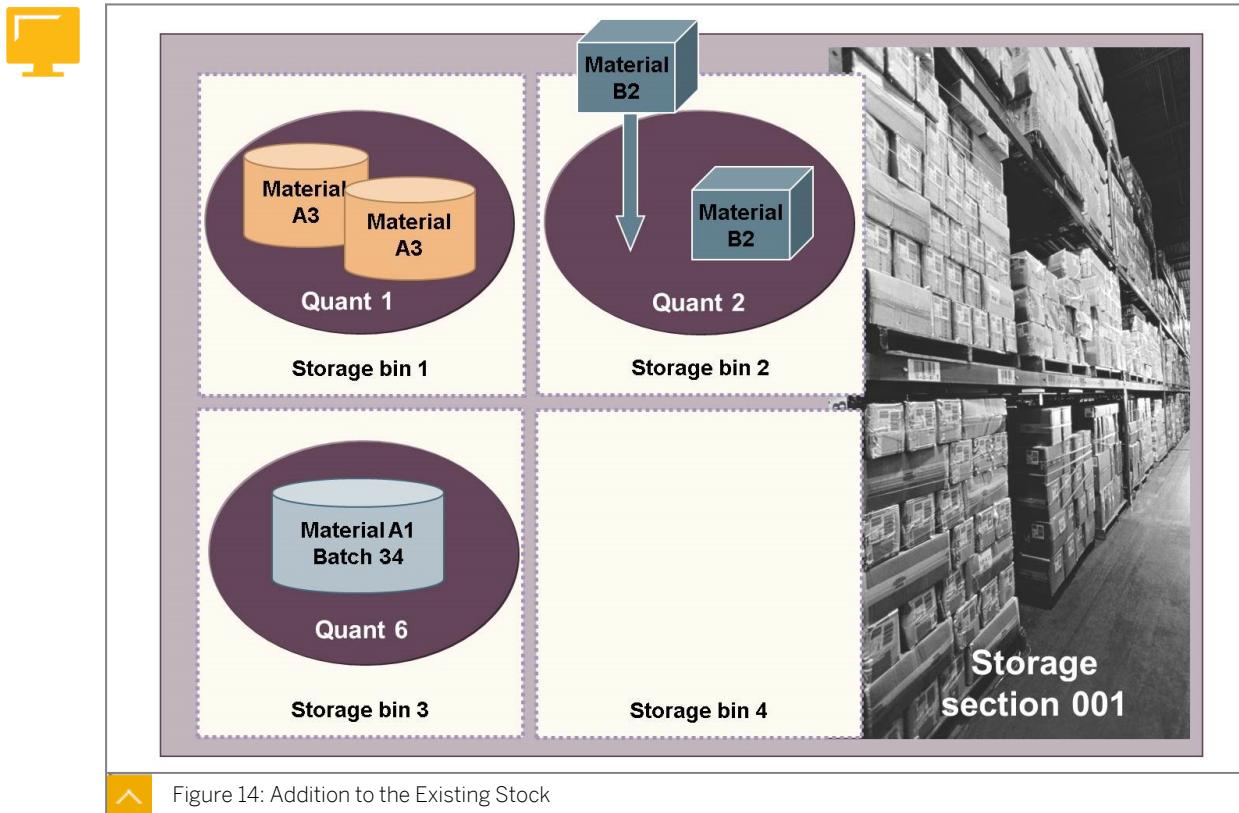
- Material number
- Stock category
- Special stock assignment
- Plant and storage location to which the material is assigned
- Batch number (if necessary)
- Storage unit number (if necessary)

The criteria for stock type, special stock assignment, and plant and storage location assignment are inventory management information for the material. When a goods receipt is posted, inventory management indicates the stock type to which the material quantity belongs. This means that at goods receipt, you can post a part of the material quantity to the unrestricted-use stock and another part to quality inspection or blocked stock. Similarly, for special stock assignment, partial quantities of a material can be flagged as project stock and other quantities as customer consignment stock.

If the inventory of a material is managed in various storage locations (for example, to map changes in ownership), the plant and storage location assignment of a specific material quantity is also important. Regardless of the stock type that is indicated by inventory management, in the Warehouse Management system, these assignments must match for a material quantity, if this quantity must form one quant in a storage bin. In other words, if you want to put away the same material that was posted at goods receipt partially to the unrestricted-use stock and partially to the quality inspection stock, at least two quants are always generated in the Warehouse Management system.

If you use batch management as a cross-component function, the batch number of a material quantity is also a quant characteristic. If you have activated the batch management requirement at the material master level, enter the relevant batch for each goods movement. In the Warehouse Management system, you must be able to determine at any point which material quantity belongs to which batch. Quants are always from the same batch.

Additions to Existing Stock and Mixed Storage



A storage bin that contains a quant of a material can store further quantities of the same material if the remaining quant criteria match. The storage type containing the storage bin must permit additions to the existing stock.

A storage bin in a storage type that permits additions to the existing stock can contain only one quant. However, you can increase and decrease the size of this quant by putaway and stock removal activities.

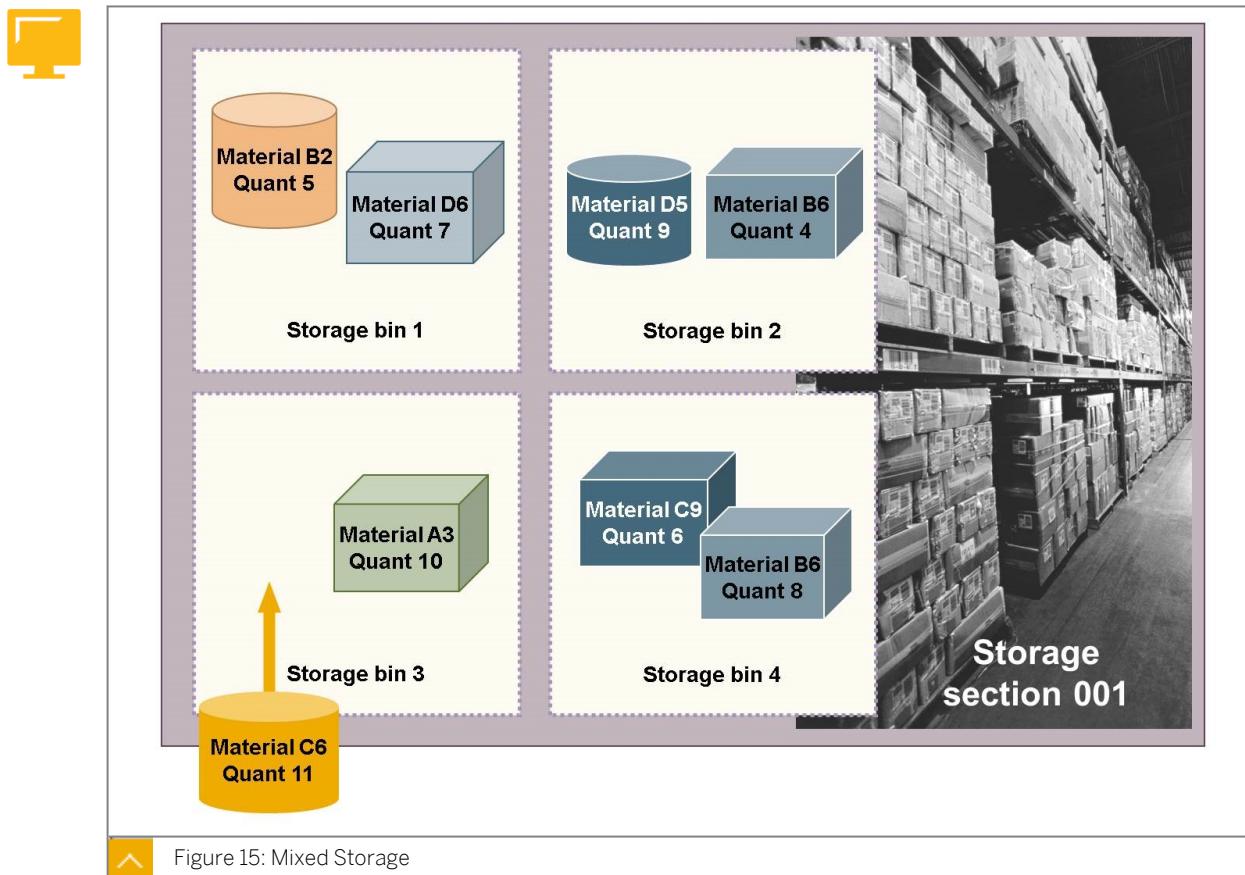


Caution:

The goods receipt date of a material quantity is managed at the quant level. If additions are made to the existing stock, the goods receipt date of the new quant is lost. The quant always shows the oldest goods receipt date. If you want to perform stock removals according to the first in first out (FIFO) principle, you need to prohibit additions to the existing stock.

If you want to store more than one quant in a storage bin, you must permit mixed storage in the storage type.

Mixed Storage



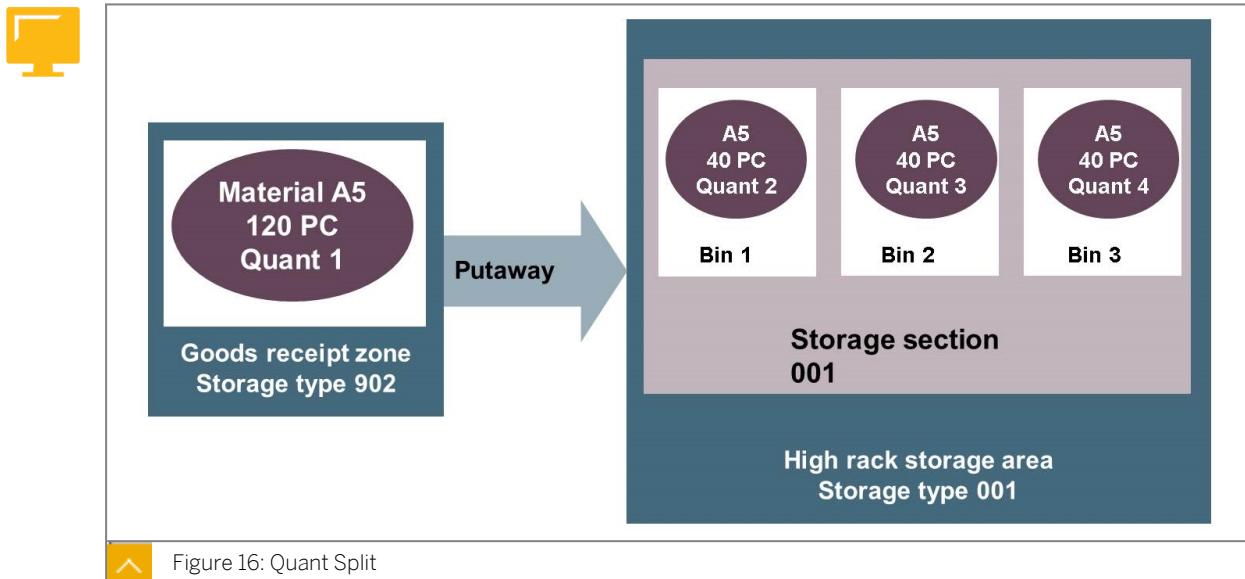
In mixed storage, you can store several materials and several batches of the same material in one storage bin. Various methods of capacity checking are available depending on the storage type and putaway control. These methods can ensure that the storage bins are not overloaded when additions are made to the existing stock or for mixed storage.

During putaway and stock removal activities, quants are generated and deleted, respectively. As long as a quant exists in the warehouse number (in other words, is contained in a storage bin), the quant has its own temporary data record. You can display this data record from the warehouse management stock overview.

The data records contain the following essential inventory management information:

- Goods receipt date
- Shelf life expiration date
- Batch number (where required)
- All storage-relevant information

Quant Split



The example in the figure shows that after a goods receipt posting, a quant of 120 pieces of a material is in a storage bin in the goods receipt area. During putaway to the high rack storage area, the system splits this quant equally among three storage bins, according to the various entries in the material master record and Customizing. This means that three new quants are generated. Each new quant consists of 40 pieces of the material. The original quant and its corresponding data record are deleted. In the goods issue process, quants disappear during stock removal.



LESSON SUMMARY

You should now be able to:

- Create storage bins
- Display quants

Maintaining Material and Customer Master Records

LESSON OVERVIEW

This lesson gives an overview of how to maintain material and customer master records.

Business Example

Your company wants to manage its material stocks in storage bins. This means that all the existing material master records require warehouse management data. To simplify the delivery processes, you need to maintain default values for shipping processing in the customer master records. For this reason, you require the following knowledge:

- An understanding of how to create warehouse management views in a material master record
- An understanding of the differences between the fields that are specific to warehouse number and storage bin
- An understanding of how to maintain shipping-relevant data in a customer record



LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create the warehouse management views in a material master record
- Maintain shipping-relevant data in a customer record

The Warehouse Management Views

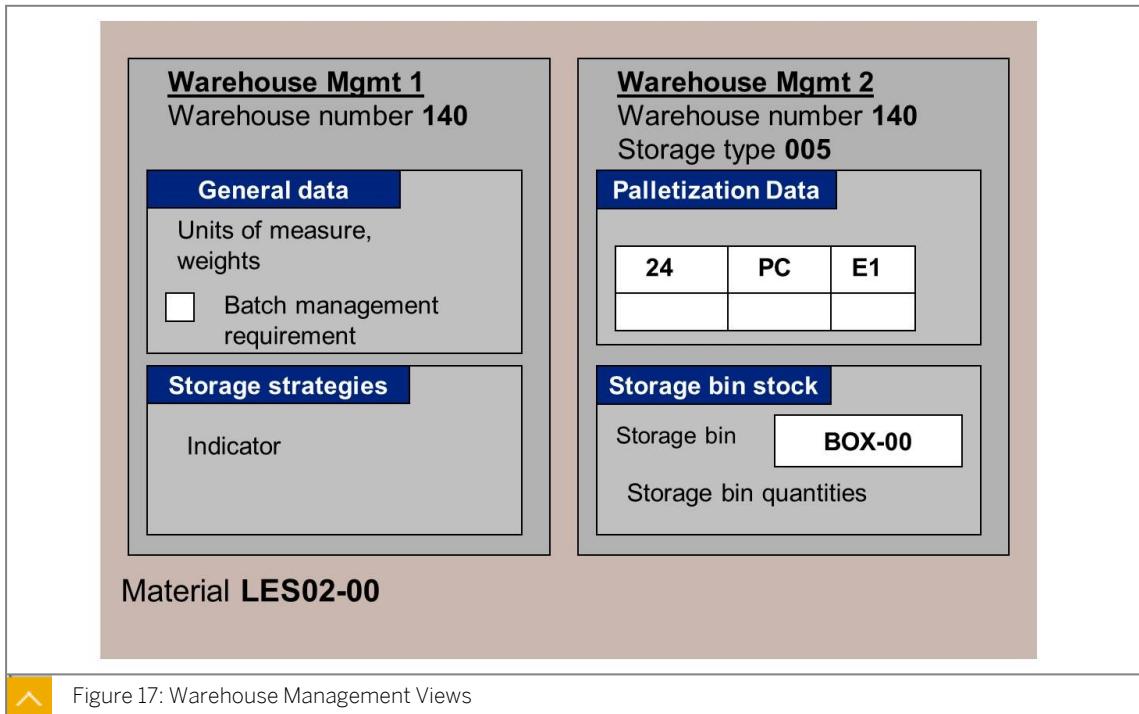


Figure 17: Warehouse Management Views

The master data for a material is divided into views. In most cases, these views correspond to specific departments or activity areas, such as sales and distribution, purchasing, and accounting, within a company. Each view contains a collection of fields that are either indicators for accessing Customizing tables or values for specific applications. These values are often default values. The Warehouse Management system has two specific views in the material master. Both views must be created to put away the material.

The first warehouse management view contains only fields whose entries are valid for a specific warehouse number. The second warehouse management view also contains information that is specific to a storage type. When you create, change, and display the warehouse management views, you must always enter the warehouse number in which you want to store the material. If the material is used in more than one warehouse number, create the warehouse management views for each warehouse number.

You do not always have to enter values into the fields that are specific to the storage type in the second warehouse management view. These fields are mainly used for materials with fixed bins. Therefore, if you store a material in a fixed storage bin, assign its fixed bin in the *Storage Bin* field of this view. This means that during putaway and stock removal the Warehouse Management system will automatically use the bin entered in the material master.



Hint:

When you create, change, and display the second warehouse management view, you can see the fields that are specific to the storage type only if you have previously defined a default storage type when selecting the organizational units.

Palletization Data

The screenshot shows the SAP Warehouse Management 2 interface. At the top, it displays "Warehouse Management 2", "Material LES02-00", and "Warehouse number 140". Below this, a table titled "Palletization data" is shown with three columns: "LE quantity", "BUN", and "SU type". The data row contains the values "24", "PC", and "E1". There are two additional empty rows below this.

Figure 18: Palletization Data

In the second warehouse management view, you can store palletization data for the material. This data is valid for one warehouse number.

If the material master contains palletization data, the Warehouse Management system adopts these as default values for each putaway operation. If a material is regularly palletized in a certain way from production or from a vendor, the system can use the default values in the material master to distribute the overall putaway quantity automatically, and perform storage bin determination.

To enter palletization data in the material master, first create suitable storage unit types in Customizing.

Storage unit types are structural aids for putaway. Storage unit types enable you to group loading equipment (such as europallets, wire baskets, or tanks) that have similar physical properties.

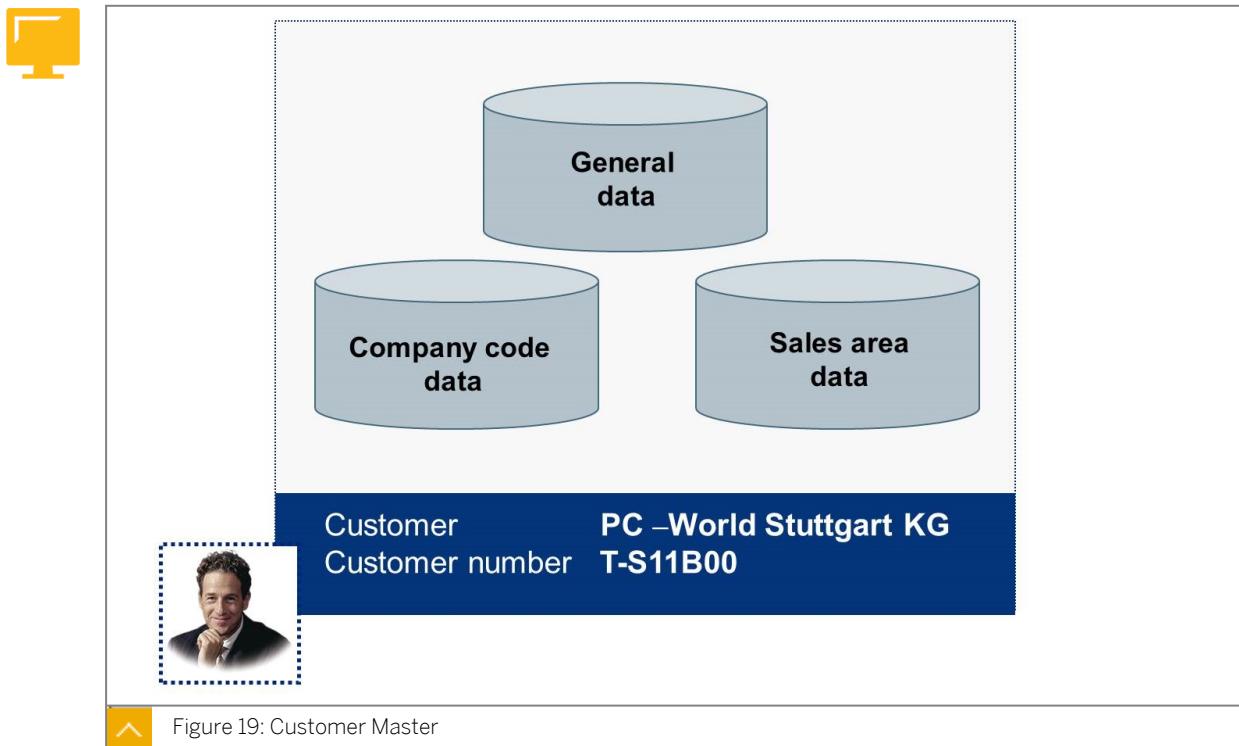
In Customizing, europallets are defined as the storage unit type, *Europallet*; wire baskets as *Wire basket*; and so on for each warehouse number. In the material master, the storage unit types are used to specify the distribution of a certain material quantity (loading equipment quantity). This means that in a standard case where 24 pieces of a material are always put away onto a europallet, this standard distribution can be stored in the material master by using the storage unit type, *Europallet*.



Hint:

The palletization data is only used as default values. If, in individual cases, the palletization is different from the data that is stored in the material master, you can manually change the proposed data before you perform the putaway.

Customer Master



A customer master record usually consists of the following views:

- General data view

The general data view contains the address and the bank details of the customer.

- Company code view

The company code view contains terms of payment and any dunning procedures.

- Sales area data view

The sales area data, in particular the subarea for delivery processing, can contain shipping conditions and delivering plants as default values for sales documents. In the sales area data view, you can store default values for delivery processing. You can also set indicators for order combination (during delivery creation) and complete delivery.

The system requires the issuing plant and the shipping condition to determine the shipping point. In logistics execution, the shipping point is the organizational unit that is required to map delivery processes. The shipping point is determined in the sales document for each document item.

During delivery creation, the system can use the shipping point that is automatically determined or a shipping point that you assign manually. The shipping point is also a source of information for scheduling in the shipping process, which the system performs according to the settings in the sales document.

LESSON SUMMARY

You should now be able to:

- Create the warehouse management views in a material master record

- Maintain shipping-relevant data in a customer record

Learning Assessment

1. Picking areas are part of the same hierarchical level as _____.

Choose the correct answer.

- A storage sections
- B storage bins
- C warehouse numbers

2. The _____ is the highest level organizational unit for the Warehouse Management system.

Choose the correct answer.

- A shipping point
- B warehouse number
- C transportation planning point

3. Storage bins are the exact location in the warehouse where goods are stored or can be stored.

Determine whether this statement is true or false.

- True
- False

4. When do you assign a storage bin type?

Choose the correct answer.

- A Before creating a storage bin
- B When creating a storage bin
- C After creating a mixed storage section

5. The batch number is a quant characteristic.

Determine whether this statement is true or false.

- True
 False

6. The shelf life expiration date is a quant characteristic.

Determine whether this statement is true or false.

- True
 False

7. What is entered when warehouse management views are created, changed, or displayed?

Choose the correct answer.

- A Cost quantity
 B Warehouse number
 C Values that are specific to storage type
 D Maximum bin quantity

8. In which of the following documents is the shipping point determined for each document item?

Choose the correct answer.

- A Sales document
 B Purchase order
 C Shipping document

Learning Assessment - Answers

- Picking areas are part of the same hierarchical level as _____.

Choose the correct answer.

- A storage sections
- B storage bins
- C warehouse numbers

- The _____ is the highest level organizational unit for the Warehouse Management system.

Choose the correct answer.

- A shipping point
- B warehouse number
- C transportation planning point

- Storage bins are the exact location in the warehouse where goods are stored or can be stored.

Determine whether this statement is true or false.

- True
- False

- When do you assign a storage bin type?

Choose the correct answer.

- A Before creating a storage bin
- B When creating a storage bin
- C After creating a mixed storage section

5. The batch number is a quant characteristic.

Determine whether this statement is true or false.

True

False

6. The shelf life expiration date is a quant characteristic.

Determine whether this statement is true or false.

True

False

7. What is entered when warehouse management views are created, changed, or displayed?

Choose the correct answer.

A Cost quantity

B Warehouse number

C Values that are specific to storage type

D Maximum bin quantity

8. In which of the following documents is the shipping point determined for each document item?

Choose the correct answer.

A Sales document

B Purchase order

C Shipping document

UNIT 3

Goods Receipt Processes

Lesson 1

Posting Goods Receipts for Purchase Orders

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Lesson 2

Performing Putaway with Transfer Orders

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Lesson 3

Creating Inbound Deliveries for Purchase Order

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Lesson 4

Posting Goods Receipts Based on Inbound Deliveries

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UNIT OBJECTIVES

- Post a goods receipt for a purchase order
- Perform putaway with transfer orders
- Create an inbound delivery for a purchase order
- Post goods receipts based on inbound deliveries

Posting Goods Receipts for Purchase Orders

LESSON OVERVIEW

This lesson describes the first form of goods receipt, that is, posting against a purchase order. It also explains the procedure to post the receipt for purchase orders.

Business Example

Your company procures materials from various vendors. After the goods receipt is posted, you want the delivered goods to be placed into the goods receipt zone. For this reason, you require the following knowledge:

- An understanding of the technical posting process of a goods receipt for a purchase order with subsequent putaway
- An understanding of how to create a purchase order in purchasing
- An understanding of how to post a goods receipt for a purchase order in inventory management
- An understanding of how to display the transfer requirement generated by the goods receipt posting and interpret its contents

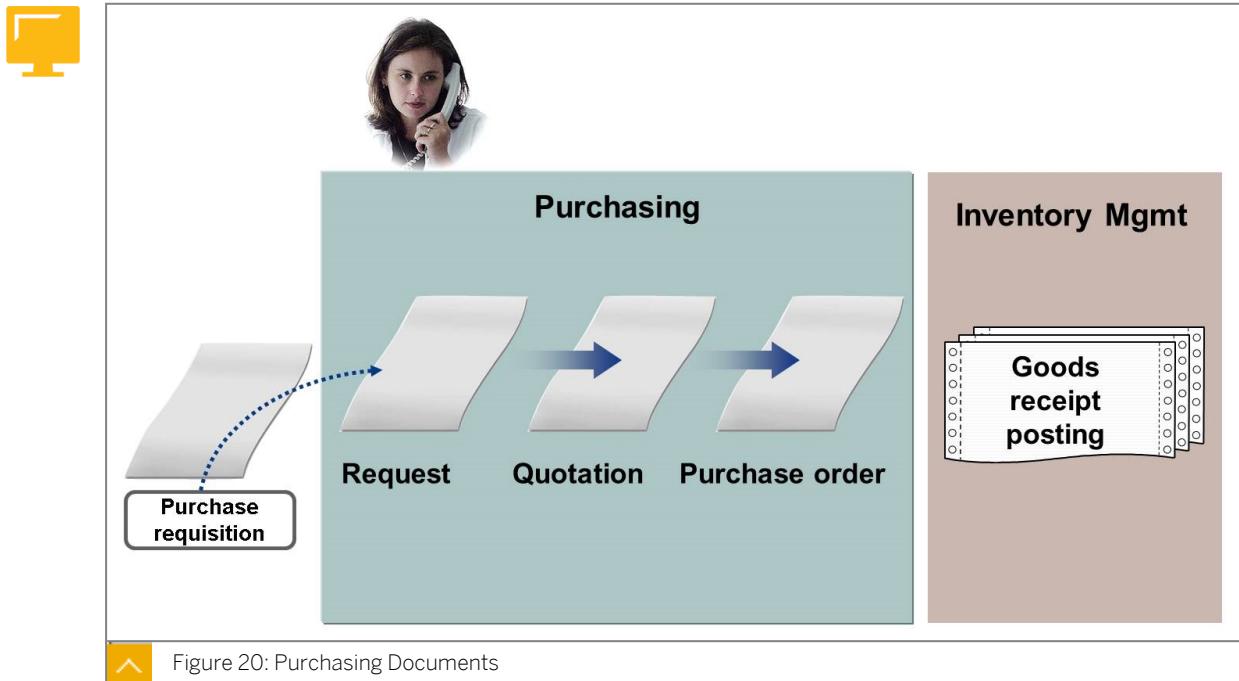


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Post a goods receipt for a purchase order

Purchase Order and Goods Receipt Posting Process



The process of making purchases from vendors and from other plants within your own company is handled in SAP ERP using purchasing documents, such as purchase requisitions and purchase orders. Employees can report requirements for externally procured materials to the purchasing department by using purchase requisitions.

For one-time transactions or for new contacts, purchasing can create a request for a quotation and then enter a corresponding quotation later. The system supports the buyer in comparing quotations from various vendors.

A purchase order can refer to a quotation as well as a requirement covering request.

Goods procured from external vendors have a separate Purchasing view in their master data. Vendors are represented by a vendor master record that contains address data, accounting data, and default values for purchase order processing (for example, delivery conditions).

If the same material is procured regularly from a specific vendor with fixed conditions, such as price, purchase quantities and delivery times, you can create a purchasing information record for the relevant combination of material and vendor. The system accesses this master data when purchasing documents are created and enters the data in the relevant fields.

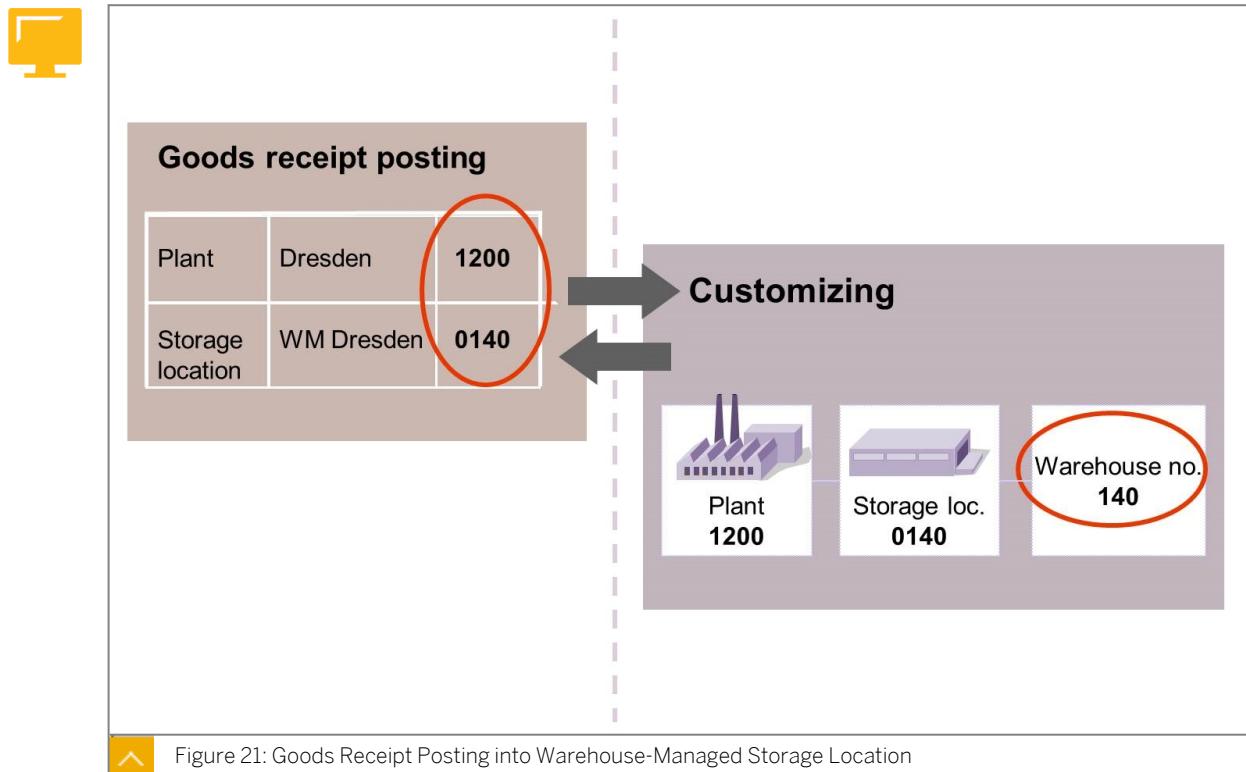
If you post a goods receipt for a purchase order in inventory management after the goods have arrived, the system copies the data from the relevant reference document. If the plant and storage location are already mentioned during the purchase order creation, each item in the purchase order contains information related to the receiving plant and the receiving storage location.

If a storage location is missing from a purchase order, or if a goods receipt needs to be posted in a different storage location from the one entered in a purchase order, you must enter or change the relevant item in the detail data. Depending on your system settings, partial goods receipts are also possible.

During a goods receipt posting, you can decide to post the delivered material immediately into the unrestricted-use stock, or post the material into the quality inspection stock or blocked stock first.

Any increase in material stocks is documented in a material document. Any value-based changes are documented in at least one accounting document.

Goods Receipt Posting and Transfer Requirements



During a goods receipt posting, for each purchase order item, the system checks whether the plant-storage location combination in the purchase order or goods receipt is assigned to a warehouse number. If it is assigned, an additional tab page, WM (warehouse management), appears at the item level.

If you post a goods receipt into a warehouse-managed storage location, the system determines the assigned warehouse number and generates a transfer requirement in addition to the material and accounting documents. The transfer requirement document is the basis for the subsequent putaway.

At the same time that the transfer requirement is being generated, the system posts the new material quantity into the goods receipt zone for external receipts, which is an interim storage area in the receiving warehouse. This material quantity is shown as a quant in the interim storage type.

If the goods receipt posting includes various materials or batches, or if a partial quantity was posted into special stock or blocked stock, then several quants are generated.



Note:

The interim storage area *goods receipt zone for external receipts* is preconfigured in SAP ERP with key 902.

In both inventory management and warehouse management, the flow of the goods receipt process is controlled using movement types. The Warehouse Management system has its own set of movement types that are linked to their inventory management counterparts in Customizing tables. The document header of a transfer requirement shows both movement types.



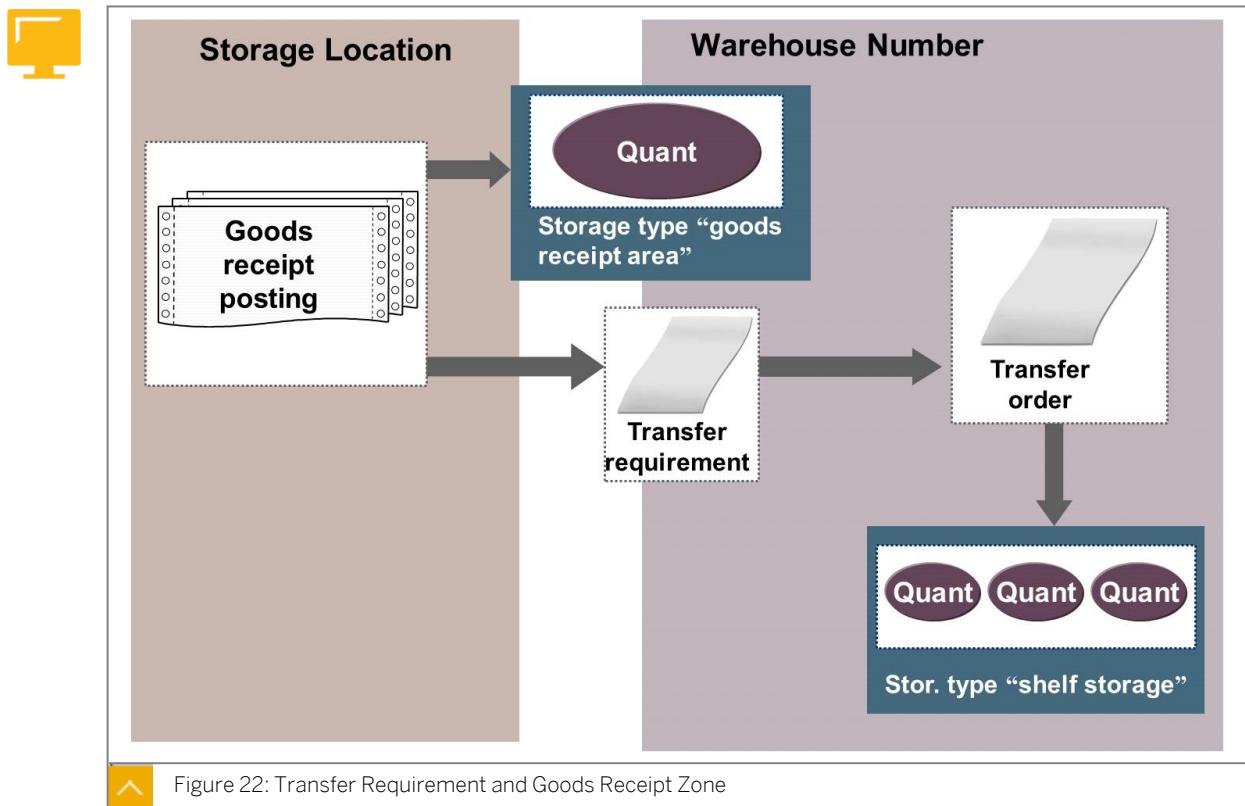
Note:

A movement type is a set of Customizing parameters that control a goods movement. Each movement type is given a three-character numerical key. For example, movement type 101 controls goods receipts for various preceding documents in inventory management. In many cases, the key for the warehouse management movement type is the same as the partner movement type in inventory management.

In other cases, different inventory management movement types are summarized into a single movement type in the Warehouse Management system (for example, stock transfers), or several warehouse management movement types are assigned to one inventory management movement type.

Warehouse management movement type 101 (goods receipt for purchase order), is assigned in Customizing to interim storage area 902 (goods receipt zone for external receipts). During the goods receipt posting for a purchase order, the system uses the links to warehouse management to map the material quantities as quants in the interim storage type. The transfer order, which is used in the Warehouse Management system to perform putaway, refers to the transfer requirement.

Transfer Requirement and Goods Receipt Zone



Interim storage areas have storage bins. These bins can be created permanently or generated by the system for specific transactions. In the SAP ERP application, these storage bins are called dynamic storage bins because they are always generated with a goods receipt or goods issue process and only exist for the duration of the process.

The storage bin coordinate is the document number of the reference document that is used for the inventory management posting, such as the purchase order number or the number of the work order.



LESSON SUMMARY

You should now be able to:

- Post a goods receipt for a purchase order

Unit 3

Lesson 2

Performing Putaway with Transfer Orders

LESSON OVERVIEW

This lesson explains the function of transfer orders in the goods receipt process (inbound process). The lesson also discusses the display for putaway operations in the warehouse management stock overview.

Business Example

You want to move the delivered goods that were placed in the goods receipt zone into the warehouse and put away using the Warehouse Management system. For this reason, you need the following knowledge:

- An understanding of transfer orders for putaway
- An understanding of stock split in transfer orders
- An understanding of how to create a transfer order with reference to a transfer requirement
- An understanding of how to handle differences at putaway

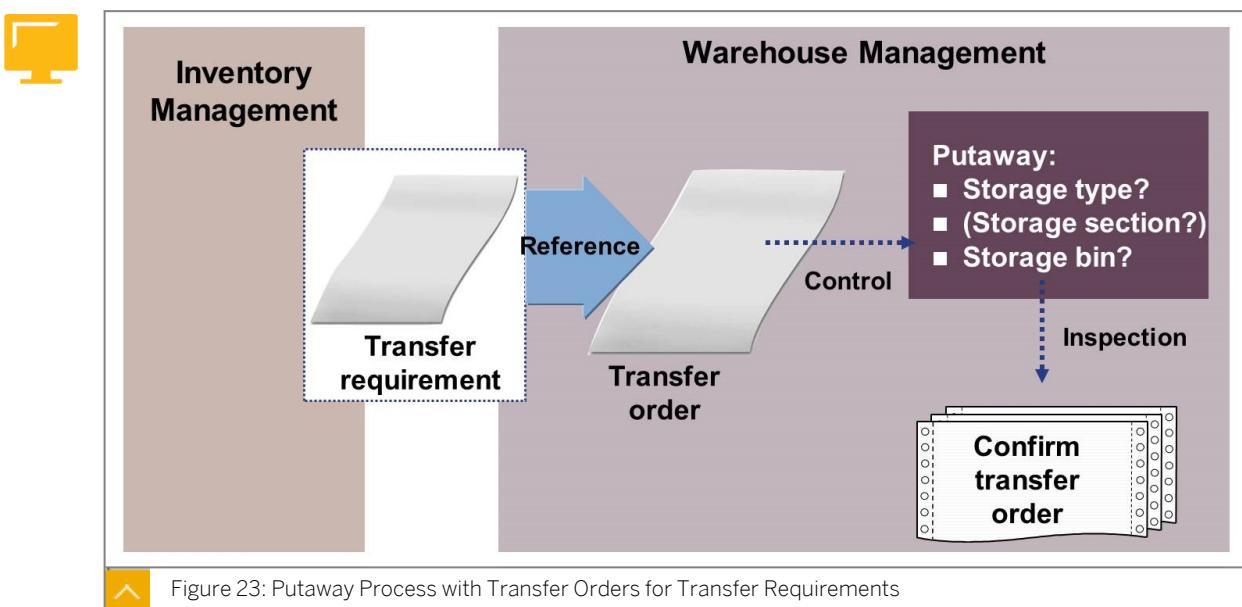


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Perform putaway with transfer orders

Putaway Process with Transfer Orders



The putaway process with transfer orders includes the following steps:

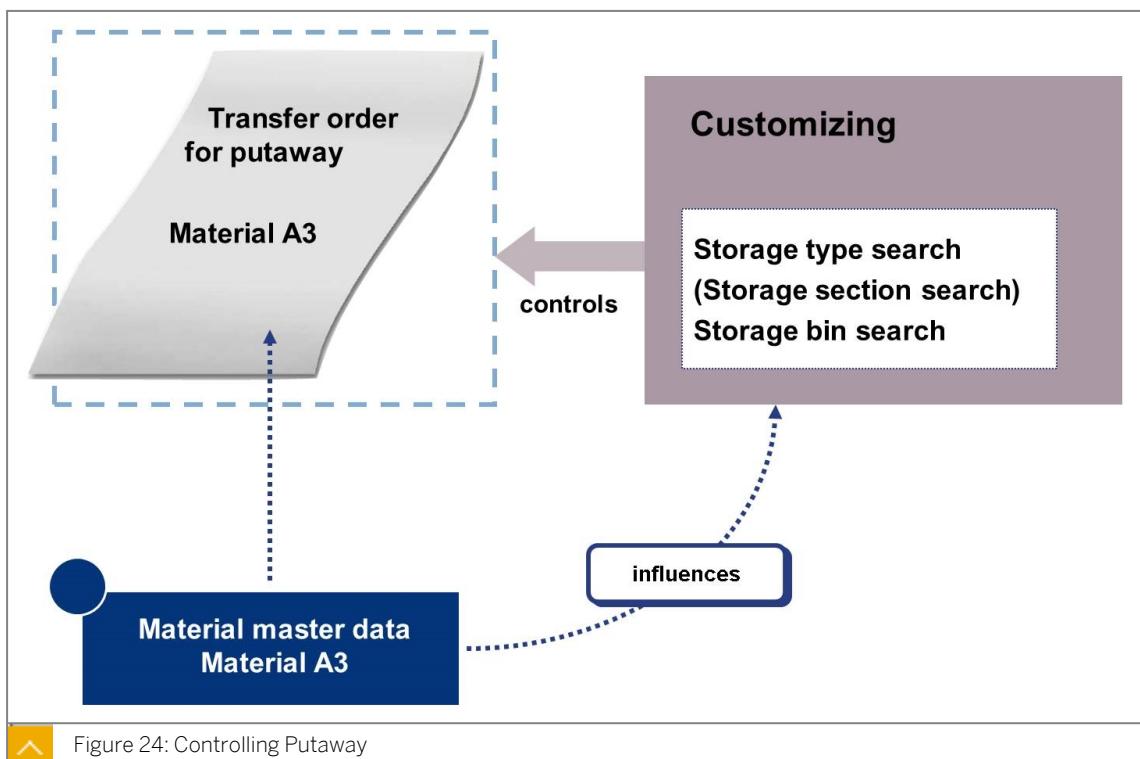
1. A goods receipt posting for a purchase order in a storage location with warehouse management generates a transfer requirement for planning the subsequent putaway. At the same time that the transfer requirement is being generated, the received material quantity is posted as quant(s) into the goods receipt zone, which is an interim storage area in the receiving warehouse number.
2. From the goods receipt zone, the material to be put away is posted into the warehouse using a transfer order. The transfer order, which is a type of instruction for the warehouse employee, refers to the transfer requirement and copies essential information from the transfer requirement.
3. The employee reports the end of the operation to the system by confirming the transfer order.
4. If quantity differences arise (because of breakages or theft), or if quantities are only recognized at putaway (underdelivery), these quantities must be noted when the transfer order is confirmed. The storage location stocks are then corrected.



Note:

Confirmation of the transfer order may not be necessary, depending on your Customizing settings at storage type level.

Transfer Order for Putaway



In SAP ERP, all warehouse movements (putaways, stock removals, and stock transfers) are performed using transfer orders.

The putaway operation includes the following steps:

1. The system determines the target storage type. If a material needs to be put away regularly into a specific storage type, you can set the relevant indicator in the warehouse management view of the master record. During each putaway, the system checks the master data of the materials involved to verify that the relevant indicator is set. The system then targets the relevant storage types. The stock type and special stock assignment can also influence storage type determination.
2. If, during configuration of the determined storage type, you configure the storage sections to be checked during each putaway, the system also performs a storage section determination. This means that the system searches for a suitable storage section within the storage type. You can also set a storage section indicator in the master record of the material to be put away; this indicator will determine that material must be put into a particular storage section.
3. A suitable storage bin is determined. Determination of this storage bin is dependent on the putaway strategy, which was assigned in Customizing to the storage type that was determined at the beginning of the operation. In this way, the fixed storage bin specified in the material master, or the next empty bin for random putaway, can be selected and recommended for putaway.

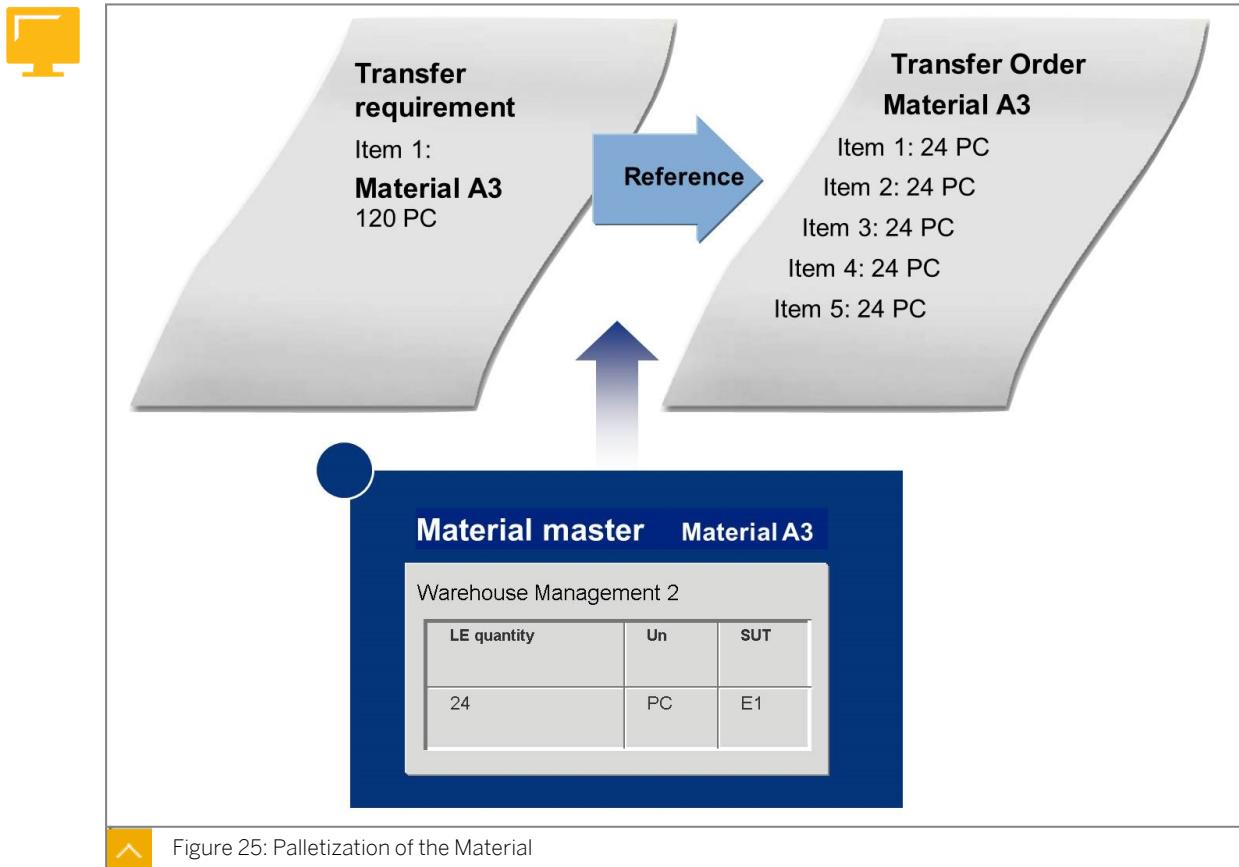
**Note:**

You can only assign one putaway strategy for each storage type. You can also perform the following checks:

- Whether the storage unit type for the load carrier to which the material will be putaway is permitted in the storage type that was determined
- Whether the storage unit type is suitable for the storage bins in the storage type

The data that is determined in this sequence includes mainly default values. If you want to put a material away into a different storage type, storage section, or storage bin than those planned according to the Customizing settings, you can change the default data in the transfer order manually.

Stock Split in Transfer Orders



Before the Warehouse Management system determines storage types, storage sections, and storage bins for the material quantities to be put away, the system first checks in the second warehouse management view of the relevant material master record to determine whether there is any palletization data for the warehouse number. If the material master contains entries for the distribution of loading equipment quantities to storage unit types, the system displays the data on the initial screen of the transfer order as a proposal for palletization of the total quantity.

If, as shown in the figure, the material master specifies that 24 pieces of a material must be putaway onto a europallet with storage unit type E1, then the total quantity (120 pieces) is split across five storage units. The system generates one transfer order item for each storage unit. If the transfer order is created in the foreground, you can change both the palletization and the bin determination for this document item.



Note:

If an error message occurs, choose *Environment* to call up a bin determination log. This log will indicate the point at which the determination process failed.

Complete Customizing settings and palletization data in the material master allow you to automate the putaway processes to a large degree.



Note:

The transfer order can be created in the background immediately after the goods receipt posting with reference to the transfer requirement. However, you can also generate transfer orders for transfer requirements automatically by using a report (RLAUTA10).

After the transfer order is created, the stock in the goods receipt zone is no longer available, but instead, is being moved. This means that in the stock overview for warehouse management, it is always displayed as stock to be removed from storage for the goods receipt zone and as stock to putaway for the receiving storage type. Therefore, the putaway operation is not complete. A transfer order for stock removal cannot access the quantities that are being moved.



LESSON SUMMARY

You should now be able to:

- Perform putaway with transfer orders

Creating Inbound Deliveries for Purchase Order

LESSON OVERVIEW

This lesson gives you an overview of the various functions of inbound deliveries. The lesson also explains how to create an inbound delivery for a purchase order.

Business Example

Your company is examining an alternative to the previous goods receipt process for externally procured materials. You need to put away the incoming goods before the goods receipt is posted in inventory management. For this reason, you require the following knowledge:

- An understanding of the flow of the goods receipt process that uses inbound deliveries
- An understanding of the function of inbound deliveries
- An understanding of how to create an inbound delivery for a purchase order

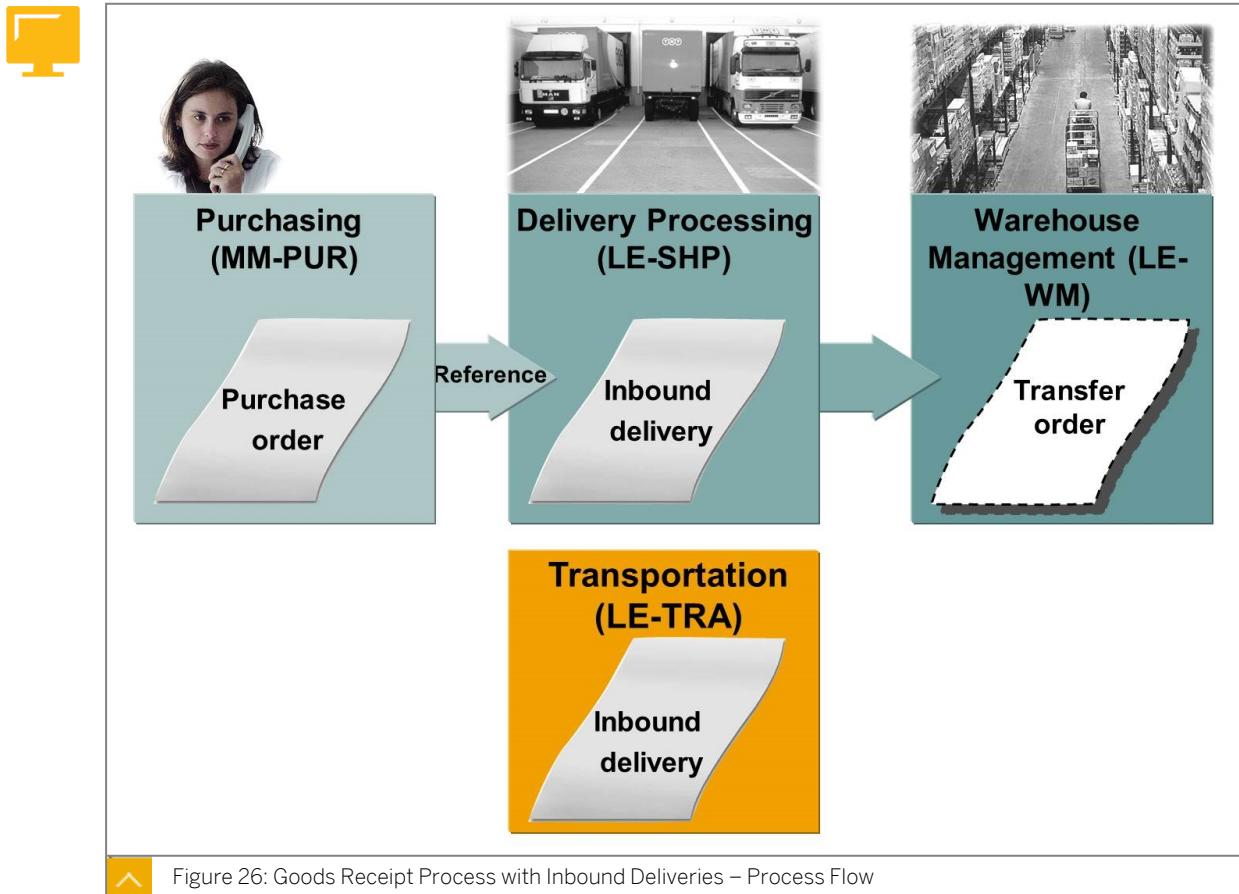


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create an inbound delivery for a purchase order

Goods Receipt with Inbound Deliveries



The goods receipt process that uses inbound deliveries realistically maps standard processes in many companies. If the vendor communicates the goods receipt with a shipping notification, the inbound delivery can be created either manually or automatically based on the information contained in the shipping notification.

The shipping notification contains the following information that the vendor provides:

- Expected delivery time
- Quantities
- Packaging

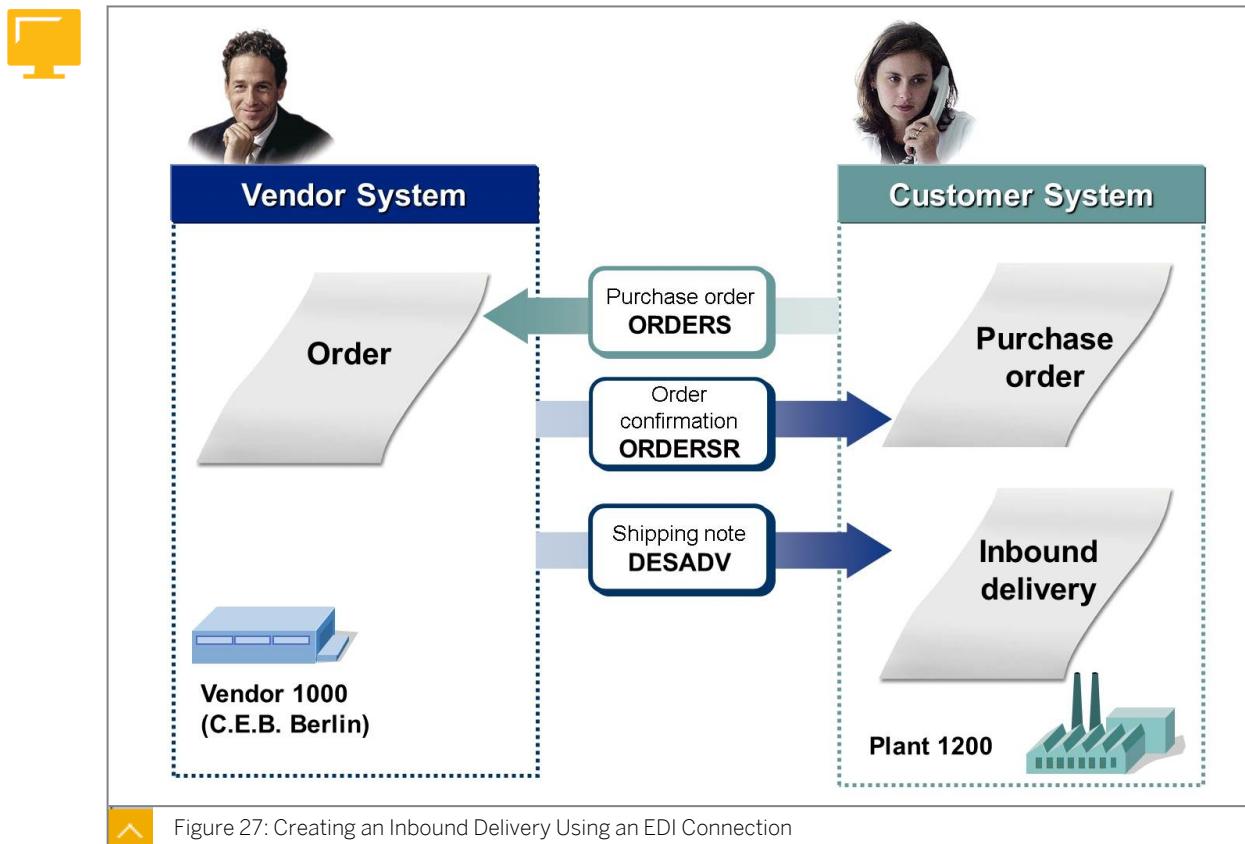
The shipping notification is also the reference document for the subsequent putaway using a transfer order. If you also use the transportation function as part of logistics execution, you can convert inbound deliveries into inbound shipments.



Note:

In the current versions of the SAP ERP application, *shipping notification* refers to the message and *inbound delivery* refers to the document.

Creating an Inbound Delivery Using an EDI Connection



If you have an Electronic Data Interchange (EDI) connection to the vendor, the shipping notification of the vendor can automatically generate an inbound delivery. The purchasing document is always the reference document.



Note:

SAP ERP uses the UN/EDIFACT message type, *DESADV*, to map EDI processes with intermediate documents (IDocs).

Confirmations

You define in the purchasing document the subsequent steps that must be performed in the process. However, if you want to work with inbound deliveries, you must define this requirement for each item in the purchase order.

You define the settings for a confirmation control key in Customizing for Purchasing. A confirmation control key in the purchase order specifies that the purchaser is expecting a confirmation from the vendor for the selected item. This confirmation can be either an order confirmation or a shipping notification. The inbound delivery is also categorized as a type of order confirmation.

Customizing links the confirmation control key, *Inbound Delivery ECC*, with the delivery type (EL), which was preconfigured for document *Inbound Delivery*. If the confirmation control key, *Inbound Delivery ECC*, is assigned to a purchase order item, you can no longer post a goods

receipt with reference to the purchase order. You must post the goods receipt with reference to the inbound delivery.

If you are using the Warehouse Management system, you usually perform a putaway with a transfer order before the goods receipt can be posted for the inbound delivery. Accordingly, you can only create an inbound delivery for purchase order items with the relevant confirmation control key.



Note:

In the vendor master or purchasing information record, you can specify a default confirmation control key in the purchasing organization data. In Customizing for *Shipping*, you can also assign suitable default values for combinations of plant, storage type, purchasing document category, and purchase order category.



Caution:

Even if you are using the Warehouse Management system, with transaction MIGO, you can post the goods receipt for the inbound delivery before the putaway. A transfer requirement is generated for which the system creates the putaway transfer order. However, this process goes against a central advantage of introducing the inbound delivery process; which is that the material must be issued as unrestricted-use storage location stock only after the putaway is complete.

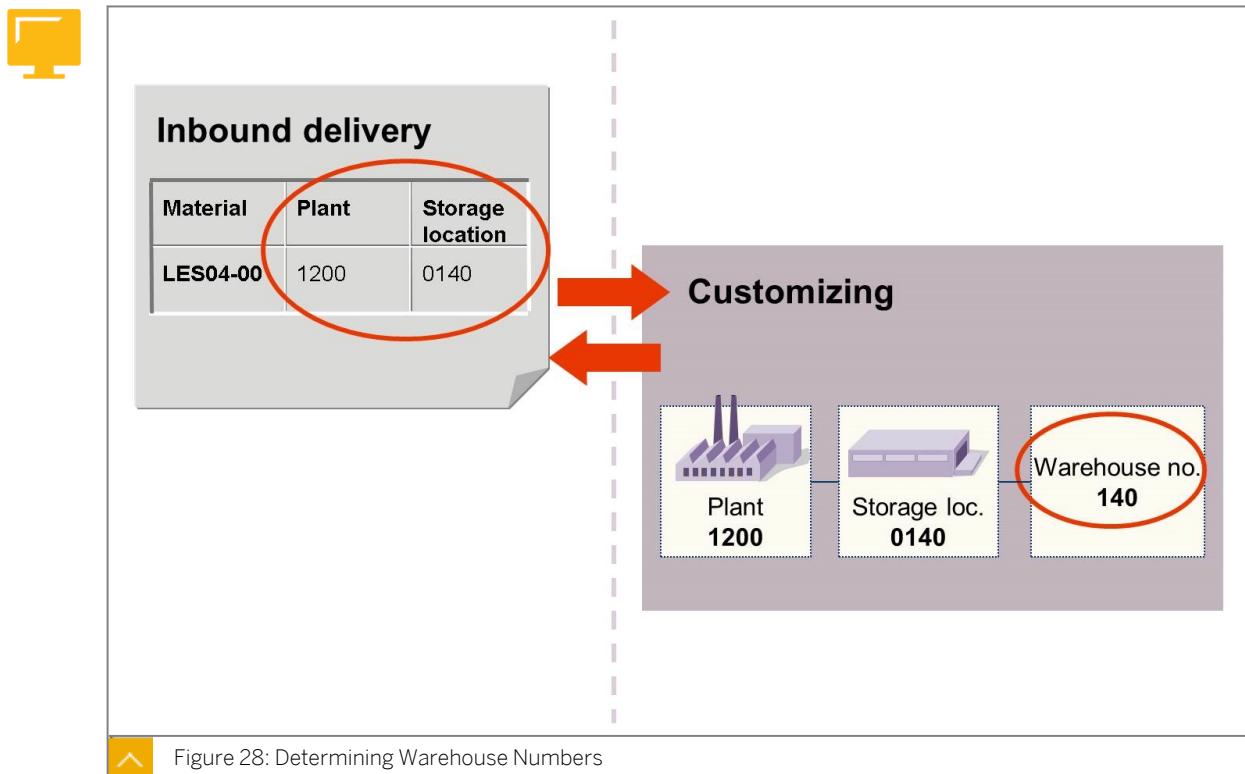
The Inbound Delivery

The structure of the document for inbound delivery is similar to the one for outbound delivery, that is, the SAP ERP document, which is the basis of shipping processing in the goods issue process.

The inbound delivery also has a document header that contains data valid for the entire transaction (vendor, goods receiving point, and delivery date) and document items for the included materials. For each of these items, the system attempts to determine the receiving plant and storage location from the purchase order. You can change the storage location manually before putaway or add a storage location if it is missing in the purchase order. The system uses the storage location to decide whether the material needs to be putaway using WM.

If the receiving plant and storage location are assigned to one warehouse number in Customizing, the system displays this warehouse number as the target for the inbound delivery. In addition, the system enters an overall status for the putaway and a status for the transfer order processing, which is updated in the course of the goods receipt process.

Warehouse Numbers Determination



In the inbound delivery, the system uses the warehouse management movement type for goods receipts of externally procured materials to determine the issuing storage type for each document item. This storage type is the interim storage area, which is the goods receipt zone, and the issuing storage bin, which is usually a dynamic storage bin with the number of the purchase order as the bin coordinates.



Note:

The SAP system displays the data, such as storage type, interim storage area, and issuing storage bin, for each item on the *Putaway* tab page.

A main advantage of the goods receipt process that uses inbound deliveries is that, in inventory management and sales and distribution, you can only see those unrestricted-use receipts that have already been put away. The storage location stocks that are used in the availability check increase only at the end of the process.

If you use handling unit management (a function for managing packages in SAP ERP that can be implemented at any point in the logistics process), you must map the goods receipt process with inbound deliveries. This is because only inbound delivery allows packing or packages to be accepted from the vendor. The same applies if you use the decentralized Warehouse Management system.

The central SAP ERP application and the decentralized Warehouse Management system exchange process data exclusively through inbound and outbound deliveries. If, however, you want to use quality management in SAP ERP, you cannot process goods receipt with inbound deliveries, unless you also use the handling unit management function.



LESSON SUMMARY

You should now be able to:

- Create an inbound delivery for a purchase order

Posting Goods Receipts Based on Inbound Deliveries

LESSON OVERVIEW

This lesson explains the technical posting process for putaway with reference to an inbound delivery.

Business Example

The vendor has delivered bases for flat screen monitors, with reference to your purchase order. The goods are brought from the goods receipt zone into the warehouse itself. You now need to create a transfer order and post the goods receipt for an inbound delivery. For this reason, you require the following knowledge:

- An understanding of how to create and confirm a transfer order for an inbound delivery
- An understanding of how to use the inbound delivery monitor
- An understanding of how to post a goods receipt for an inbound delivery
- An understanding of how to trace the putaway steps in the stock overview

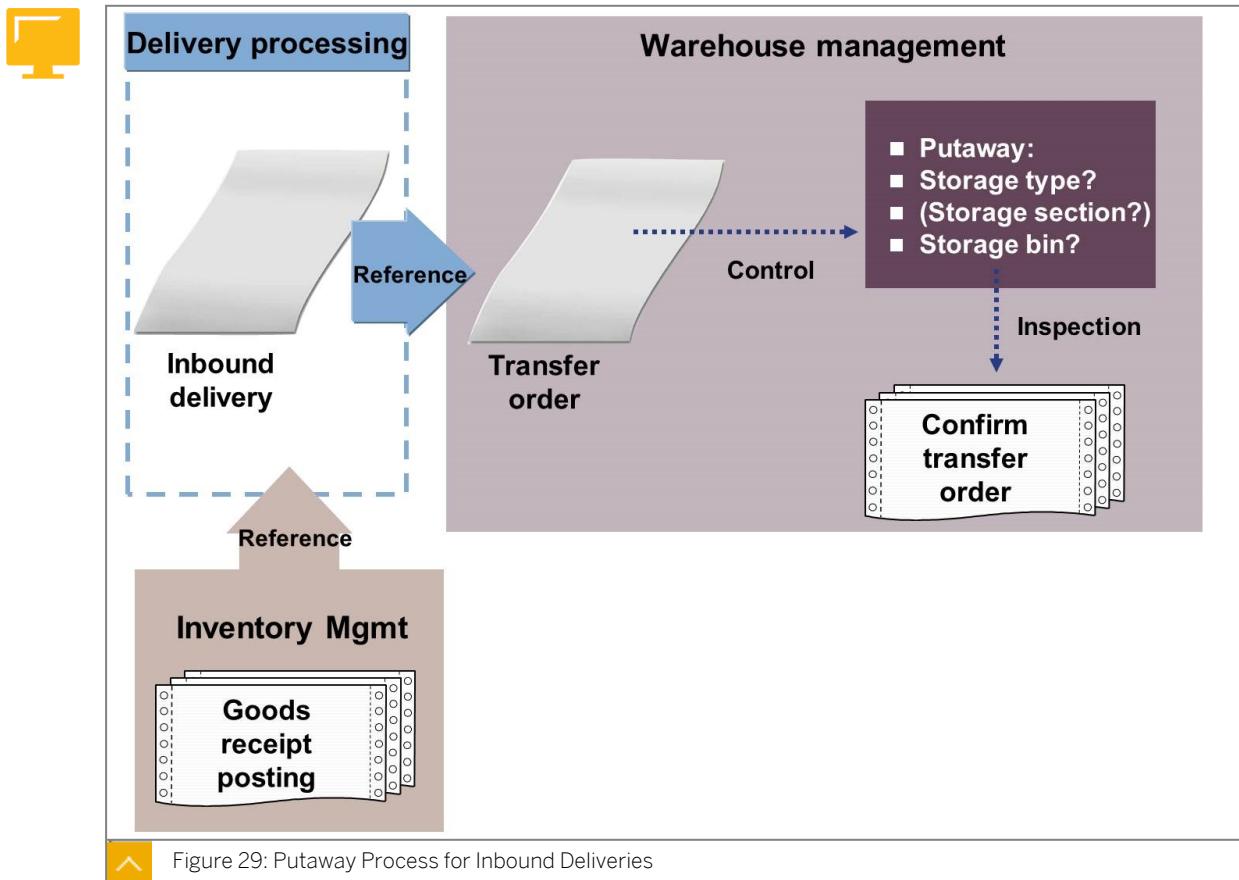


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Post goods receipts based on inbound deliveries

Putaway Process for Inbound Deliveries



A transfer order is required to put away the delivered goods. The transfer order refers to the inbound delivery for essential data that is used for further processing (such as issuing storage type and storage bin).

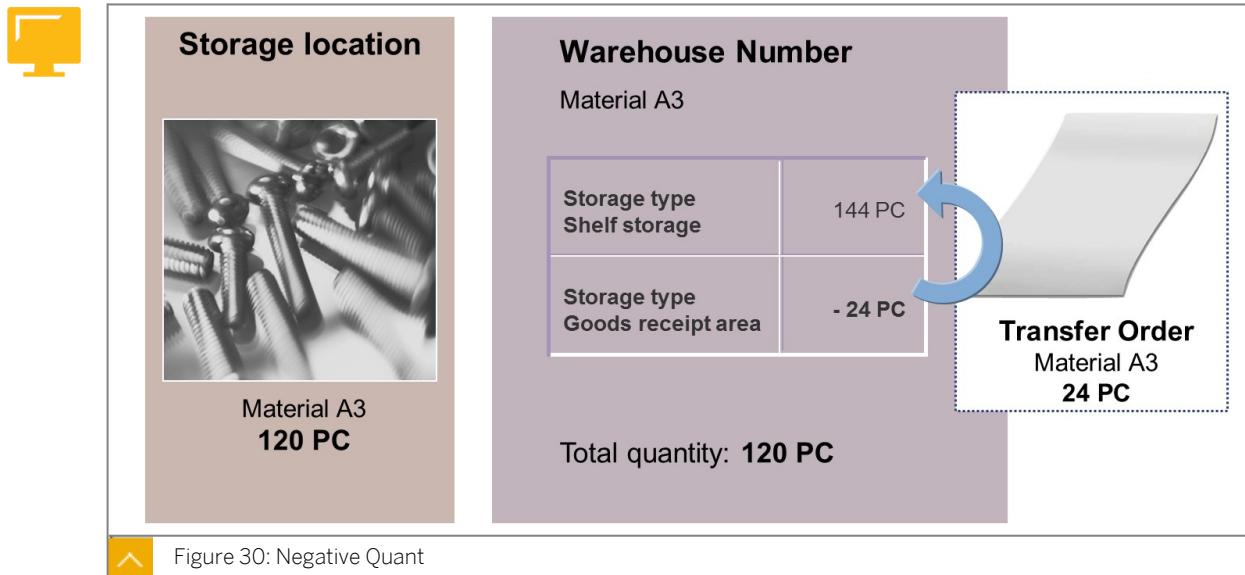
When you create the transfer order, the system uses master data and Customizing settings to determine storage types, storage sections, and storage bins for putaway. The goods receipt posting in inventory management with reference to the inbound delivery, completes the process.

Mapping the Putaway Operation

In the inbound delivery, the SAP system refers to the purchase order or Customizing settings to determine a putaway storage location for each delivery item. If the plant and storage location are linked to a warehouse number in Customizing, the SAP system displays this warehouse number in the inbound delivery.

The requirement for warehouse management is indicated with an overall putaway status and a transfer order status. This status shows you the progress of the putaway. In the transfer order for the putaway, the system copies palletization data (where present) from the material master.

Negative Quants



When you create a transfer order for an inbound delivery, the system updates at least one negative quant in the interim storage area goods receipt zone.



Note:

The delivery items and quantities define the number of quants in the goods receipt zone. For example, if more than one material is delivered, the system generates at least one quant for each material. If individual materials are subject to batch management, the system generates at least one quant for each batch.

The updated negative quant is a constructed object that ensures that at each point in the process, the stocks in warehouse management and inventory management have the same total. In the example shown in the figure, the transfer order for putaway refers to an inbound delivery for 24 pieces of material. The putaway itself occurs before the transaction is posted in inventory management. This means that temporarily 144 pieces of the material already exist in the warehouse. However, inventory management shows only 120 pieces in the stock overview. The quantity of the negative quant in the goods receipt zone (-24 pieces) is subtracted from the total stock in the warehouse number, so that the stock overview in warehouse management also shows a total of 120 pieces of the material.

The goods receipt posting always refers to the inbound delivery. You can post the goods receipt only after the putaway is complete for all items. Both the delivery statuses must be set to C.



Note:

When you putaway partial quantities, the result is overall status B. If the transfer order for putaway has not yet been confirmed, the transfer order status is B.

The goods receipt posting increases the storage location stock. Therefore, the negative quant in the interim storage area has served its purpose and is cleared by the stock increase. Only now can the user view the putaway received goods in sales and distribution.



Note:

You report the differences that arise or are noticed at putaway when you confirm the transfer order. The shortfall quantity is posted through the interim storage area assigned in Customizing.

As of SAP R/3 Enterprise, you can post a partial goods receipt for an inbound delivery. If several transfer orders are required to put away the total delivered quantity, you can post the partial quantity with reference to the inbound delivery after you post one transfer order for the goods receipt. The same applies if the transfer order contains several items and the putaway is confirmed only for some items.



LESSON SUMMARY

You should now be able to:

- Post goods receipts based on inbound deliveries

Learning Assessment

1. Interim storage areas have _____ that can be created permanently or generated by the system for specific transactions.

Choose the correct answer.

- A quants
- B storage bins
- C warehouse numbers

2. A _____ can refer to a quotation and to a requirement coverage request.

Choose the correct answer.

- A purchase order
- B purchase requisition
- C goods receipt

3. The received material quantity is posted as _____ into the goods receipt zone at the same time when a transfer requirement is generated by warehouse management with a goods receipt posting for a purchase order.

Choose the correct answer.

- A negative quant
- B quant
- C additional data
- D stock

4. To work with inbound deliveries, you have to define it for each item in the _____.

Choose the correct answer.

- A shipping notification
- B purchase order
- C purchase document
- D SAP ERP document

5. The _____ ensures that during the process of creating a transfer order for an inbound delivery, the stocks in warehouse management and inventory management have the same total.

Choose the correct answer.

- A negative quant
- B stock
- C purchase order
- D goods receipt

Learning Assessment - Answers

1. Interim storage areas have _____ that can be created permanently or generated by the system for specific transactions.

Choose the correct answer.

- A quant
- B storage bins
- C warehouse numbers

2. A _____ can refer to a quotation and to a requirement coverage request.

Choose the correct answer.

- A purchase order
- B purchase requisition
- C goods receipt

3. The received material quantity is posted as _____ into the goods receipt zone at the same time when a transfer requirement is generated by warehouse management with a goods receipt posting for a purchase order.

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- A negative quant
- B stock
- C purchase order
- D goods receipt

UNIT 4

Goods Issue Processes

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Posting Goods Issues for Cost Centers

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Planning Transportation in SAP ERP

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UNIT OBJECTIVES

- Post goods issues for cost centers
- Perform stock removals with transfer orders
- Create outbound deliveries with reference to sales orders
- Perform the shipping process
- Plan transportation in SAP ERP

Unit 4

Lesson 1

Posting Goods Issues for Cost Centers

LESSON OVERVIEW

This lesson explains how to post a goods issue for a cost center from a warehouse-managed storage location.

Business Example

The Research and Development department in your company is conducting product tests and needs to use material from the company stock. To record the use of this material, you need to post a goods issue to the Research and Development cost center. For this reason, you require the following knowledge:

- An understanding of how to post a goods issue to a cost center with subsequent stock removal
- An understanding of how to post a goods issue to a cost center in inventory management
- An understanding of how to display the transfer requirement that is generated by the goods issue posting
- An understanding of how to interpret the stock overview

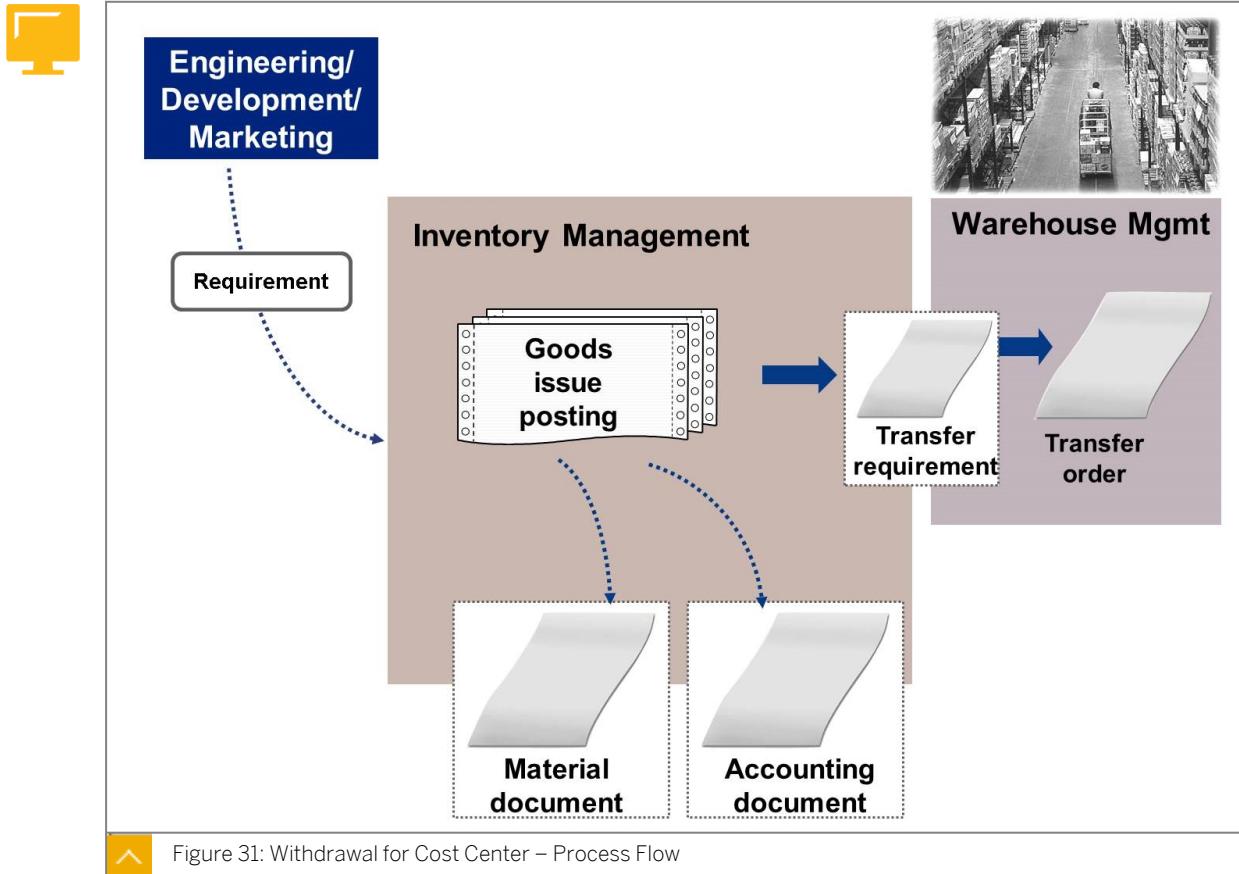


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Post goods issues for cost centers

Withdrawal for Cost Center



The process of withdrawing materials from a cost center is as follows:

1. To withdraw warehouse materials that will be charged to a cost center, perform a goods issue in inventory management.
2. If the issuing storage location is linked to a warehouse number in Customizing, the system generates both a transfer requirement for the material to be withdrawn and the material and accounting documents. The material to be withdrawn is stored as a negative quant in the interim storage area goods issue zone.



Note:

Standard SAP ERP systems contain a preconfigured goods issue area for cost center with storage key type 911.

3. Use a transfer order to record the fact that the material will be removed from a storage bin. A transfer order refers to and adopts the destination data from the transfer requirement (receiving storage type and storage bin).
4. Confirm the transfer order to complete the goods issue process. The material is now available to the department that requested it.

**Note:**

You can skip confirmation of the transfer order based on the storage type that is specified in your Customizing settings.

Negative Quants in the Goods Issue Area

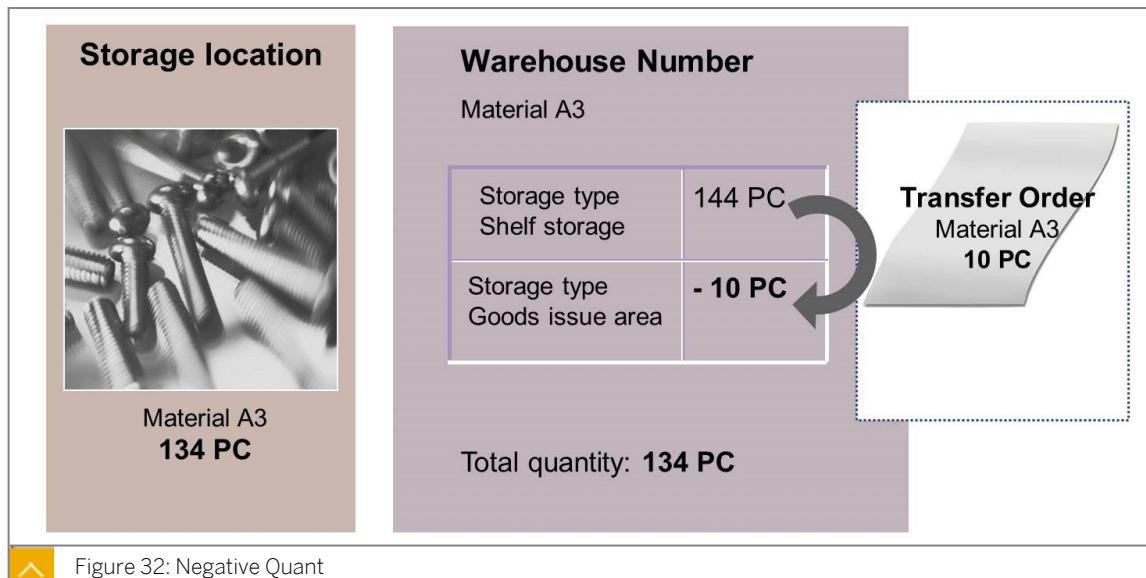


Figure 32: Negative Quant

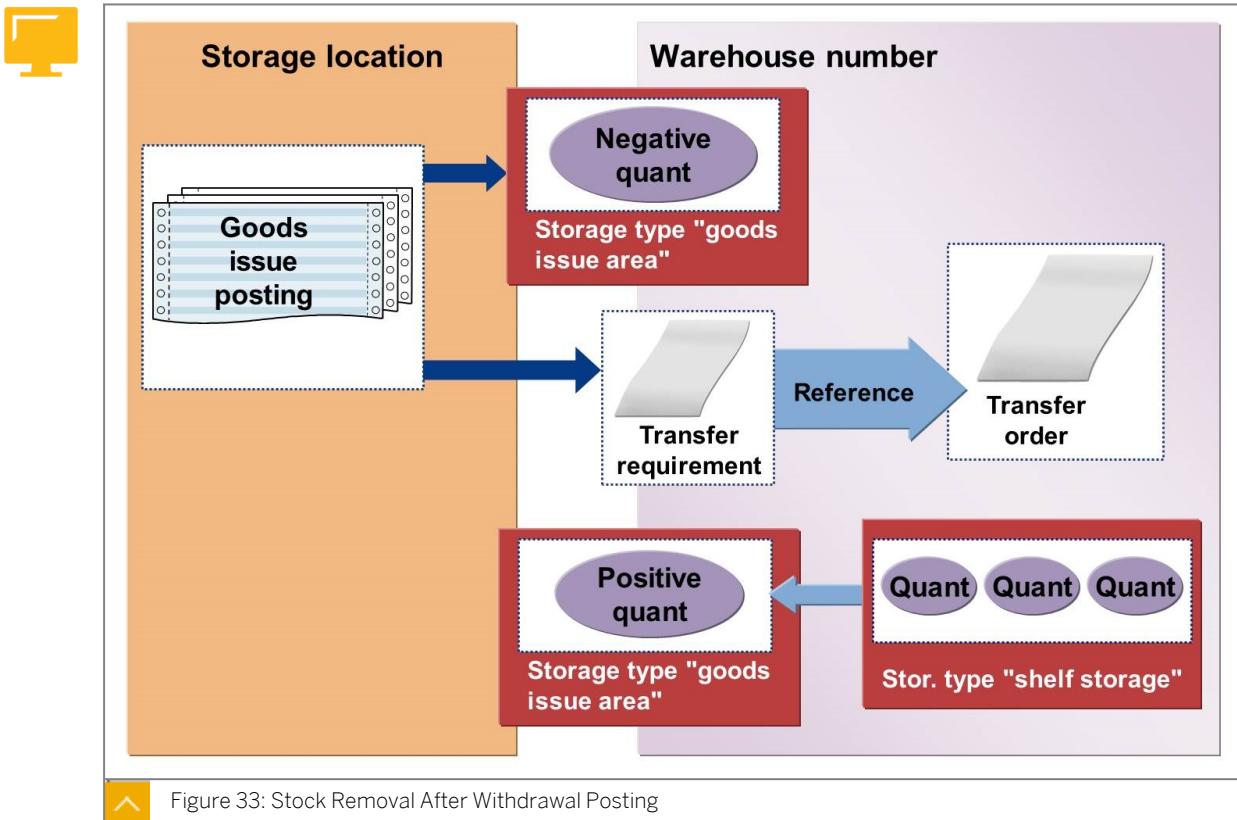
A goods issue posting in inventory management reduces the stock of the material in a storage location. However, the stock in the assigned warehouse number remains unchanged until the stock removal process is complete.

To display the same material quantities in both inventory management and warehouse management, the system generates a negative interim storage area stock when you post the goods issue. The system then subtracts this stock from the warehouse number total stock during the stock removal operation for the material.

**Note:**

This procedure is comparable to the goods receipt process for inbound deliveries, during which the system uses negative interim storage type stocks to note the fact that quantities have been received in the warehouse number and these quantities have not yet been posted at storage location level. The subsequent goods receipt posting for the inbound delivery balances the negative stock.

Stock Removal After Withdrawal Posting



The putaway of the requested quantity into the interim storage area goods issue area balances the positive and negative quants. This completes the stock removal process.

Assuming that you are not using the interface between warehouse management and production planning, a material withdrawal for a production work order is performed in the same way. A goods issue is posted for the work order in inventory management (in the standard system, with movement type 261). This goods issue generates negative quants in the goods issue area for work orders (in the standard system, interim storage area 914). The material withdrawal generates a transfer requirement for the materials that will be removed from storage. Confirmation of the transfer order completes the material withdrawal.



Note:

Using the preconfigured interface between warehouse management and production planning allows you to perform staging that is targeted at specific storage bins. You can do this by using production supply areas from shop floor control. Here, stock removal is controlled by using control cycles. These control cycles are master data in warehouse management. In the master data, you define which material is staged, in which storage bin, and in which form.



LESSON SUMMARY

You should now be able to:

- Post goods issues for cost centers

Performing Stock Removal with Transfer Orders

LESSON OVERVIEW

This lesson explains how to perform stock removal by using a transfer order that refers to a transfer requirement.

Business Example

The Research and Development department in your company is conducting product tests and needs to use material from the company stock. You need to remove this material from the shelf storage area and make it available to the Research and Development department. For this reason, you require the following knowledge:

- An understanding of how to create a transfer order for a transfer requirement
- An understanding of how to confirm a transfer order
- An understanding of how to track the stock removal in the stock overview

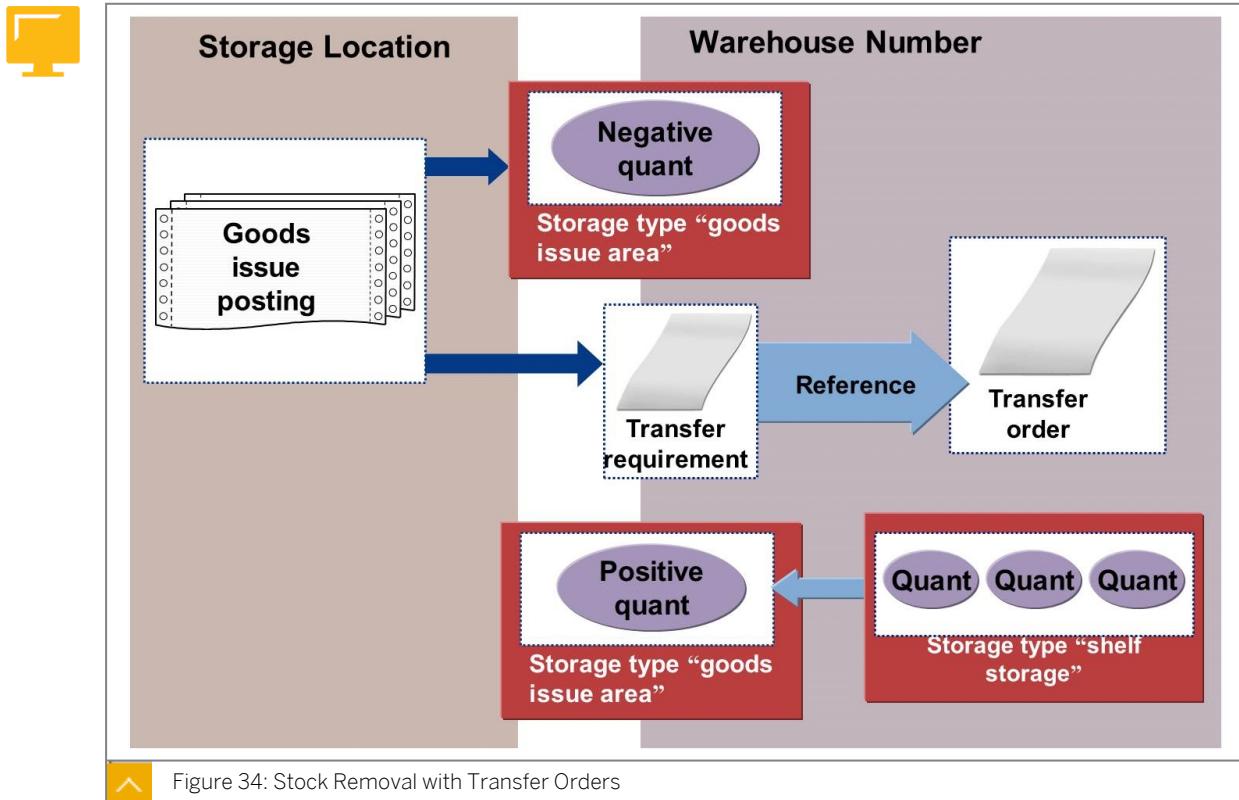


LESSON OBJECTIVES

After completing this lesson, you will be able to:

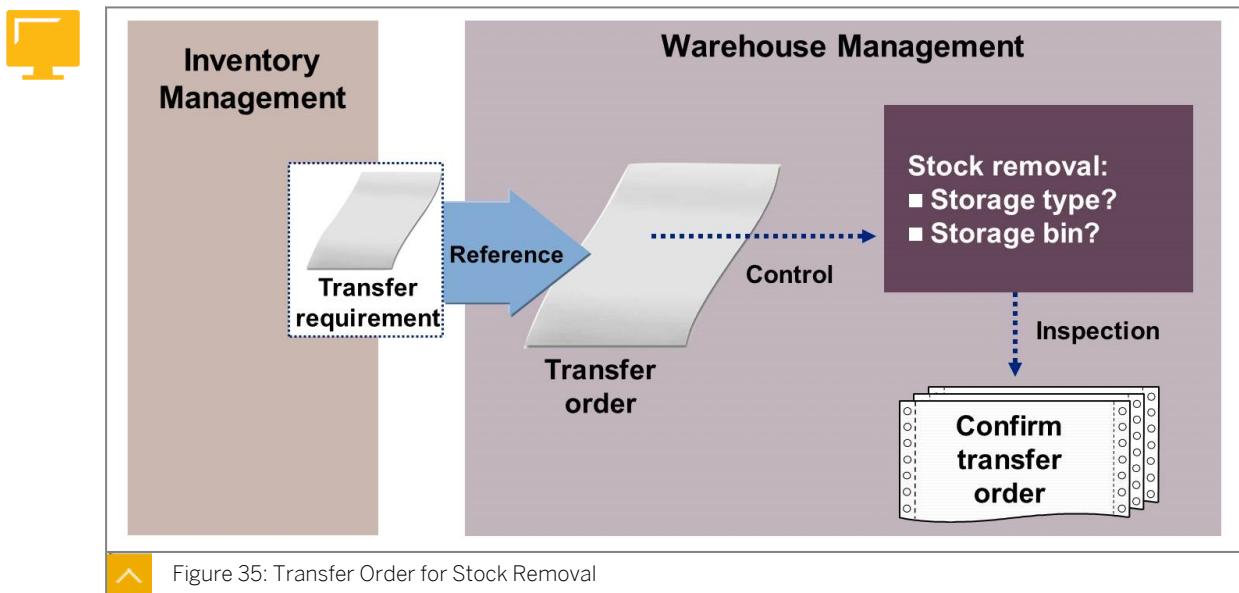
- Perform stock removals with transfer orders

Stock Removal with Transfer Orders



The transfer order for removing the requested material from storage is created with reference to the transfer requirement. The goods issue posting for the cost center has generated a negative stock in the interim storage area goods issue area. This negative stock ensures that both the storage location and the warehouse number show the same material stock. The putaway of the requested material into the goods issue area balances the negative stock, and this step completes the goods issue process.

Transfer Order for Stock Removal



When you create a transfer order, the system checks the master data and Customizing tables to find suitable stocks to be removed from storage.

The system searches for an issuing storage type (*source storage type*). In Customizing for *Warehouse Management*, you define a default storage type search sequence for stock removals for each warehouse number. The system works through the storage types in the sequence in which it should search for stock that can be removed from storage. You can use indicators to influence access to the table that controls the search sequence. For example, you can use an indicator in the material master (storage type indicator) to define that a certain material is removed from the shelf storage area.



Note:

Two more factors can define the storage type search: the stock type and whether the stock is special stock. The prerequisite is that a corresponding entry is made in the table for the storage type search sequence.

In Customizing for the issuing storage type, the system finds the stock removal strategy that specifies how the issuing storage bin (*source storage bin*) is determined in that storage type. The first in first out (FIFO) strategy is often used, which means that the oldest quant is always removed from stock first. However, in the standard system, there are other strategies available for storage bin determination.



Note:

You can assign only one stock removal strategy to each storage type.

If there are picking areas in the issuing storage type, you can use the following methods to optimize the stock removal process:

- Print a combined picking list that contains material numbers and quantities to be removed from the storage bin. These quantities are sorted by picking area.
- Divide the transfer order according to picking areas (transfer order split). This means that you create more than one transfer order for each reference document.



To Create a Transfer Order for a Transfer Requirement

1. In one of the transfer requirement lists, find the transfer requirement for which you want to create a transfer order. You can search by storage type, material, or requirement type.



Hint:

The requirement type specifies the cause of the material movement, such as a withdrawal for a cost center (requirement type K).

- a) On the SAP Easy Access screen, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Other Transactions* → *Picking* → *Create Transfer Order* → *For Storage Type/For Material/For Requirement*.

- b) Enter values for your selection and choose *Enter* to confirm.
2. If you want to display a transfer requirement that is shown in one of the lists, position the cursor on the document number and click.
 3. To create a transfer order, select the relevant transfer requirement and choose either the *TO in Foreground* pushbutton or the *TO in Background* pushbutton.



Hint:

In foreground processing, you create the transfer order interactively. Therefore, you can modify the order. In background processing, the system generates the transfer order in the background and displays the document number in the status bar.

4. Confirm the transfer order. If you want to enter differences, choose foreground processing (choose *Foreground/Backgrnd* on the initial screen).
On the SAP Easy Access screen, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Other Transactions* → *Picking* → *Confirm Transfer Order* → *Single Document* → *In One Step*.



LESSON SUMMARY

You should now be able to:

- Perform stock removals with transfer orders

Creating Outbound Deliveries with Reference to Sales Orders

LESSON OVERVIEW

This lesson explains the connection between logistics execution and sales and distribution (SD). The lesson also describes the goods issue process with outbound deliveries.

Business Example

You need to deliver stock materials to customers. You need to use warehouse management to pick the goods. For this reason, you require the following knowledge:

- An understanding of the goods issue process with outbound deliveries
- An understanding of how to create a sales order
- An understanding of how to check the scheduling of the shipping process
- An understanding of how to create an outbound delivery for a sales order
- An understanding of how to display and interpret document data that is relevant for stock removal

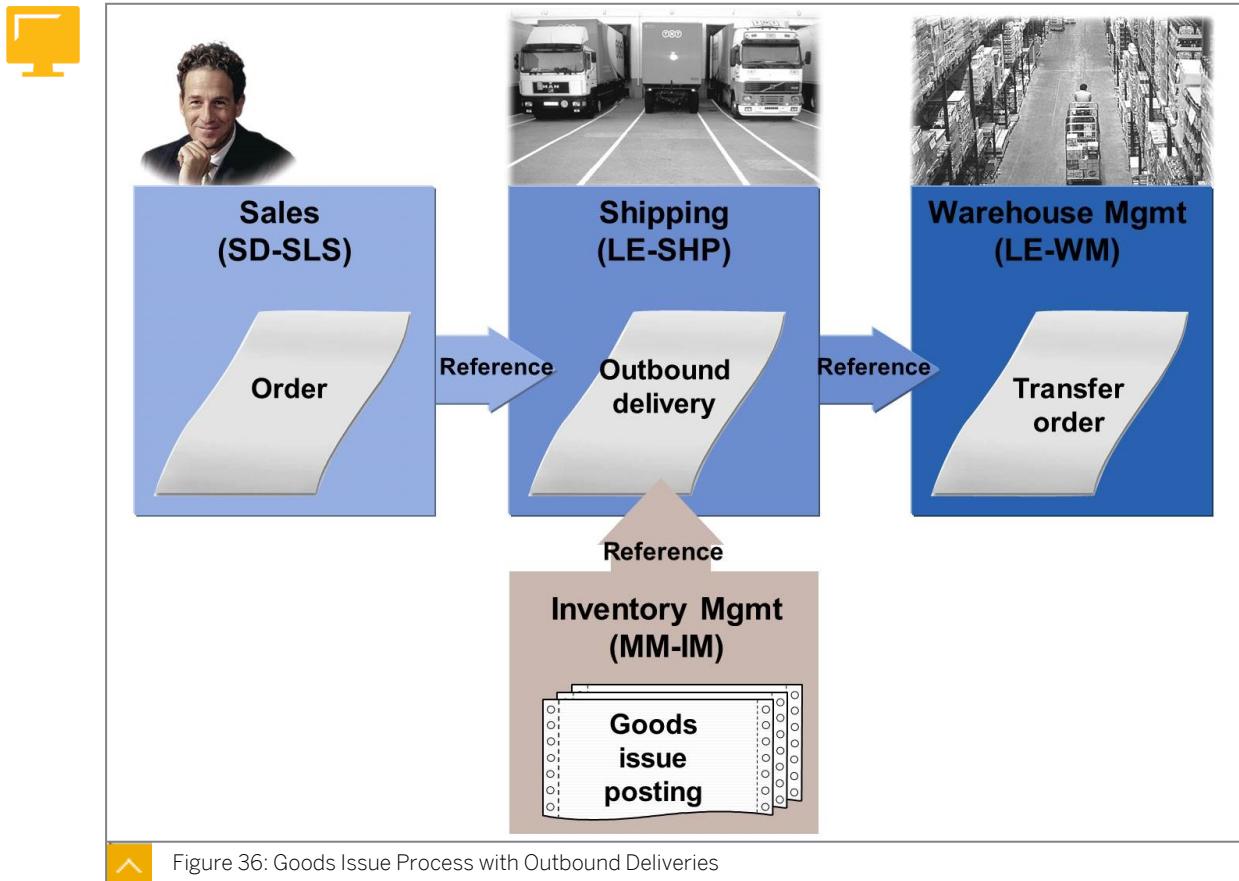


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create outbound deliveries with reference to sales orders

Goods Issue Process with Outbound Deliveries



The figure illustrates the technical postings involved in an outbound delivery process in warehouse management.

In SAP ERP, you create and monitor sales orders in sales and distribution. The standard system contains a selection of sales document types, which are mainly used to summarize orders according to their function. You make essential Customizing settings to control sales and distribution processes in the sales document type.



Note:

Some settings, such as a standard order for normal sales and distribution processing and a rush order for urgent orders, are preconfigured in the system.

When you create a sales order, the shipping process is scheduled according to the Customizing settings. This means that time limits are calculated for certain steps in the process, such as goods loading time. This calculation, which is made for each document item, is dependent on the sales document type that you select.

The central document in logistics execution, the outbound delivery, is created with reference to the order. You can choose from various forms of collective processing to process sales orders that are due for delivery. The outbound delivery adopts the main data from the order, including the planned dates for the follow-on process.

In the outbound delivery, the system also determines a storage location for each document item. If the system determines that this storage or storage location has been assigned to a warehouse number in Customizing, the system displays this warehouse number in the outbound delivery.

The system also assigns an overall picking status and a stock removal status to the outbound delivery. You can then determine whether the subsequent stock removal must be performed by using a transfer order.

You create the transfer order for the stock removal with reference to the outbound delivery. The master data and Customizing settings for warehouse management define which storage bin stocks are picked. You can post the goods issue in inventory management only after the stock removal is complete. Again, the outbound delivery functions as the reference document.



Note:

Status management in the document prevents the goods issue from being posted before picking has been completed. You can post the goods issue only after both picking and warehouse management statuses are set to C.

You can also perform packing of the goods in the outbound delivery. If you use the Warehouse Management system, you can pack the picked material when you confirm the transfer order (pick and pack).

Determining the Shipping Point

When you create a sales order, the system determines a requested delivery date and displays it in the document overview. The system calculates this requested delivery date based on the lead time that is defined in Customizing for the sales document type. The system adds the number of days specified in the lead time to the current date.

After you enter the customer number of the sold-to party, the customer number of the ship-to party (if this ship-to party is different from the sold-to party), and the material numbers, the system performs shipping point determination and route determination for each document item. Shipping points are organizational units within logistics execution.



Note:

When you create an outbound delivery, you must enter a shipping point. You can use only the shipping points that are determined in the order. Every outbound delivery is processed by one shipping point only.

If different shipping points were found for individual items in the order, a delivery split takes place. The system creates the relevant number of outbound deliveries for the order.

A route describes a distance from location A to location B. Routes are customized in logistics execution. The data record for a route can contain information on the service provider, the distribution channel, and the transit time.

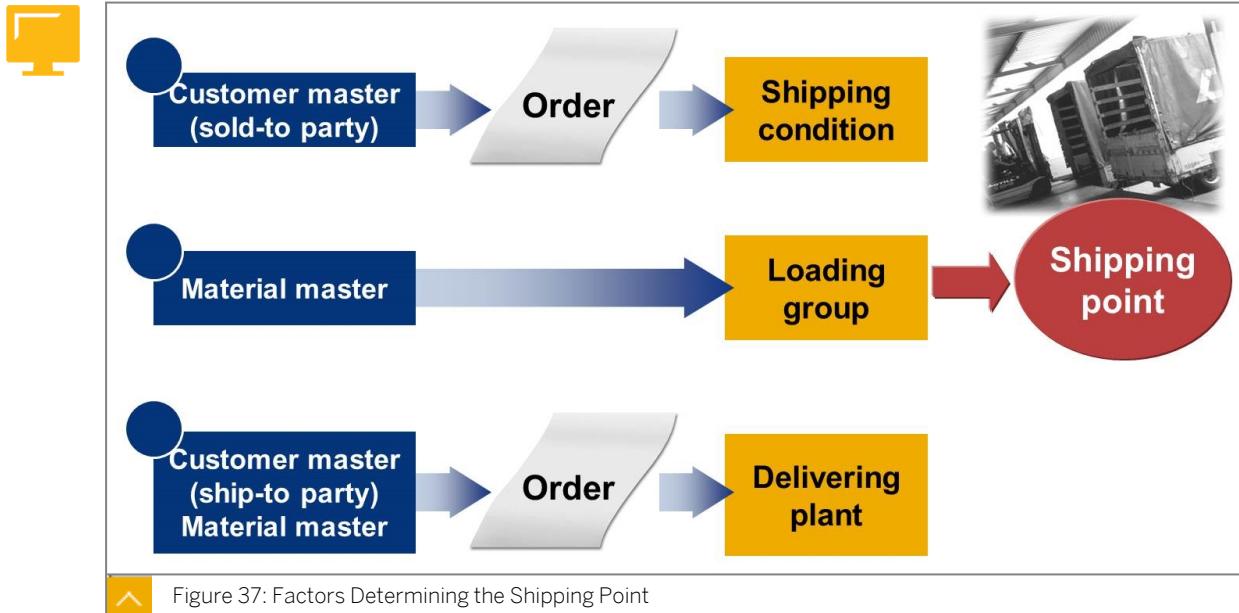
You can make specific entries for the point of departure and the destination (for example, Hamburg-Munich). However, you can also enter a more vague description of the route location (for example, East Coast USA).

The system uses the shipping point and route to calculate the time limits for shipment scheduling. You need to enter specific details to ensure that scheduling is as precise as possible.

For example, this would mean that the route Hamburg-Munich can have separate routes for shipping by post, by truck, and by plane.

You can also use the route as selection criteria for collective processing of orders due for delivery.

Factors Determining the Shipping Point



Shipping point determination is defined by the following factors:

- The shipping condition that is valid for the order
- The delivering plant
- The loading group of the material in the delivering plant

You can set the shipping condition and delivering plant as default values in the customer master record. However, you can also make manual entries and changes in the order. You use a loading group to group materials according to their loading attributes.

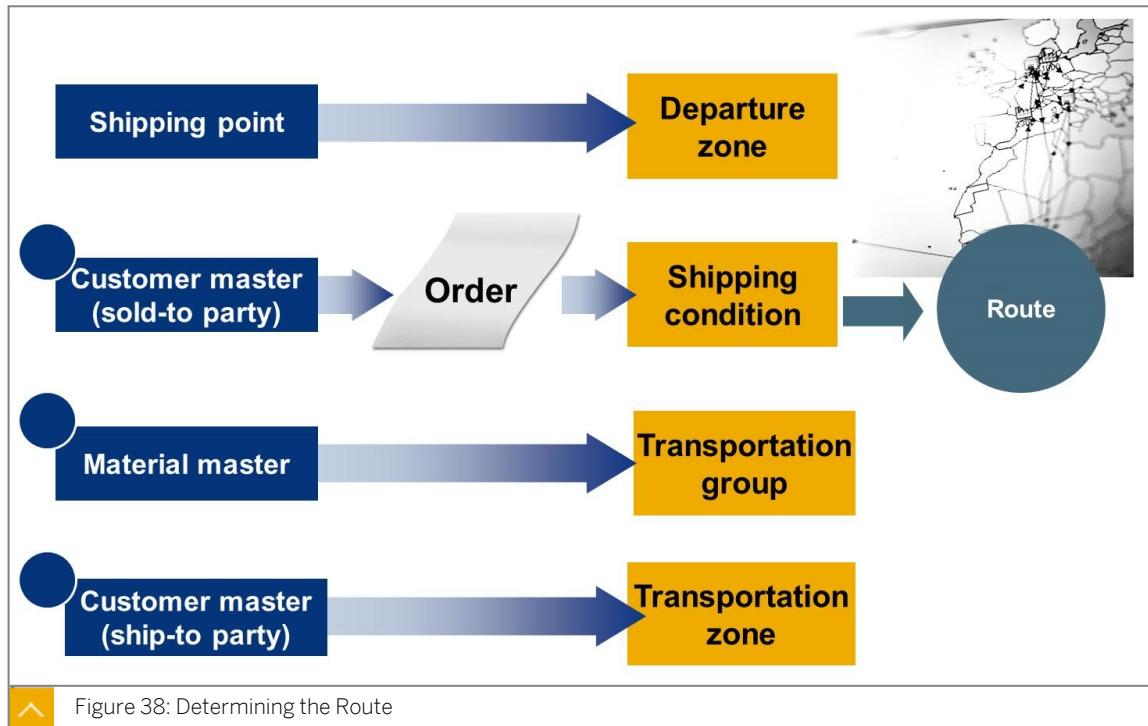
You can easily define shipping conditions and loading groups in Customizing. You can then easily assign the shipping conditions and loading groups at master data level. You can also enter a delivering plant in the material master as a default value (*Sales Organization 1* view).

Another possible source for the delivering plant value in the order is a customer-material information record, which contains specific agreements as the master data for sales and distribution.

**Note:**

If this type of customer-material information record exists, the record takes priority over other master records during plant determination. The system next checks the customer master of the ship-to party, and then the material master if necessary. If no default value is stored anywhere, enter the delivering plant manually for the item.

Determining the Route



The system determines the route by using specific data from the customer master, material master, and shipping point. Route determination depends on a successful shipping point determination.

The system adopts the departure zone for the outbound delivery from the shipping point. As in shipping point determination, the shipping condition is determined from the customer master of the sold-to party. You can change shipping condition manually in the order. If you do change the shipping condition in the order, the system repeats shipping point determination and route determination.

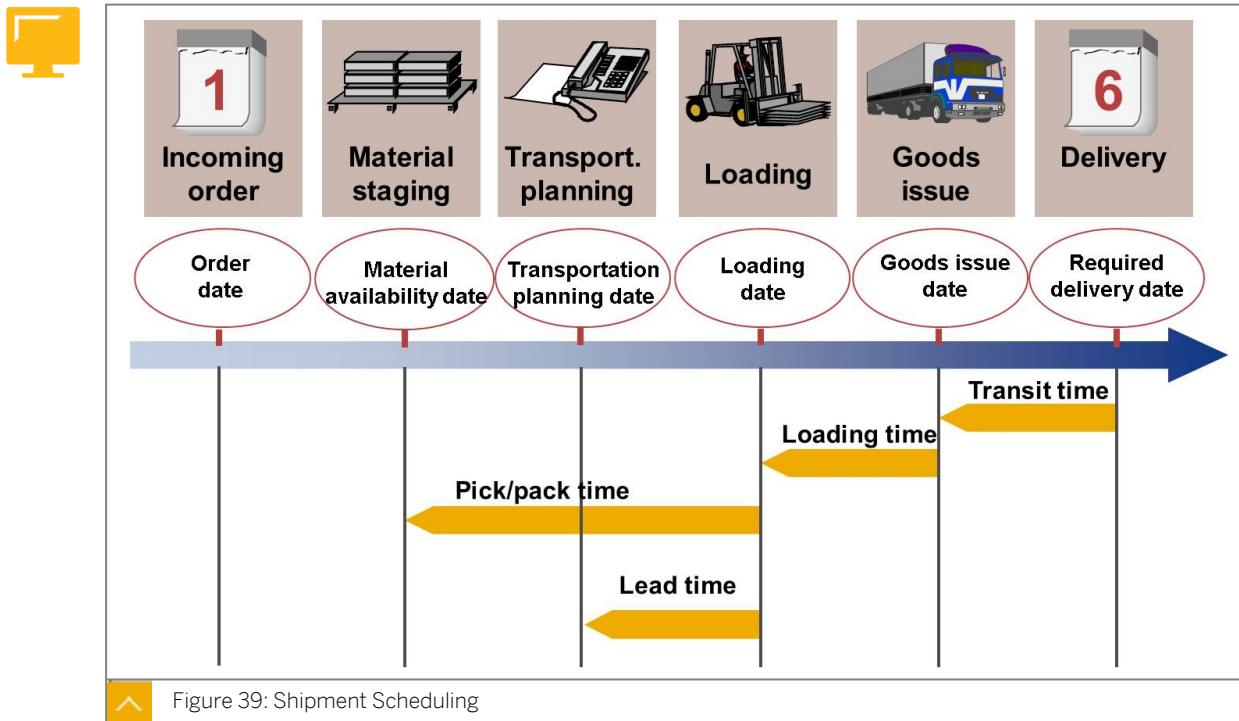
**Note:**

You can also manually assign a route in the order.

Transportation groups group materials according to their transportation attributes, such as on pallets or in containers. The transportation group is defined in Customizing and then assigned to the material master in the *Sales Gen/Plant* view.

The system searches for the transportation zone, or the regional destination of the outbound delivery, in the customer master for the ship-to party. You define transportation zones in Customizing in the same way as you define transportation groups.

Shipment Scheduling



Based on values from the shipping point and route in the order, the system proposes dates for the following shipping activities:

- Material Availability (picking, packing, and creating shipping documents)
- Loading
- Transportation planning (booking freight space)
- Goods issue

The system calculates the four planned dates from the requested delivery date by subtracting the time limits adopted from the shipping point and the route.

The four planned dates are calculated by using the following subtraction calculations:

- The transit time is subtracted from the requested delivery date to determine the goods issue date.
- The loading time is subtracted from the goods issue date to determine the loading date.
- The pick and pack time and transportation lead time are subtracted from the loading date to determine the material availability date and the transportation planning date (backward scheduling). The earliest creation date for the outbound delivery date is either the material availability date or the transportation planning date, depending which date is earlier.

When you create the outbound delivery, the system copies the dates to the document header because the shipping point and route are the header fields in each outbound delivery.

**Note:**

During outbound delivery creation, the shipping point and route are split criteria. If the system determines more than one shipping point or route in the order, then the system creates multiple outbound deliveries.

During shipment scheduling, if the system encounters a problem when performing backward scheduling from the customer requested delivery date (for example, if no material stock is available), then the system tries to propose a realistic material availability date (as soon as the material is available). The system then adds the four time limits to this new material availability date to reach a new delivery date (this process is called forward scheduling).

You can avoid shipment scheduling for certain types of transactions. The rush order sales document type, which is delivered with the standard system, does not require scheduling. This is because you need to perform all required steps as quickly as possible, one after the other.

Item Categories in the Outbound Delivery

Similar to almost all logistics documents in SAP ERP, the outbound delivery has a header level and an item level. Data at the header level always applies to the entire document. Examples of header level data include ship-to party, shipping point, route, and dates for shipping processing.

At the delivery item level, you can view data such as the material quantities that the customer orders. However, there can also be document items for packaging materials.

The item category indicates the type of the delivery item. You define delivery item categories in Customizing for *Shipping*. You identify these item categories with three-character or four-character keys. For example, you define *TAN* for a standard item or *TATX* for a text item.

When you create an outbound delivery for a sales order, the system copies the relevant key for the item category from the order into the outbound delivery. Delivery-relevant order item categories and their corresponding delivery item categories must have the same key.

If there are items in the outbound delivery that are not order dependent (such as packaging material), or if the outbound delivery is created without reference to a sales order, the system performs an item category determination.

**Note:**

In Customizing, the delivery types and item category groups for the materials to deliver are linked in a table that contains delivery item categories.

In Customizing for the delivery item category, specify if and how the system must check the quantities for a delivery item, such as for over deliveries and under deliveries. You also specify whether the item is relevant for picking and whether the item can or must be packed..



LESSON SUMMARY

You should now be able to:

- Create outbound deliveries with reference to sales orders

Performing the Shipping Process

LESSON OVERVIEW

This lesson explains how to perform the shipping process.

Business Example

You need to remove the goods to be delivered from storage and place in the goods issue area. You then need to post the goods issue in inventory management. For this reason, you require the following knowledge:

- An understanding of how to create and confirm a transfer order for an outbound delivery
- An understanding of how to post the goods issue for an outbound delivery
- An understanding of how to use the outbound delivery monitor
- An understanding of the options available for collective processing and automated processing

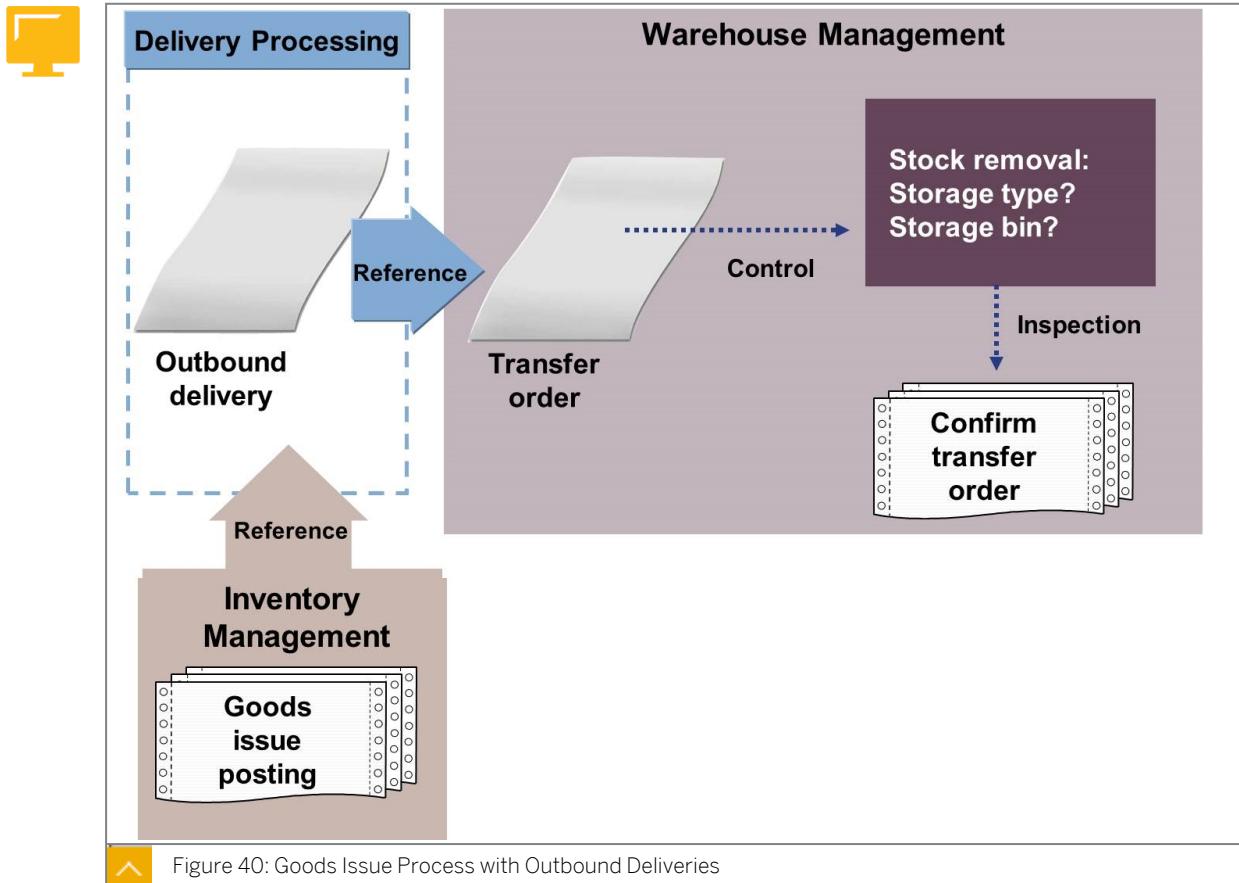


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Perform the shipping process

Stock Removal for Outbound Deliveries



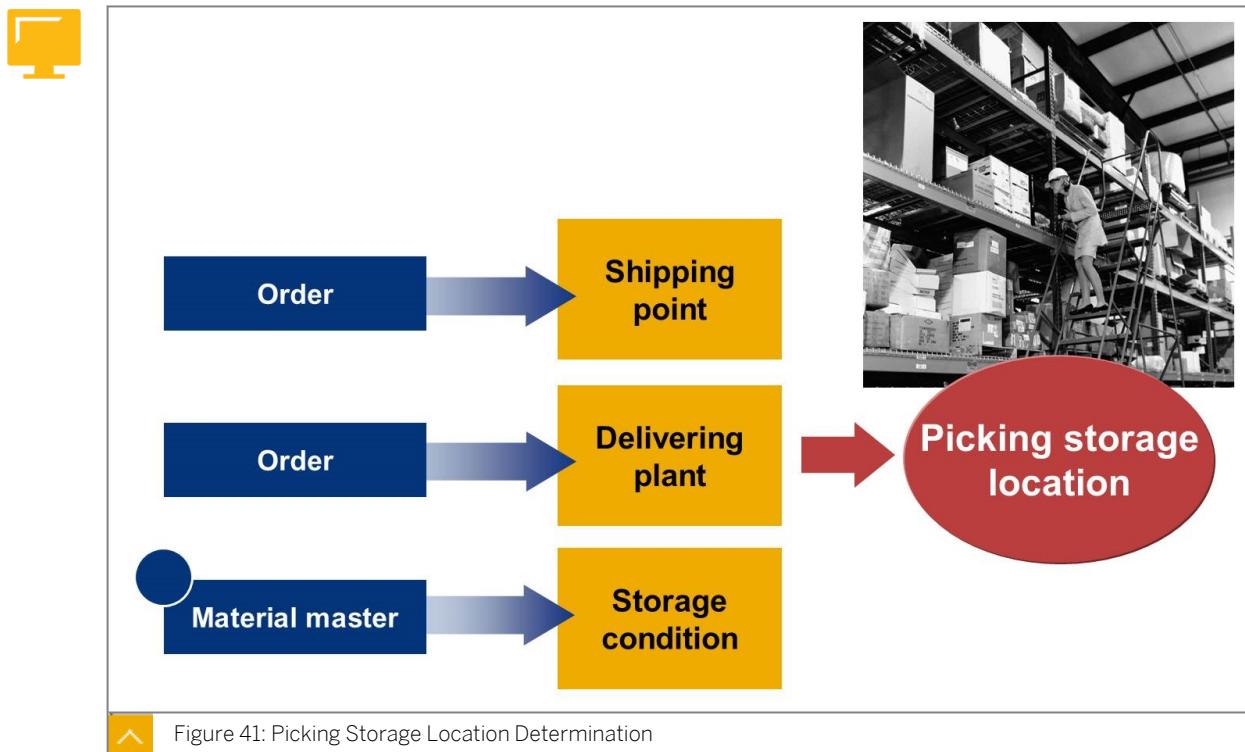
At the start of the goods issue process for outbound deliveries, you create an order or sales document by using the *Sales and Distribution* (SD) area menu.

You create the outbound delivery, which is central to this process, with reference to the order.

The subsequent stock removal of the goods to deliver uses the transfer order, which, in turn, refers to the outbound delivery.

You need to confirm the transfer order to complete the picking process in the system. Only then you can post the goods issue for the outbound delivery in inventory management.

Determination of the Picking Storage Location



When you create an outbound delivery, the system attempts to determine a picking storage location for each document item. You configure the settings for the determination of the picking storage location in Customizing for *Shipping*. The picking relevance must be activated for the relevant delivery item category.

The system considers the following factors when determining the picking storage location:

- The shipping point
- The delivering plant
- The storage condition of the material

The system adopts the shipping point and delivering plant from the order. The storage condition of the material is stored in the *General Plant Data/Storage 1* view of the material master, and the system copies the storage condition into the outbound delivery.

You define storage conditions in Customizing for *Shipping* to roughly indicate the requirements for the storage of a material. The storage conditions are only used in storage location determination.

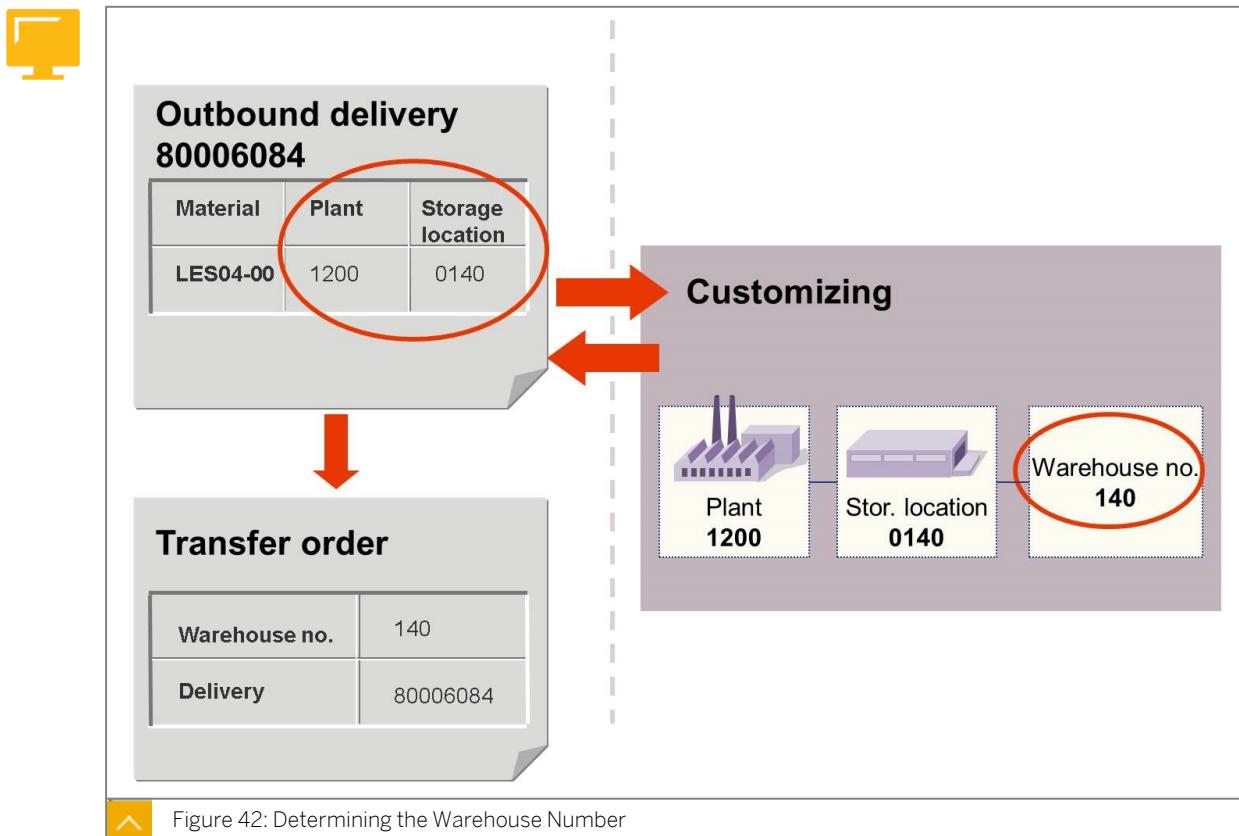


Note:

Storage location determination does not have to run for a specific material. Therefore, the system can limit the search to the shipping point and delivering plant.

Before picking, you can manually change the storage location that the system proposes in the outbound delivery.

Determination of the Warehouse Number



When determining the picking storage location, the system also checks whether the storage location determined in Customizing has been assigned to a warehouse number. If the storage location has been assigned, you must create a transfer order to remove the material from stock.

In addition to the warehouse number, the system shows the following statuses in the outbound delivery:

- An overall status of picking
- An overall status of the transfer order

In Customizing, you can set the warehouse number for each delivery type as a split criterion at delivery creation. The deliveries then always have unique warehouse numbers.

Lean Warehouse Management

Not every company requires a Warehouse Management system. Sometimes, putaway and stock removal are performed in highly specialized and almost completely automated systems that are controlled by separate software. If storage bin management is not required in the SAP system, you can use Lean Warehouse Management (Lean WM), instead of the actual Warehouse Management system. In Lean WM, stocks are only managed at storage location level. However, the system still uses the transfer order for picking.

In contrast to the Warehouse Management system, the transfer order in Lean WM does not have a controlling function. You can either print the transfer order as a picking sheet or use the transfer order as a means of communication between SAP ERP and an external system, such as a warehouse control unit. Therefore, you need to make few Customizing settings to use Lean Warehouse Management.



Note:

In Lean WM, you require only one warehouse number and two storage types (fixed storage bin and a goods issue area). This data is only similar in form to the organizational units from the Warehouse Management system. The only task of this data, which does not have any control functions, is to facilitate the creation of transfer orders for outbound deliveries.

In the same way as a complete warehouse number, the lean warehouse number is connected to a plant-storage location combination in Customizing for *Enterprise Structure*. The system identifies a warehouse number as a lean warehouse number by using indicators that you set in Customizing for *Shipping*.

Collective Processing of Outbound Deliveries

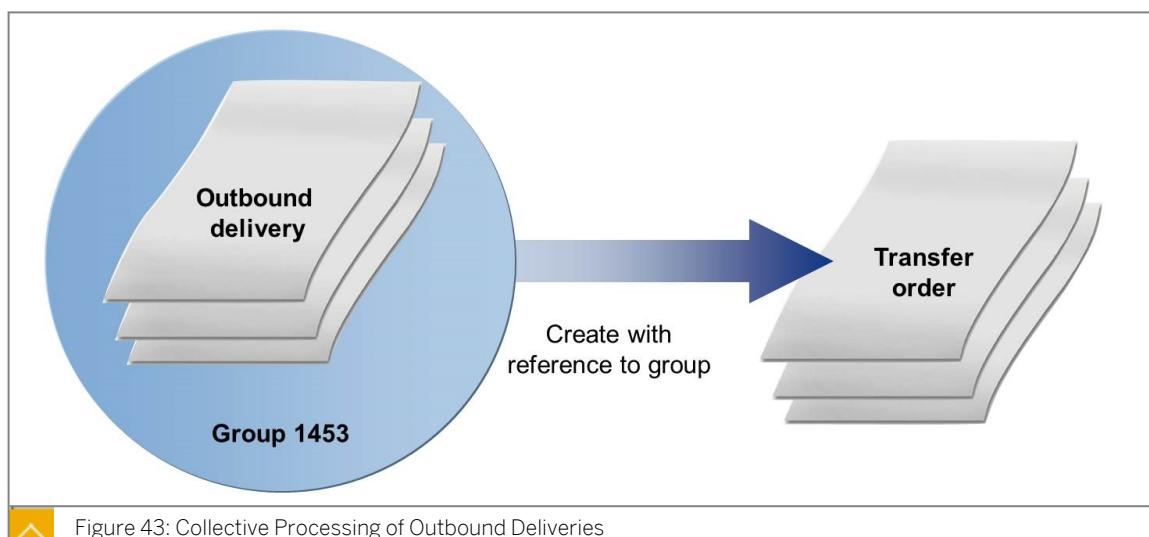


Figure 43: Collective Processing of Outbound Deliveries

In addition to manually creating single transfer orders for a single outbound delivery, you can also perform the following tasks to process outbound deliveries:

- Automatic creation of transfer orders by using the RLAUTA20 report
- Group formation in the outbound delivery monitor and subsequent transfer order creation for the group
- Two-step picking

To be able to use the RLAUTA20 report, output type *WMTA* (*Automatic Transfer Order*) must be determined in the outbound delivery. You use this output type to create a transfer order for the outbound delivery in the background.

Depending on your Customizing settings for output determination, output type *WMTA* is determined in the outbound delivery under certain conditions, such as when a particular delivery type is combined with a particular shipping condition. This output type is processed

using the RSNAST00 report, which runs the RLAUTA20 report to create a transfer order for the outbound delivery.

**Hint:**

The system creates one transfer order for each outbound delivery. In SAP ERP, you can create a single transfer order for a group of outbound deliveries.

In the outbound delivery monitor, you can summarize outbound deliveries according to various criteria into groups. You then process the groups collectively during subsequent picking. You can also perform the remaining steps of the outbound process from a single screen in the outbound delivery monitor. Even if you do not form groups, you can always process several outbound deliveries collectively in the outbound delivery monitor.

The outbound delivery monitor contains many selection options to streamline the collective processing of outbound delivery. The outbound delivery monitor allows you to access specific outbound deliveries. This means that you can collectively process all outbound deliveries that you want to deliver to the customer by, for example, using a specific forwarding agent or route.

Collective Processing – Wave Pick and Two-Step Pick

The wave pick is a special form of collective processing that occurs during transfer order creation. Outbound deliveries are again summarized into groups for further processing. However, time-based criteria (for example, a joint goods issue time) take priority in the selection.

**Note:**

In Customizing for *Shipping*, you specify when picking occurs during a working day. You also specify the compare time for each warehouse number, which must be used when selecting outbound deliveries. You can use wave pick profiles to specify weight and volume limits and also a maximum processing time for each wave.

Two-step picking is also a special form of collective processing of outbound deliveries.

In two-step picking, stock is removed from storage in two steps, withdrawal and allocation.

Before you perform two-step picking, you must summarize outbound deliveries into groups.

In the withdrawal step, you create a single transfer order to remove all materials of the group from storage. You can then place the cumulated material quantities into interim storage in a separate storage type.

In the subsequent allocation to the outbound deliveries involved, the system generates one transfer order for each outbound delivery. The material is transported from the interim storage type to the goods issue area.

**LESSON SUMMARY**

You should now be able to:

- Perform the shipping process

Unit 4

Lesson 5

Planning Transportation in SAP ERP

LESSON OVERVIEW

This lesson outlines the range of functions for transportation.

Business Example

Your company plans to ship goods to customers in various locations. For this reason, you require the following knowledge:

- An understanding of the range of functions within transportation planning
- An understanding of the fundamental control parameters for the shipment type
- An understanding of how to create a shipment document
- An understanding of how to use the shipment document to execute transportation processing in SAP ERP

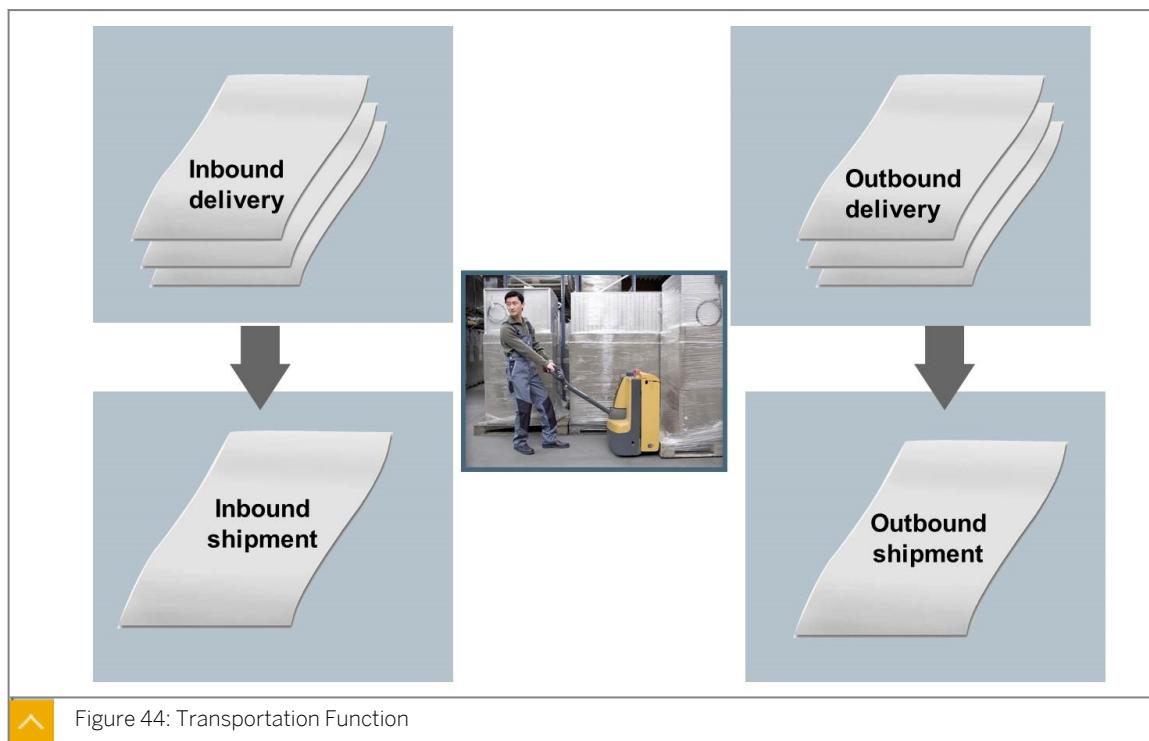


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Plan transportation in SAP ERP

Transportation Functions



The transportation functions in SAP ERP enhance the following forms of the delivery process:

- Goods receipts with inbound deliveries
- Goods issues with outbound deliveries

In the process, the basic principle is always the same. Deliveries are grouped according to various selection criteria. Further processing is performed separately for each group. This process references a separate document, the shipment document (referred to as the shipment), which is flagged with the number of the delivery group.

The shipment document stores the data concerning planning and completion of the process substeps. You can create the document either before or after picking.

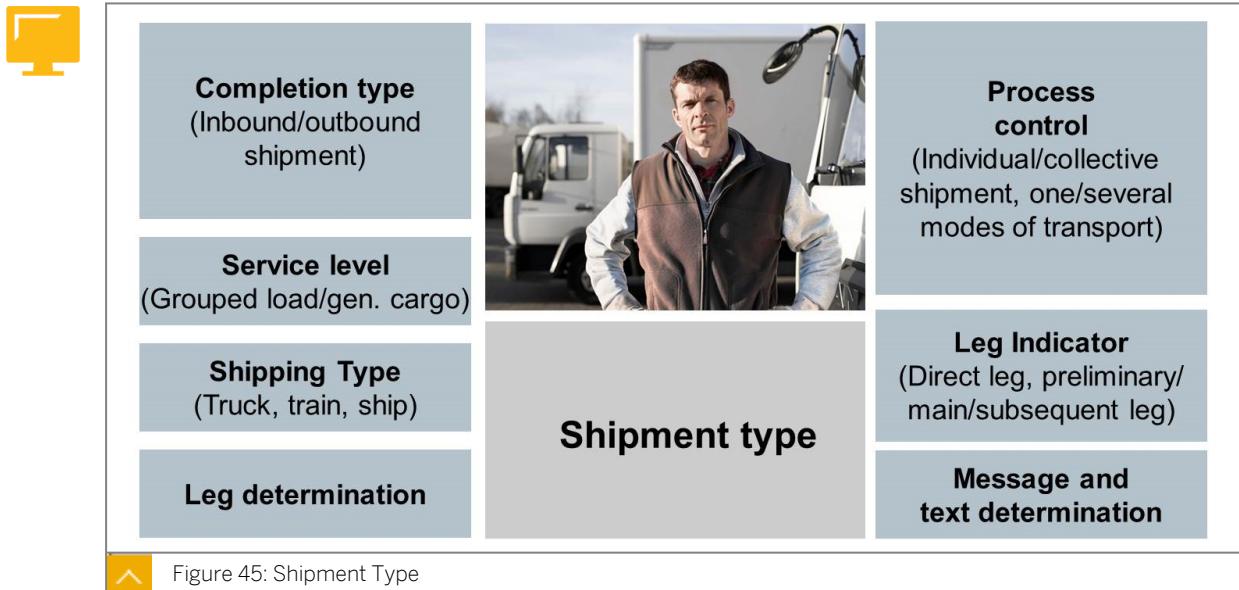
Using transportation functions does not change the process flow of the inbound or outbound process. Instead, it adds an extra step and a document. You can also process output types in connection with this document. The standard system contains preconfigured output types for bills of lading, shipping orders, and invoices accompanying goods. These documents can be printed or sent by fax or Electronic Data Interchange (EDI) to the goods recipient.

You can also perform cross-delivery packing in the shipment. In cross-delivery packing, initial packing either occurs in the shipment or packages are adopted from the delivery and then packed further.

An essential part of the transportation functions is shipment cost calculation and settlement, which uses pricing methods. You can use this subfunction to create detailed forecast estimates of costs that might arise because of transportation processing. You can forward the estimates to accounting in order to generate appropriations or create credit memos.

You can also invoice the customer for shipment costs in the billing document. A shipment cost document is used to calculate and settle shipment costs.

Shipment – Types, Stages, and Documents



A shipment type is a collection of process-controlling parameters that you create in Customizing for *Transportation*. A shipment type decides the direction, combination, and mode of transport for a shipment, in addition to the transfer of data from preceding documents and the output determination.

The preconfigured shipment types in the standard system can be copied and changed. You can also enhance the preconfigured shipment types by adding new shipment types. You must always enter a shipment type when you create a shipment document.

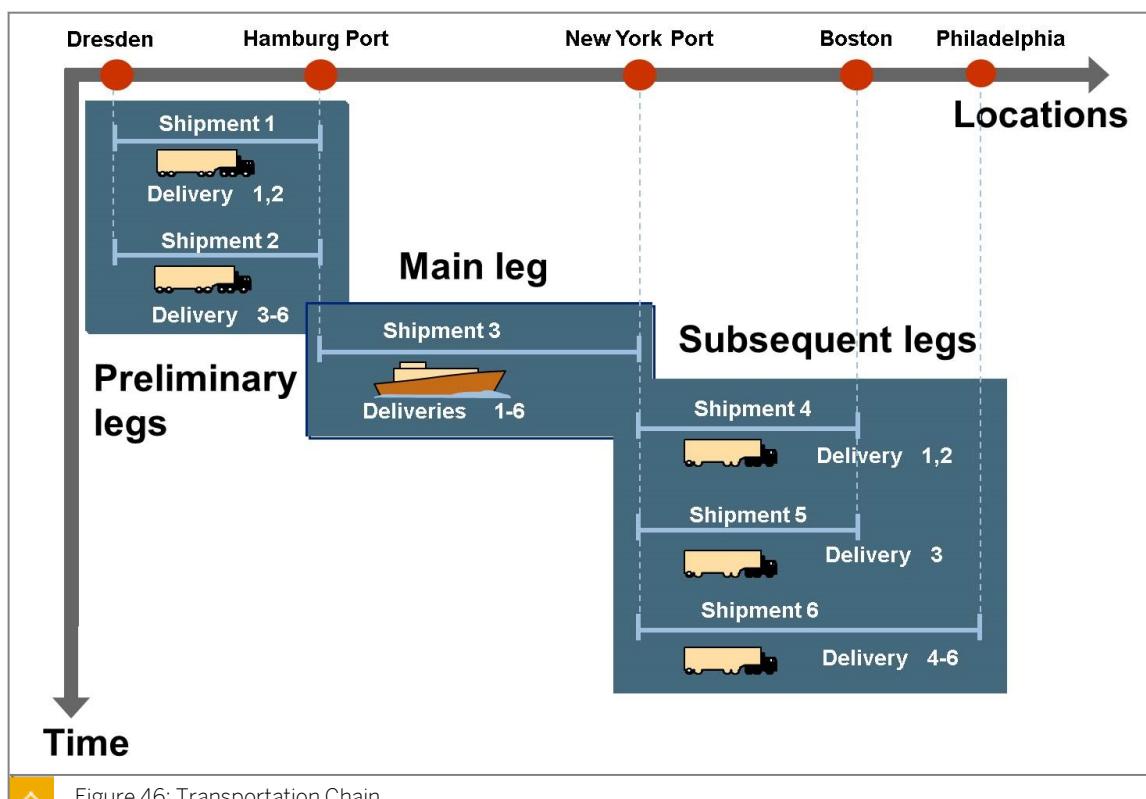
The completion type of the selected shipment type decides the direction of the shipment. Use the indicator for process control to determine whether the shipment is a single shipment or a collective shipment. You can differentiate between shipments with one or more modes of transport.



Note:

A single shipment always has exactly one point of departure and one destination, regardless of the number of deliveries that are included in the shipment. A collective shipment can have more than one point of departure and destination.

Transportation Chain



If you want to execute a complex form of transportation processing in the system (several points of departure or different modes of transport), you can create a transportation chain.

Transportation chains consist of several shipments that are each created with a different shipment type. This means that you can control each partial run separately.

Transportation chains consist of at least one preliminary leg, one main leg, and one subsequent leg.

**Note:**

The shipment types that are used to process a simple single or collective shipment receive the leg indicator, *Direct Leg*.

The run indicator of a shipment type specifies the leg type. To create a transportation chain, you need at least three shipment types that are flagged accordingly as *Preliminary Leg*, *Main Leg*, or *Subsequent Leg*. If you create a shipment using a shipment type flagged as such, the system recognizes that this shipment is linked to other shipments.

Shipment Stages

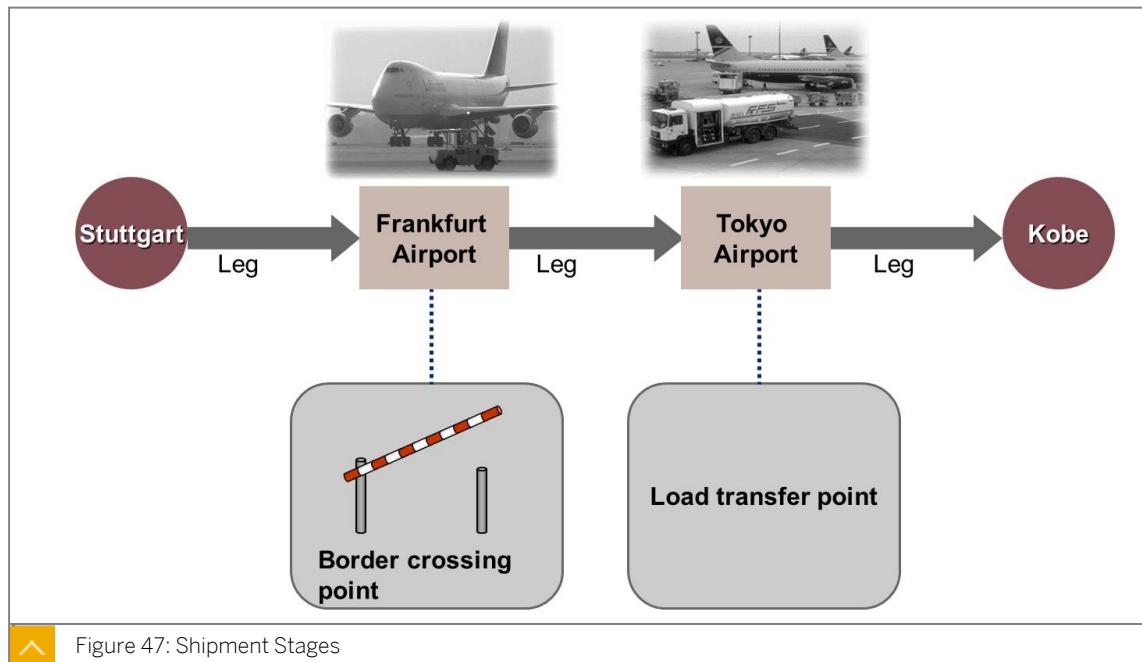


Figure 47: Shipment Stages

A shipment type also defines the type of leg determination. You can divide a shipment into several stages either manually or automatically.

SAP ERP contains the following defined shipment stages:

- Legs

A leg is a connection between a starting point and an end point, such as a shipping point, a plant, a customer, or a vendor.

- Load transfer points

The means of transport is switched at load transfer points. For example, the goods are loaded from a truck to a ship.

- Border crossing points

Border crossing points are locations where shipments cross national boundaries.

Each shipment stage can be linked to specific information, such as a service provider, a shipment cost calculation, and a shipment schedule. When you create a shipment, this data is copied into the shipment document.

**Note:**

Shipment stages can also be generated from routes. When you create a shipment and enter a route in the document header, the stages are copied from this route. However, you can also copy the route and its stages from the delivery. The shipment type defines whether stages are copied from the route.

Leg determination according to the shipment type has an extremely simple structure. It is based on simple rules for determining a useful departure and arrival sequence.

Tools for geographical optimization or for planning a vehicle load are not available in SAP ERP. For this reason, there is an interface (between sales and distribution (SD) and the transportation planning system (TPS)) that enables you to connect other transportation planning systems to SAP ERP. These external systems are specialized for specific industries or goods.

SAP Transportation Management (SAP TM) is a separate SAP product for optimizing transportation planning and execution.

Shipment Documents

The shipment document is the basis for transportation planning. The document is used to summarize deliveries into a group according to specific criteria.

When you create a shipment, you can select deliveries according to the following criteria:

- Start or target point
- Time-related criteria, such as transportation planning date or goods issue date
- Other transportation-relevant criteria, such as forwarding agent, Incoterms, shipping condition, route, or means of transport

**Note:**

You can only select transportation-relevant deliveries. The system decides whether a delivery is relevant for transportation using the delivery type, the item category and the route. All three criteria must be flagged as relevant for transportation in Customizing.

You can view the relevance for transportation from transportation planning status A on the outbound delivery overview and on the delivery header screens.

You can create shipments as single documents. You can also use collective processing, which generates shipment documents using selection variants. Selection variants contain a group of criteria used to select deliveries. They also enable background processing.

For processes that take place regularly, you can assign a selection variant to a shipment type in Customizing. You can use planning proposals to simplify the manual creation of shipments. In contrast to collective processing, you can still manually influence how shipments are constructed.

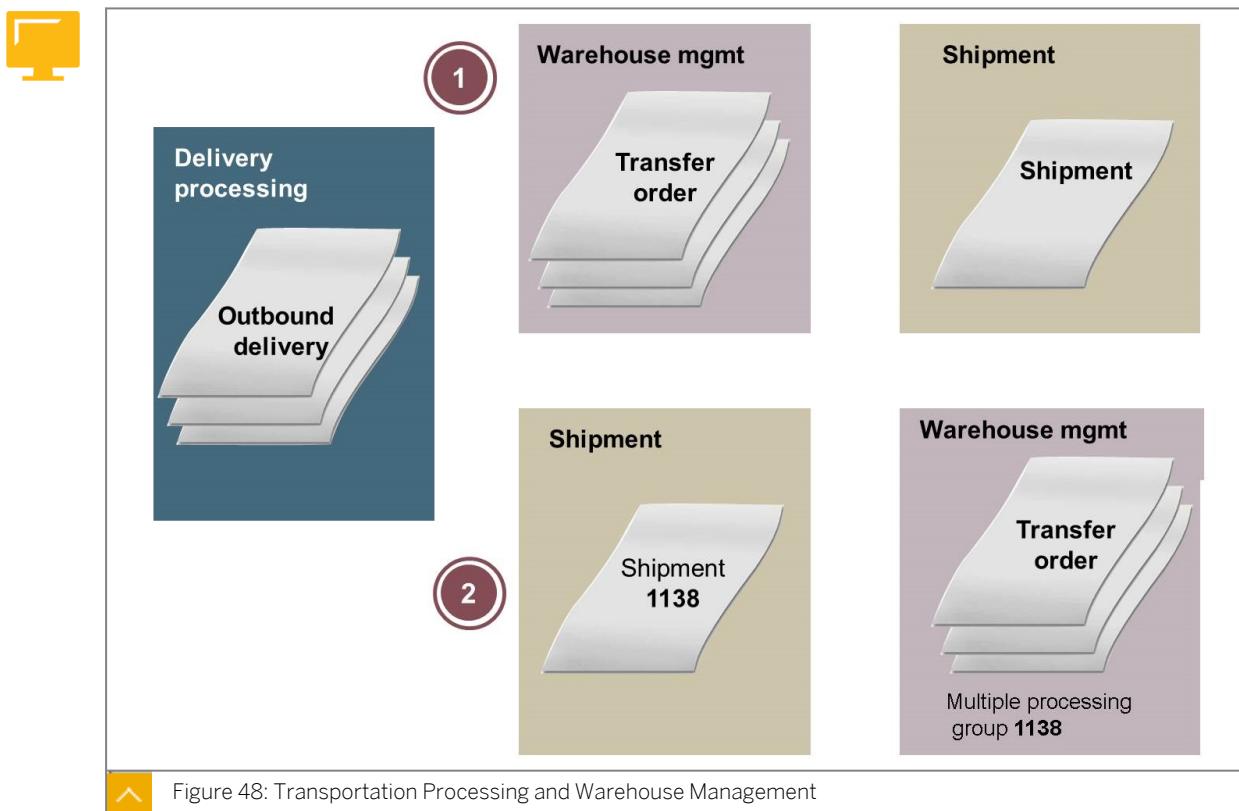
In the shipment document, you can enter dates, service providers, and texts. You can also construct cross-delivery packages. Transportation processing is controlled in the document

using predefined statuses. These statuses, which flag substeps in the process, range from *Planned* to *Completed*. You can also use statuses for the beginning and end of the shipment process.

You can use the document to track the current progress at any time. In the document, you can also plan specific substeps, such as loading. If the status *Loading End* is set, the system enters the actual time when loading was completed.

In Customizing, you can link each shipment type to activity profiles with separate statuses. You can use these profiles to automate output printing. However, you can also configure the system to perform background processing as soon as the assigned status is set in the document and the change is saved.

Transportation Processing and Warehouse Management



If you are using warehouse management, picking can take place before or after you create the shipment. If the shipment has already been created before picking, you can use the shipment in a collective run as a group to create and confirm transfer orders for the deliveries in the shipment.

In the first example shown in the figure, picking has been performed before a shipment is created. In the second example shown in the figure, the shipment is used as a group (outbound delivery) for creating wave picks.



LESSON SUMMARY

You should now be able to:

- Plan transportation in SAP ERP

Learning Assessment

1. Which of the following are the functions of negative quants in the goods issue area?

Choose the correct answers.

- A Negative quants indicate that something is missing in the warehouse.
- B Negative quants ensure that the total stocks are the same in both inventory management and warehouse management.
- C Negative quants indicate that material is to be removed from storage.
- D Negative quants map the temporary situation after the goods issue posting and before stock removal.

2. The transfer order for removing the requested material from storage is created with reference to the sales order.

Determine whether this statement is true or false.

- True
- False

3. Which of the following factors influence shipping point determination?

Choose the correct answers.

- A The sales document type
- B The sales organization
- C The delivering plant
- D The shipping condition
- E The loading group of the material

4. Which of the following factors influence picking location determination?

Choose the correct answers.

- A The shipping point
- B The warehouse number
- C The delivering plant
- D The picking area
- E The palletization data of the material
- F The storage condition of the material

5. A _____ decides the direction, combination, and mode of transport for a shipment.

Choose the correct answer.

- A shipment document
- B shipping stage
- C shipment type
- D leg determination

Learning Assessment - Answers

1. Which of the following are the functions of negative quants in the goods issue area?

Choose the correct answers.

- A Negative quants indicate that something is missing in the warehouse.
- B Negative quants ensure that the total stocks are the same in both inventory management and warehouse management.
- C Negative quants indicate that material is to be removed from storage.
- D Negative quants map the temporary situation after the goods issue posting and before stock removal.

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Determine whether this statement is true or false.

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- False

3. Which of the following factors influence shipping point determination?

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- A The sales document type
- B The sales organization
- C The delivering plant
- D The shipping condition
- E The loading group of the material

4. Which of the following factors influence picking location determination?

Choose the correct answers.

- A The shipping point
- B The warehouse number
- C The delivering plant
- D The picking area
- E The palletization data of the material
- F The storage condition of the material

During picking storage location determination, the system considers the shipping point, delivering plant, and storage condition of the material.

5. A _____ decides the direction, combination, and mode of transport for a shipment.

Choose the correct answer.

- A shipment document
- B shipping stage
- C shipment type
- D leg determination

Lesson 1

Packing Materials

107

Lesson 2

Applying Handling Unit Management

113

UNIT OBJECTIVES

- Pack materials using the packing function and the packing station
- Create a handling unit without reference to an object

Packing Materials

LESSON OVERVIEW

This lesson explains how to perform packing as a substep of the shipping process in the SAP ERP application.

Business Example

Packing of goods that are picked for outbound deliveries must be performed in the system. You must use scanners to perform this task at the packing station. For this reason, you require the following knowledge:

- An understanding of how to make the required settings for packing at material master level
- An understanding of how to use the packing function in outbound deliveries
- An understanding of how to use the packing station

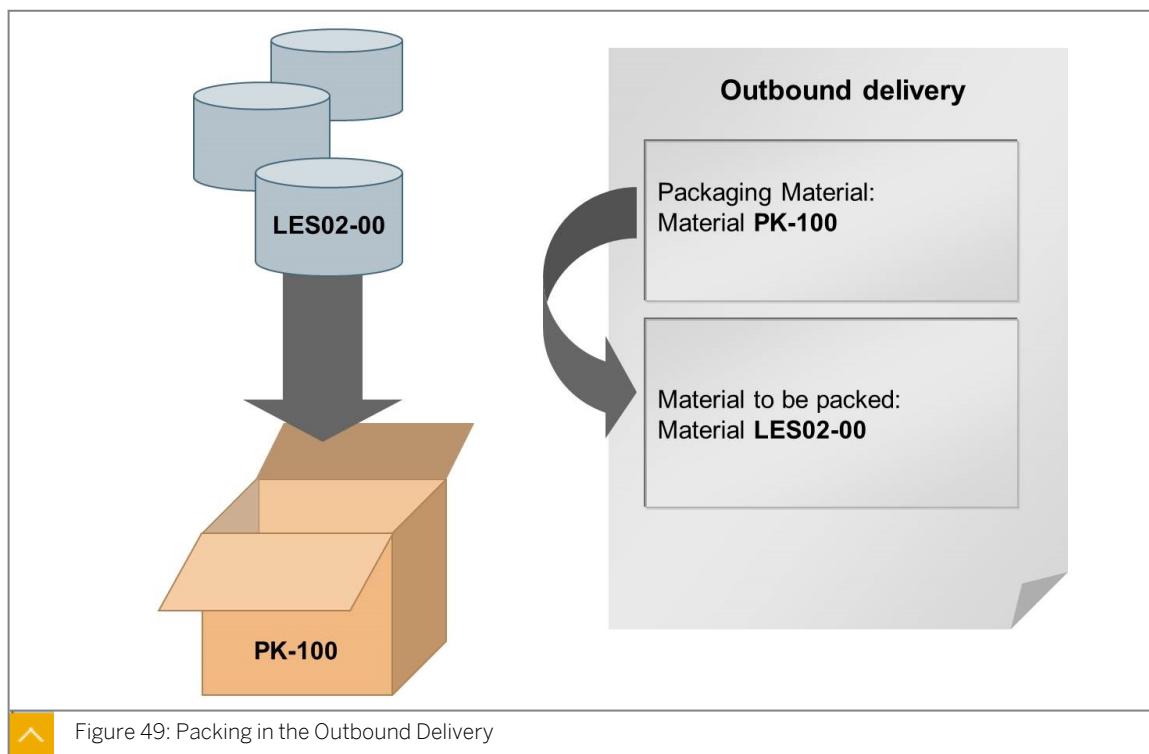


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Pack materials using the packing function and the packing station

Prerequisites for Packing



During packing, items in the outbound delivery are assigned to packaging materials, which are managed in the system as separate materials with their own master records. You create the assignments in the packing function for the outbound delivery.



Note:

When you create material master records for new packaging material, use *Material Type VERP (Packaging Material)*. This material type contains several packing-relevant fields, such as maximum weight and maximum volume.

Only those materials to which a packaging material type has been assigned in the master record can be used as packaging materials. Packaging material types are defined in *Customizing for shipping*. You group packaging materials according to their physical properties, such as boxes of a certain size or pallets of a certain type.



Note:

You assign packaging material types to the material master record for a packaging material in the *Sales: General/Plant* view.

Materials to be packed can also be grouped according to their physical properties. To do this, use the material group for packaging material, which you create in *Customizing for Shipping* using the same method as when you defined packaging material types.

Use material groups for packaging materials to group materials that must be packed in the same way.



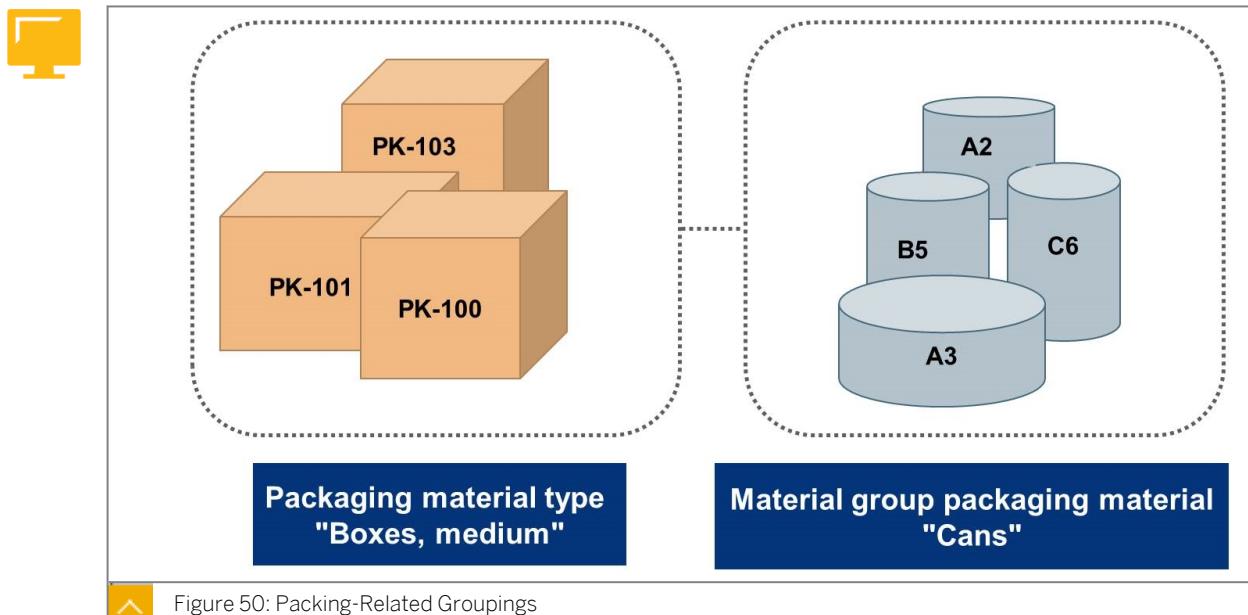
Note:

You enter the material group for packaging materials in the *Basic Data 1* view in the material master.

Packaging material types and material groups for packaging materials are assigned to each other in *Customizing*. Using these assignments as a basis, during packing, the system checks whether the selected packaging material is allowed for the material to be packed.

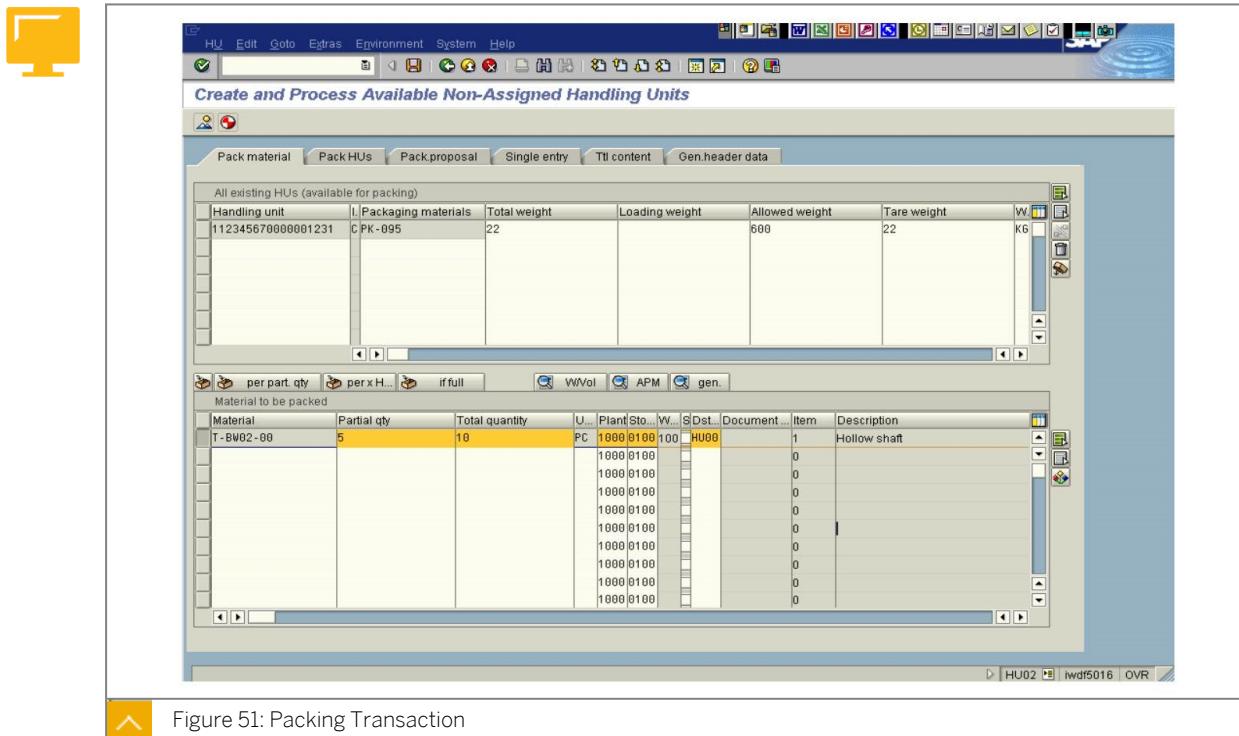
In the packing transaction, you can display the packaging materials allowed for the material to be packed. You can then select a material from the list of displayed materials.

Packing-Related Groupings



In packing for the outbound delivery, you can construct several levels. For example, you can determine that goods must first be packed into boxes, and the boxes must then be packed onto a pallet. To specify that the system is to check at the second level whether the selected packaging material is allowed, or to specify that the system is to propose the packaging material, you must assign a separate material group for packaging materials to the materials to be packed in the material master.

Functions in the Packing Transaction



In the outbound delivery, when you choose *Edit → Pack* on the *Create Outbound Delivery Overview* screen, a screen that displays the processing of handling unit for outbound delivery is displayed. The upper half of the screen is for packaging materials and existing packages. The lower half of the screen lists the materials to be packed.

In the lower screen area, the system automatically proposes the delivery items that can be packed.



Note:

In Customizing for the delivery item category, you specify relevancy to packing and if packing is required.

To allocate the packaging material of the delivery items that require packing, enter the material number or, if you have made the relevant settings, select a material from a list of the allowed packaging materials.

The packing activity itself involves assigning packaging materials to the materials that must be packed.

Packing Options

The packing options are as follows:

- Pack the largest possible quantity of the material.
- Create a package for each partial quantity of the material to be packed.
- Pack the total quantity of the material.

If you choose to pack the largest possible quantity of the material, the result is one package. The system packs the given quantity until the weight and volume tolerances that are defined in the material master are reached. The gross weight of the material to be packed is compared to the allowed packing weight for the packaging material. Remaining quantities are not packed.

The other two options ensure that the total quantity of the material is packed. When choosing these options, you either enter a partial quantity or allow the system to distribute the total quantity. The system distributes the quantity as equally as possible and constructs a new package for any remaining quantities.



Note:

The packing function contains similar options that enable you to pack packages further.

The packaging process can be almost completely automated as follows:

- You can store the packing requirements of the customer as a packing proposal in the order. You can then configure the system to copy this proposal automatically into the outbound delivery.
- To standardize packing for situations where certain materials are always packed in a certain way, you can create packing instructions as master data.

Handling Units Without Handling Unit Management

A handling unit is described as a package that you create in the packing function for the outbound delivery. With the development of handling unit management, a package management tool that covers the entire logistics process, the term handling unit has replaced the term shipping unit.

The range of functions of a shipping unit has been enhanced with package numbering according to international standards and the packing station.



Note:

In SAP ERP, packages can be numbered according to GS1-128. In Customizing, you can set up the automatic assignment of a Serial Shipping Container Code (SSCC).

If you are using the packing functions in the outbound delivery process, it does not mean that you have implemented handling unit management. To move packages across the entire process chain, you must make various Customizing settings. Changes to the process control may have substantial consequences, particularly at inventory management level.

Parts of the packing station functions (transaction code HUPAST) correspond to the packing transaction in the outbound process. However, the packing station is designed for data entry using scanners to minimize the time that users who perform packing must spend working with on-screen data.

A packing station enables you to connect computer-controlled scales to transfer the actual weight of a package to the SAP system. This option is particularly useful where the weight of the material to be packed changes, and the outbound delivery to the customer must contain an exact weight for each package.



Note:

The scales are connected through a serial interface to the computer of the packing station worker . The locally installed program that controls the scales transfers the weights to the SAP-specific program, scale.exe, which is also installed on the computer. The connection between the SAP system and the scales is created by using a Remote Function Call (RFC).



LESSON SUMMARY

You should now be able to:

- Pack materials using the packing function and the packing station

Applying Handling Unit Management

LESSON OVERVIEW

This lesson explains the basic principles of handling unit management, which is a tool for managing packages within the entire logistics process.

Business Example

Your company is exploring methods to create packages in the system and move those packages throughout the entire supply chain. For this reason, you require the following knowledge:

- An understanding of handling unit
- An understanding of the functions of handling unit management
- An understanding of how to create a handling unit without reference to an object
- An understanding of how to use the handling unit monitor

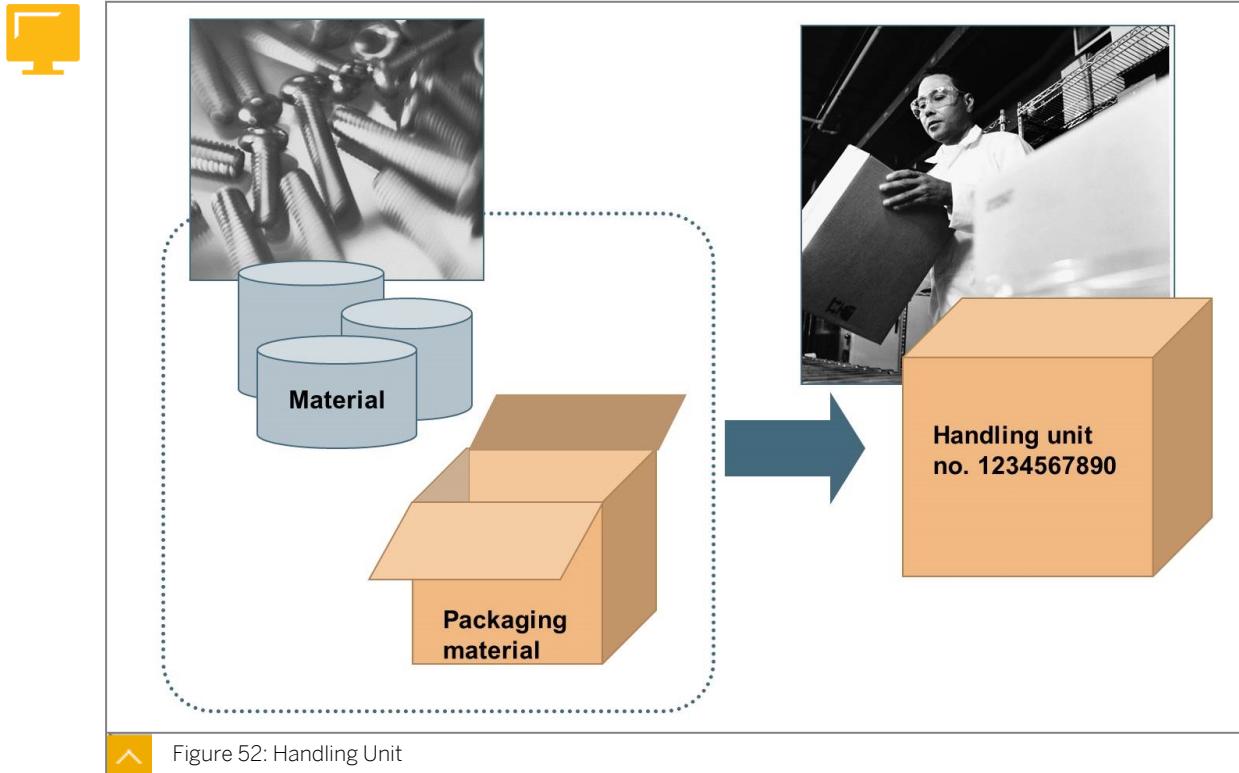


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Create a handling unit without reference to an object

Handling Unit Management



A handling unit consists of material to be packed and packaging material that is uniquely identified by a number. You can use a handling unit in the entire logistics process and, if required, outside your SAP system. The option to use handling units across processes constitutes the main difference between handling units and shipping units. A shipping unit is generated by packing in the delivery, meaning that you can only use a shipping unit in the delivery process.



Note:

In SAP ERP, the term shipping unit has been replaced by the term handling unit. As a result, all units that are created by packing are called handling units in the system.

Handling unit management was developed to simplify the technical system processing of logistics processes. Various material movements are performed with reference to packages. Only the identification number of a handling unit is required to display detailed information about the contents and packaging.

Each handling unit also has a history, that is a cross-process, chronological documentation of all the movements of the handling unit.

The identification number of a handling unit can be unique within a client or across systems. If the number must be unique only at client level, the number assignment is made according to number ranges.

A Serial Shipping Container Code (SSCC) is used to uniquely identify a handling unit in the SAP system as well as outside the system boundaries. In this case, the system also uses number ranges, but with the addition of other elements.



Note:

The SSCC is part of the coding standard GS1-128. The SSCC is a eighteen-character number that is used to identify logistics units. The aim is to identify a package for at least one year worldwide by using the SSCC of the package.

Consequences for Inventory Management

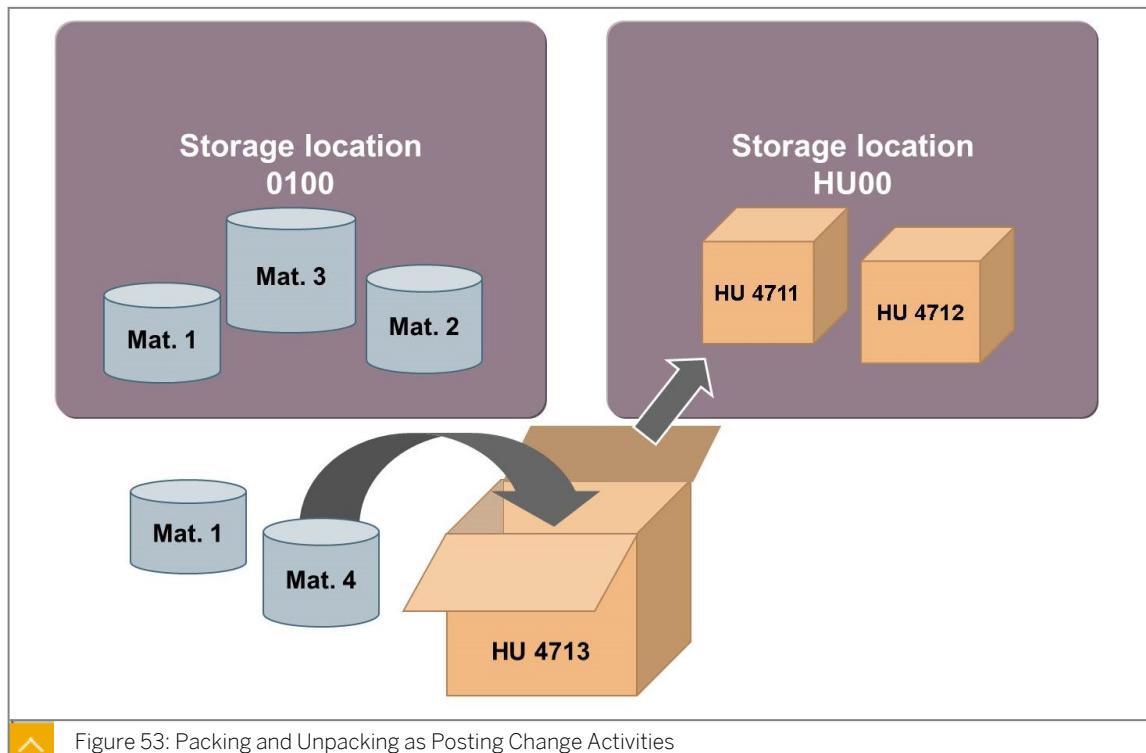


Figure 53: Packing and Unpacking as Posting Change Activities

In contrast to the old shipping unit, a handling unit (and not the material packed in the handling unit) is an inventory management object. This means that the inventory in handling units is always managed in a separate storage location. This storage location is flagged in Customizing for *Handling Unit Management* as subject to handling unit management. This means that the storage location can only accept packed stocks.

You can only stock handling units in a handling unit storage location. A partner storage location, which is not subject to handling unit management, is assigned to each handling unit storage location. This structure is necessary because packing and unpacking in handling unit management always cause storage location to storage location posting changes. The figure illustrates this basic procedure.

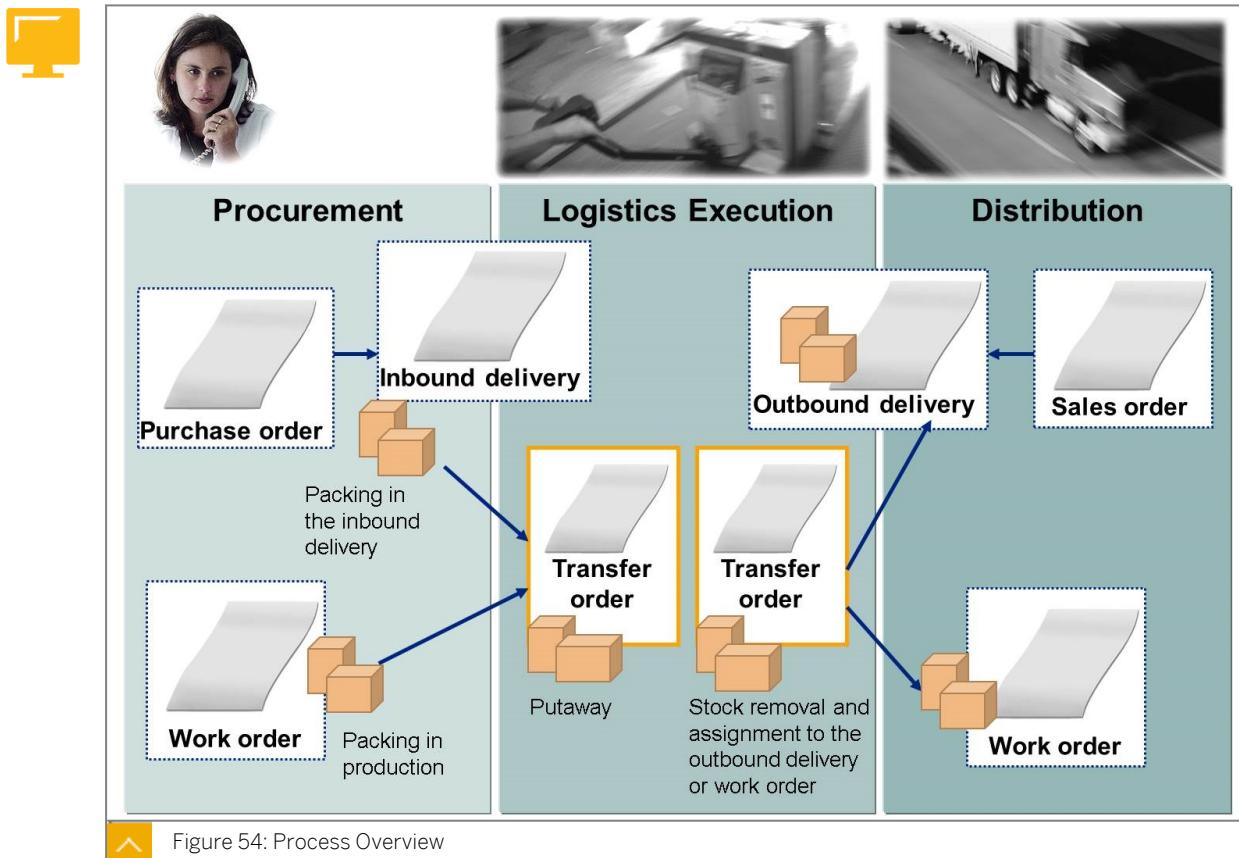
When you pack an unpacked material, a posting change takes place from a storage location that is not managed by a handling unit to a storage location that is managed by a handling unit. If you unpack a handling unit or a partial quantity, the system transfer posts this material quantity into a storage location that is not managed by a handling unit.

**Note:**

A storage location that is not managed by a handling unit does not necessarily have to be the partner storage location of a handling unit storage location. If there is no default storage location, the system uses the partner storage location.

For inventory management postings that affect packed material, you must always enter the relevant handling unit. The posting must always refer to the total packed quantity.

Handling Unit Management in the Logistics Process



Handling unit management is a package management tool that can be used throughout the logistics process. You can implement this solution in almost all logistics subapplications in SAP ERP.

Goods procured externally are packed in the inbound delivery. However, you can also use the identification numbers of the packages to adopt packages from vendors as handling units in your system.

**Note:**

Goods receipt processes with handling units must be executed using inbound deliveries.

Material that is produced in-house is packed in production. You can use the Warehouse Management system in connection with handling unit management. Transfer orders are used to put away packages.

You can supply packed components to production. When doing so, you can use the Warehouse Management system for material staging.

To deliver handling units to customers, you must at least be using Lean Warehouse Management (Lean WM) if partial quantities must be picked for the outbound delivery from existing handling units.

If the picking storage location is subject to handling unit management, the system does not permit packing in the outbound delivery.



Note:

If you do not use a Warehouse Management system, you can assign an existing handling unit to the outbound delivery.

You can use a transfer order to pick a handling unit that is created in advance for the material quantity to pick. When the transfer order is confirmed, the pick handling unit is assigned to the outbound delivery.

You can display handling units in the handling unit monitor at any point in the logistics process, regardless of their usage. The handling unit monitor also allows you to make certain changes to handling units.

- 1
- 2
- 3

To Create a Handling Unit Without Reference to an Object

1. On the SAP Easy Access screen, choose *Logistics* → *Central Functions* → *Handling Unit Management* → *Processing Handling Units* → *Create and Change (General)*.



Hint:

Packing is essentially a posting change from a storage location that is not managed by a handling unit to a storage location that is managed by a handling unit. Therefore, you must always enter the issuing and receiving storage locations.

2. On the *General Header Data* tab page, enter the plant and the issuing storage location that is not managed by a handling unit. On the *Pack Material* tab page, enter the material to pack, the quantity, and the receiving handling unit storage location.
3. Choose a suitable packaging material from the list of allowed packaging materials or enter a default packaging material. To display the list of allowed packaging material, select the material to be packed and choose *Extras* → *Allowed Packaging Material*.
4. To assign the packaging material to the materials to be packed, choose one of the four pushbuttons between the *Material to be packed* and *All existing HUs (available for packing)* options.
5. To create the handling units, save your entries. The system informs you that the packing data is saved and a material document has been created. This material document is evidence of the storage location to storage location posting change.



LESSON SUMMARY

You should now be able to:

- Create a handling unit without reference to an object

Learning Assessment

1. Which of the following options enable you to pack material in outbound deliveries?

Choose the correct answer.

- A Packaging function
- B Material group
- C Packing functions

2. Goods procured externally are packed in the _____.

Choose the correct answer.

- A purchase order
- B outbound delivery
- C inbound delivery
- D work order

Learning Assessment - Answers

1. Which of the following options enable you to pack material in outbound deliveries?

Choose the correct answer.

- A Packaging function
- B Material group
- C Packing functions

2. Goods procured externally are packed in the _____.

Choose the correct answer.

- A purchase order
- B outbound delivery
- C inbound delivery
- D work order

UNIT 6

Additional Functions in Warehouse Management

Lesson 1

Monitoring Warehouse Stocks and Movements

123

Lesson 2

Processing Warehouse Management Functions Using Mobile Devices

129

Lesson 3

Optimizing Warehouse Processes with Cross-Docking

133

Lesson 4

Using Task and Resource Management

137

UNIT OBJECTIVES

- Monitor warehouse stocks and movements
- Process warehouse management functions using mobile devices
- Optimize warehouse processes with cross-docking
- Use the Task and Resource Management object

Monitoring Warehouse Stocks and Movements

LESSON OVERVIEW

This lesson explains the various tools that SAP ERP provides to monitor and evaluate warehouse stocks and movements. The lesson also explains about the warehouse activity monitor, additional standard analyses, and stock overviews.

Business Example

Your company wants you to use the warehouse activity monitor to quickly recognize errors or problems in the warehouse. In addition, you need to regularly check the stocks and material flow. For this reason, you require the following knowledge:

- An understanding of the range of functions of the warehouse activity monitor
- An understanding of how to use the warehouse activity monitor to monitor warehouse processes
- An understanding of how to use bin status reports, indexes of empty storage bins, and capacity evaluations

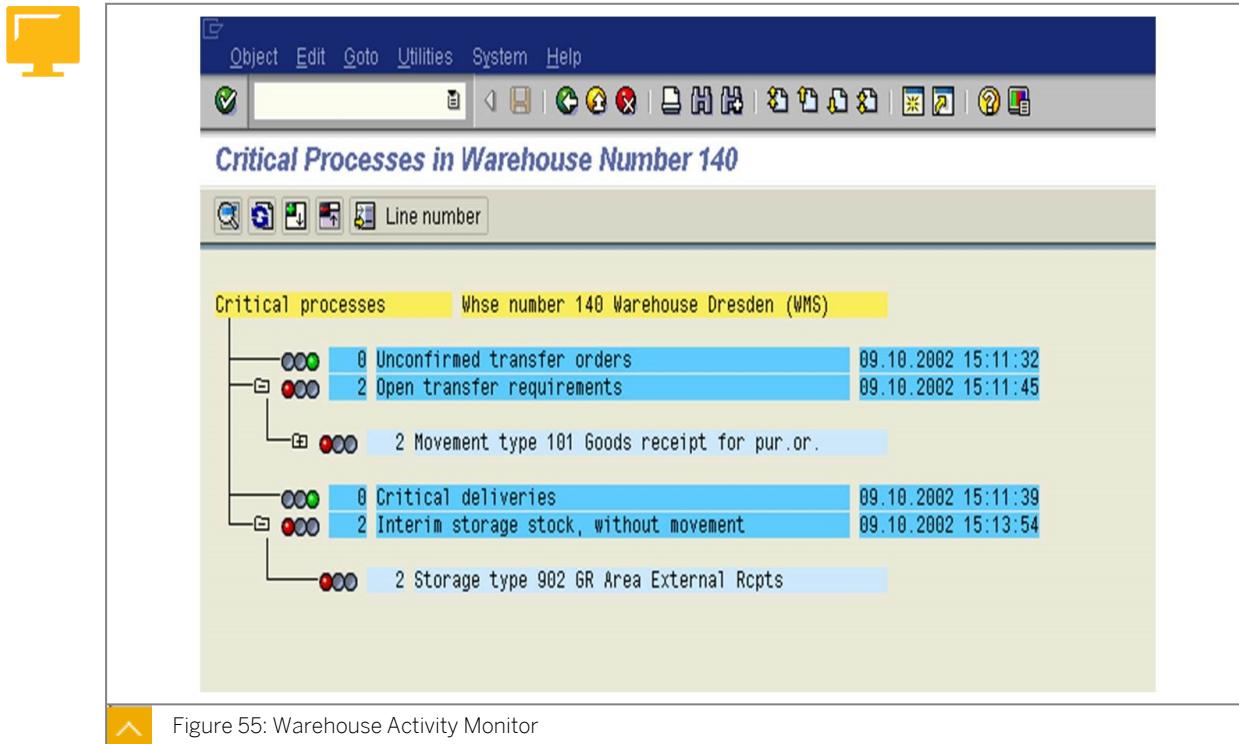


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Monitor warehouse stocks and movements

Warehouse Activity Monitor



The warehouse activity monitor is a tool that enables you to monitor warehouse movements and stocks. The tool provides timely information about processes that are either incomplete or incorrect. The tool also allows you to create and correct documents, as well as perform postings.

Objects used for Monitoring

The warehouse activity monitor contains the following objects for monitoring:

- Unconfirmed transfer orders
- Open transfer requirements
- Open posting change documents
- Open deliveries
- Negative stocks
- Stocks in interim storage types
- Critical stocks in production storage bins

You define processing deadlines for each object in Customizing. The warehouse activity monitor only displays a document or a stock if the deadlines have not been met. Each object has a corresponding report, and you can create variants of these reports. You can also schedule the reports as jobs to regularly check documents and stocks.

The reference organizational unit for the warehouse activity monitor is the warehouse number.

If the system processes the unconfirmed transfer orders object, the system searches for transfer orders that were not confirmed within the deadline specified in Customizing. The selection is restricted in Customizing to certain movement types and, if required, to certain storage types.

The check for the open transfer requirement and open posting change documents objects is similar to the check for unconfirmed transfer orders object. If you do not create transfer orders for the documents within the specified period, they appear in the warehouse activity monitor.



Note:

Transfer requirements and posting change documents have the same function. They document an inventory management posting and are reference documents for the transfer order. Posting change documents are usually the result of posting changes in inventory management, such as change in the stock type, assignment to special stock, or change in the batch of a material quantity. A transfer order is required to inform the Warehouse Management system which quants are affected by the changes.

For the open deliveries object, the system searches for outbound deliveries with picking-relevant items that do not yet have the overall picking status C (*Completely Processed*). The deadlines that you specify in Customizing for this object are valid with regard to the dates for specific shipping activities. The system determined these dates when the sales order was created and copied the dates into the outbound delivery. This means that if you start the selection report for the object, the system compares the planned time from the outbound delivery within the report time. The system uses the deadline from Customizing to determine whether there is enough time to complete the shipping activities.



Note:

The value for wave pick processing for the warehouse number determines whether the system uses the material availability time, loading time, or goods issue time for the comparison. If the other values, such as material availability time and goods issue time, are missing, the loading time is used as the reference factor.

Negative stocks and stocks in interim storage types are only displayed in the warehouse activity monitor after a deadline specified in Customizing has passed.

The object for critical stocks in production storage bins was created to monitor variances between transfer requirement quantities in the work order and the transfer requirement used to stage the material for production.



Note:

The critical stocks in production storage bins object are only relevant if production is supplied with material from the warehouse.

Stock Overviews and Evaluations

The Warehouse Management system provides various stock overviews, in addition to evaluations from various perspectives.

The overviews of storage bin stocks are essential for daily work in the warehouse. You can choose between an overview of the entire stock of a material in a warehouse number (transaction code LS26) and a material-specific bin stock overview (transaction code LS24). The advantage of the first overview is that you can immediately view whether stocks are being moved. The structure of the overviews is otherwise identical.



Note:

Transaction code LS24 directly opens a list of all storage bins that contain the selected material.

Bin Status Report



Type	Storage Bin	Material	Pint	Batch	C	S	Special Stock Number	TIL
002	01-01-01	T-BW04-00	1000					793
002	01-01-02	T-BW04-00	1000					793
002	01-01-03	T-BW04-00	1000					793
002	01-01-04	T-BW04-00	1000					793
002	01-01-05	T-BW04-00	1000					793
002	01-02-01	T-BW04-00	1000					793
002	01-02-02	T-BW04-00	1000					793
002	01-02-03	T-BW04-00	1000					793
002	01-02-04	T-BW04-00	1000					793
002	01-02-05	T-BW04-00	1000					793
002	01-03-01	T-BW04-00	1000					793
002	01-03-02	T-BW04-00	1000					793
002	01-03-03	T-BW04-00	1000					793
002	01-03-04	T-BW04-00	1000					793
002	01-03-05	T-BW04-00	1000					793
002	01-04-01	T-BW04-00	1000					793
002	01-04-02	T-BW04-00	1000					793
002	01-04-03	T-BW04-00	1000					793
002	01-04-04	T-BW04-00	1000					793
002	01-04-05	T-BW04-00	1000					793
002	01-05-01	T-BW24-00	1000					128
002	01-05-02	T-BW24-00	1000					128
002	01-05-03	T-BW24-00	1000					128
002	01-05-04	T-BW24-00	1000					128



Figure 56: Bin Status Report

The bin status report (transaction code LX03) provides an overview of various stocks in a warehouse or in individual storage types. From the bin status report, you can display individual storage bins and quants.



Note:

You can use the SAP List Viewer to customize these stock overviews. You can hide columns that are not required.

If you are using fixed storage bin, you can use the fixed bin information list (transaction code LX29) to analyze fixed bins and their stocks. For example, the system checks whether there are fixed bins that have not yet been assigned to a material master, and whether materials are contained in a different fixed bin than specified in the material master. You can also specifically select all the empty bins in a storage type (transaction code LS04).

**Note:**

You can find other evaluations, such as analyses for inventories in warehouse management and document overviews for transfer requirements and transfer orders, under *Information System* in the *Logistics Execution* area menu. This menu also contains the standard analyses for warehouse controlling (evaluations of material and quantity flows).

**LESSON SUMMARY**

You should now be able to:

- Monitor warehouse stocks and movements

Processing Warehouse Management Functions Using Mobile Devices

LESSON OVERVIEW

This lesson provides an overview of the SAP range of functions in the solution for mobile data entry in warehouses.

Business Example

For cost reasons, you want to cut down on paper work in your company. You also want to use scanners to report putaway and stock removal operations. For this reason, you require the following knowledge:

- An understanding of the uses of mobile data entry
- An understanding of the radio frequency (RF) solution in SAP ERP
- An understanding of how to use the RF monitor



LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Process warehouse management functions using mobile devices

Mobile Data Entry

Mobile data entry is frequently used in warehouse management. Material and storage bin data are entered using a bar code scanner and are checked by a system.

The advantages of mobile data entry are as follows:

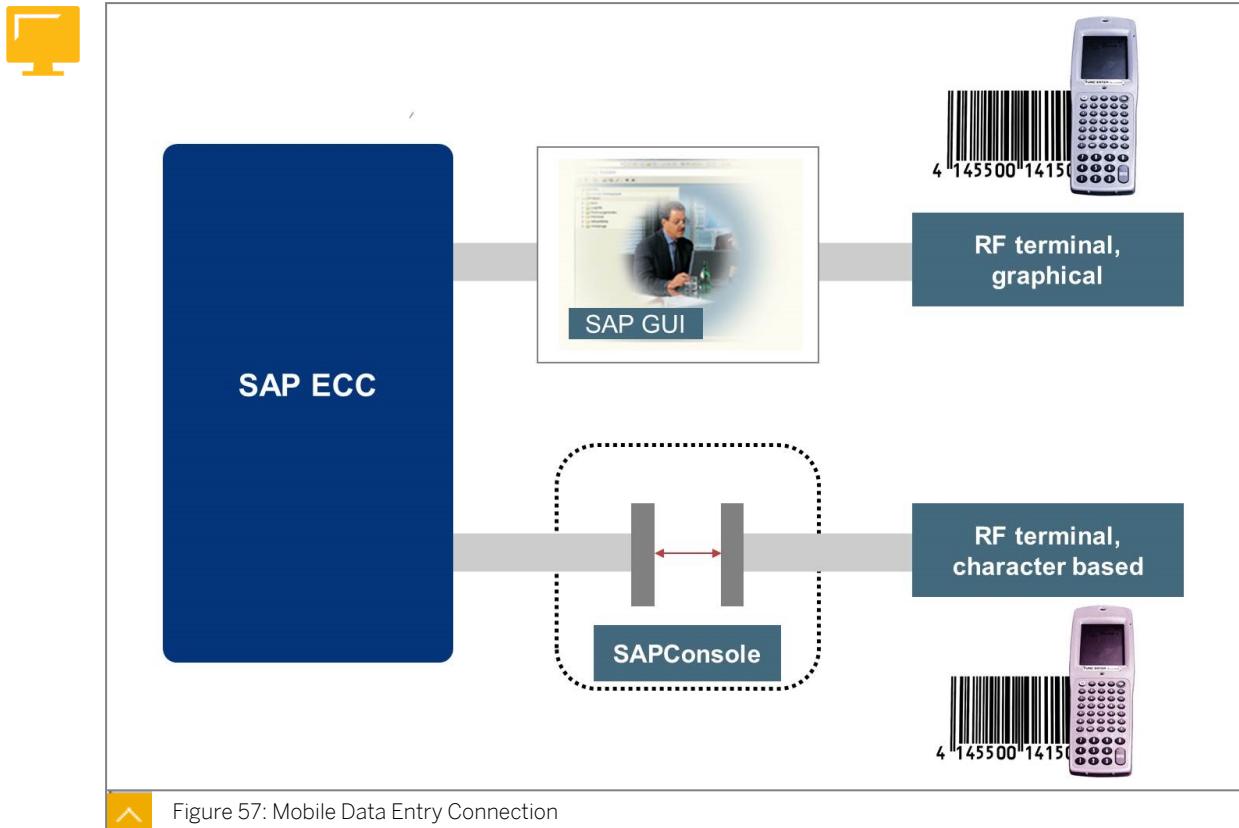
- Reduced error rate, because it is not possible to enter data manually
- Increased processing speed
- Current stock information
- Rapid training of new or temporary employees, because no previous knowledge is required

The warehousing mobile data entry solution available in logistics execution is based on the RF technology. You enter data directly into the SAP ERP application using data frequency terminals, which are available as either hand-held devices or forklift terminals for mounting on vehicles. These terminals consist of a display and a keyboard with an integrated bar code reader. Some devices use touch screen technology. The size, weight, details, and prices of these devices may vary depending on the manufacturer and model.



Note:
The RF solution in SAP ERP is not specific to any hardware. This means you can use products from most manufacturers.

Mobile Data Entry Connection



Mobile data entry in logistics execution supports the following types of RF devices:

- Devices with graphical user interfaces
- Devices with text-based user interfaces

Terminals with graphical user interfaces use SAP Graphical User Interface (SAP GUI) for Microsoft Windows or a Web Browser. The screen display and size of the processing transactions are adjusted to the current device functions and allow the use of function pushbuttons.



Note:
SAP GUI is a program that connects a front-end computer to a specific SAP ERP application. SAP GUI is the standard point of access to most SAP solutions.

To use terminals with a text-based user interface, you must use an interface that can convert text displays into graphical displays, and vice versa. Therefore, standard SAP ERP systems are shipped with a suitable standard SAP interface, the SAP console, which runs on the

Microsoft Windows NT and Windows 2000 platform. The connection to the subsystem of the hardware supplier is made by using telnet.



Note:

Telnet is a program for making connections to any computer within a network to execute programs on the connected computer without a graphical interface.

Mobile Data Entry – Use in Warehouses

The transactions for running the RF solution that are shipped with the standard SAP ERP system are designed for use within the Warehouse Management system. The transactions cover nearly all putaway and stock removal operations, and can be used to pack and load inventory stocks. It is also relatively easy to enhance the solution by including additional functions.



Note:

Customizing allows for user-specific screen and menu management. For example, you can adjust the size of the screen display and assign specific transactions. Several user exits for screen control are also available. If required, you can use ABAP to program new. This means that the RF solution can be used outside the Warehouse Management system.

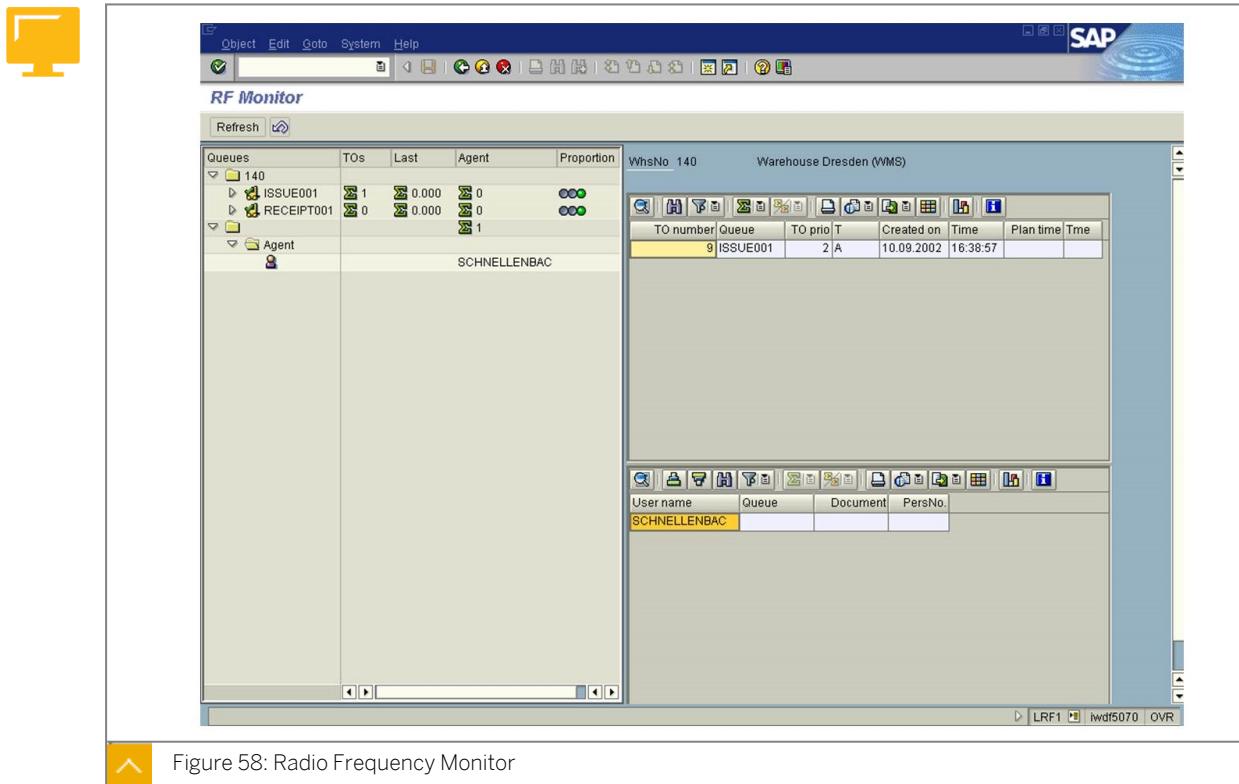
In Customizing for *Mobile Data Entry*, you define queues, which are working groups that consist of similar activities. For example, you can create a queue for the goods receipt or for the goods issue. These queues are assigned to users and documents to be processed. You can monitor the relationship between users and documents in the RF monitor. If the workload for a particular user is more, you can move users and documents from one queue to another.



Note:

A traffic light icon helps you recognize overloads immediately. In Customizing, you define the relationship between the user and workload, specifying when the system must view the relationship as critical or unbalanced.

Radio Frequency Monitor



Depending on the default settings, either warehouse employees can manually select documents to process using the document number (for example, from deliveries) or the system proposes the next document in the queue for processing.

The standard system supports all current bar code types, and permits the use of the application identifier (AI).



Note:

AI is part of the GS1 coding standards. The application identifiers are prefixes that flag the meaning and format of their subsequent codes. For example, AI 10 describes a batch number with up to 20 characters.

Under certain circumstances, you can interleave to optimize processes in the warehouse. For example, a user who has performed a putaway is assigned a stock removal for their return journey to reduce the number of empty runs and deadheading.

There are separate RF transactions available for handling unit management.

The SAP Library contains step-by-step documentation on putaway, stock removal, packing, loading, and identification operations.



LESSON SUMMARY

You should now be able to:

- Process warehouse management functions using mobile devices

Optimizing Warehouse Processes with Cross-Docking

LESSON OVERVIEW

This lesson explains how to optimize warehouse processes with cross-docking (CD).

Business Example

Your company often has to deliver stock material to customers at short notice. Therefore, you need to pick goods directly from the goods receipt zone. For this reason, you require the following knowledge:

- An understanding of the functions of CD
- An understanding of the possible scenarios in CD
- An understanding of how to perform planned CD

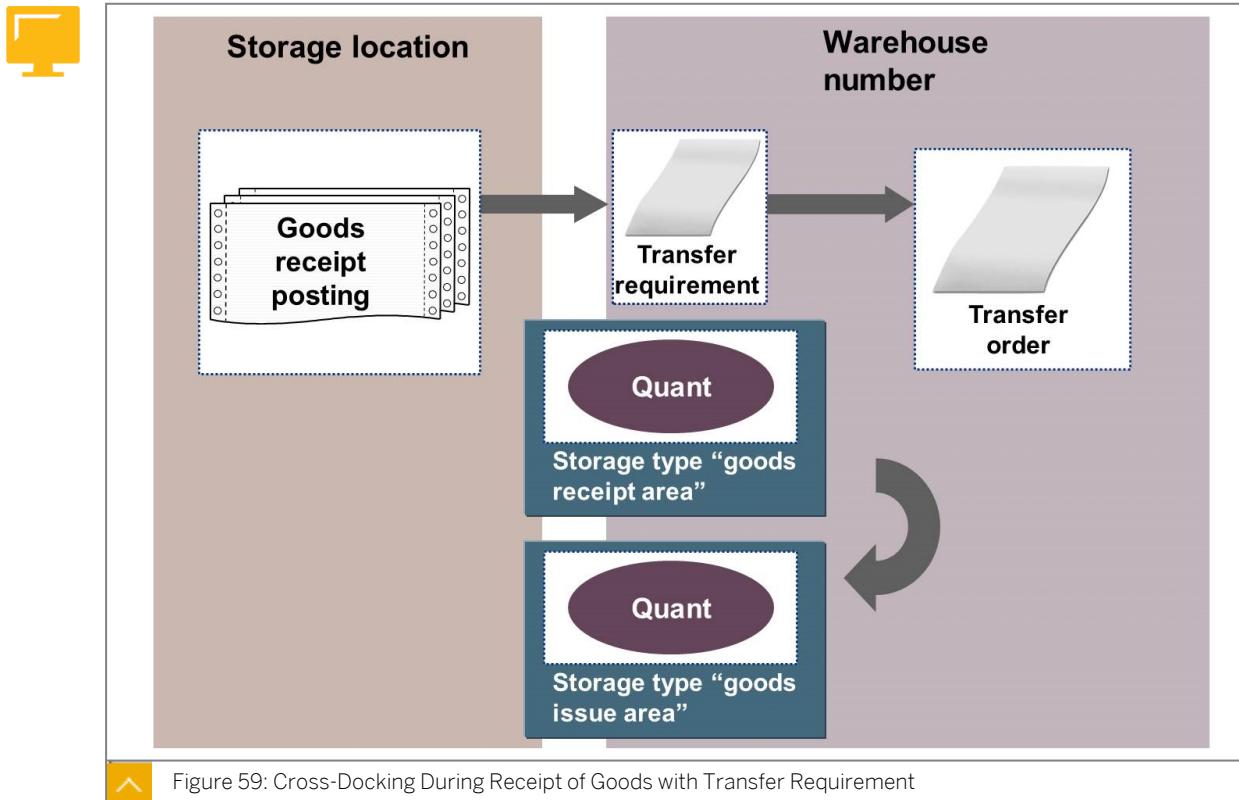


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Optimize warehouse processes with cross-docking

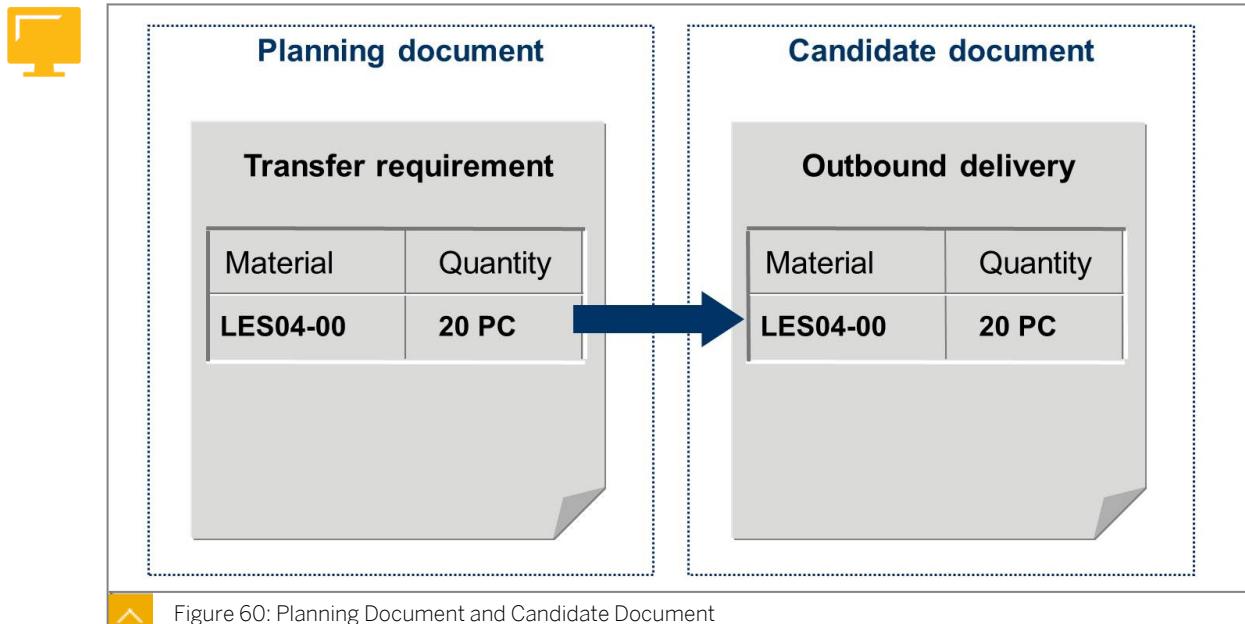
Cross-Docking



CD is a subfunction of warehouse management in logistics execution. This subfunction can be used to pick goods directly from the goods receipt zone after the goods have arrived from the vendor or production. You do not need to store the goods first and then remove the goods again from stock.

In SAP ERP, you can plan CD. Before the goods arrive, you can arrange for the goods to be assigned to a specific outbound delivery and thereby picked directly on arrival. However, you can also make a similar CD decision if the delivered goods are already in the goods receipt zone. The system performs the CD tasks in the CD monitor. You can use the CD monitor to manually assign goods receipts to goods issues. The system reports overdue processes and other errors in the alert monitor. You can use the alert monitor to access a current process and quickly address any errors.

Planning Document and Candidate Document



During the CD process in logistics execution, documents that can directly link goods receipt and goods issue processes are divided into planning documents and candidate documents.

A planning document can be a transfer requirement, an inbound delivery, or an outbound delivery. The system checks whether a suitable CD partner for the planning document exists in the form of a candidate document. If the candidate document exists, the system assigns this document to the planning document. The check is always performed in relation to items.

In the *Inbound to Outbound* planning direction, the system checks the inbound delivery planning document to determine whether an outbound delivery has already been created in which the planning requirement can fully or partially cover the inbound delivery. In this scenario, the outbound delivery is the candidate document or the document whose items can be linked with the planning document items. The CD decision updates the link in the system.

If the planning direction is *Outbound to Inbound*, the function of the planning document and candidate document are reversed. The outbound delivery is now the planning document and the inbound delivery and transfer requirements are potential candidate documents.

Types of Cross-Docking Processes



Logistics execution offers the following basic forms of CD:

- Planned CD
- Opportunistic CD

During the planned CD process, you make CD decisions prior to the arrival of incoming stock and release of outgoing documents that will most likely affect new incoming stock. Release in this context means the creation of a transfer order for outbound delivery. If you are planning CD for an outbound delivery, the stock removal transfer order for this outbound delivery must not yet have been created.

In the CD monitor, the system provides you with CD links between inbound and outbound documents, from which you can make CD decisions. You can also run the CD planning in the background and accept CD decisions that are recommended by the system. As a result, you can execute CD planning manually or with system guidance.

**Note:**

Within the planned CD process, the system optimizes the assignment of inbound and outbound documents on the basis of quantities. In the CD monitor, you can choose the optimization levels, such as delivery and transfer requirement, shipment, or group.

With opportunistic CD, the system operates independently. This type of CD always takes place after the arrival of the incoming stock, after the release of the outgoing document, or when the transfer order is created.

The system cancels any previously created transfer orders to generate a CD. If you are working with inbound deliveries, the goods receipt must be posted in connection with the transfer order confirmation (indicator 4 in the *Adopt Putaway Quantity* field). If you are using handling unit management, the goods receipt must be posted before the transfer order is created.

Cross-Docking Process

CD in logistics execution can be performed in either of the following methods:

- One-step CD process

During the one-step CD process, the stock removal transfer order moves stock directly from the goods receipt zone. In the standard SAP system, the source storage type of stock removal is usually 902 and the destination storage type of stock removal is the respective goods issue area, such as storage type 916. The opportunistic CD process is always one step.

- Two-step CD process

Planned CD can also be performed in two steps. First, goods are moved from the goods receipt zone to a CD storage type (first transfer order). Next, you create the second transfer order to move stock from the CD storage type during stock removal. If the planning document and candidate document cannot be assigned immediately or are not required, you can initially determine CD for a document in the two-step procedure. For example, if CD for a goods receipt transfer requirement is performed using the two-step procedure, the system determines the CD storage type as destination storage type for putaway when the transfer order is created.



LESSON SUMMARY

You should now be able to:

- Optimize warehouse processes with cross-docking

Unit 6

Lesson 4

Using Task and Resource Management

LESSON OVERVIEW

This lesson introduces you to the Task and Resource Management (TRM) object, which extends the warehouse management functions in logistics execution to include optimization tools. The lesson also explains how to use TRM in goods receipt and goods issue processes.

Business Example

Your company wants you to examine how TRM can optimize processes within warehouse management. For this reason, you require the following knowledge:

- An understanding of the basic functions of TRM
- An understanding of the goods movement process in TRM

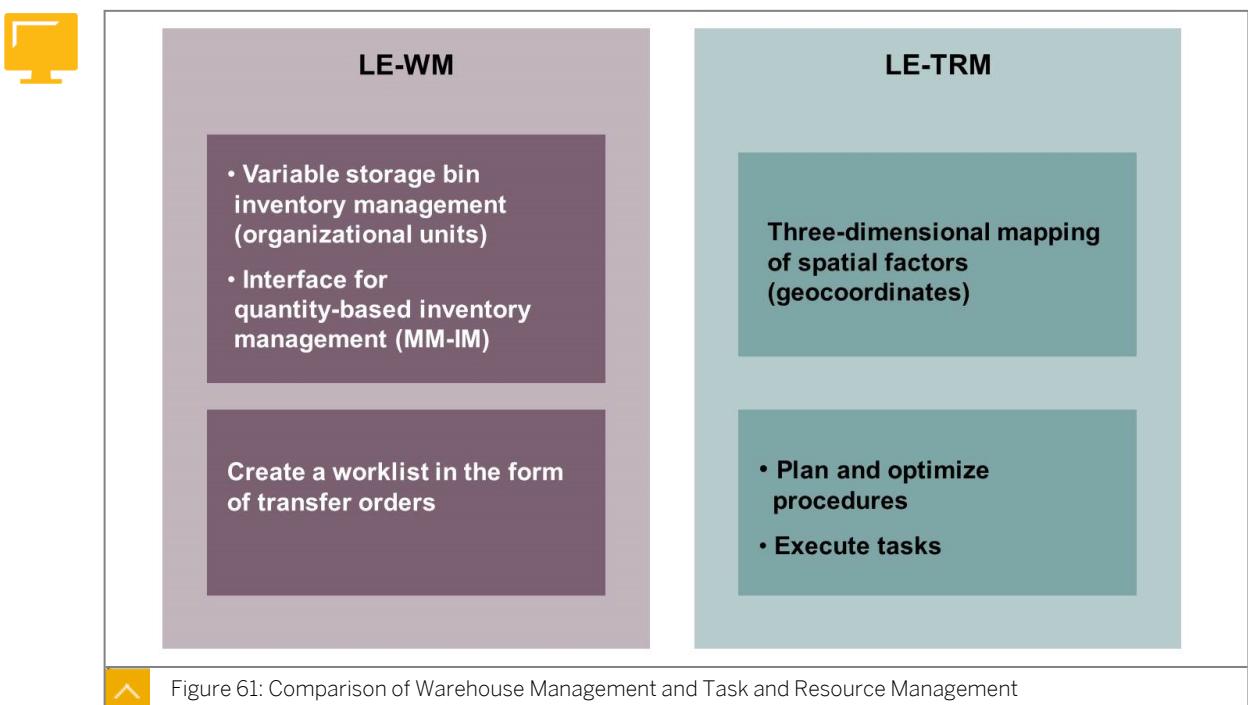


LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Use the Task and Resource Management object

Task and Resource Management



TRM is based on the three-dimensional representation of the spatial factors of a warehouse complex in the SAP system. Movements between two or more points within the warehouse

are determined in the recorded routes. Employees, vehicles, and devices are defined as resources whose capabilities are determined in more detail by specific criteria.



Caution:

Do not confuse a route in TRM with a route in delivery and transportation processing in logistics execution.

TRM extends the warehouse management functions in logistics execution to key optimization processes. The system determines the resources for executing each task and provides the resources with the optimal route to reach their destination. You can manually initiate actions using the TRM monitor.

When deployed, TRM controls the execution of movements in the warehouse. Transfer orders, which represent warehouse management instructions in conventional systems, function as a worklist to optimize and execute putaway and stock removal processes. However, storage bin inventory management and the exchange of data between other SAP applications are still handled by warehouse management.

Preparatory Settings

The central organizational unit of TRM is a site.

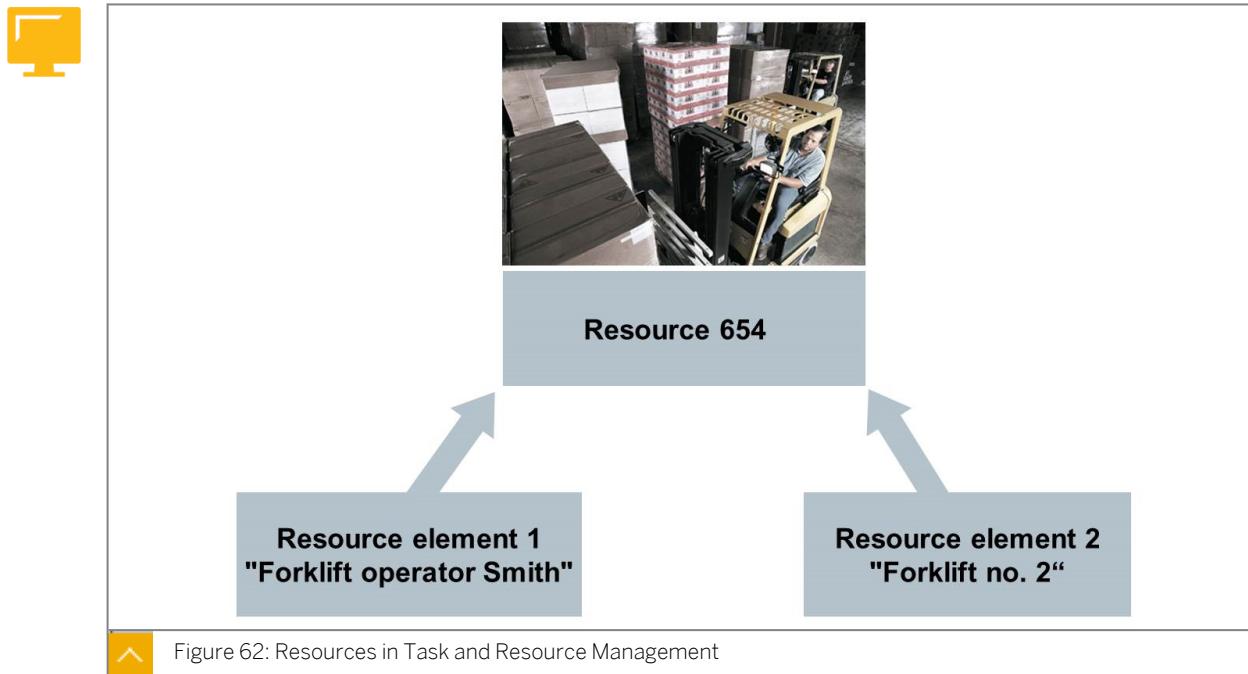
A site maps a warehouse complex in the system, the processes of which are to be controlled using TRM. In Customizing for *Warehouse Management*, at least one warehouse number is assigned to the site first. The next step is to define the stock movements relevant to TRM. Storage types and warehouse management movement types are used as criteria to determine the relevance of stock movements. When you create a transfer order, the system determines whether TRM is required in the process. If TRM is required, the system generates a corresponding request.

The spatial factors of the warehouse complex are mapped in a three-dimensional site map. Therefore, you must assign three coordinates to each of your storage bins.

You must define zones such as the pick-up point, drop-off point, and empty pallet zones. Consider which obstacles impede the passage of a resource between the start and destination zones.

On the basis of this site map, the system calculates the route that resources must take from one point to another when they are put away or removed from stock.

Resources in Task and Resource Management

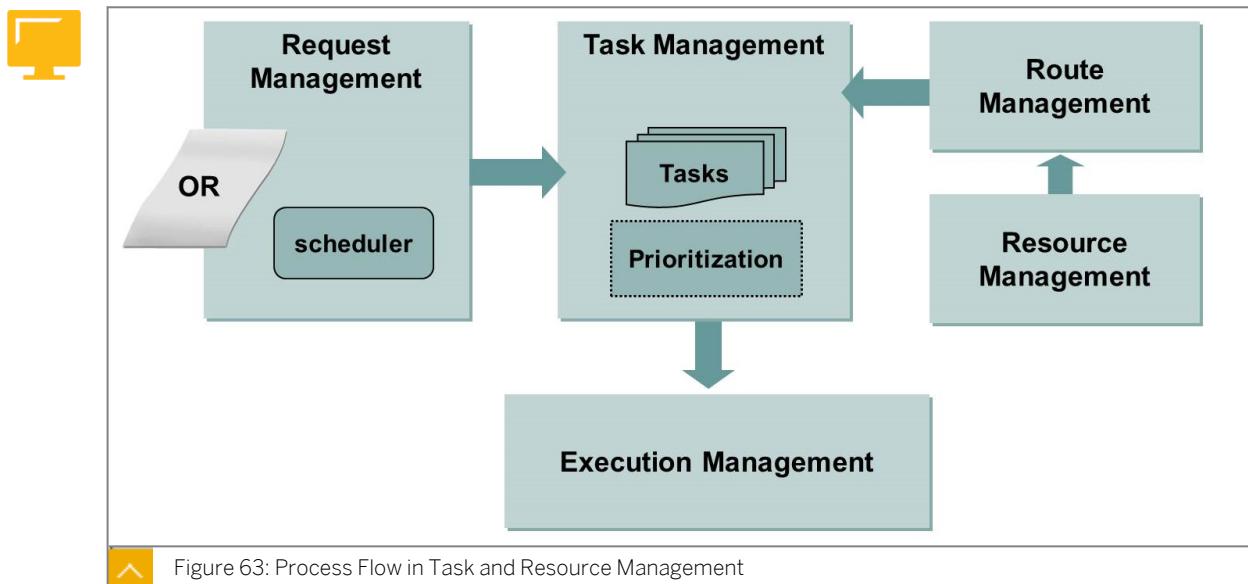


TRM creates a resource with a unique identification number when at least one resource element is logged on to the system. This resource is then displayed and controlled in the TRM monitor.

Resource elements can be employees, vehicles, or devices.

In Customizing for *Resource Management*, define the resource type, such as forklift operator, forklift, or picker, to which future resource elements can belong. The system later uses the detailed settings for these categories to determine the capabilities of the resource. In this way, you can define the maximum speed of a vehicle, the area of application, and the type of load carrier that the vehicle can transport.

Process Flow in Task and Resource Management



TRM consists of several function packages that effectively optimize the putaway and removal of stock.

Request management accepts the transfer orders from warehouse management individually or in groups. Request management then uses these orders to generate requests, which the scheduler releases to create tasks. The scheduler forwards these tasks to task management. Suitable routes are then calculated using route management.

Route management uses resource control services to find suitable resource types. Route management then accesses information for the capabilities of the resource types. On the basis of this data, task management converts requests into tasks or the actual work instructions. These tasks form a list, from which the resource type most suitable for executing each task is determined.

The tasks can be monitored using execution management after the tasks are executed.

User-Guided Mode and System-Guided Mode

Resources perform their assigned tasks, which includes putting away stock into high rack storage, and confirm the execution of these tasks in the system. Mobile data entry is used to perform these tasks. Depending on the presetting, the resource can choose specific tasks (user-guided mode) or accept tasks recommended by the system (system-guided mode).

In user-guided mode, you can scan the identification number of a storage unit and use TRM to search for the task that belongs to this storage unit.

In system-guided mode, the system checks the properties and capabilities of a resource to find and assign suitable tasks. If a resource can perform more than one task at the same time, the system prioritizes these tasks and recommends that the task with the highest priority be executed first. Using the TRM monitor, you can control which criteria and weighting the system uses.



Note:

In this way, the estimated time that a resource needs to travel from its current site to the starting point of the new task can be considered.

In TRM, you can use task interleaving, a process where a new task is assigned to a resource when the resource completes the previously assigned task. The follow-on task is executed in an area that is close to the location of the resource after the first task completes. Therefore, an employee who has just completed a putaway can remove stock from a neighboring storage bin. This helps in reducing or avoiding deadheading.



LESSON SUMMARY

You should now be able to:

- Use the Task and Resource Management object

Learning Assessment

1. Which of the following data is the reference organizational unit for the warehouse activity monitor?

Choose the correct answer.

- A Warehouse number
- B Storage location
- C Storage bins

2. Which of the following devices or terminals are used to enter data directly into the SAP system?

Choose the correct answers.

- A Radio frequency terminal
- B Data frequency terminal
- C Hand-held devices
- D Forklift terminals

3. Which of the following documents can function as a transfer requirement, an inbound delivery, or an outbound delivery?

Choose the correct answer.

- A Candidate document
- B Shipping document
- C Planning document

4. What is the central organizational unit of Task and Resource Management?

Choose the correct answer.

- A Movement type
- B Site
- C Resource

5. Which of the following processes assigns a new task to a resource after the previously assigned task is completed?

Choose the correct answer.

- A Task interleaving
- B Resource interleaving
- C Goods movement

Learning Assessment - Answers

1. Which of the following data is the reference organizational unit for the warehouse activity monitor?

Choose the correct answer.

- A Warehouse number
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4. What is the central organizational unit of Task and Resource Management?

Choose the correct answer.

A Movement type

B Site

C Resource

The central organizational unit of Task and Resource Management is a site.

5. Which of the following processes assigns a new task to a resource after the previously assigned task is completed?

Choose the correct answer.

A Task interleaving

B Resource interleaving

C Goods movement

Task interleaving is a process by which a resource is assigned a new task after the previously assigned task is completed.