EWM100

Extended Warehouse Management (EWM) Processes

SAP Supply Chain Management

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Participant Handbook

Course Version: 81
Course Duration: 3 Day(s)
Material Number: 50089306

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About This Handbook

This handbook is intended to complement the instructor-led presentation of this course, and serve as a source of reference. It is not suitable for self-study.

Typographic Conventions

American English is the standard used in this handbook. The following typographic conventions are also used.

Type Style	Description
Example text	Words or characters that appear on the screen. These include field names, screen titles, pushbuttons as well as menu names, paths, and options. Also used for cross-references to other documentation both internal (in this documentation) and external (in other locations, such as SAPNet).
Example text	Emphasized words or phrases in body text, titles of graphics, and tables
EXAMPLE TEXT	Names of elements in the system. These include report names, program names, transaction codes, table names, and individual key words of a programming language, when surrounded by body text, for example SELECT and INCLUDE.
`Example text`	Screen output. This includes file and directory names and their paths, messages, names of variables and parameters, and passages of the source text of a program.
`Example text`	Exact user entry. These are words and characters that you enter in the system exactly as they appear in the documentation.
<Example text>	Variable user entry. Pointed brackets indicate that you replace these words and characters with appropriate entries.

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Icons in Body Text

The following icons are used in this handbook.

Icon	Meaning
	For more information, tips, or background
	Note or further explanation of previous point
	Exception or caution
	Procedures
	Indicates that the item is displayed in the instructor's presentation.

Contents

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Course Overview

Target Audience

This course is intended for the following audiences:

- Project Team Members
- Team Leaders
- Consultants
- SAP Business Partners

Course Prerequisites

Required Knowledge

- SAP01 mySAP Overview
- SAPSCM or SAPSPM

Recommended Knowledge

- SCM610 Delivery Processes
- SCM210 APO Core Interface
- SCM660 Handling Unit Management

Course Goals

This course will prepare you to:

- Describe the Extended Warehouse Management system environment.
- Understand the master data and organizational elements required by the Extended Warehouse Management component.
- Use the Warehouse Monitor and the RF framework to process EWM transactions.
- Outline the various documents used within the EWM application processes and understand their relationship to delivery documents created in the ERP system.
- Describe the inbound and outbound processes and related documents in EWM.
- List various internal processes that exist within the EWM component.

Course Objectives

After completing this course, you will be able to:

- Describe the Extended Warehouse Management system environment for both centralized and decentralized operation.
- List and define the organizational elements used by the EWM system and describe their relationships. In addition, you will be able to describe the master data requirements of EWM and explain how material master data and partner data can be transferred from the ERP system to the EWM system.
- Use the Warehouse Monitor to display EWM data and execute various warehouse processes. You will also be able to use the RF framework to process EWM transactions in an RF-enabled setting.
- Process EWM transactions in inbound and outbound processes and understand the roles that various EWM documents play in the processes.
- Describe various EWM internal processes such as Labor Management and Slotting.

Unit 1

The Extended Warehouse Management System

Unit Overview

Extended Warehouse Management was introduced in October, 2006. Although it is not a replacement for the SAP standard Warehouse Management application, it represents a new generation of SAP warehouse management software. In this unit we will explore the history of SAP warehouse management software and the development of the SAP Extended Warehouse Management application. In addition, the basic system environment and requirements will be presented.

Unit Objectives

After completing this unit, you will be able to:

- Outline the history of SAP warehouse management applications.
- Describe the business environment for which EWM is designed.
- Explain the deployment options.

Unit Contents

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Lesson: Introduction to Extended Warehouse Management

Lesson Overview

Before getting into detail with respect to Extended Warehouse Management data requirements, organizational structures and business processes, it is important to understand the history and environment in which EWM is designed to operate. In this lesson we will look at EWM from an overview perspective.

Lesson Objectives

After completing this lesson, you will be able to:

- Outline the history of SAP warehouse management applications.
- Describe the business environment for which EWM is designed.
- Explain the deployment options.

Business Example

With the introduction of Extended Warehouse Management (EWM) as a second WM application, it is important to understand the background and key characteristics of EWM so that you can differentiate EWM from the SAP ERP Warehouse Management application.

SAP ERP Warehouse Management vs. Extended Warehouse Management

In the figure below you can see the historical time-line related to SAP warehouse management software.

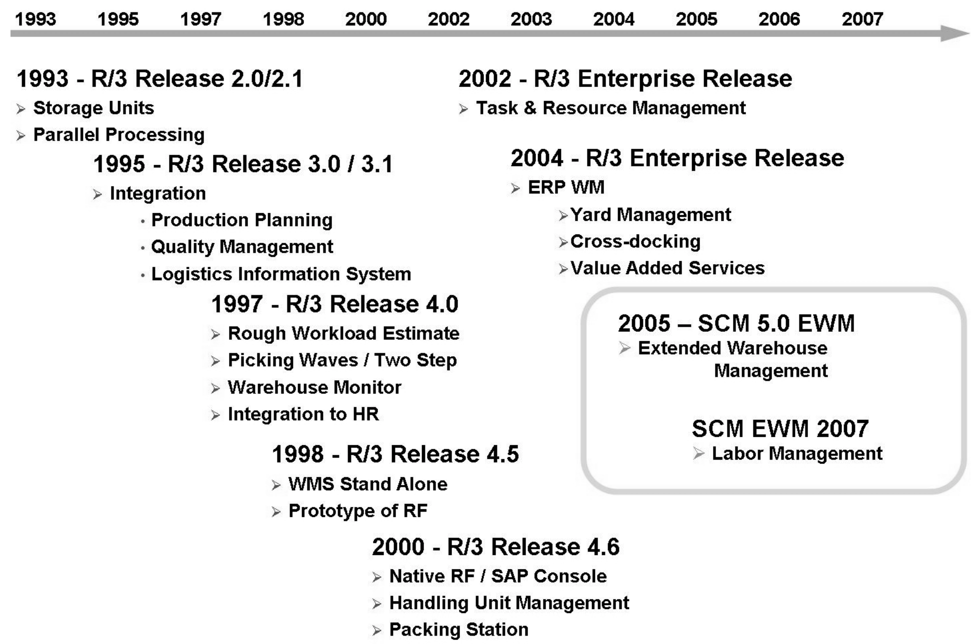

Figure 1: SAP WM Historical Timeline

Since Release 2.0 of the SAP R/3 System, SAP has provided warehouse management functionality. In all major releases of the R/3 System, there have been enhancements to the Warehouse Management application. In 2004, for Release 4.7 Extension Set 2.0 SAP released a group of enhancements for warehouse management that were collectively called “ERP Extended Warehouse Management”. This group of enhancements are add-on functions to the warehouse management system and include the functions: yard management, cross-docking and value added services. The ERP Extended Warehouse Management enhancements have no relationship to the Extended Warehouse Management system that was released in 2005 by SAP.

In 2005, SAP announced the availability of its Service Parts Management (SPM) System. Extended Warehouse Management (EWM) was an integral component of this system. However, today, EWM is considered a standalone application that can be used in any warehousing environment and it does not require any connection to SPM.

SAP has further enhanced EWM since it's introduction. In August, 2007, EWM was upgraded with a number of functional additions and with the Labor Management component. This release is called EWM 2007.

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SAP ERP Warehouse Management

- **SAP Warehouse Management focusing on enterprise-centric processes for warehousing and storage**
  - Warehouse internal movements and replenishment for storage bins
  - RF- and voice-supported put-away and picking
  - Optimized warehouse movements using Task and Resource Management
    - Dynamic route planning in the warehouse
    - Task interleaving
  - Inventory management on storage bin level with batch management and shelf life expiration dates
  - Warehouse internal packing
- Architecture options
  - Integrated or
  - Decentralized

Figure 2: Roadmap WM: Enterprise Focus - Today

The SAP ERP warehouse management system remains a viable alternative for many warehouses. The introduction of the SAP Extended Warehouse Management System does not mean that it replaces the SAP WM system. It just means that there is now an additional alternative for those warehouses that require the functionality provided by EWM. An SAP customer can implement the SAP WM system for some warehouses and EWM for other warehouses in its enterprise. One of the main differences between the SAP WM system and the SAP EWM system is that functionally, the WM system in more “inward” focused. In general, there is very little functionality that provides a link to external processes such as transportation cross-docking, contract packaging and transportation.

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Extended Warehouse Management Key Characteristics

- Bring together Product and Service Supply Chain for a comprehensive solution in planning and execution
- Key characteristics for Extended Warehouse Management:
  - High SKU volumes and line item volumes
  - Very fast and very slow moving items competing for the same warehouse space
  - Vast product differences - size, weight, model year, serial number, country of origin, batch and valuation
  - Complex cross docking and order fulfillment processes
  - Detailed packaging and shipping logistics
  - Integration of third party logistics (3PL) services for packaging (inbound) and packing (outbound) of products
  - 3PL and outsourcing support for consolidators and carriers using portal capabilities

Figure 3: Roadmap WM: Extended Warehouse Management

Extended Warehouse Management (EWM) was designed to be the next generation warehouse management system for SAP and to work in concert with the new SAP Service Parts Management (SPM) System. It is designed for warehouses/distribution centers having many products and high processing volume requirements. Functions required by many warehouses/DC's such as slotting, complex cross-docking requirements, packaging and shipping logistics, integration with third-party logistics (3PL) providers and labor management are integral parts of EWM.

In summary, Extended Warehouse Management (EWM) in SAP SCM....

- is designed for the execution of complex supply chain networks
- is integrated with the SAP Service Parts Management System
- has new and enhanced functionality over ERP WM
- does **NOT**replace ERP WM
- can be used in combination with ERP WM in the same landscape. However, each warehouse/distribution center must be processed by one or the other.

Extended Warehouse Management Functions

Shown in the figures below are a number of examples of warehousing functions that are included in EWM. In this course we will cover a number of these processes and functions, particularly the goods receipt and goods issues processes.

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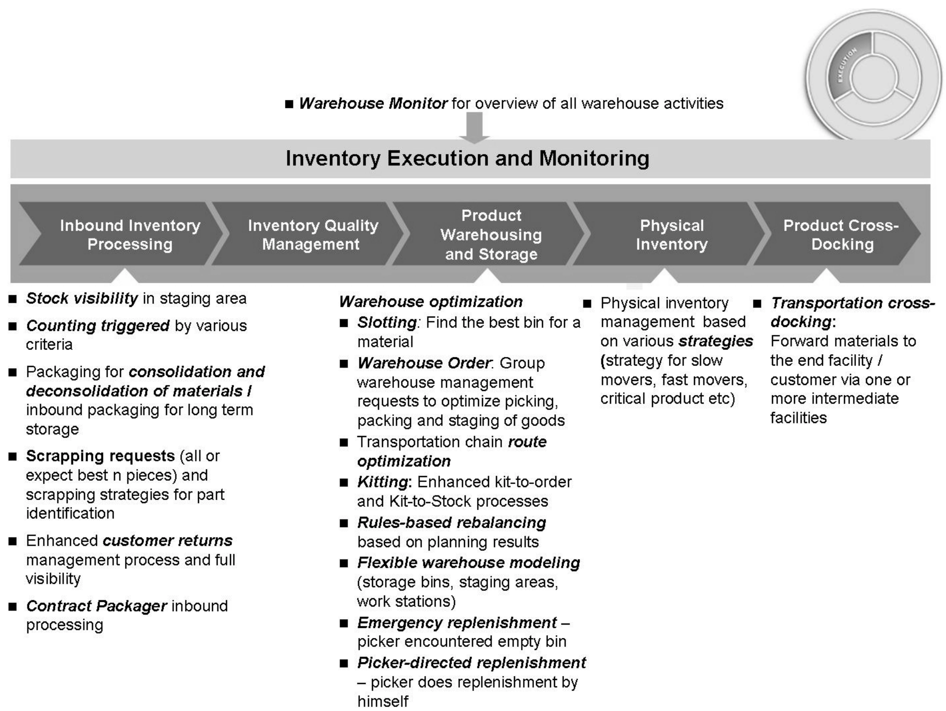

Figure 4: EWM Warehousing Functions

Generally, there are warehouses that have processing characteristics and requirements that will drive the use of Extended Warehouse Management. Shown below are the major internal functions provided by EWM.

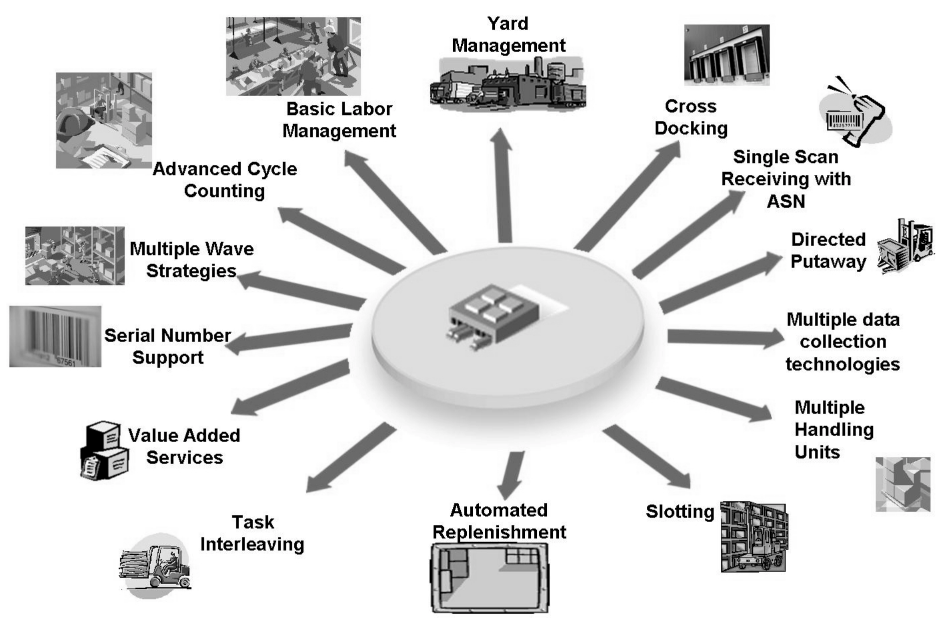

Figure 5: EWM Internal Functions

In addition to the functions illustrated above, EWM also provides....

- Labor Management that includes:
  - Measurement and KPI's
  - Planning and simulation
  - Visualization
- RFID enablement
- Goods receipt optimization:
  - Planned goods receipt
  - Goods receipt initiated in EWM
  - Production goods receipt
- Batch management
- Manual creation of outbound deliveries in EWM
- Catch weight support
- Material Flow System (MFS). This is functionality that provides an interface to automated storage and retrieval systems (AS/RS)
- Support for the IS-Retail article master

EWM System Environment and Deployment Options

When introduced in 2005, the Extended Warehouse Management system was an application in the SCM system environment. It was designed to be a fully decentralized WM system. Shown in the figure below, EWM is an application within the SCM 2007 server environment that includes other applications, principally, Advanced Planning and Optimization.

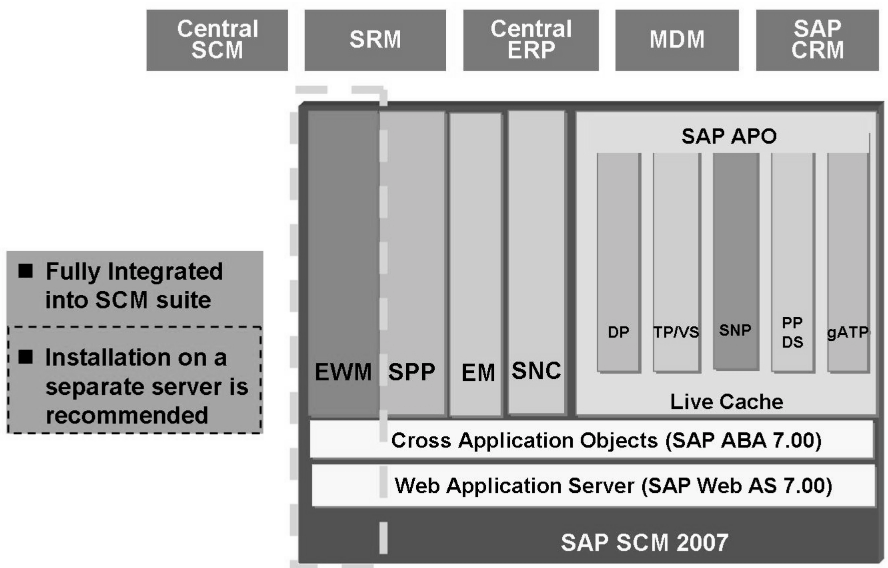

Figure 6: Landscape Overview - Decentralized EWM

Although EWM shares the same server as the other applications such as APO and Event Management, it is a standalone application. In fact, if due to performance considerations, EWM can be run in its own server environment. SAP recommends that EWM not run in the same server as a planning application such as the APO Demand planning and Production Planning/Detail Scheduling.

Although EWM is a self-contained application, it does require integration with an ERP system for master and transaction data. We will cover the master data requirements in a subsequent unit. Certain functions in EWM such as Kit-to-stock, slotting and availability checking require an interface to other SAP applications/systems such as CRM, Global ATP in APO and Service Parts Planning in APO.

In the SCM 2007 release of EWM, the ability to run EWM in a centralized mode within the SAP ECC 6.0 became available. In addition, EWM can be supported from the SAP R/3 4.6C through the ECC 5.0 releases with the application of Service pack 06 (SP06).

It must be noted that there are some functions, such as batch selection within EWM, that were introduced in EWM 2007 that require ECC 6.0 EhP 3 delivered in December, 2007. It is advised that you review the EWM release notes for the EWM 2007 release.

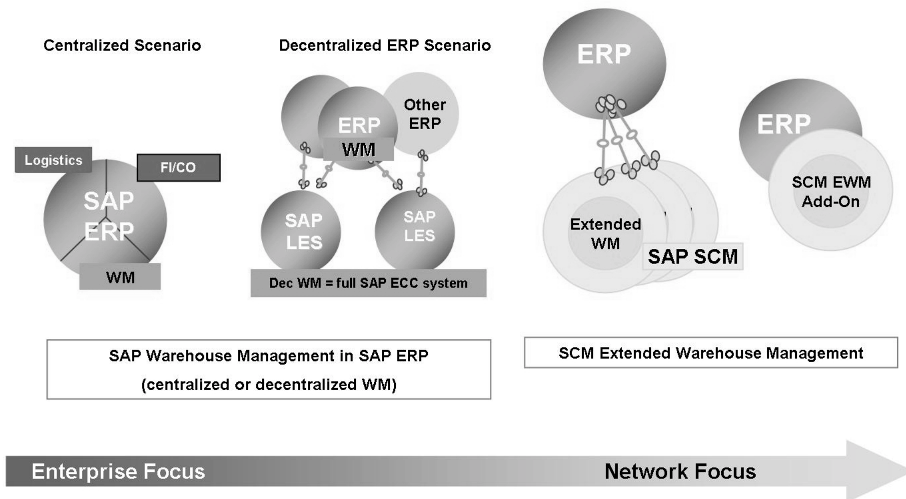

Figure 7: SAP WM Implementation Scenarios

In the figure above is shown the various deployment options that exist for the SAP warehouse management applications. These scenarios include both the ERP WM and the EWM applications.

Because EWM is designed to be a decentralized WM application, interfaces are provided to handle the flow of master and transaction data between the EWM and the ERP system. In fact multiple ERP systems can be interfaced with EWM for WM processing.

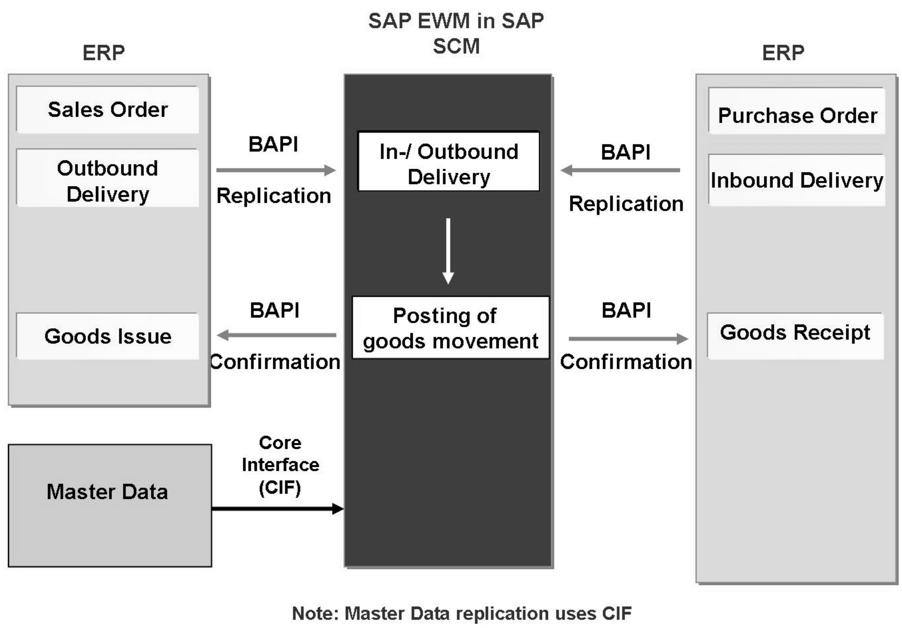

Figure 8: EWM Data Interface

Document data such as inbound and outbound deliveries are transferred between the ERP and EWM systems via BAPI's. This data transfer is designed to occur in real-time. Document data transfer is a two-way process. Delivery document data can be transferred from the ERP system to the EWM system for processing and updates to the delivery documents can be transferred from EWM to the ERP system.

Master data required by the EWM system is handled in a different manner. Master data to be transferred to EWM is processed though the use of the APO Core interface (the "CIF"). The process of moving master data (material, customer and vendor) requires the creation of integration models. Integration models contain the parameters that specify what master data to transfer. The model, after creation, is activated. This activation process causes the master data to be physically transferred to the EWM system. Included in the process of establishing the CIF models are settings that determine how subsequent relevant master data is transferred (for example, in real time or subsequent delta updates). The master data transfer of data is in uni-directional. From the ERP system to the EWM system. Any change to a master record in the EWM system (for example, a product description, or customer name) does not get transferred back to the ERP system.

Exercise 1: EWM Menu Structure

Exercise Objectives

After completing this exercise, you will be able to:

- Orient yourself with the basic menu structure of the Extended Warehouse Management system.

Business Example

IDES, AG is installing the Extended Warehouse Management system so you are to review the various menu transactions that can be used in EWM processing.

Task:

Log on to the SCM system that contains the Extended Warehouse Management system and look at the various menu paths listed to become familiar with the various transactions.

1. Log on to the SCM training system with your user name EWM100-##. The instructor will give you the name of the system and the key for the training client.

2. On the initial screen, you will see the Extended Warehouse Management node in the SAP Menu. Go to the area menu for Monitoring and record the transaction code for the following:

Menu path	Transaction code
Monitoring → Warehouse Management Monitor	
Delivery Processing → Inbound Delivery → Maintain Inbound Delivery	
Delivery processing → Outbound Delivery → Maintain Outbound Delivery Order	
Work Scheduling → Create Warehouse Task for Warehouse Request→ Stock Removal for Outbound Delivery Order	

Continued on next page

Execution → Confirm Warehouse Task	
Execution → Log On to RF Environment	
Master Data → Create Storage Bin	
Master Data → Product → Maintain Warehouse Product	

Hint: If the transaction codes do not display in the menu, go to *Extras* → *Settings* and select *Display technical name*

Solution 1: EWM Menu Structure

Task:

Log on to the SCM system that contains the Extended Warehouse Management system and look at the various menu paths listed to become familiar with the various transactions.

1. Log on to the SCM training system with your user name EWM100-##. The instructor will give you the name of the system and the key for the training client.
   a) After selecting the system, enter the client assigned by the instructor. the initial password, and the initial password, and the key for the required logon language. Confirm these with *Enter*.
   b) The first time you log on to the system, you are required to enter a new password. You must confirm the new password by entering it twice. Confirm your entries with *Enter*.
2. On the initial screen, you will see the Extended Warehouse Management node in the SAP Menu. Go to the area menu for Monitoring and record the transaction code for the following:

Menu path	Transaction code
Monitoring → Warehouse Management Monitor	
Delivery Processing → Inbound Delivery → Maintain Inbound Delivery	
Delivery processing → Outbound Delivery → Maintain Outbound Delivery Order	
Work Scheduling → Create Warehouse Task for Warehouse Request→ Stock Removal for Outbound Delivery Order	
Execution → Confirm Warehouse Task	

Continued on next page

Execution → Log On to RF Environment	
Master Data → Create Storage Bin	
Master Data → Product → Maintain Warehouse Product	

Hint: If the transaction codes do not display in the menu, go to *Extras → Settings* and select *Display technical name*

a)

Menu path	Transaction code
Monitoring → Warehouse Management Monitor	**/SCWM/MON**
Delivery Processing → Inbound Delivery → Maintain Inbound Delivery	**/SCWM/PRDI**
Delivery processing → Outbound Delivery → Maintain Outbound Delivery Order	**/SCWM/PRDO**
Work Scheduling → Create Warehouse Task for Warehouse Request → Stock Removal for Outbound Delivery Order	**/SCWM/TODLV_O**
Execution → Confirm Warehouse Task	**/SCWM/TO_CONF**
Execution → Log On to RF Environment	**/SCWM/RFUI**
Master Data → Create Storage Bin	**/SCWM/LS01**
Master Data → Product → Maintain Warehouse Product	**/SCWM/MAT1**

Note: When entering transaction codes that begin with the "/" character in the *Command* field, you must always prefix the transaction code with" /n".

Lesson Summary

You should now be able to:

- Outline the history of SAP warehouse management applications.
- Describe the business environment for which EWM is designed.
- Explain the deployment options.

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Unit Summary

You should now be able to:

- Outline the history of SAP warehouse management applications.
- Describe the business environment for which EWM is designed.
- Explain the deployment options.

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Test Your Knowledge

1. Which of the following are examples of EWM internal functions/processes?

   Choose the correct answer(s).

   □ A Labor Management
   □ B Task and Resource Management
   □ C Value Added Services
   □ D Yard Management

2. In EWM, the ________________________________ provides an interface to automated storage/retrieval systems.

   Fill in the blanks to complete the sentence.

3. SAP introduced the Extended Warehouse Management system as a replacement for its existing warehouse management system.

   Determine whether this statement is true or false.

   □ True
   □ False

4. EWM can used with the following releases:

   Choose the correct answer(s).

   □ A Only SAP ECC 6.0 and beyond.
   □ B Only SAP ECC 5.0 and beyond.
   □ C From SAP R/3 4.6C forward with Service Pack 06.
   □ D From SAP R/3 3.0F forward with Service Pack 06.

5. EWM can be deployed as follows:

   Choose the correct answer(s).

   □ A only in the SAP SCM server environment.
   □ B only in a standalone, decentralized server environment
   □ C either as a component of the SAP SCM 5.0 and SCM 2007 server environment, or as an add-on to an SAP ERP server environment.
   □ D either as a component of an SAP SCM 5.0/SCM 2007 server environment, or as an add-on to an SAP ERP system, or as a standalone decentralized system.

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6. Data is transferred between the SAP ERP and EWM systems using

   ____

   Fill in the blanks to complete the sentence.

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Answers

1. Which of the following are examples of EWM internal functions/processes?

   Answer: A, C, D

   Task and Resource Management is a bolt-on application for standard SAP WM in the SAP ERP system.

2. In EWM, the Material Flow System provides an interface to automated storage/retrieval systems.

   Answer: Material Flow System

3. SAP introduced the Extended Warehouse Management system as a replacement for its existing warehouse management system.

   Answer: False

   EWM was introduced to provide a WM system for those warehouses/DC's who need the functions provided by EWM such as kitting, slotting, and labor management. In addition, EWM was designed to support high SKU and line item volumes.

4. EWM can used with the following releases:

   Answer: C

   SAP only supports EWM in SAP R/3 Release 4.6C forward with Service Pack 06. Earlier releases of R/3 are not supported.

5. EWM can be deployed as follows:

   Answer: C, D

   In a data high volume environment, or in an SAP SCM planning environment SAP recommends a standalone decentralized EWM server environment.

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6. Data is transferred between the SAP ERP and EWM systems using BAPI's

   Answer: BAPI's

   Transaction data is transferred between the SAP ERP and EWM systems in real-time.

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Unit 2

EWM Structure

Unit Overview

All warehouses have a structure in which goods are stored according to physical and spatial requirements. When the warehouse processes are automated, the physical structure must be mapped and described to the computer system. In this unit we will explore the various structural elements that are used to describe to the Extended Warehouse Management System the physical and logical storage areas in the warehouse and spatial requirements and characteristics of the materials and storage bins. In addition, the relationship of the SAP ERP Inventory Management component and Extended Warehouse Management will be described.

Unit Objectives

After completing this unit, you will be able to:

- Name the organizational units related to Extended Warehouse Management
- Describe the organizational subdivisions of an extended warehouse number.
- Outline the relationships that exist between various organizational units in ERP and EWM.

Unit Contents

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Lesson: Organizational Units

Lesson Overview

An important part of understanding EWM processes is learning the organizational units and their relationships. In this lesson an overview of the EWM-related organizational data requirements from both the ERP system and the EWM system will be presented. In addition to outlining the use of each organizational unit the relationships between the various organizational units will be covered.

Lesson Objectives

After completing this lesson, you will be able to:

- Name the organizational units related to Extended Warehouse Management
- Describe the organizational subdivisions of an extended warehouse number.
- Outline the relationships that exist between various organizational units in ERP and EWM.

Business Example

In learning the various business processes such as goods receipt and goods issue that are related to EWM, you will notice that organizational data plays an important role in controlling the processes and how materials and their associated quantities are handled by the warehouse. In addition, the knowledge of Extended Warehouse Management organizational units is critical in the implementation of the EWM application.

Organizational Units in ERP

Because EWM is linked to an ERP system from which material movements originate, there are organizational units that must be considered in ERP. All materials that are managed by an EWM warehouse will have a link to the Inventory Management component within the ERP system. All quantities of materials stored in an EWM warehouse will be accounted for at the Plant and Storage Location Level within the Inventory Management component of the Materials Management application in SAP ERP.

A **plant** is an organizational unit that represents a location where goods are manufactured (manufacturing plant) or stored (distribution center). Another important role served by the plant is that it is assigned to a **Company Code** that is used to control the creation of accounting entries. The **storage location** is a subdivision of the plant and is used to classify the material quantities within a plant to indicate their use (available for sale), physical storage characteristics (refrigerated storage) or perhaps their logical location (at a third-party logistics provider).

Although Extended Warehouse Management is not related functionally to the SAP Warehouse management application, both use a **Warehouse Number** to represent a physical complex where materials are stored and managed. In ERP, Warehouse Management the warehouse number is a three-character field; whereas, in extended warehouse management, it is a four-character field.

Materials that are managed by a EWM warehouse must have the appropriate Plant-Storage Location related views created within the SAP material master. In ERP customizing, the Plant and Storage Locations representing the material quantities that are stored in an EWM warehouse must be linked to an ERP warehouse representing the EWM warehouse. In ERP warehouse management customizing, a warehouse number must be created that represents the EWM warehouse. The plant-storage location must be linked to this "intermediate" warehouse. In the ERP-to-EWM interface configuration the ERP warehouse is linked to the EWM warehouse. No other ERP warehouse management configuration is required. The following figure illustrates the organizational units and relationships that have been presented here.

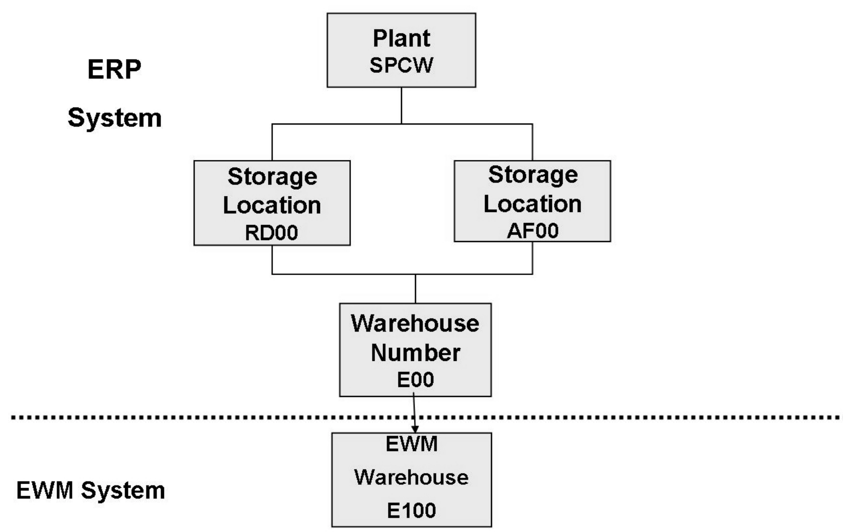

Figure 9: ERP - EWM Interface

In the following sections we will cover the EWM-specific organizational units.

EWM Organizational Units and Structure

In EWM the organizational unit that is a the highest level is the **Warehouse Number**. It is a four-character field that represents the warehouse complex.

Before you implement Extended Warehouse Management (EWM), you must define the structure, meaning the physical structure, of your warehouse or warehouse complex and configure this in the system. When you implement EWM, you define the individual physical areas within the warehouse such as high-rack storage area, bulk storage area, picking storage area, and so on as storage types within a warehouse complex, and join them together under one warehouse number. In EWM, you define storage bins for each storage type. EWM uses these to manage stock information about all products in the warehouse, at storage bin level.

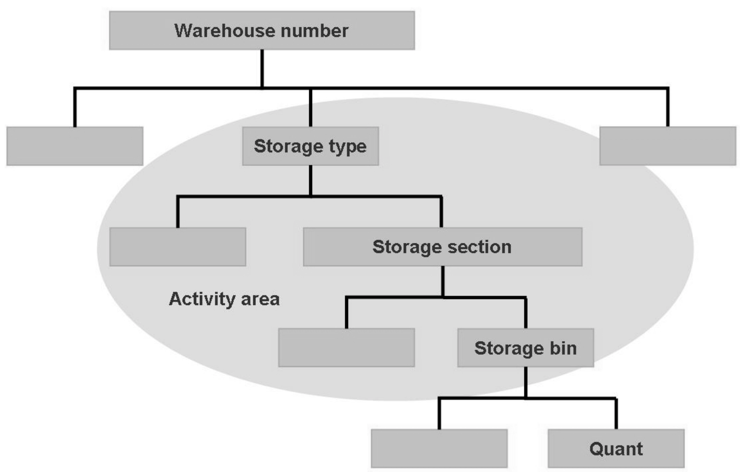

Figure 10: EWM Warehouse Organizational Elements

The warehouse structure in warehouse management is divided hierarchically and consists of the following elements:

- **Warehouse number** - In EWM, you can manage an entire physical warehouse complex using a single warehouse number.
- **Storage type** - You can define the individual warehouse physical storage areas that make up the warehouse complex, using their technical, spatial, and organizational characteristics as storage types.
- **Storage section** - Each storage type is divided into storage sections. All storage bins with specific common attributes belong to one storage section. For example, storage bins for fast moving items that are close to the goods issue zone.
- **Storage bin** - Each storage type and storage section consists of a selection of storage compartments that are called storage bins in EWM. The coordinates of the storage bin tell you the exact position in the warehouse, where you can store products. Storage bins are considered master data and will be covered in a subsequent unit.
- **Quant** - The quant is used for inventory management of a product in a storage bin. A quant represents a quantity of a product assigned to a storage bin. The quant is not organizational data and will be covered in detail in a subsequent unit.
- **Activity area** - An activity area is a logical grouping of storage bins. It can refer to a storage bin, or can concatenate bins from several storage types. You can either assign storage bins manually to the activity areas, or if there is a 1:1 relationship between storage type and activity area, you can have the system generate the assignment.

Warehouse Number

The organizational and physical attributes of a warehouse complex are entered under the warehouse number in customizing. For example, the weight unit, volume unit, and time unit of measure are defined at the warehouse number level. There are also various determination procedures for palletization data and packaging specifications that are assigned at the warehouse number level.

SAP recommends, as a general rule, using one warehouse number for each group of storage areas or buildings (warehousing complex) in the same geographical area. If your warehousing facilities are located in different cities or are physically separated by a longer distance, it is appropriate to assign a separate warehouse number to each warehouse complex.

You must make a one-time assignment between the warehouse number and a **supply chain unit** with the business attribute, Warehouse, as a setting.

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Supply Chain Unit

The **supply chain unit** contains essential information, such as country, region, and time zone. The system uses the time zone for the warehouse number when displaying all date and time fields. You create the supply chain unit in EWM master data but you assign it to the warehouse number in customizing. When the supply chain unit is created, in addition to the location-related settings, you must assign the business attribute of "warehouse". After you have entered any Product master data or document data for a warehouse, you should no longer change the assignment of the supply chain unit to the warehouse number. Doing so can result in follow-on errors.

Storage Type

A **storage type** is a four-character code that represents a storage space, storage facility, or storage zone, which you define for a warehouse number in Extended Warehouse Management (EWM). The storage type is a physical or logical subdivision of a warehouse complex, which is characterized by its warehouse technologies, space required, organizational form, or function. A storage type consists of one or more storage sections and bins. The use of the storage type within the warehouse is indicated by the **role** code in storage type customizing. As we will explore in later topics the storage type can be used in the following roles:

- Standard Storage Type - represents a physical area in the warehouse where products are stored. SAP has pre-configured a number of standard storage types.
- Identification Point - typically an area within a warehouse where goods are labelled/identified/checked during a goods receipt process
- Pick Point - a physical area within the warehouse where goods are checked/labelled/inspected/packed during a goods issue process
- Identification and Pick Point - an area within a warehouse where both id and pick point processing takes place.
- Staging Area Group - assigned to a storage type that represents one or more material staging areas in the warehouse.
- Work Center - a storage type that represents a physical area within the warehouse where certain processes take place such as deconsolidation, inspection, packing or value added service processing
- Doors - this role is used to represent one or more doors is a certain physical location within a warehouse. For example, the doors on the west side of the warehouse.
- Yard - in this role, a storage type represents a yard adjacent to the warehouse.
- Material Flow Control - A storage type with this role represents a area or system using automated storage / retrieval automation such as a conveyoring system.
- Work Center in Staging Areas Group - this role is assigned to a storage type to represent a work center within a material staging area

Within the storage type customizing there are numerous control indicators whose settings determine the placement, storage and removal characteristics of product quantities assigned to the storage type.

Storage Section

In Extended Warehouse Management (EWM), a **storage section** (four-characters) is an organizational subdivision of a storage type, which joins together storage bins with similar attributes for the purpose of putaway. The criteria for joining these bins together can be defined in any way, for example, heavy parts, bulky parts, hazardous materials having certain characteristics, fast-moving items, slow-moving items.

You can use the storage section as an organizational technique for assigning product quantities to a particular physical section of storage bins during the stock putaway process. When you use storage types with multiple storage sections, you must define the organizational aims clearly. The physical location is the main organizational factor. It is not absolutely mandatory that you subdivide a storage type into two or more storage sections. However, you must create at least one storage section for each storage type.

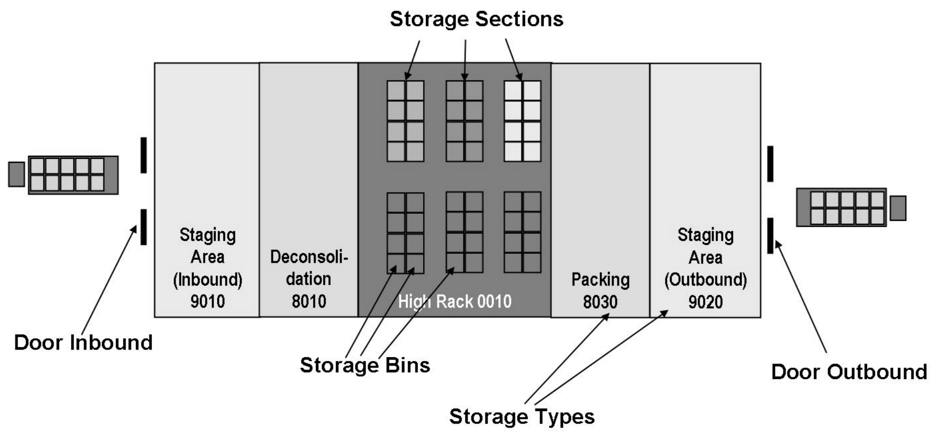

Figure 11: EWM Example Warehouse Structure

Doors

A **door** is a location in the warehouse where the goods arrive at or leave the warehouse. The door is an organizational unit that you assign to the warehouse number. Vehicles and their transportation units (TUs) drive up to the doors of a warehouse to load or unload goods there. The doors are in close proximity to the relevant material staging areas

To control putaway and stock removal processes in your warehouse, you can define doors and staging areas within a warehouse number. You can assign various functions to a door:

- Inbound only
- Outbound only
- Both inbound and outbound permitted

Door:

Location in the warehouse where the goods arrive at or leave the warehouse. The door is assigned to the warehouse number.

Vehicles **and their** transportation units (TU's) **drive up to the doors of a warehouse to load or unload goods. The doors are in close proximity to their relevant** staging areas**.**

Figure 12: Doors

Material Staging Areas

Within the warehouse, a material staging area is an organizational unit that is assigned hierarchically to the warehouse number and that is used to organize the flow of goods in the warehouse.

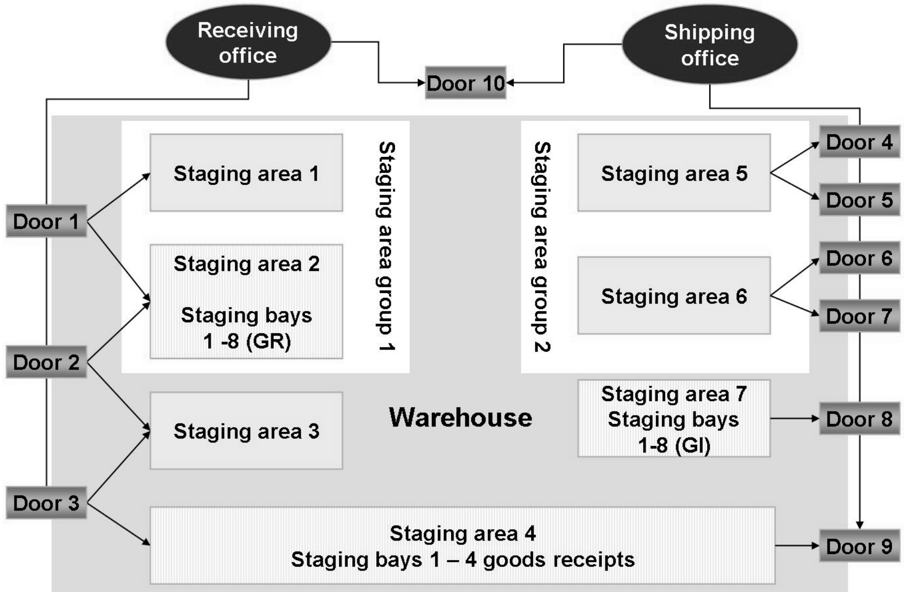

Figure 13: Material Staging Areas

Material staging areas are used for the interim storage of goods in the warehouse. They are located in close proximity to the doors assigned to them. You can define staging areas for different purposes and even simultaneously for multiple purposes:

- Goods receipt - Interim storage of unloaded goods until they are put away
- Goods issue - Interim storage of picked goods until they are loaded

A material staging area is represented in the warehouse structure as a storage type with storage type role “D”. You can group multiple staging areas into staging area groups. In this case, the staging area group corresponds to a storage type, while the material staging area within the staging area group corresponds to a storage section. You can also divide each material staging area into one or more storage bins. You need multiple storage bins, for example, if you want to define a loading sequence.

Work Center

The **work center** is a physical unit in the warehouse, in which you can perform warehouse activities such as packing, distribution, or weighing. Structurally, the work center is a storage type with a storage type role of ‘Work Center’ (E), ‘Pick Point’ (B), or ‘Identification and Pick Point’ (C). You can configure more than once work center for each storage type in the system. You can assign an inbound and outbound section to each work section.

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The work center is a physical unit in the warehouse, in which you can perform warehouse activities.

You can use the work center in the following processes:
- ✓ **Packing**
- ✓ **Deconsolidation**
- ✓ **Counting**
- ✓ **Quality Inspection**

The work center is assigned in the packaging specification

Figure 14: Work Center

You can use the work center in the following processes:

- Packing
- Deconsolidation
- Counting
- Quality Inspection

Extended Warehouse Management (EWM) contains the following transaction types for the work center:

- Packing – General - This transaction type is for all general repacking transactions.
- Deconsolidation - This transaction type is for distributing mixed handling units (HU's) into HU's for non-mixed deconsolidation groups.
- Quality Inspection and Count - This transaction type is for entering count and inspection results, and for confirming inspection results.
- Packing in the Staging Area - This transaction type is for packing together HU's according to the criterion Stop on Route.

The following example shows you various options, for example, on how a work center for deconsolidation can be structured:

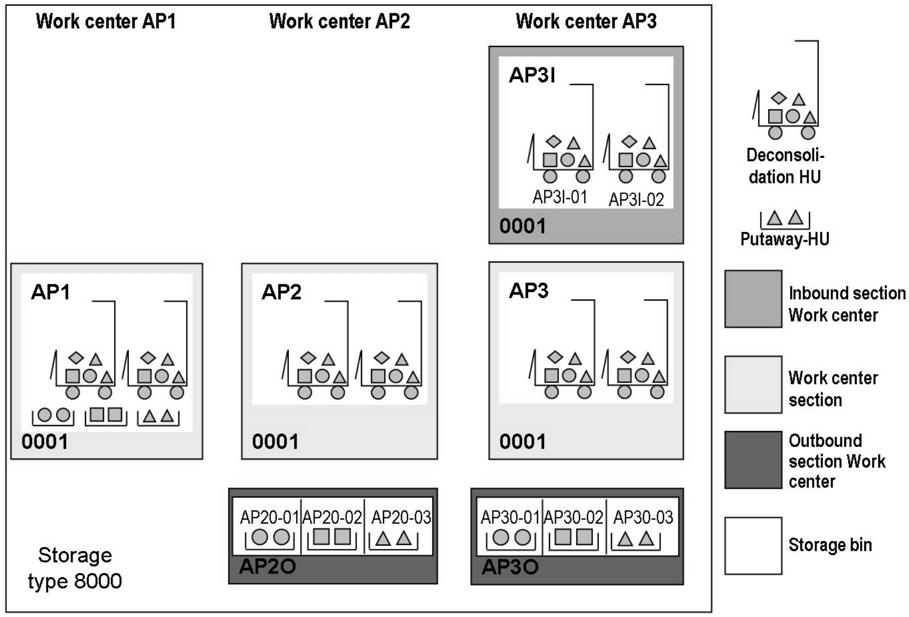

Figure 15: Work Center for Deconsolidation

1. Work center 1 represents the deconsolidation work center, which has no inbound section and no outbound section.
2. Work center 2 represents the deconsolidation work center, which has an outbound section but no inbound section.
3. Work center 3 represents the deconsolidation work center, which has both an inbound section and an outbound section.

You can also join work centers together into work center groups. This means that you can send individual products or HU's to a work center group, which corresponds to a storage section. In the above example, this would be a warehouse task to storage section 0001. The system only determines the final storage bin, and thus the work center, when you confirm the warehouse task.

Activity Area

An **Activity Area** represents logical section of the warehouse that groups storage bins based on defined warehouse activities. Examples of activity areas include:

- Putaway
- Picking
- Physical Inventory

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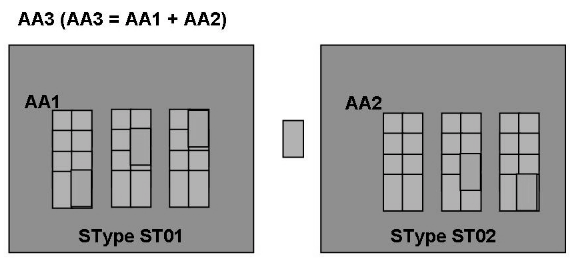
You use activity areas to provide logical subdivisions in your warehouse. In these activity areas, different warehouse workers execute certain warehouse activities, such as putaway or picking. You create activity-dependent bin sortings within an activity area. Extended Warehouse Management (EWM) uses these bin sortings to optimize the execution of warehouse tasks.



- Activity Areas (AA) are logical groups of bins that can be used in different activities like Picking, Put-away, Physical Inventory.
- Activity Areas are used to determine how Warehouse Orders (WO) are created through Warehouse Order Creation Rules (WOCR).
- Activity Areas enables sorting sequences for Bins.
- Activity Area is an influencing parameter in determining queues

Figure 16: Activity Area

An activity area consists of one or more assigned storage bins. You can define the assigned storage bins using the following attributes:

- Aisle
- Stack
- Level
- Bin subdivision
- Depth
- Information about the storage type
- Any assigned deconsolidation groups

You can sort these storage bins into any sequence you want, and assign as many activities to them as you require.

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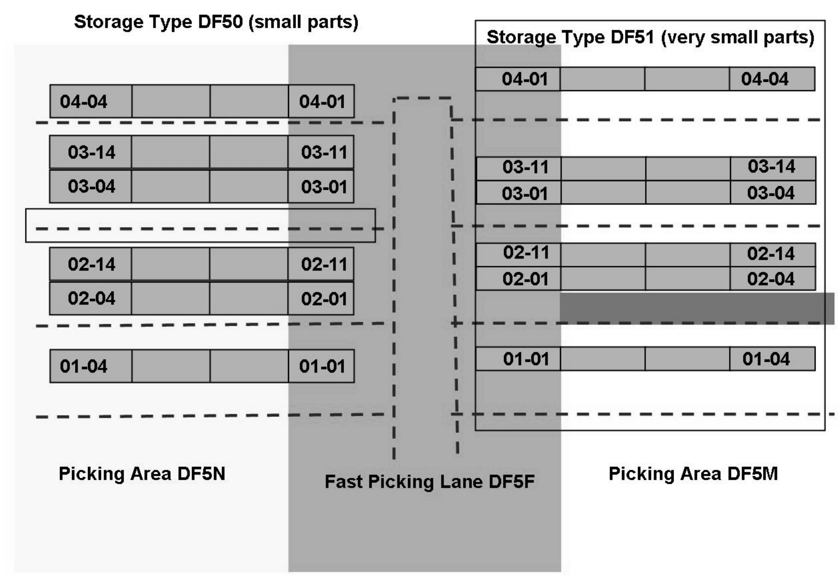

Figure 17: Picking Activity Area across Storage Types

In the example above the storage bins from the two storage types can be logically grouped using the activity area for efficiency in the picking process.

Exercise 2: Supply Chain Unit

Exercise Objectives

After completing this exercise, you will be able to:

- Describe the use and connection between the Supply Chain Unit and the EWM warehouse.

Business Example

Each warehouse defined in Extended Warehouse Management must have a supply chain unit assigned.

Task 1:

The supply chain unit is created in master data but is assigned to the EWM warehouse in customizing. It furnishes location and time zone information for the warehouse. Check the supply chain unit, **SPCW**, for warehouse **E100** and answer the following questions.

1. Display the supply chain unit.

Continued on next page

2. What is the time zone of the supply chain unit?

3. What is the Postal Code and City?

4. What are the Business attributes?

Task 2:

The Supply Chain Unit is assigned to the EWM warehouse in Customizing. Display this assignment in the SCM/EWM IMG for warehouse E100.

1. Locate the assignment table in the IMG.
2. What other fields are assigned to the warehouse in this table?

Solution 2: Supply Chain Unit

Task 1:

The supply chain unit is created in master data but is assigned to the EWM warehouse in customizing. It furnishes location and time zone information for the warehouse. Check the supply chain unit, **SPCW**, for warehouse **E100** and answer the following questions.

1. Display the supply chain unit.
   a) In the SAP Menu of the EWM system, go to *Extended Warehouse Management → Master Data → Maintain Supply Chain Unit*
   b) Enter the supply chain unit SPCW, then choose *Display*.
   c) Answer the questions by choosing the tabs.
2. What is the time zone of the supply chain unit?

   Answer: CET
3. What is the Postal Code and City?

   Answer:

   Postal code: 22299

   City: Hamburg
4. What are the Business attributes?

   Answer:

   INV - Warehouse

   PLOC - Planning Location

Continued on next page

Task 2:

The Supply Chain Unit is assigned to the EWM warehouse in Customizing. Display this assignment in the SCM/EWM IMG for warehouse E100.

1. Locate the assignment table in the IMG.

   a) Go to *Tools* → *Customizing* → *IMG* → *Execute Project*

      To access the **Implementation Guide** (IMG), choose *SAP Reference IMG*.

   b) In the Implementation Guide, choose *Extended Warehouse Management* → *Master Data* → *Assign Warehouse Numbers*. To perform the IMG Activity, choose Execute

   c) In the *Determine Work Area: Entry* dialog enter E100. Choose *Enter*

2. What other fields are assigned to the warehouse in this table?

   a)

Field Name	Value
Custodian	**1185**
Dflt Pty Entld	**SPCW**
Default Ship-to	blank

   b) Choose *Exit*

Lesson Summary

You should now be able to:

- Name the organizational units related to Extended Warehouse Management
- Describe the organizational subdivisions of an extended warehouse number.
- Outline the relationships that exist between various organizational units in ERP and EWM.

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

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Unit Summary

You should now be able to:

- Name the organizational units related to Extended Warehouse Management
- Describe the organizational subdivisions of an extended warehouse number.
- Outline the relationships that exist between various organizational units in ERP and EWM.

Test Your Knowledge

1. What organizational unit is the Supply Chain Unit assigned?

   Choose the correct answer(s).

   □ A Storage Type
   □ B Plant
   □ C EWM Warehouse Number
   □ D Activity Area

2. You need to use an organizational unit to represent the subdivision of a storage type based on hazardous material classifications. Which organizational unit would you use?

   Choose the correct answer(s).

   □ A Storage bin
   □ B Activity Area
   □ C Storage section
   □ D Quant

3. Goods arrive and leave the warehouse through __________.

   Fill in the blanks to complete the sentence.

4. A work center in EWM is represented by what organizational unit?

   Choose the correct answer(s).

   □ A Storage Section
   □ B Storage Type
   □ C Activity Area
   □ D Storage Bin

5. An activity area is used to represent a group of:

   Choose the correct answer(s).

   □ A Storage types
   □ B Storage Sections
   □ C Material Staging Areas
   □ D Storage Bins

6. In EWM a warehouse is identified by the:

   Choose the correct answer(s).

   □ A Warehouse Number
   □ B Storage Type
   □ C Warehouse organization code
   □ D Warehouse complex code

7. What is the organizational unit that is used to represent a physical storage area within the warehouse and that has certain physical and spatial characteristics?

   Choose the correct answer(s).

   □ A Storage bin
   □ B Storage section
   □ C Storage type
   □ D Activity area

8. To represent a physical subdivision of a storage type you would use the __________________________.

   Fill in the blanks to complete the sentence.

9. Which of the following are organizational units within EWM?

   Choose the correct answer(s).

   □ A Storage bins
   □ B Storage types
   □ C Storage section
   □ D Warehouse number

10. In the SAP ERP system, a warehouse number must be created in the WM system to represent the EWM warehouse.

    Determine whether this statement is true or false.

    □ True
    □ False

11. In the SAP ERP system, the two organizaional units used to determine the EWM warehouse are the:

    Choose the correct answer(s).

    □ A Company Code
    □ B Supply chain unit
    □ C Plant
    □ D Storage Location
    □ E Storage Type

12. An activity area can be assigned to the bins in only one storage type.

    Determine whether this statement is true or false.

    □ True
    □ False

Answers

1. What organizational unit is the Supply Chain Unit assigned?

   Answer: C

   The supply chain unit furnishes address-related and time zone information related to the warehouse.

2. You need to use an organizational unit to represent the subdivision of a storage type based on hazardous material classifications. Which organizational unit would you use?

   Answer: C, D

   The storage section is used to represent the physical subdiviisions of a storage type.

3. Goods arrive and leave the warehouse through doors.

   Answer: doors

   The warehouse door is the link between the external warehouse environment and the warehouse itself.

4. A work center in EWM is represented by what organizational unit?

   Answer: B

   The work center is a storage type with a storage type role of work center (E), pick point (B), or ID and pick point (C).

5. An activity area is used to represent a group of:

   Answer: D

   An activity area consists of one or more storage bins. The bins can be in different storage types.

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6. In EWM a warehouse is identified by the:

   Answer: A

   The warehouse number is a four character code that is used to identifiy a warehouse complex.

7. What is the organizational unit that is used to represent a physical storage area within the warehouse and that has certain physical and spatial characteristics?

   Answer: C

   The storage type is used to represent a physical area where goods are stored according to the material handling equipment such as pallet racking, open storage area, small parts bins. The storage type in EWM can also be used to represent work areas in the warehouse.

8. To represent a physical subdivision of a storage type you would use the storage section.

   Answer: storage section

   Every storage type must have at least one storage section assigned.

9. Which of the following are organizational units within EWM?

   Answer: B, C, D

10. In the SAP ERP system, a warehouse number must be created in the WM system to represent the EWM warehouse.

    Answer: True

    An warehouse number created in ERP acts as bridge between the ERP system and the EWM warehouse. No other WM organizational unit configuration is required.

11. In the SAP ERP system, the two organizaional units used to determine the EWM warehouse are the:

    Answer: C, D, E

    The plant and storage location representing the inventory management of the materials in the EWM warehouse is assigned to the intermediate warehouse number that represents the EWM warehouse.

12. An activity area can be assigned to the bins in only one storage type.

    Answer: False

    Storage bins in one or more storage types can be assigned to a storage type.

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Unit 3

Master Data

Unit Overview

There are two basic types of master data that is used within Extended Warehouse Management. One type of data is external data that must be copied from the SAP ERP system into the EWM environment. Material master data and partner data from the ERP System are examples of external data. The other type of master data is internal data that is created within the EWM environment. Storage Bin master data and packaging specifications are examples of internal master data. However, storage bin master data may initially be copied into the EWM environment from an external legacy system. In this unit we will explore the various master data files required within Extended Warehouse Management.

Unit Objectives

After completing this unit, you will be able to:

- Describe the master data that is required within the EWM system
- Outline the technique used to get the EWM required location and material master data from the ERP system to the EWM system.
- Create and maintain storage bins in EWM
- Outline the purpose of packaging specifications in EWM
- Create packaging specifications within EWM

Unit Contents

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Lesson: EWM Master Data

Lesson Overview

In this lesson we will review the basic master data that is used and required by the Extended Warehouse Management system. In addition to the basic master data there are master data objects that are required by the various optional functions within EWM such as yard management. Function specific master data will be presented when the specific function is described in the relevant EWM training materials.

Covered in the lesson will be the following EWM master data:

- Location-related master data for plants, shipping points, customer and vendor master data.
- Material master data
- Storage bins
- Packaging specifications

Location specific and material master data originates in the ERP system. You will learn the basic process that is used to move and update this data from the ERP system to the EWM system. Other data such as storage bin master data is considered EWM master data because the data originates there and is maintained there. There are, however, functions within EWM that allow you to download storage bin master data from a legacy/external system when implementing EWM. Another example of EWM internal master data is packaging specifications. Packaging specifications must be created within the EWM system.

In summary, the objective of this lesson is to familiarize you with the required EWM master data, how it is created and maintained within the EWM system.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the master data that is required within the EWM system
- Outline the technique used to get the EWM required location and material master data from the ERP system to the EWM system.
- Create and maintain storage bins in EWM
- Outline the purpose of packaging specifications in EWM
- Create packaging specifications within EWM

Business Example

Location-related master data such as plants, customer ship-to addresses and vendor addresses play important roles in the major business processes of goods receipt and goods issue within EWM. In addition, a primary use of EWM is in managing materials and their quantities within storage bins. For these reasons, it is important to have an overall understanding of the roles that master data plays in the EWM system.

Data Transfer Between ERP and EWM

It is important to understand the data transfer techniques used to move both master and document data between an ERP system and EWM. Although this lesson is focused on the master data required by EWM, it is also important to know how document data is transferred because certain applications in SCM can use the same technique used to transfer master data. The following illustration shows the basic techiques used to transfer master and document data between an ERP system an the EWM system.

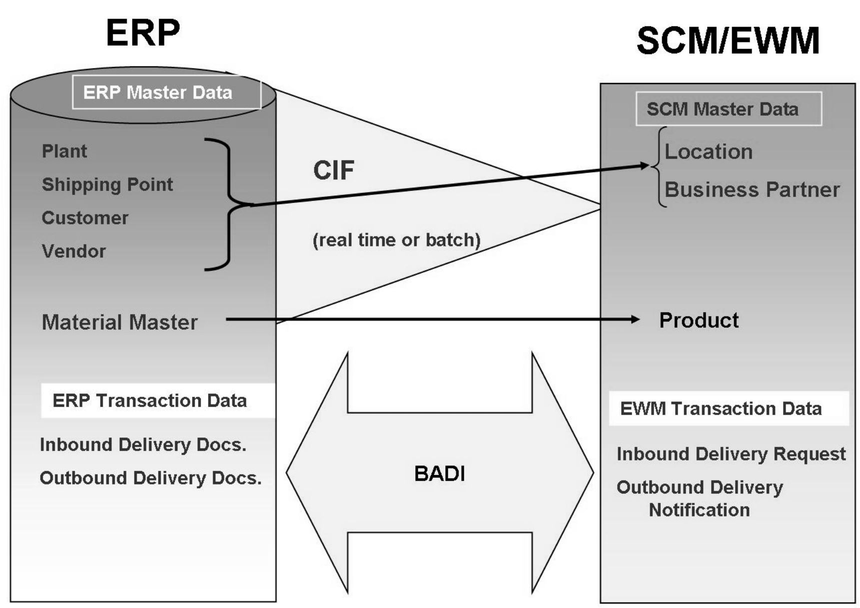

Figure 18: Data Transfer

There are two distinct techniques used to transfer data between an ERP system and EWM. Location-related and material master data are transferred using the Advanced Planning and Optimizer core-interface or CIF. Document data is transferred using the business-add in (BADI) functionality. In this lesson we will now focus on the master data transfer.

Location-related master data consists of the location key and associated name and address data from the master and configuration tables of the following objects:

- Plant/DC's - from the plant definition table in ERP customizing
- Shipping Points - from the shipping point definition table in ERP customizing
- Customer master - from the ERP customer master
- Vendor master - from the ERP vendor master

The customer and vendor location relevant data is used primarily to furnish name and address information to EWM functions such as inbound and outbound delivery processing. Plant and shipping point location master data is used, not only to supply name address information, but can also be used to define the Supply Chain Unit assignment to the warehouse number and Party Entitled to Dispose to product masters. All of the location master data is stored in a single SCM master: the Location master file.

Material master data from an ERP system is transferred to the product master in the SCM system. The data that is transferred consists mainly of material descriptions, units of measure, material product coding fields such as material group, and weights/volume specifications. EWM-specific data fields are entered after the product master data is created. We will discuss this aspect of the product master later in this lesson. In addition to the basic material master data to be transferred, batch managed materials must also have their characteristics and batches transferred in the data transfer process.

In addition to its use in EWM, the location and product master data can be used by Advanced Planning and Optimizer (APO) planning applications in SCM such as Service Parts Planning, Demand Planning and Transportation Planning / Vehicle Scheduling.

To transfer location and material-relevant master data, a Core Interface (CIF) model must be defined in the ERP system. Shown below is the basic information required in this process.

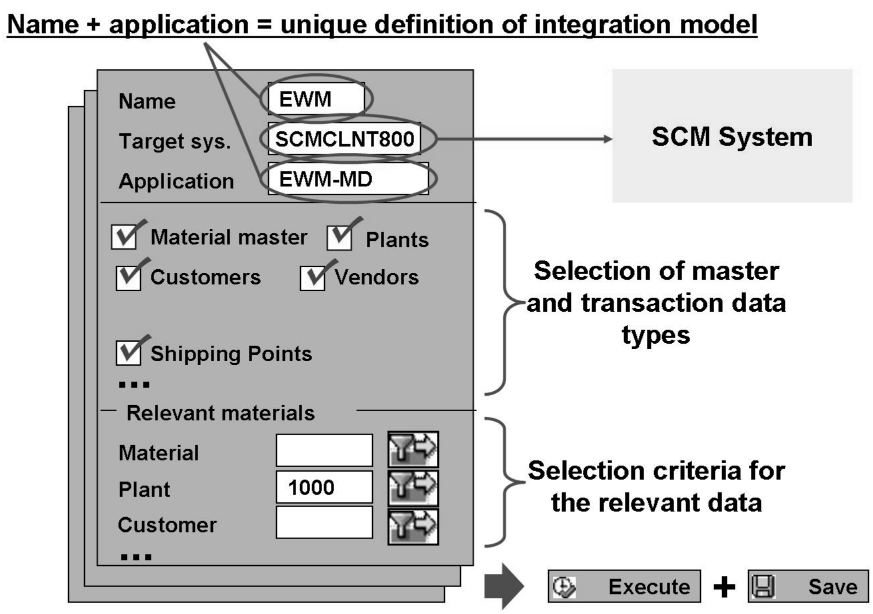

Figure 19: Generate Integration Model

An integration model is identified using three fields of information as shown in the graphic: the Name, Target System and Application. Within the model you indicate which location, and material relevant data masters you want to transfer. You must indicate to the system the data records you want to transfer by inputting selection criteria.

After the integration model is created, you “execute” and “save” it. This process builds an internal file of the selected data. The next step is to activate the model. It is this step that actually transfers the data to the SCM system. After activating the model any changes to the master data will cause the corresponding data fields to automatically update the corresponding data in SCM/EWM.

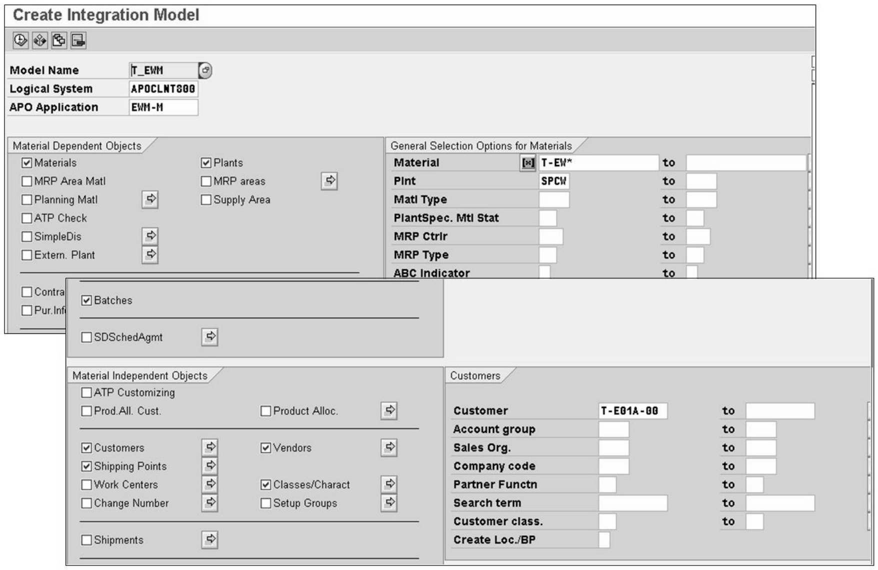

Figure 20: Integration Model Create - Transaction CFM1

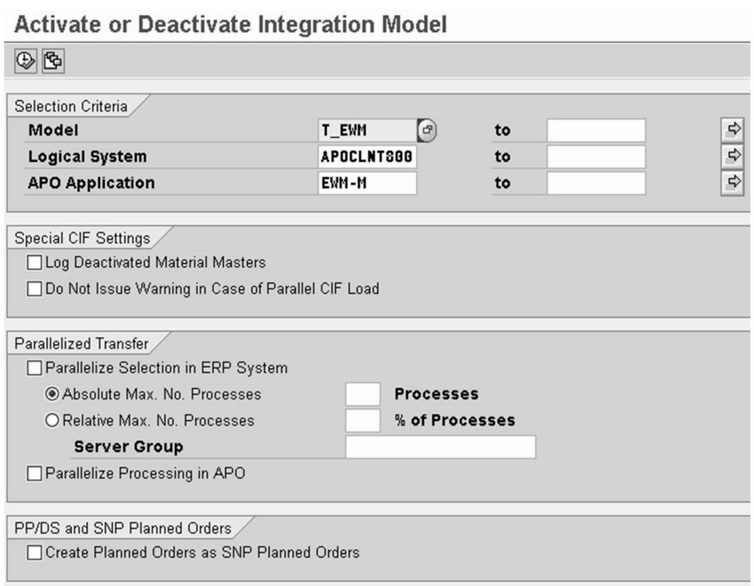

Figure 21: The CIF Interface: Activate the Integration Model

When the CIF model is activated, the master data is transferred to the SCM/EWM system. The location-related data is placed into the SCM/APO Location master and is assigned a Location Type Code that corresponds to the data as shown below.

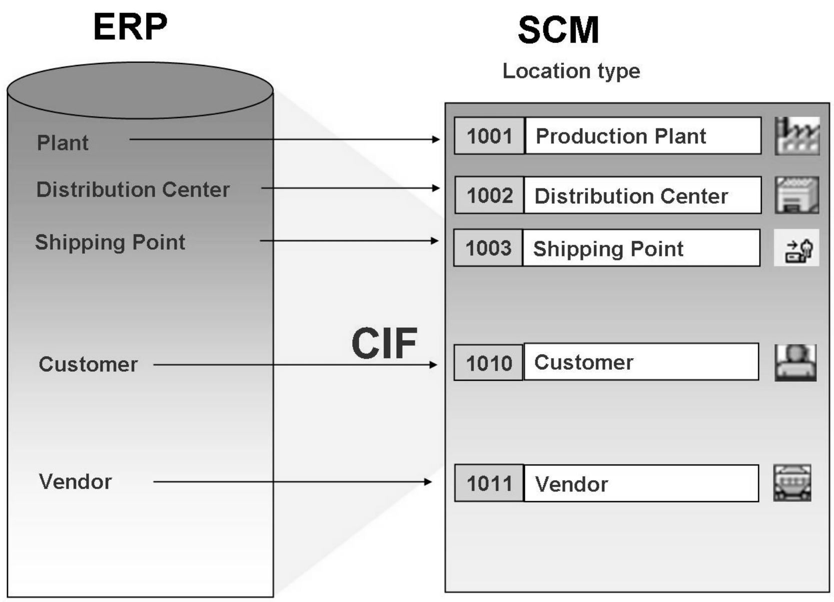

Figure 22: Location Types

The location master information is available not only to the EWM system but also to the planning applications in the Advanced Planner and Optimizer. For its use, the EWM system converts the location master data to Business Partner master data. It is this version of the location data that EWM uses in its processes.

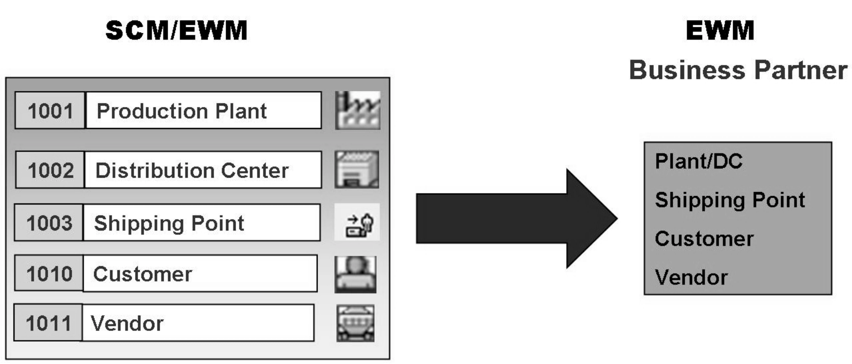

Figure 23: Location Types to Business Partners

Each location master record created results in a corresponding **business partner record** to be generated within EWM. It is the business partner master data that EWM accesses when it needs partner-related data. For example, each product master used within EWM must have an EWM warehouse product view created. When the warehouse product view is created, a "**Party Entitled to Dispose**"must be assigned to the warehouse product master record. The Party Entitled to Dispose must exist as a business partner in EWM. The Party Entitled to Dispose is the business partner that represents a location, normally a plant, that represents the party who holds title to the goods stored in an EWM warehouse. In fact, an EWM warehouse can, though customizing, be assigned a default Party Entitled to Dispose. An EWM warehouse can also be assigned in EWM customizing a **Custodian** business partner. The Custodian partner is a location that manages the warehouse products but does not hold title to the goods. The Party Entitled to Dispose and Custodian business partners are used primarily by third-party logistics service providers (3PL's) who are using EWM to provide warehousing services for their customers.

Warehouse Product Master Data

As a result of the CIF processing, product master data is created in the SCM/EWM system. The basic product master data can be accessed using the “Maintain Product” transaction at *Extended Warehouse Management → Master Data → Product → Maintain Product*. Data in the product master view is global data that is applicable to all warehouses in which the product is stored. The data is organized under the following tabs:

- Properties - this tab contains general information related to the product such as description, weight, volume, grouping codes
- Units of measure
- Classification - classification information fields for batch managed products
- Pkg Data - fields in this tab are used only for product masters that represent packaging materials

After the product master data is created in SCM, the **warehouse product master** must be created before a product can be used within the extended warehouse management system. The warehouse product master data is maintained using the Maintain Warehouse Product transaction within EWM Master Data at *Extended Warehouse Management → Master Data → Product → Maintain Warehouse Product*. Entry of the warehouse number and the ‘party entitled to dispose’ is mandatory, because the warehouse-number-dependent data pertaining to the warehouse product applies only to this warehouse number and this party. Using this transaction you can create, change or display the warehouse product master data for an EWM product.

The warehouse product master is the warehouse-number-dependent view of the product master data. The warehouse product comprises all the properties of a product that relate to its storage in a certain warehouse within the framework of Extended Warehouse Management (EWM), such as the putaway and removal control indicators.

Global, warehouse-number-independent data pertaining to the storage of the product can be found on the Storage tab page. This tab page is also displayed in product master maintenance. The following warehouse-number independent data on the storage of a product is adopted in EWM from the ERP system:

- Handling unit types
- Warehouse product group
- Warehouse storage condition
- Warehouse handling indicator
- Serial number profile
- Quality inspection group
- Hazardous material coding
- Catch weight coding

The warehouse-number-dependent data on the warehouse product can be found on the following tab pages in the maintenance function for warehouse products:

- Warehouse data - Here you maintain data on the warehouse in which the product is stored.
- Slotting - In this tab you maintain the parameters that are used in the slotting and rearrangement processes.
- Storage type data - Here you maintain data that is specific to a particular storage type in which a product is assigned. This data generally consists of indicators used in replenishment and storage bin management.

Storage Bins

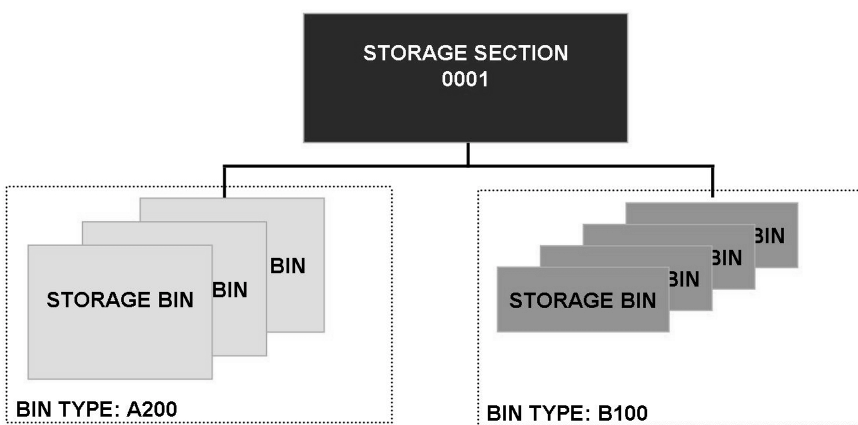

Figure 24: Storage Bins

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A storage type consists of one or more physical storage spaces, which are called storage bins in Extended Warehouse Management (EWM). The storage bin is the smallest spatial unit in a warehouse. Therefore, the storage bin represents the exact position in the warehouse where products can be stored. Since the address of a storage bin is frequently derived from a coordinate system, a storage bin is often referred to as a coordinate. For example, the coordinate 01-02-03 could be a storage bin in aisle 1, stack 2, and level 3. In EWM the bin coordinate is 18 characters in length.

In customizing you define the bin coordinate structure by assigning, first of all, a unique character to represent the following components of the bin coordinate:

- Aisle
- Stack
- Level
- Bin subdivision
- Bin Depth

You can then use this coding to create templates that can be used to generate the storage bin master data automatically.

To each storage bin, you assign the warehouse number in which the storage bin is located. You must also assign a storage type and storage section to each storage bin. It is important to note that the bin coordinate assigned to a storage bin must be unique within the warehouse. You can also define the following additional attributes for a storage bin:

- Storage bin type - used to indicate relative size of bin and/or actual bin dimensions
- Bin Access Type - used to control how bin is accessed by resources
- RF Verification field - used to store the bin coordinate-related data used in RF scanning to verify that the correct bin is being accessed
- Geo-coordinates of storage bin - used by EWM to compute distances between the bins in goods movements
- Capacity checking attributes (max weight, volume, total capacity) - used to control the amount of product assigned to a bin.
- Fire containment section - used in product hazardous material reporting

You can use any combination of letters and numbers for storage bin coordinates. However, you should ensure that you orient the parts of the structure to the indicators defined for the warehouse for aisle, stack, level, and so on.

As described earlier, storage bins are assigned to Activity Areas to facilitate physical bin access by warehouse activities such as picking, putaway, physical inventory counting and replenishment. The assignment is made in customizing. In addition to

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the activity area assignment, a bin sorting sequence can be assigned. The bins are then sorted so that they can be accessed in a particular sequence for a given process such as picking.

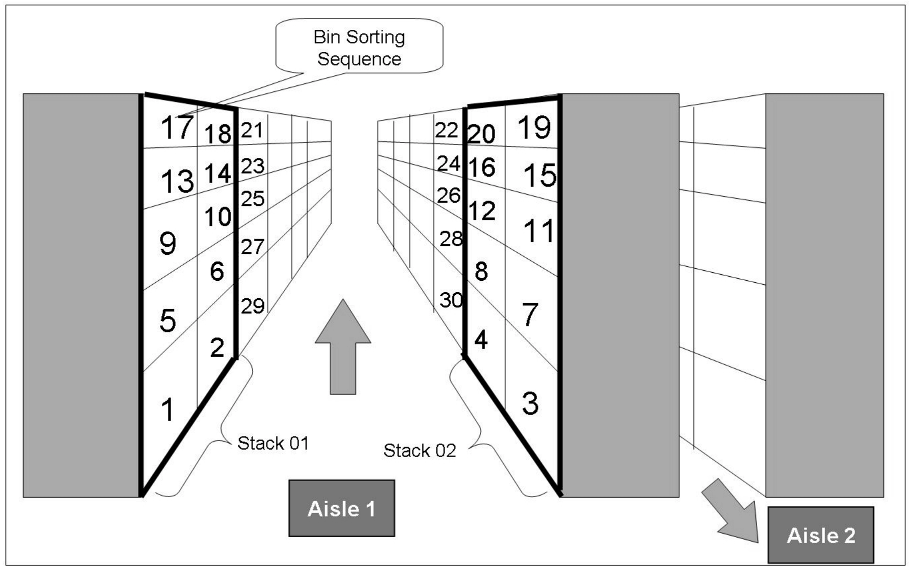

Figure 25: Storage Bin Sequencing

Quants

The term **quant** is used to represent the quantity of a specific product with the same characteristics in one storage bin, resource, or transportation unit. The system manages different batches of a product as different quants. You can increase the quantity of a quant by adding to the existing stock. Quants can only be created and deleted using movements.

Quants are used to manage stocks at storage bin level, resources, and transportation units. When you put a product away into an empty bin in Extended Warehouse Management (EWM), the system generates a quant in this storage bin. When you remove the quantity from storage, the system automatically deletes the quant. In the quant record, the system manages the data for the products collected together in the quant. This data includes:

- Quant identification - assigned by the system
- Product Number
- Batch number
- Stock type
- Stock category
- Stock usage

Packaging Specifications

Another important set of master data in Extended Warehouse Management are packaging specifications. The packaging specification is used to define the packing requirements for products to be put away or transported.

Within Extended Warehouse Management the packing process, using packaging specifications, can be performed in the following processes:

- Packing in the work center (packing station or deconsolidation)
- Automatic packing in inbound delivery processing
- Packing during warehouse task confirmation
- Deconsolidation using the RF framework
- Packing using the RF framework

One common use of packaging specifications is to specify how products are palletized. The palletization of a product can influence how the material is assigned to storage bins during the putaway process. For example, in your warehouse, you put away product A onto pallets for 50 pieces. You would create a packaging specification with a level that contains the main packaging material, Pallet, and the contents Product A. For this level, enter the target quantity 50. In the process 'Putaway' for the inbound delivery, the system splits the quantity in the inbound delivery across multiple warehouse tasks, due to this packaging specification. For example, if a quantity of 100 pieces is delivered, then the system creates two warehouse tasks for 50 pieces.

A document, the packaging specification defines all the necessary packing levels for a product and the related packaging materials. Included in the packaging specification are the steps to be performed in the packing process.

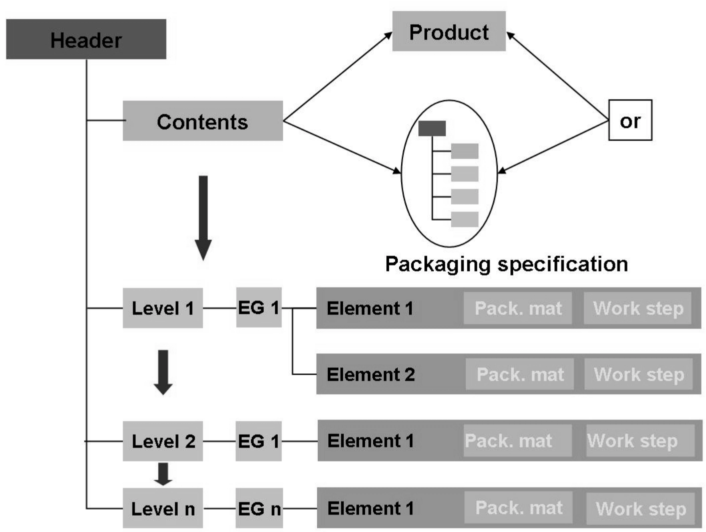

Figure 26: Packaging Specification Structure

In the structure above the following are the elements of a packaging specification:

- **Header** - contains the name of the packaging specification, user who created it, and status
- **Contents** - Contains either the product(s) to be packed , or the name of another packaging specification.
- **Level** - A packaging specification can contain one or move levels. The level contains the overall instructions for packing a previous level, or for Level 1, the contents into the level.
- **Element Group** - Each level has exactly one element group. The element group consists of one or more Elements. Element groups can also be reused in multiple packaging specifications.
- **Element** - An element defines either a packaging material and/or a work step. A packaging material is a product that is used to pack products in or on. The packaging material must be defined in the warehouse product master. In the warehouse product master for a packaging material, there are various fields that specifically define the packing characteristics and limits such as maximum packing weight and/or volume.

  Use of an element as a work step is simple entry of text to describe how the packing is to be performed. The text is identified with a code so that it can be re-used in other packaging specifications.

Here is an example of a packaging specification to pack product T-EW01-00 into a box, label the box, then pack 50 of the packed boxes onto a pallet:

- Header: Name: PackSpec A, Status: New
- Contents: T-EW01-00 1 PC.
- Level 1: Target Quantity: 1, Element Group: EG1
  - Element Group: EG1:
  - Element: E1: packaging material: PK-BOX, Work step: “Place 1 piece upright in each box”
  - Element: E2 :Auxilliary packaging material: LABEL, Work step: “Place LABEL on upper left”
- Level 2: Target Quantity: 50 Element Group: EG2
  - Element Group: EG2
  - Element: E3: Packaging material: PK-PALLET, work step: “Place boxes layer by layer onto pallet”

Packaging specifications are used not only in Extended Warehouse Management but also in the Supply Network Collaboration (SNC) and the Service Parts Planning applications. In addition to their use in determining the packing of products and creation of handling units in EWM and SNC, packaging specifications can be used in rounding rules in Service Parts Planning.

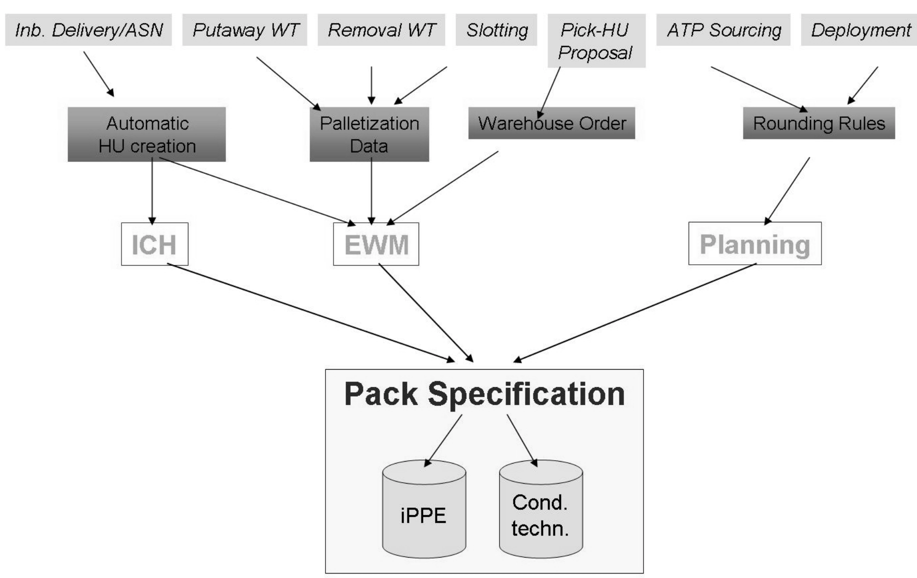

Figure 27: Processes Using Packaging Specifications

Internally, the packaging specifications use the Integrated Product and Process Engineering (iPPE) database engine to store the packaging specifications. To determine when a packaging specification is to be applied, the condition technique is used. The following processes in EWM use Packaging Specification determination:

- Automatic packing in the inbound delivery in goods receipt processing
- Packaging material determination during warehouse order creation
- Packaging material determination during outbound delivery processing in the goods issue process
- Packaging material determination during deconsolidation
- Slotting
- Internal warehouse processes (palletization, unit of measure determination)

Therefore, a great deal of flexibility is available to determine packaging specifications, For example, materials might be palletized differently depending on the supplier. Using the condition technique, the combination of the vendor and the product can be used to determine the palletization during the goods receipt process.

Packaging specifications can be maintained centrally and distributed to satellite systems. If you want to use packaging specifications in multiple systems, then you can distribute these packaging specifications to the other systems so that you are able to work with the same master data in all systems. You can distribute the packaging specifications to the other systems using the qRFC method.

Handling Units

Handling Units play an important role in many Extended Warehouse Management processes. In some key product movement processes they are required. In this section we will review key concepts related to handling unit management master data to prepare you for their usage in EWM.

A Handling Unit is a physical collection of goods consisting of….

- **Packaging materials** (e.g. Pallet, Carton, Shrink wrap, Container)
- **Products** (which have to be transported, stored, used etc..)

A Handling Unit has an unique identification number through which the information can be read.

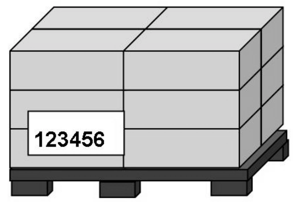

Figure 28: Handling Unit

As pointed out in the figure above, the basic definition of a handling unit is the assignment of one or more materials and their quantities to a packaging material. Information related to the packed products such as quantity, unit-of-measure, weight, volume, batches are stored in the handling unit data. Similar information related to the packaging materials and auxiliary packaging materials are also retained in the handling unit structures. The packaging materials must be present in the warehouse product master.

The process of creating a handling unit is called "packing". Handling units can also be nested by packing one or more handling units to another packaging material. When a handling unit is created a unique number called the **handling unit number** is assigned. The handling unit number can be formed from an internal number range table or according to the industry standard EAN128, Serial Shipping Container Coding (SSCC-18)

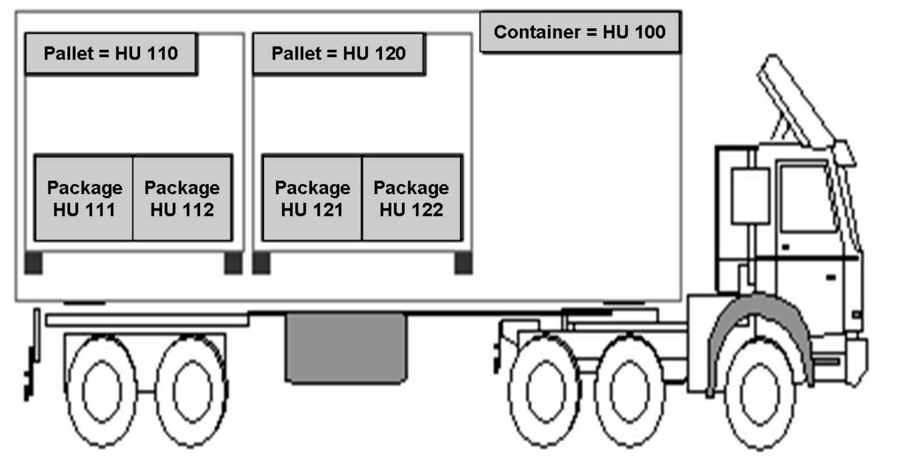

Figure 29: Nested Handling Units

illustrated in the figure above is an example of nested handling units. There are three levels of handling units in the example. The “packages” represent the first level. The “package” HU's were then packed to a pallet packaging material creating the second level handling units. The “pallet” HU's were then packed to a packaging material that represents the vehicle, or means of transport, which gives us our third and highest level handling unit.

Within EWM, whether products are required to be processed in handling units depends on a number of factors. If the use of handling units is an enterprise standard then products will normally be received, WM-managed and issued in handling unit form. Even in warehouses where products are not managed in handling unit form, certain EWM processes will require that products being received or issued be packed into handling units, at least temporarily, to facilitate the internal EWM processes. In EWM, in the putaway process, for example, products may be HU-managed until they are actually putaway in their final bin. When the actual putaway occurs to the final bin, the HU number can be removed by the system from the product.

Products can only be placed into storage bins within a storage type that has been configured to allow handling units. In EWM customizing of Storage Types, you indicate whether HU's can be placed into bins in the storage type, or whether only HU's can be placed in the storage type, or you can forbid HU's from being placed into a storage type. If a product is putaway in EWM in handling unit form, the HU data is transferred to the ERP system during the goods receipt posting and is visible there.

In the Yard Management, Transportation Cross Docking and Transportation functions within EWM, handling units are created internally by EWM to represent the vehicles and their loads.

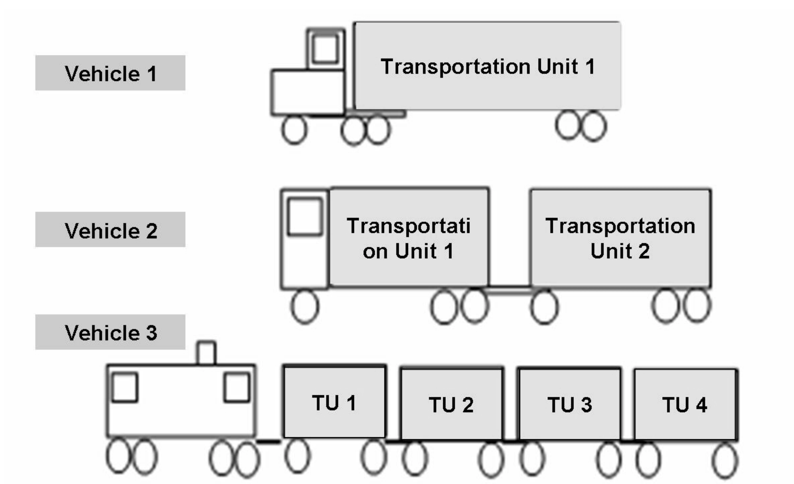

Figure 30: Transportation Units and Vehicles

A **transportation unit** is the smallest loadable unit of a vehicle that is used to transport goods. The transportation unit (TU) can be a fixed part of the vehicle. The transportation unit is represented by an internally created handling unit. A specialization of a particular means of transport, a **vehicle** can comprise one or more transportation units.

The illustration above shows examples of different transportation units scenarios:

- Vehicle 1: Semi-trailer truck with one transportation unit
- Vehicle 2: Truck with cargo area and trailer, in other words, two transportation units
- Vehicle 3: Train with four railcars, in other words, four transportation units

Resources

A resource is an entity representing a user or equipment, which can execute work in the warehouse.

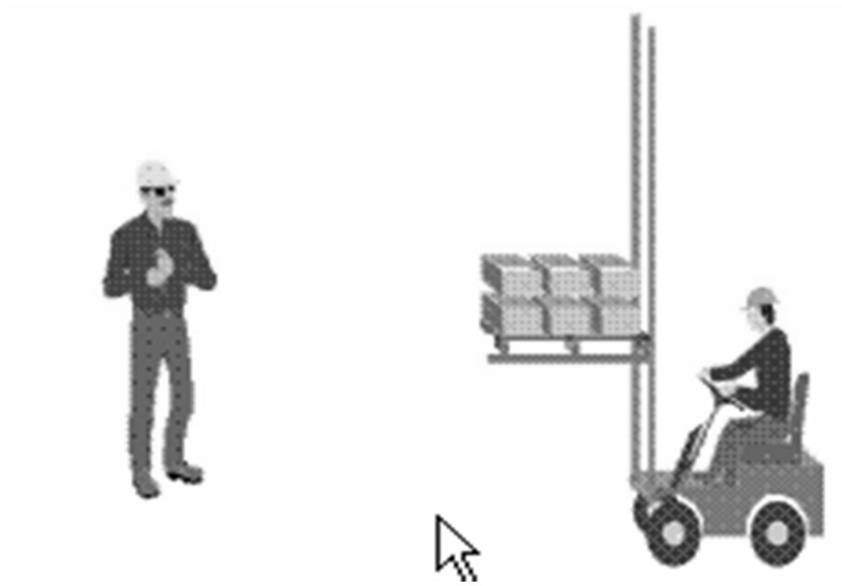

Figure 31: Resources

A resource can log on to a radio frequency (RF) or non-RF environment. Once the resource is logged on to the system, it can receive work for execution, and can be tracked and displayed in the warehouse management monitor. A resource belongs to a **resource type** and r**resource group**. You define a resource in the transaction for resource maintenance.

A **resource type** is a grouping of resources with similar technical or physical qualifications. The resource type determines the following for its corresponding resources:

- Horizontal velocity - The velocity of a resource can influence the Latest Starting Date of a warehouse order. The warehouse order is a document containing one or more tasks to be carried out by a resource.
- Applicability of position management as defined within the Labor management function within EWM.
- Qualifications and preferences (reflected by priority values) regarding bin access types and HU type groups The qualifications and priority values influence which warehouse orders are selected for a resource requesting work.

A **resource group** is a grouping of resources for queue assignment purposes. The resource group determines the sequence of allowed queues for its corresponding resources, which can influence which warehouse orders are selected for a resource.

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Exercise 3: Transferring Master Data from the ERP System to the EWM System

Exercise Objectives

After completing this exercise, you will be able to:

- Create an CIF model to set up the transfer ERP material master data to the EWM system.
- Activate the CIF model to transfer master data to the EWM system.

Business Example

The establishment of the master data transfer link between the ERP system and the EWM system is a required step in the implementation and operation of EWM. In this exercise you will get hand's on experience setting up an APO core interface (CIF) model, activating the model and then confirming the master data in the EWM system.

Task:

Create a Core Interface (CIF) Model to transfer material masters T-EW03-## and T-EW04-## in your plant SPCW to the EWM system. Save the CIF model so that it can be used in the future to transfer new material master data.

After you have generated the model, activate it to transfer the data to the EWM system. Check the warehouse product master in EWM to insure that the materials were transferred.

1. Create the CIF model using the data in the table below:

Model Name	**GR##-EWM**
Logical System	**APOCLNT800** or, system assigned by instructor
APO Application	**MD**
Masters to be selected:	
Material Master 1	**T-EW03-##**
Material Master 2	**T-EW04-##**
Plant	**SPCW**

Continued on next page

2. Save the CIF model as a variant so that it can be updated in the future with new materials. Name the variant GR##-MD.
3. Generate the model.
4. Activate your model and transfer the data to the EWM system.
5. In the EWM system, display the product master data for the materials.

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Solution 3: Transferring Master Data from the ERP System to the EWM System

Task:

Create a Core Interface (CIF) Model to transfer material masters T-EW03-## and T-EW04-## in your plant SPCW to the EWM system. Save the CIF model so that it can be used in the future to transfer new material master data.

After you have generated the model, activate it to transfer the data to the EWM system. Check the warehouse product master in EWM to insure that the materials were transferred.

1. Create the CIF model using the data in the table below:

Model Name	**GR##-EWM**
Logical System	**APOCLNT800** or, system assigned by instructor
APO Application	**MD**
Masters to be selected:	

Continued on next page

Material Master 1	**T-EW03-##**
Material Master 2	**T-EW04-##**
Plant	**SPCW**

a) In the ERP SAP menu, go to *Logistics* → *Central Functions* → *Supply Chain Planning Interface* → *Core Interface Advanced Planner and Optimizer* → *Integration Model* → *Create*

b) Enter the *Model Name*, *Logical System*, and the *APO Application* from the corresponding fields from the table above.

c) In the *Material Dependent Objects* section, select the *Materials* and *Plants* check boxes.

In the *General Selection Options for Materials* section, select Multiple Selections.

In the *Select Single Values* tab, enter your two materials from the table above.

Choose *Copy*.

Enter the plant from the table above in the *Plnt* field.

2. Save the CIF model as a variant so that it can be updated in the future with new materials. Name the variant GR##-MD.

a) Choose *Save*.

b) In the *Variant Name* enter GR##-MD. Enter a description of your own choosing in the *Meaning*.

c) Choose *Save*.

3. Generate the model.

a) On the *Create Integration Model* screen, choose *Execute*.

b) In the next screen, choose *Generate IM*. The system now builds the integration model. An information message will display informing you that the model has been generated. Choose *Continue*.

c) Choose *Exit* twice.

Continued on next page

4. Activate your model and transfer the data to the EWM system.

   a) Go to → *Integration Model* → *Activate*

   b) Your *Model*, *Logical System* and *APO Application* data should be present in the *Selection Criteria* fields in the *Activate or Deactivate Integration Model* screen.

   c) Select *Execute*.

   d) On the next screen, in the *Integration Models* column on the left, select the line with the **MD**.

      A line with the date and your user-id should appear on the right.

   e) Select the line, then select the *Active/Inactive* button. A green check mark should appear in the *New Status* column.

   f) Choose Start.

      The system will transfer your master data to the EWM system. You will get an Application Log request display. Respond with Yes. In the log display verify that all of the lines have a green signal on the left side of the display. Choose *Exit*.

   g) On the next screen you will get a message that the Activation is complete. Choose *Continue* then *Exit*.

5. In the EWM system, display the product master data for the materials.

   a)

Exercise 4: Create and update Warehouse Product Master

Exercise Objectives

After completing this exercise, you will be able to:

- Create and update the warehouse product master views for a product.
- Describe the types of data stored under the tabs in the warehouse product master.

Business Example

Although the ERP material master data for warehouse managed materials must be copied to the EWM system, you must create the warehouse product master views.

Task:

You will create the warehouse product master data for the two material master records (T-EW03-## and T-EW04-##) that you transferred via the CIF. In addition, you will make certain data settings as defined in the tables below.

Product::	**T-EW03-##**
Pilferable	**Yes**
Putaway Control Indicator	**0030**
Stock Removal Ind.	**PICK**
Stag Area/Door Det. Grp.	**BZT1**

Product::	**T-EW04-##**
Pilferable	**No**
Proc.Type Det. Ind.	**80**
Putaway Control Indicator	**0030**
Stock Removal Ind.	**PICK**
Stag Area/Door Det. Grp.	**BZT1**

1. Create and update the warehouse product master records for the two materials in the table above for warehouse **E100** and Party Entitled to dispose: **SPCW**.

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Solution 4: Create and update Warehouse Product Master

Task:

You will create the warehouse product master data for the two material master records (T-EW03-## and T-EW04-##) that you transferred via the CIF. In addition, you will make certain data settings as defined in the tables below.

Product::	**T-EW03-##**
Pilferable	**Yes**
Putaway Control Indicator	**0030**
Stock Removal Ind.	**PICK**
Stag Area/Door Det. Grp.	**BZT1**

Product::	**T-EW04-##**
Pilferable	**No**
Proc.Type Det. Ind.	**80**
Putaway Control Indicator	**0030**
Stock Removal Ind.	**PICK**
Stag Area/Door Det. Grp.	**BZT1**

1. Create and update the warehouse product master records for the two materials in the table above for warehouse **E100** and Party Entitled to dispose: **SPCW**.

   a) Go to *Extended Warehouse Management System → Master Data → Product → Maintain Warehouse Product*

   b) Enter a *Product Number, Warehouse* and *Party Entitled to Dispose*. Choose *Create*.

   c) Select the *Storage* tab. On this screen you will see the *Pilferable* check box. Set it based on the table specification above.

   d) Select the *Warehouse Data* tab. Enter the remaining settings from the table above in fields in this tab.

   e) Choose *Save*.

   f) Choose Exit .

Exercise 5: Manual Creation of Storage Bins

Exercise Objectives

After completing this exercise, you will be able to:

- Create storage bins in Extended Warehouse Management.

Business Example

You need to create a few new bins in the general storage area of your warehouse.

Task:

Create four new bins from the list below in storage type 0030 the general storage area. The bins are assigned to section 0001.

In the bin coordinate, aa = (30 + ##) .

0030-aa-01-01
0030-aa-01-02
0030-aa-01-03
0030-aa-01-04

1. Use the create storage bin transaction to create the bins. Block the bins for putaway.
2. Use the change bin transaction to unblock the four bins.
3. Use the mass change transaction to set the weight in the four new bins to 2000 KG.

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Solution 5: Manual Creation of Storage Bins

Task:

Create four new bins from the list below in storage type 0030 the general storage area. The bins are assigned to section 0001.

In the bin coordinate, aa = (30 + ##) .

0030-aa-01-01
0030-aa-01-02
0030-aa-01-03
0030-aa-01-04

1. Use the create storage bin transaction to create the bins. Block the bins for putaway.
   a) In the EWM system, choose*Extended Warehouse Management → Master Data → Storage Bin → Create Storage Bin*.
   b) Enter your warehouse, E100 and the storage bin from the table above. Choose *Enter.*
   c) Enter the storage type, 0030 and section 0001. Save your entry.
   d) From the menu bar, choose *Storage bin → Change*.
   e) In the *Status* box, select *Set Putaway Block*. Save your entry. Do not leave the screen.
   f) Choose Create .
   g) Repeat the process for the remaining bins. After the last bin is created, choose *Exit* .
2. Use the change bin transaction to unblock the four bins.
   a) In the EWM system, choose*Extended Warehouse Management → Master Data → Storage Bin → Change Storage Bin*.
   b) Enter the bin coordinate. Choose *Enter.*
   c) In the *Status* area select *Delete Putaway Block*. Choose *Save.*

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3. Use the mass change transaction to set the weight in the four new bins to 2000 KG.

   a) Go to *Extended Warehouse Management System → Master Data → Mass Change to Storage Bins*

   b) On the *Mass Change of Storage Bins in Warehouse E100* selection screen, enter your storage bin range in the *Storage Bin* selection fields.

   c) Choose *Execute* .

      Your four bins should display.

   d) Choose *Select All* .

   e) Select *Change Storage Bins*. In the *Change Storage Bins* dialog, enter the maximum weight. Choose *Enter*.

   f) Choose *Save*.

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Exercise 6: Review Location and Business Partner

Exercise Objectives

After completing this exercise, you will be able to:

- Display Location master data in the APO location master
- Display the corresponding business partner master data in EWM.

Business Example

For each location master replicated from the ERP system to the EWM system, a business partner record is created that can be used in the various EWM business processes.

Task:

Display the location master and business partner data for the customer, **T-E01A-00** and vendor, **EWM-VEND**. Document the following fields from the displays: partner name, postal code, city, zip and the location type.

Note: For each location master created from the CIF process, there will be a business partner master created for use in EWM. Settings must be made in business partner Customizing in the SCM system.

1. Using the APO location master, display the customer and vendor master data.
2. Display the Business Partner data for each master.

Solution 6: Review Location and Business Partner

Task:

Display the location master and business partner data for the customer, **T-E01A-00** and vendor, **EWM-VEND**. Document the following fields from the displays: partner name, postal code, city, zip and the location type.

Note: For each location master created from the CIF process, there will be a business partner master created for use in EWM. Settings must be made in business partner Customizing in the SCM system.

1. Using the APO location master, display the customer and vendor master data.
   a) From the SCM SAP Menu go to *Advanced Planning and Optimization* → *Master Data* → *Location* → *Location*
   b) In the *Location Master Data: Initial Screen*, enter the customer number in the *Location*. Choose *Display*.
   c) Choose the *Address* tab. Document the following fields:

Location Type	
Name	
Postal Code	
City	

   d) Choose *Back*.
   e) Enter the Vendor in *Location*. Choose *Display*.
   f) Choose the *Address* tab. Document the following fields:

Location Type	
Name	
Postal code	
City	

   g) Choose *Exit* twice.

Continued on next page

2. Display the Business Partner data for each master.

   a) Go to *Extended Warehouse management* → *Master Data* → *Maintain Business Partner*

   b) In the Maintain Business partner screen, under the *Find* column, enter/select the following:

Find	Select: **Business Partner**
By	Select: **Number**
BP Number	**T-E01A-00**

   c) Choose *Start* under the *Find* tab. The business partner will be displayed in the *Find* tab.

   d) Double-click on the displayed BP Number. The business partner data will be displayed on the right side of the screen. Verify the customer address data documented in the previous exercise step.

   e) Enter your vendor number, **EWM-VEND** in the *BP Number* field under the *Find* tab.

   f) Choose *Enter*.

   g) Double-click on the displayed BP Number. The business partner data will be displayed on the right side of the screen. Verify the vendor address data documented in the previous exercise step.

   h) Choose *Exit* .

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Exercise 7: Create Warehouse Resources

Exercise Objectives

After completing this exercise, you will be able to:

- Create warehouse resources that represent the workers in the warehouse.

Business Example

IDES, AG will be using RF devices in the warehouse. A resource must be created for each worker who will be using an RF device.

Task:

Create a resource (GR##) then assign your log on user name to the resource.

1. Create a resource in EWM master data.
2. Assign your user-id to your resource.
3. Test your settings by logging into the RF framework.

Solution 7: Create Warehouse Resources

Task:

Create a resource (GR##) then assign your log on user name to the resource.

1. Create a resource in EWM master data.

   a) In the SCM SAP menu go to *Extended Warehouse Management → Master Data → Resource Management → Maintain Resource*. Enter Warehouse **E100**. Choose *Continue*.

   b) Choose *Display->Change*.

   c) Choose *New Entries*.

   d) Create a new entry from the data in the table below.

Resource	GR##
Resource Type	RT01
Resource Group	RGAL
Default Presentation Device	PRES

   e) Choose *Save*.

   f) Choose *Exit*.

Continued on next page

2. Assign your user-id to your resource.
   a) Go to *Extended Warehouse Management → Master Data → Resource Management → Maintain Users*
   b) Switch to *Change* mode.
   c) Choose *New Entries*.
   d) Enter the data from the table below.

User	Enter your user-id.
Persn.Prof.	Select ** from the list.
Warehouse Number	E100
Resource	GR##
Auto Logon	Leave blank.

   e) Choose *Save*.
   f) Choose *Exit*.
3. Test your settings by logging into the RF framework.
   a) Go to and select *Extended Warehouse Management → Execution → Log On to RF Environment*.
   b) On the initial screen you should see the *Warehouse*, *Resource* and *Default Presentation Device* that you set up in resource management.
   c) Choose *Enter*. You should now see the main RF menu. Your resource settings are correct.
   d) Select function key **F1** to log off.
   e) On the next screen, with the *Reason* code, choose **F1** .

Lesson Summary

You should now be able to:

- Describe the master data that is required within the EWM system
- Outline the technique used to get the EWM required location and material master data from the ERP system to the EWM system.
- Create and maintain storage bins in EWM
- Outline the purpose of packaging specifications in EWM
- Create packaging specifications within EWM

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

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Unit Summary

You should now be able to:

- Describe the master data that is required within the EWM system
- Outline the technique used to get the EWM required location and material master data from the ERP system to the EWM system.
- Create and maintain storage bins in EWM
- Outline the purpose of packaging specifications in EWM
- Create packaging specifications within EWM

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Test Your Knowledge

1. The ______________________ is the organizational unit used to represent a work center in EWM.

   Fill in the blanks to complete the sentence.

2. Palletization of materials is specified through the use of a ____.

   Fill in the blanks to complete the sentence.

3. List three examples of EWM master data.

Storage bins
Warehouse product master
work center
packaging specifications

4. Material and location master data are transferred to the EWM system using what technique?

   Choose the correct answer(s).

   □ A BAPI
   □ B APO core interface
   □ C BAdI
   □ D IDoc

5. Examples of location-related data that is transferred from the SAP ERP system to the SAP EWM system are:

   Choose the correct answer(s).

   □ A Plants
   □ B Shipping points
   □ C Storage bins
   □ D Customer Master
   □ E Vendor Master

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6. What technique is used to transfer transaction related data to EWM?

   Choose the correct answer(s).

   □ A BAPI
   □ B BAdI
   □ C APO Core Interface
   □ D Qrfc

7. In what system is the APO core interface model created to transfer master data?

   Choose the correct answer(s).

   □ A SAP ERP
   □ B SAP SCM APO
   □ C Either the SAP ERP or the SAP SCM system.
   □ D EWM system

8. Each location master is identified in the SAP SCM system by the ______________________________.

   Fill in the blanks to complete the sentence.

9. What organizational units must be assigned to each warehouse product master record?

   Choose the correct answer(s).

   □ A Plant
   □ B Party Entitiled to Dispose
   □ C Storage location
   □ D EWM warehouse number
   □ E Shipping point

10. Select the statements below that are accurate characteristics of EWM storage bin master data.

    Choose the correct answer(s).

    □ A They are identified by a 10 character bin coordinate.
    □ B They are identified by an 18 character bin coordinate.
    □ C The bin coordinate must be unique within the warehouse.
    □ D Bins can have geo-coordinates that the EWm system can use to compute travel distances.
    □ E The bin coordinate must be unique within the storage type.

11. What master data must be created in EWM to perform automatic packing?

    Choose the correct answer(s).

    - ☐ A Packing instruction
    - ☐ B Master packing format
    - ☐ C Automatic packing document
    - ☐ D Packaging specification

12. A warehouse employee or equipment is represented in EWM as a

    ____

    Fill in the blanks to complete the sentence.

Answers

1. The Storage Type is the organizational unit used to represent a work center in EWM.

   Answer: Storage Type

2. Palletization of materials is specified through the use of a packaging specifications.

   Answer: packaging specifications

   A packaging specification must be used to indication how materials are palletized.

3. List three examples of EWM master data.

Storage bins
Warehouse product master
work center
packaging specifications

4. Material and location master data are transferred to the EWM system using what technique?

   Answer: B

   One or more APO integration models can be used to select and transfer SAP ERP master data to the EWM system.

5. Examples of location-related data that is transferred from the SAP ERP system to the SAP EWM system are:

   Answer: A, B, D, E

   ERP related master data must be transferred to the EWM system. ERP master data should never be created as stand-alone master data in EWM.

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6. What technique is used to transfer transaction related data to EWM?

   Answer: B

   All EWM related transaction data from delivery documents are transferred using the BAdI technology.

7. In what system is the APO core interface model created to transfer master data?

   Answer: A

   The APO CIF models are always created in the SAP ERP system.

8. Each location master is identified in the SAP SCM system by the location type code.

   Answer: location type code

   Each location master record is identified with a predefined four character location type code that identifies the type of master data (plant, shipping point, customer, vendor, etc.)

9. What organizational units must be assigned to each warehouse product master record?

   Answer: B, D

   All warehouse product master records must have these two organizational units assigned to them. A warehouse product master can be assigned to more than one EWM warehouse number.

10. Select the statements below that are accurate characteristics of EWM storage bin master data.

    Answer: B, C, D

    Storage bins are the physical locations where product quantities are stored in the warehouse.

11. What master data must be created in EWM to perform automatic packing?

    Answer: D

    Packaging specifications are always required for processes in which handling units are to be created automatically. In addition, packaging specifications are always required in value-added service orders.

12. A warehouse employee or equipment is represented in EWM as a <u>resource.</u>

    Answer: resource.

    A resource is an entity representing a user or equipment which can execute work in the EWM warehouse.

Unit 4

Warehouse Monitor and RF Framework

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Unit Overview

In this unit we will cover two topics. In the first topic we will cover the central monitoring tool in Extended Warehouse Management: the Warehouse Monitor. In the second topic the RF Framework will be presented. The RF Framework is the function within EWM that supports the use of mobile data entry devices in the warehouse.

The Warehouse Monitor can be used to display virtually any type of EWM data. It can be used to display stock balances as well as document related displays. In the coverage of the Warehouse Monitor we will also learn how to use it to create, process and confirm various warehouse documents.

In the lesson on RF Framework, you will learn how to navigate the menu structure and how to use the function to perform various warehouse transaction. Also covered in this lesson will be the basic technique used to modify the RF Framework.

Unit Objectives

After completing this unit, you will be able to:

- Understand the basic functions provided by the Warehouse Monitor
- Describe the layout of the Warehouse Monitor and the various display options
- Navigate within the Monitor and display storage bin, document and process data.
- Create variants for monitoring specific objects
- Describe the Easy Graphics Framework
- Explain the use of the Warehouse Cockpit
- Describe the EWM RF Framework.
- Logon to the RF environment and perform basic navigation
- Explain the EWM Exception Code and its use.
- Understand the process for modifying the menu and screen structures in the RF Framework

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Unit Contents

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Lesson: Warehouse Monitor, Easy Graphics Framework and Warehouse Cockpit

Lesson Overview

One of the most important tools in Extended Warehouse Management is the Warehouse Monitor. In addition to its monitoring capabilities it can be used to execute work in EWM. In this lesson you will learn the fundamentals of the Warehouse Monitor and how to use it. In addition, a basic overview of the Easy Graphics Framework and Warehouse cockpit will be covered.

Lesson Objectives

After completing this lesson, you will be able to:

- Understand the basic functions provided by the Warehouse Monitor
- Describe the layout of the Warehouse Monitor and the various display options
- Navigate within the Monitor and display storage bin, document and process data.
- Create variants for monitoring specific objects
- Describe the Easy Graphics Framework
- Explain the use of the Warehouse Cockpit

Business Example

As activities are being carried out in the warehouse, the Warehouse Monitor provides a way for warehouse supervisory personnel to monitor the tasks and, if necessary, take corrective action. The warehouse monitor is the central display tool for the Extended Warehouse Management system and will be used by warehouse personnel in the execution of their jobs.

Warehouse Monitor Basics

[The EWM Warehouse Monitor is a central tool for keeping warehouse managers constantly up-to-date as to the current situation in the warehouse, and to enable them to initiate appropriate responses in light of this situation. The warehouse monitor also contains alert monitoring capabilities, which highlight to warehouse managers to actual and potential problematic situations in the warehouse, and provide exception handling tools to assist in the correction of these situations. Highly customizable and extendable (Custom nodes and even complete custom monitors are possible). The following figure illustrates the basic screen layout of the Monitor.

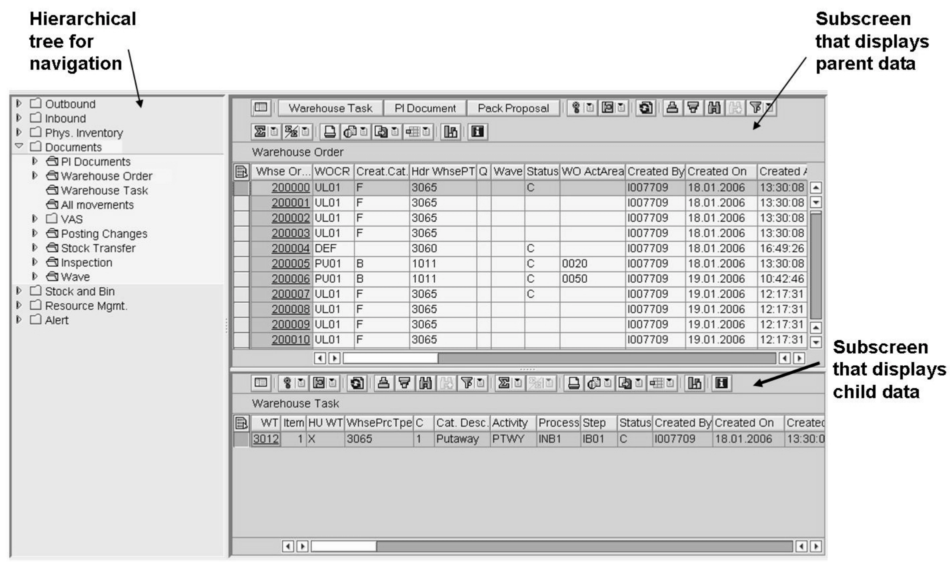


Figure 32: Warehouse Monitor Display

The warehouse Monitor screen is divided into three sections. On the left side is the **node hierarchy tree**. The node hierarchy tree contains all of the predefined nodes representing different object classes. The tree is used solely for navigation purposes. You can use the hierarchy tree to display in the upper view area object information for a specific node, based on selection criteria. The warehouse monitor contains nodes for object classes relating to the following:

- **Documents** such as warehouse requests (WR's), warehouse orders (WO's), warehouse tasks (WT's), and physical inventory documents
- **Processes** such as stock and bin, and resource management
- **Alerts** such as overdue waves or overdue deliveries without goods issue/goods receipt

The upper right side of the warehouse monitor screen is where “parent ”data is displayed. The lower portion of the right-hand side of the screen is where “child” data is displayed. After displaying in the upper view area object information for a node, you can drill down and display the object information for its lower-level nodes (the “child” area), via designated pushbuttons. You can similarly drill down to the lower-level nodes from the lower view area. In the figure below an example shows a display of resource management queue data.

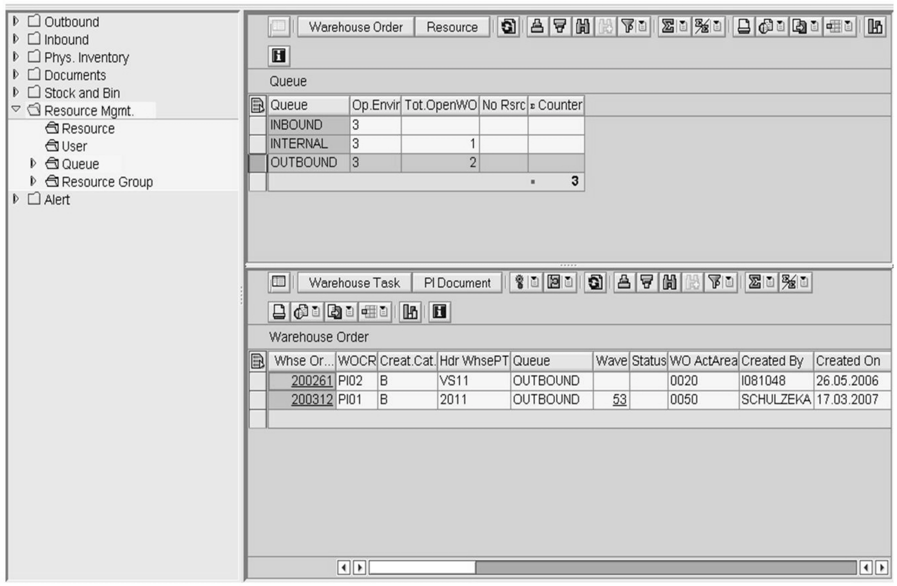
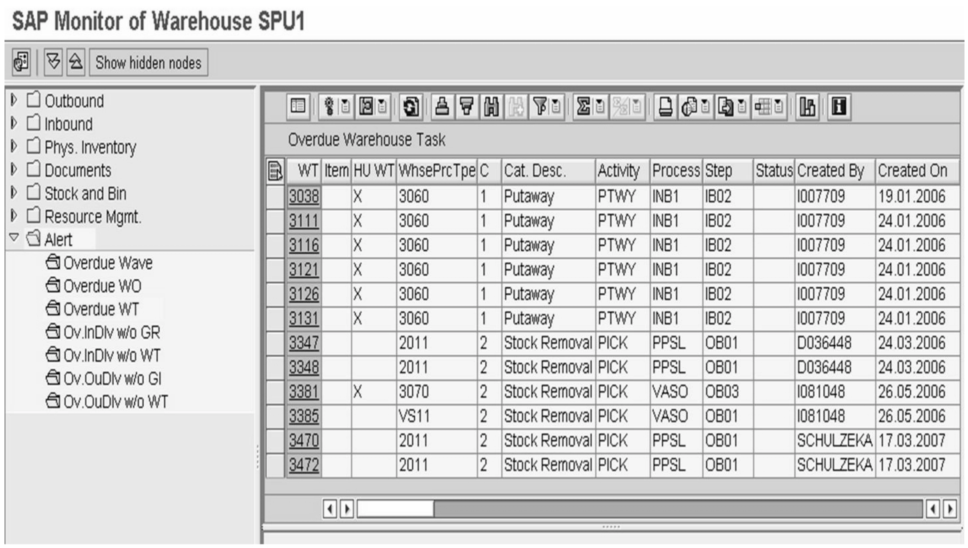


Figure 33: Warehouse Monitor: Parent and Child Example

In the upper right-hand display the number of warehouse orders for each queue is displayed. The lower portion of the right-hand side shows the warehouse orders for the selected queue.

By default, object information is displayed as a list view. The list view is displayed in an **ALV grid**, and offers all standard ALV functionality, including sorting, filtering and printing. You also have the option of toggling to **form view** for a selected object. The form view provides a focused view of the object, and provides more detailed information than the list view. The form view is displayed in an HTML viewer.

There are different ways to be notified about alert situations: there are **Alert Nodes** in the Warehouse Monitor and there are Alerts in the SCM Alert Monitor.



WT	Item	HU WT	WhsePrcTpe	C	Cat. Desc.	Activity	Process	Step	Status	Created By	Created On
3038		X	3060	1	Putaway	PTWY	INB1	IB02		I007709	19.01.2006
3111		X	3060	1	Putaway	PTWY	INB1	IB02		I007709	24.01.2006
3116		X	3060	1	Putaway	PTWY	INB1	IB02		I007709	24.01.2006
3121		X	3060	1	Putaway	PTWY	INB1	IB02		I007709	24.01.2006
3126		X	3060	1	Putaway	PTWY	INB1	IB02		I007709	24.01.2006
3131		X	3060	1	Putaway	PTWY	INB1	IB02		I007709	24.01.2006
3347			2011	2	Stock Removal	PICK	PPSL	OB01		D036448	24.03.2006
3348			2011	2	Stock Removal	PICK	PPSL	OB01		D036448	24.03.2006
3381		X	3070	2	Stock Removal	PICK	VASO	OB03		I081048	26.05.2006
3385			VS11	2	Stock Removal	PICK	VASO	OB01		I081048	26.05.2006
3470			2011	2	Stock Removal	PICK	PPSL	OB01		SCHULZEKA	17.03.2007
3472			2011	2	Stock Removal	PICK	PPSL	OB01		SCHULZEKA	17.03.2007

Figure 34: Alert Monitoring

In the figure above the Alert Node is open and a display of warehouse tasks that have not been completed within a certain time are shown on the right side of the monitor. The time parameter used to select an object is set by right-clicking on the alert node on the left side of the screen.

Another common use of the Warehouse Monitor is to display stock balances. Physical and available stocks can be displayed using a variety of selection parameters from the Stock and Bin node. From the Warehouse Monitor stocks are visible:

- in storage bins - capacity checks are also available for warehouse doors and staging areas
- on resources - forklift, pick HU's
- in transportation units (TU's) that are in the yard
- and in the Differences Analyzer in physical inventory processing

In the following graphic you can see an example of a stock display in the Warehouse Monitor.

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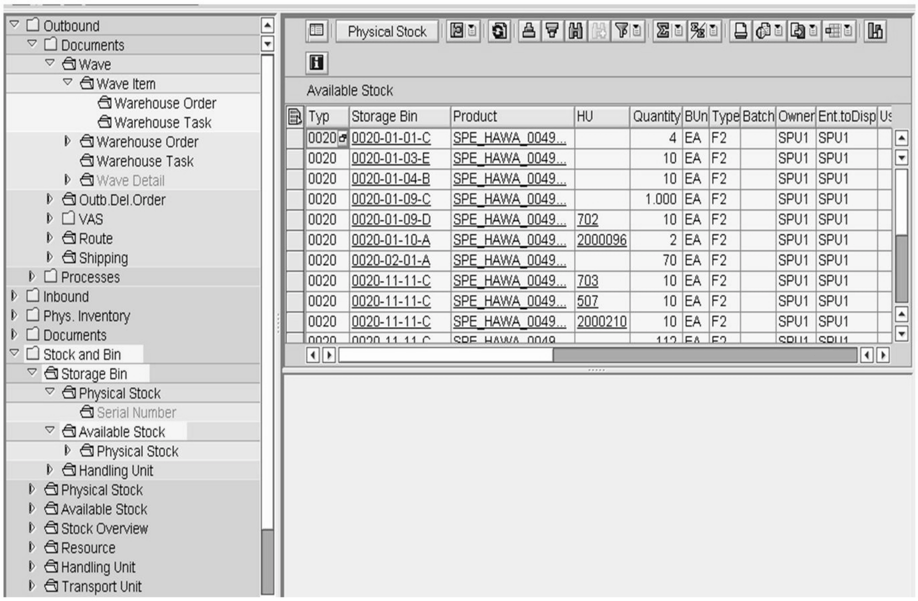


Figure 35: Stock Visibility

You can use the standard SAP Warehouse Monitor or you can create your own monitor in Customizing. If you use the standard SAP monitor, you can tailor it to your needs by either creating variants for the standard nodes, or creating new variant nodes, based on the standard nodes. Creating **variants** for the standard nodes enables you to use predefined selection criteria while running a session of the monitor. The variant-node assignments are lost when you close the monitor session unless you save them. Creating **variant nodes** enables you to create your own nodes, which are based on the standard nodes, but with specific selection criteria, or with a specific layout. Variant nodes are always available when the user utilizes the monitor.

Easy Graphics Framework

In the EWM 2007 release SAP introduced the Easy Graphics Framework. The Easy Graphics Framework (EGF) is a generic tool that you can use for the simple configuration of cockpits for applications such as Extended Warehouse Management (EWM), which you can use in addition to text-based monitors to display your data graphically. Multiple users can work with the EGF cockpit at the same time.

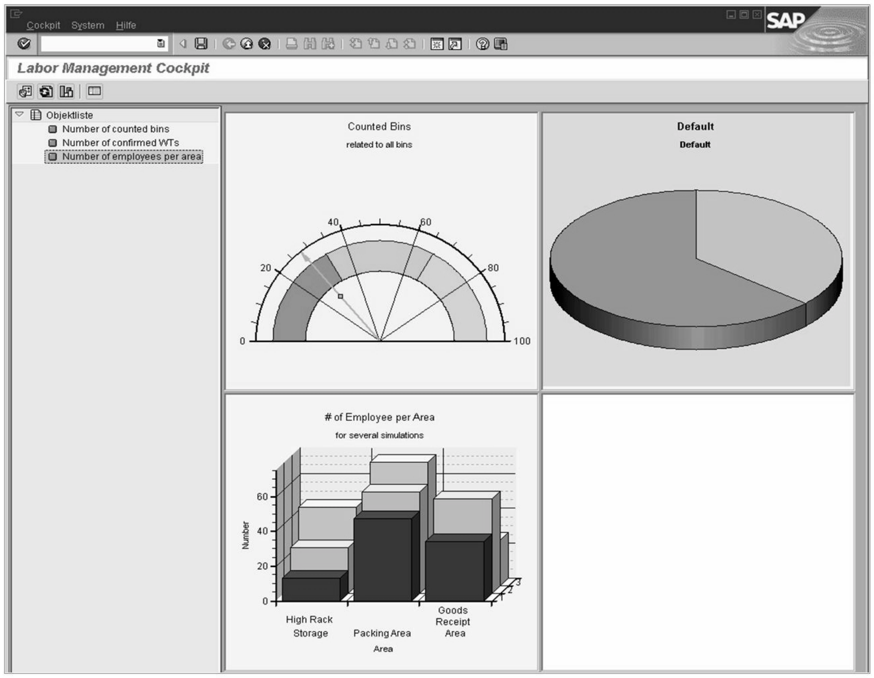


Figure 36: Warehouse Cockpit

Illustrated above is the **Warehouse Cockpit** created for the EWM Labor Management application. It is Intended for use by warehouse supervisory personnel to monitor team performance and the performance of certain warehouse areas or the whole warehouse. The warehouse cockpit provides at-a-glance views of several key figures that enables you to react to critical situations quickly

Exercise 8: Warehouse Monitor and Warehouse Cockpit

Exercise Objectives

After completing this exercise, you will be able to:

- Use the warehouse monitor to display EWM document data
- Display stock balances using the warehouse monitor
- Create variants in the warehouse monitor
- Describe the basic use of the warehouse cockpit.

Business Example

IDES, AG will use the warehouse monitor to display and manage EWM documents in the inbound, outbound and internal processes. It will also be used to provide stock overview information on the warehouse inventory.

The warehouse cockpit will be used to provide management planning and execution data in a graphical format.

Task 1:

Use the warehouse monitor to display the inbound notifications and related warehouse tasks. You will also use it to check stock for your products T-EW01-## and T-EW02-##. To make the lookup of stock balance for these products easier you will create a selection variant.

1. Display the inbound delivery documents currently in the system that are partially completed. Select one of the documents and display the associated warehouse task (s). From the warehouse task document the following:

Warehouse Process Type	
Source Location	
Destination Location	
Status	

2. Find the stock balance for the following products: T-EW01-## and T-EW02-##. Enter the balances in the table below.

Continued on next page

Product	Stock Balance
T-EW01-##	
T-EW02-##	

3. Personalize the monitor by creating a variant so that you do not have to enter the products each time you want to check their stock balances.
4. You can hide and show nodes. Hide the *Available Stock* node and then un-hide it.
5. Remove your variant node.
6. Review the alerts that can be provided by the Warehouse Monitor.

Task 2:

Use the Warehouse Cockpit to display a pre-configured graphical display of door assignment statistics.

1. Display the Door Assignment performance charts.

Solution 8: Warehouse Monitor and Warehouse Cockpit

Task 1:

Use the warehouse monitor to display the inbound notifications and related warehouse tasks. You will also use it to check stock for your products T-EW01-## and T-EW02-##. To make the lookup of stock balance for these products easier you will create a selection variant.

1. Display the inbound delivery documents currently in the system that are partially completed. Select one of the documents and display the associated warehouse task (s). From the warehouse task document the following:

Warehouse Process Type	
Source Location	
Destination Location	
Status	

   a) Go to and select *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.

   If a dialog appears, enter **E100** in the *Warehouse number* and select 'SAP' from the *Monitor* list, then select *Execute*.

   b) In the Warehouse Management monitor screen, from the hierarchy tree on the left side, open the *Inbound* node, then the *Documents* node.

   Right-click on the Inbound Delivery node. A selection variant will appear. Enter **2** (partially complete) in the *Warehouse Activity Status.*. Choose *Execute*.

   c) A list of partially completed inbound deliveries will appear in the parent window on the upper right side of the screen.

   Select one of the delivery documents by selecting the button to the left of the *Locked* column. Now, select the *Warehouse Task* button at the top of the parent window. The corresponding warehouse task will be displayed in a child window in the lower right portion of the screen.

   d) Use the scroll bar at the bottom of the task screen to find and document the fields in the table above.

Continued on next page

2. Find the stock balance for the following products: T-EW01-## and T-EW02-##. Enter the balances in the table below.

Product	Stock Balance
T-EW01-##	
T-EW02-##	

a) Open the node *Stock and Bin* → *Available Stock*

b) Double-click on the *Available Stock* node.

c) The Available Stock selection dialog will appear. Choose the *Product* Multiple Selection.

Enter your two materials in the list. Choose *Copy*. Now, choose *Execute*.

The system will display the stocks for the two products. Record the balances in the table above.

Continued on next page

3. Personalize the monitor by creating a variant so that you do not have to enter the products each time you want to check their stock balances.

   a) Right-click on the *Available Stock* node. Select *Create Variant Node for Current Level*. Enter the data from the following table in the dialog.

Text	**Node for Group ##**
Presentation Text	**GR##**

   Choose *Create Variant Node*. Your node will be added to the hierarchy structure.

   b) Double-click on your variant node. You will get a selection screen. Choose the product *Multiple Selection*

   and enter your two products in the selection list. Choose *Copy*. You will return to the selection screen.

   c) Choose *Save as Variant*. On the *Variant Attributes* screen, enter a *Variant Name* **GR##-V** and a *Meaning*: **Products**. Choose *Save*. You are now returned to the selection screen.

   d) Choose *Execute* on the selection screen.

   e) Right-click on your variant node, GR##. Choose *Assign Selection Variant.*

   Select your variant, **GR##**. Choose *Enter*.

   f) Exit from the Monitor and re-enter. Open the node *Stock and Bin* → *Available Stock*. Select your variant node directly and you should see the stock balances of your products.

4. You can hide and show nodes. Hide the *Available Stock* node and then un-hide it.

   a) Right-click on the *Available Stock* node. Select *Hide Node*.

   b) To see hidden nodes, select *Show Hidden Nodes* at the top of the navigation pane.

5. Remove your variant node.

   a) Right-click on your node and choose *Remove Node*.

6. Review the alerts that can be provided by the Warehouse Monitor.

   a) In the monitor open the *Alerts* node.

   b) Double-click on *Overdue Wave*. You can use the selection variant to determine over due waves. You can also create variants for the alerts.

Continued on next page

Task 2:

Use the Warehouse Cockpit to display a pre-configured graphical display of door assignment statistics.

1. Display the Door Assignment performance charts.

   a) Go to the Warehouse Cockpit by selecting *Extended Warehouse Management → Monitoring → Warehouse Cockpit*

   b) In the selection dialog choose: **Demo_cockpit**. Choose *Continue*.

   c) Double-click on **Demo-Door Assignment** in the *Object List*.

   d) The door assignment performance chart will display.

   e) Double-click on the chart to see a second chart that displays planned vs. actual door times over a period of days.

   f) Choose Exit

Lesson Summary

You should now be able to:

- Understand the basic functions provided by the Warehouse Monitor
- Describe the layout of the Warehouse Monitor and the various display options
- Navigate within the Monitor and display storage bin, document and process data.
- Create variants for monitoring specific objects
- Describe the Easy Graphics Framework
- Explain the use of the Warehouse Cockpit

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: RF Framework

Lesson Overview

Although the various EWM warehouse processes can be carried out using either the Warehouse Monitor or various transactions, in reality, warehouse resources will be using RF mobile data entry equipment in executing their work. In this lesson we will review the basic functions and use of the EWM RF Framework.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the EWM RF Framework.
- Logon to the RF environment and perform basic navigation
- Explain the EWM Exception Code and its use.
- Understand the process for modifying the menu and screen structures in the RF Framework

Business Example

A key task in implementing Extended Warehouse Management is setting up the RF environment and training the warehouse personnel on its use. To begin this process the project team personnel needs to understand the underlying concepts and basic navigation of the RF environment.

The RF Framework

Extended Warehouse Management (EWM) includes the implementation of a radio frequency (RF) framework satisfying the following objectives:

- Supports a large variety of device sizes, device types, and data entry types
- Provides appropriate forms of data presentation according to application data, device capabilities, and user preferences
- Calls appropriate services according to resource inputs (such as verification/input data, keystroke, or logon request)
- Enables personalized menus and screens
- Enables flexible and user-friendly screen and flow logic generation and modification by providing an RF framework, greater efficiency and fast, error-free data communication can be attained in the warehouse, through the use of mobile RF devices.

The RF framework supports both GUI and character-based devices, as well as browser-based devices. GUI (MS Windows-based) devices are connected to the SAP System just like any other client-dependent PC. The screens can be touch screens, using predefined pushbuttons, or they can be operated using a keyboard. If you are using touch screens, you simply "touch" the appropriate positions on the touch screen instead of clicking with the mouse on a pushbutton.

Character-based devices are linked to the system through SAPConsole. SAPConsole operates on a Windows NT/Windows 2000/XP platform and interacts with the RF terminals connected to it. This concept is currently supported by the leading providers of RF terminals. The system uses the ITSMobile for connecting browser-based or Windows CE devices. ITSMobile replaces the previous graphical interface WebSAPConsole. WebSAPConsole will no longer be functional beginning with NetWeaver 7.1.

All screen forms use a common format as illustrated below.

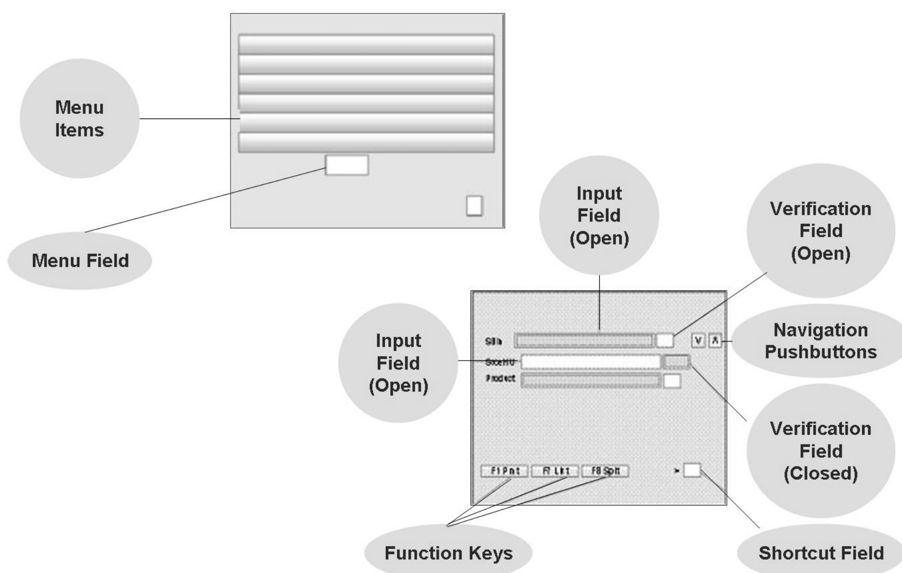


Figure 37: Basic Screen layouts

The RF framework supports the use of bar codes for identification and verification purposes. SAP currently supports EAN 128 bar code types, but you can also support other types within the RF framework through customizing in the Mobile Data Entry activity.

Using the RF screen manager, you can customize the appearance of RF presentation screens, so as to ensure that they are consistent with the attributes of the presentation devices being used. Although SAP provides a standard menu and menu hierarchy, you can also define your own menus and menu hierarchy for the RF device transactions using the RF Menu Manager.

The SAP RF framework provides standard RF functionalities, including the following:

- Logon and Logoff
- Recovery
- Work execution transactions for the following warehouse processes:
  - Picking
  - Putaway
  - Loading
  - Unloading
  - Deconsolidation
  - Packing
  - Physical Inventory
  - Replenishment

In the basic navigation within the RF Framework, SAP provides various functions that are triggered through the use of function keys. The **standard function keys** that are pre-configured by SAP are as follows:

Function	Function Key	Description
More	F5	Displays the next pushbuttons in the sequence (in case of more than four push pushbuttons for a screen).
Clear	F6	Clears a selected input field, or all input fields.

Back	F7	Returns to previous screen/step.
List	F8	Displays the list screen (showing the possible input values) for a selected field.
Full Message	F9	Displays the full message on a separate screen

The standard function keys can be changed in EWM Mobile Data Entry customizing. Transaction-specific function keys are displayed in the function key line. If more than four function keys/pushbuttons exist for a screen, “>” is displayed, and you can then choose the F5 function key to display the other pushbuttons.

The logon process begins with the execution of the EWM transaction /SCWM/RFUI. The logon user-id must be a registered SAP system user and be assigned to a resource in EWM master data.

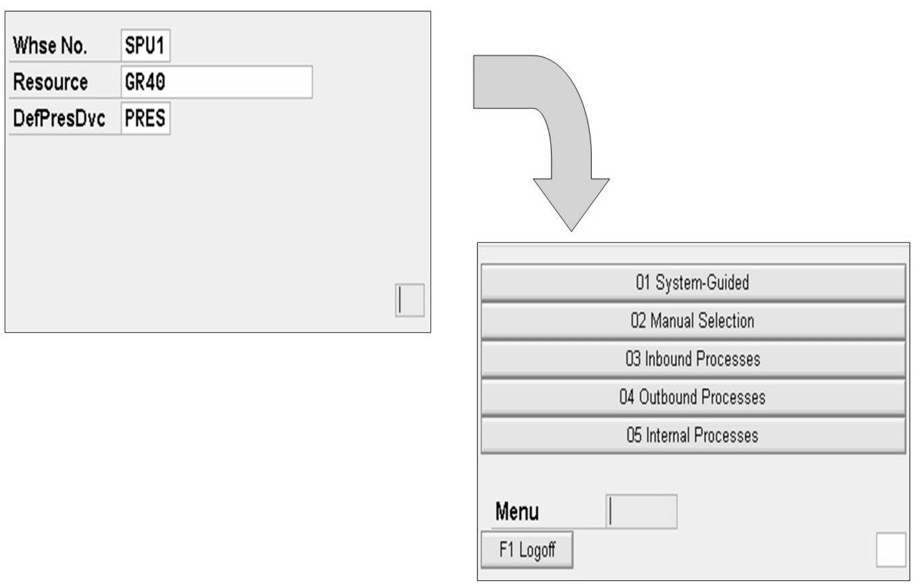


Figure 38: RF environment

After the user is confirmed by the system, the main menu is displayed. Logon to the RF environment enables the tracking of resources, stock on resources, and warehouse order (WO) selection. After logging on to the system, a resource can operate as an active resource, which can request and execute work in the warehouse. From the RF menu structure, you can navigate to the desired transaction. Navigation is done by entering the menu / entry number and pressing ENTER. For example: to select menu entry "Outbound Processes" enter 4 or 04 for the "Menu" entry field. In the" Menu" entry field you can also enter the whole menu path. For example: 331 - to start the transaction *Inbound process → Putaway → Putaway By HU* .

Normally the transaction should work without any manual input. The data entry is done by barcode scanning including an automatic ENTER. After all input fields are filled the posting (e.g. warehouse task confirmation) is automatically triggered. Use ENTER after you enter values manually. The "shortcut" field to enter exceptions or a function key. Depicted below are the entry fields that are present on most RF transactions.

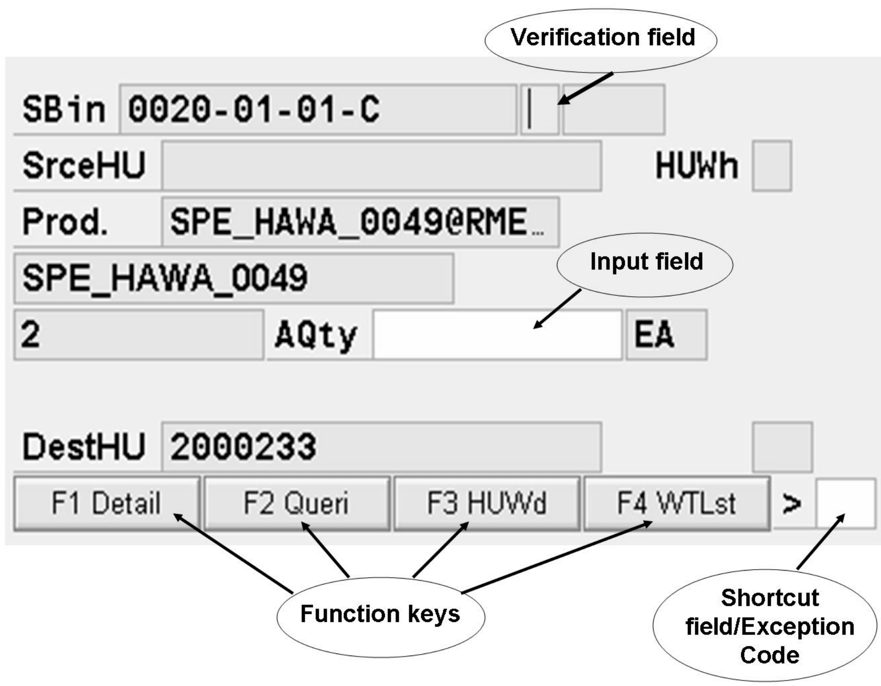


Figure 39: Data Entry Fields in RF

In the following Figure, a typical RF navigation sequence is shown. In this example, a putaway task is to be processed by the warehouse resource.

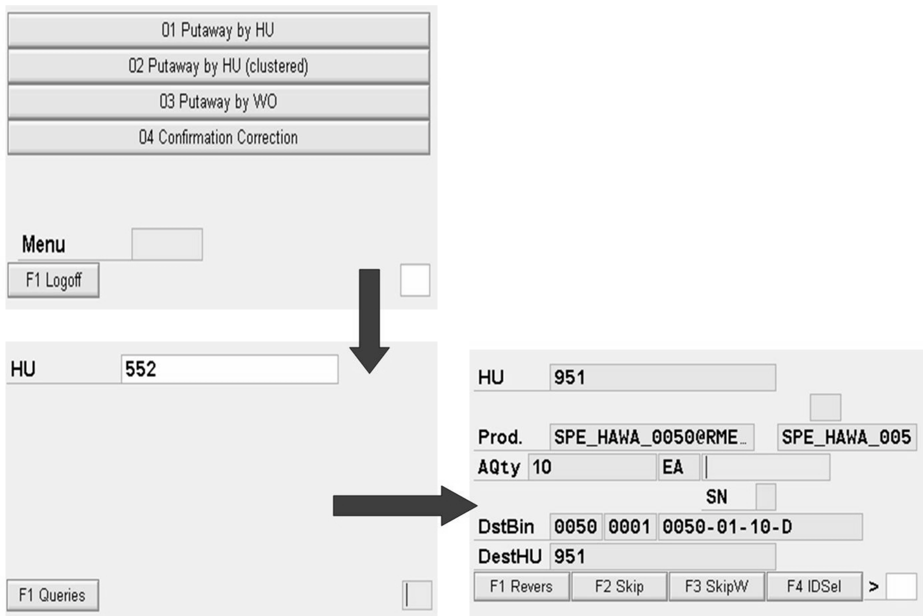
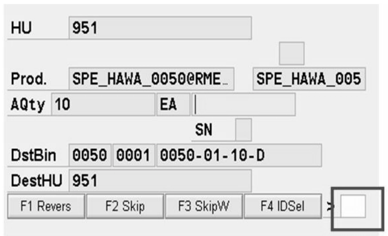


Figure 40: Example: Putaway by HU sequence

In Extended Warehouse Management (EWM), you use **exception codes** to describe exception situations in the warehouse. You can define exception codes for different document types, (such as for inbound deliveries or outbound deliveries), product shortages during goods receipt, product shortages during picking (pick denial) and other warehouse situations where processing abnormalities can exist.

Combined with the exception code processing is the **exception handler service** that can be configured to create corrective tasks, generate alerts and/or record the exception for reporting purposes. Exception codes can be reported in the desktop user interface or in the RF User interface. In the following figure, the location of the exception code entry field is shown for both interfaces.

RF User Interfaces:



Desktop User Interfaces:

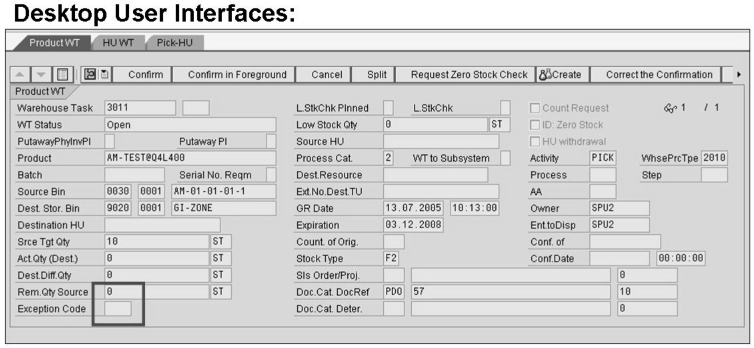


Figure 41: Exception Code Entry

An example in the use of exception code is as follows:

A warehouse task and subsequent warehouse order is created for picking a product based on an outbound delivery order. The warehouse task calls for picking 10 pieces of the material but when the designated storage bin is located, there is no stock (pick denial). Based on the Exception Code entered, the exception code could be configured to:

- Create a bin replenishment and/or
- Generate a workflow process to create e-mail notifications and/or
- Direct the picker to another bin location for the product and/or
- Accept the pick denial and proceed to the next product pick task and/or

The EWM system can be customized to react to an exception code depending on the resource. For example, during pick denial processing outlined above, an experienced warehouse resource might be directed to replenish the bin, then complete the pick; whereas, an inexperienced warehouse resource might be directed to move to the next warehouse task.

Exercise 9: RF Framework

Exercise Objectives

After completing this exercise, you will be able to:

- Log on to the RF Environment and navigate using the RF menu structure.
- Perform a stock overview using the RF environment.

Business Example

The RF framework will be used to perform tasks in the EWM warehouse.

Task:

Log on to the RF environment and display the stock balances for products T-EW01-## and T-EW02-##.

1. Log on to the RF Environment and find the stock balances of **T-EW01-##** and **T-EW02-##.**

   Use the following function keys in RF:

Function Key	Action
F5	More (display next pushbutton seq.)
F6	Clear (Clear input fields)
F7	Back (Returns to previous screen)
F8	List (Display possible data for field)
F9	Full message (Display message on separate screen)

Solution 9: RF Framework

Task:

Log on to the RF environment and display the stock balances for products T-EW01-## and T-EW02-##.

1. Log on to the RF Environment and find the stock balances of **T-EW01-##** and **T-EW02-##.**

   Use the following function keys in RF:

Function Key	Action
F5	More (display next pushbutton seq.)
F6	Clear (Clear input fields)

Continued on next page

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F7	Back (Returns to previous screen)
F8	List (Display possible data for field)
F9	Full message (Display message on separate screen)

a) Go to and choose *Extended Warehouse Management* → *Execution* → *Log On to RF Environment*.

b) On the first RF screen, Choose *Enter*. The RF main menu will be displayed.

c) Enter **5** (Internal Processes) in *Menu* field. Choose *Enter*.

d) Enter **3** (Queries) in the *Menu* field. Choose *Enter*.

e) Enter **2** (Stock/Bin Query) in the *Menu* field. Choose *Enter*.

f) Enter **2** (Stock / Bin Query Product) in the *Menu* field. Choose *Enter*.

g) Enter one of your product numbers in *Prod.* . Choose *Enter* twice. The bin stock will be displayed. Record the balance below.

Product	Quantity
T-EW01-##	
T-EW02-##	

h) Press the **F7** function key until you return to the *Prod.* screen. Enter your second product number and display the stock balance. Record the quantity in the table above.

i) Press the **F7** function key until you return to the RF main menu.

j) Enter **5322** in the *Menu* field. Choose *Enter*.

You are now positioned directly on the product query screen without having to navigate through each menu. I f you wish you can repeat the product queries.

k) Press the **F7** function key until you return to the RF main menu. Press **F1** to log off. Press **F1** again to exit RF.

Lesson Summary

You should now be able to:

- Describe the EWM RF Framework.
- Logon to the RF environment and perform basic navigation
- Explain the EWM Exception Code and its use.
- Understand the process for modifying the menu and screen structures in the RF Framework

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Unit Summary

You should now be able to:

- Understand the basic functions provided by the Warehouse Monitor
- Describe the layout of the Warehouse Monitor and the various display options
- Navigate within the Monitor and display storage bin, document and process data.
- Create variants for monitoring specific objects
- Describe the Easy Graphics Framework
- Explain the use of the Warehouse Cockpit
- Describe the EWM RF Framework.
- Logon to the RF environment and perform basic navigation
- Explain the EWM Exception Code and its use.
- Understand the process for modifying the menu and screen structures in the RF Framework

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Test Your Knowledge

1. How many screen sections make up the warehouse monitor display?

   Choose the correct answer(s).

   □ A two
   □ B three
   □ C four
   □ D one

2. What types of EWM data can be displayed using the warehouse monitor?

   Choose the correct answer(s).

   □ A Warehouse product master data
   □ B EWM documents
   □ C Process related data
   □ D Alerts
   □ E EWM location master data
   □ F EWM storage bin data

3. The _________________ provides detailed view of an object.

   Fill in the blanks to complete the sentence.

4. Which of the following tools can you use to display the stock balance of a product in storage bins?

   Choose the correct answer(s).

   □ A Easy Graphics Framework (EGF)
   □ B Warehouse Monitor
   □ C Stock Overview report
   □ D RF Framework
   □ E Warehouse cockpit

5. The Warehouse Cockpit was created as a tool for what EWM application?

   Choose the correct answer(s).

   □ A Slotting
   □ B Physical Inventory
   □ C Labor Management
   □ D Quality Inspection engine

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Answers

1. How many screen sections make up the warehouse monitor display?

   Answer: B

   The warehouse monitor screen display is divided into three sections.

2. What types of EWM data can be displayed using the warehouse monitor?

   Answer: B, C, D, F

   The warehouse monitor does not provide a display of warehouse product or location master data.

3. The form view provides detailed view of an object.

   Answer: form view

   The form view allows a detailed display of an object in a window styled display.

4. Which of the following tools can you use to display the stock balance of a product in storage bins?

   Answer: B, D

   The EGF and the Warehouse Cockpit are used to display graphical representations of EWM data.

5. The Warehouse Cockpit was created as a tool for what EWM application?

   Answer: C

   The Warehouse cockpit was created to display performance summary data for Labor Management although it can be configured to display other EWM data.

Unit 5

Goods Receipt Process

Unit Overview

The overall goods receipt process in an EWM-managed environment will be presented in this unit. In addition to the process coverage, the various documents that are required will covered as well. It is in this unit that the use of the delivery document as the central process input to EWM will be explored. Within the EWM environment, the concept and use of process and layout-oriented storage control will also be presented as part of the goods receipt process.

Unit Objectives

After completing this unit, you will be able to:

- Describe the goods receipt process flow between the ERP system and the EWM system.
- Outline the use of the inbound delivery document in the goods receipt process.
- Name the EWM documents used to facilitate the physical putaway movements in the warehouse.
- Describe the characteristics of the delivery documents used in EWM inbound delivery processing.
- Explain the use of the warehouse task document in the goods receipt process.
- Understand the difference between a product task and an HU task in EWM.
- Create inbound notification and inbound delivery documents in EWM.
- Create warehouse task and warehouse order documents.
- Outline the three basic methods used to direct goods movements in EWM.
- Define the basic putaway functions supported in EWM.
- Describe process-oriented storage control
- Explain layout-oriented storage control and give examples of when it would be appropriate to use it.
- Understand the use of the expected goods receipts processes in receiving from purchase orders and production orders

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- Describe the use of the Notification of Expected Goods Receipt and Expected Goods Receipt documents.
- Generate and Delete Expected Goods Receipts.
- Generate Inbound Delivery documents from Expected Goods Receipt documents.
- Describe the benefits and use of the QIE.
- Understand the underlying data model used by QIE.
- Explain the counting process used as a quality management function within EWM.
- Understand the basic concepts of RFID technology.
- Describe the basic architecture of an SAP Auto-ID infrastructure coupled with EWM.
- Explain how RFID tagged products can be received into EWM.
- Define the terms "slotting" and "rearrangement".
- Describe the slotting and rearrangement processes.
- Perform slotting and rearrangement in the EWM system.

Unit Contents

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Lesson: Goods Receipt Processing Using EWM

Lesson Overview

In this lesson the overall goods receipt process using an SAP ERP system and a Extended Warehouse Management (EWM) system will be presented. This lesson will serve as an introduction to the overall goods receipt process flow, the delivery documents used in the process in both the ERP system and the EWM system and the EWM-related processing documents.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the goods receipt process flow between the ERP system and the EWM system.
- Outline the use of the inbound delivery document in the goods receipt process.
- Name the EWM documents used to facilitate the physical putaway movements in the warehouse.

Business Example

IDES, AG is implementing EWM and procures materials from vendors. The goods receipt process will be performed using inbound deliveries created in the ERP system.

Goods Receipt with Inbound Deliveries

A key part of the external procurement process, the goods receipt process normally begins in the ERP system when either an inbound delivery is created from the purchase order, or an advanced shipping notification (ASN) is received from the vendor and is converted in the EDI process into an inbound delivery document.

Note: A requirement by the system to allow the creation of an inbound delivery document with reference to a purchase order is the assignment of a **confirmation control key** to the relevant line items in the P.O. In customizing of the confirmation control key there is a setting that allows the inclusion of a line item in the P.O. in an inbound delivery document. If a P.O. line item does not have a confirmation control key assigned, the item cannot be included in an inbound delivery.

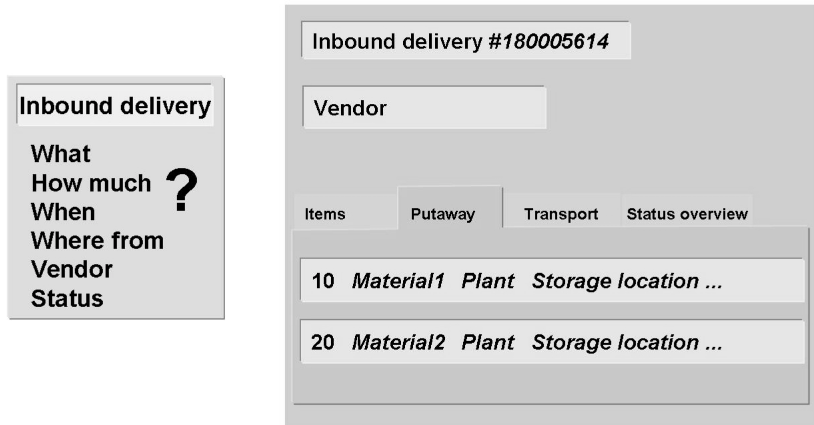

Figure 42: Information in Inbound Delivery

The inbound delivery contains information derived from the purchase order. It contains the following information:

- What is to be moved (quant information)
- How much is to be moved (quantity)
- Plant and Storage Location
- Status. document type, item categories, etc.

If one or more materials in the inbound delivery is relevant for extended Warehouse Management (EWM) processing, the inbound delivery document is replicated to the EWM system. The relevancy for EWM processing is determined based on the Plant and Storage Location in each line item of the inbound delivery. In Logistics Execution Customizing there is an assignment table in which plant and storage locations are assigned to the warehouse (es) in which the materials are managed.

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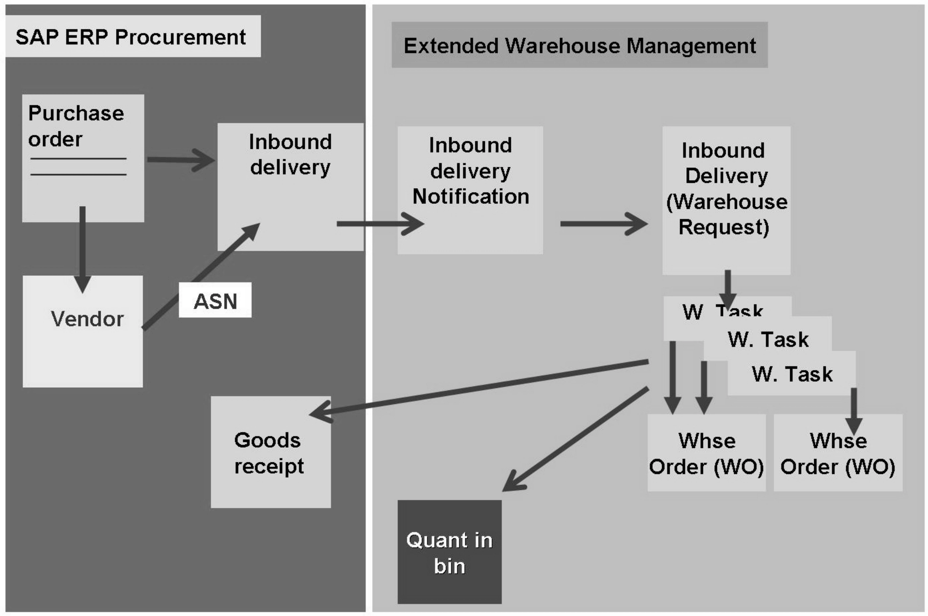

Figure 43: Goods Receipt with Inbound Deliveries: Process Flow

The inbound delivery in EWM is called the Inbound Delivery Notification (IDN) document. It contains the same information and has the same basic structure as the inbound delivery in the ERP system. In the standard EWM system a second document is created from the inbound delivery notification document. It is the Inbound Delivery (ID) document. It has the same basic structure as the IDN but contains additional EWM-relevant fields such as EWM Status. The ID is also called a warehouse request document because it is from this document that all EWM putaway activities begin.

From the warehouse request, Inbound Delivery, document one or more Warehouse Tasks (WT's) are created to direct the goods movements in the putaway process. Warehouse tasks are always assigned to Warehouse Order (WO) documents for execution. The warehouse order is a document that represents an executable work package that a warehouse employee can perform.

During the EWM putaway process goods receipt tasks are created that cause the goods receipt postings to be made in the ERP system. These goods receipt posting are made to the corresponding storage location stocks within the plant. Customizing settings within the EWM system are used to determine the timing and the plant-storage location stocks to update.

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EWM Inbound Processes

Because EWM must deal with the physical processes related to the putaway of materials, it supports a number of peripheral functions and activities that might be required in the "real-world" business of warehousing. In the graphic below are shown some of the functions supported by EWM.

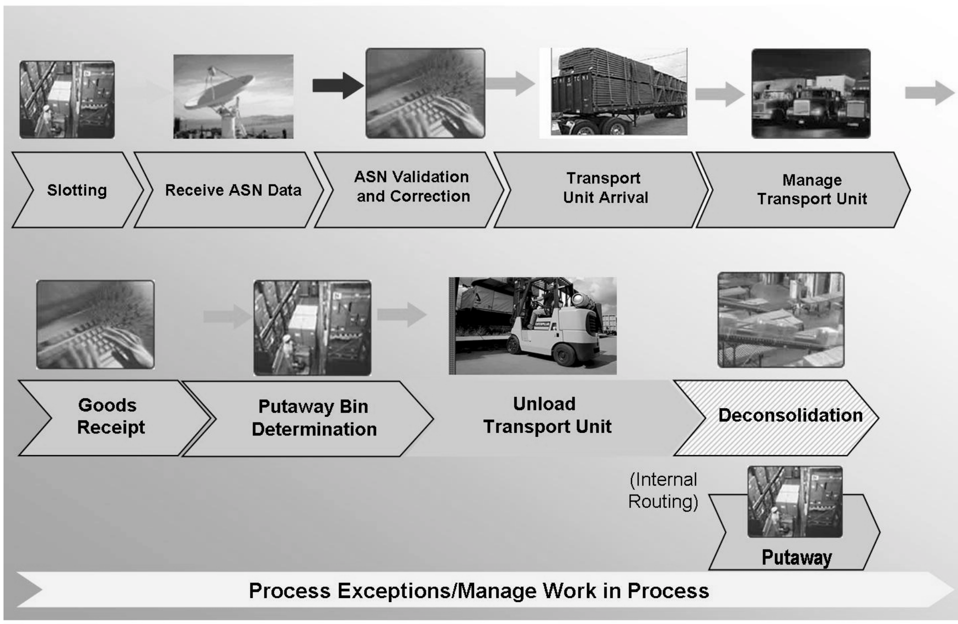

Figure 44: EWM Inbound Processes Example

To provide for more efficient putaway and picking in the warehouse, EWM provides a **slotting** and **rearrangement** process in which putaway storage bins can be assigned based on demand and/or forecasting data related to the products stored in the warehouse. Inbound shipments and their transportation units can be managed using the EWM **yard management** function. In EWM yard management, vehicles/TU's representing inbound as well as outbound loads can be managed before their arrival at the warehouse as well as after their physical arrival at the warehouse yard.

Using master data and customizing settings, EWM can determine the putaway path of each received product in the warehouse. The putway path could include movements to **deconsolidation**, **quality checking** and **value-added services (VAS)** processing work centers before the final putaway bin. This physical putaway path can be dynamically determined by EWM.

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Figure 45: EWM Inbound Process: Additional Supported Processes

EWM includes other processes that may be used to support the goods receipt requirements in a warehouse. Support of warehouse cross-docking functions that provide for the picking from a goods-receipt area, and transportation cross-docking that can be used in movements of materials from one warehouse to another warehouse or to ship-to customers using intermediate hub locations is also included in EWM functionality, Receipts of products from customer returns and reverse logistics processes are also supported by EWM. A key warehousing function for many warehouses and distribution centers is packaging logistics. EWM supports packaging/re-packaging in the goods receipt process as well as packing in the goods issue process. Packaging logistics uses the packing specification and, work center master data. It is generally a key function in the Value-Added Services function.

Lesson Summary

You should now be able to:

- Describe the goods receipt process flow between the ERP system and the EWM system.
- Outline the use of the inbound delivery document in the goods receipt process.
- Name the EWM documents used to facilitate the physical putaway movements in the warehouse.

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: ERP and EWM Documents in Goods Receipt

Lesson Overview

In the lesson a more in-depth coverage of the documents that play a role in the goods receipt process in EWM. In the introductory lesson, the objective was to understand the overall data and process flow in the goods receipt process. In this lesson we will take a closer look at the key documents in the process.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the characteristics of the delivery documents used in EWM inbound delivery processing.
- Explain the use of the warehouse task document in the goods receipt process.
- Understand the difference between a product task and an HU task in EWM.
- Create inbound notification and inbound delivery documents in EWM.
- Create warehouse task and warehouse order documents.

Business Example

Goods receipt processing using EWM at your distribution center at IDES, AG requires a detailed understanding of the inbound delivery processing.

EWM Inbound Delivery Processing

Delivery processing plays a significant role in the logistics chain. It provides functions for executing goods receipt and goods issue activities. Corresponding to the goods receipt and goods issue processing, a difference is made in delivery processing between the inbound delivery process and the outbound delivery process. The following inbound delivery scenarios are supported by delivery processing:

- Deliveries from the supplier.
- Returns from the customer, from any ship-from party or from any ship-from location.
- Goods receipt from production.
- Goods receipts from expected goods receipt processing.

Illustrated below is the basic EWM inbound delivery process.

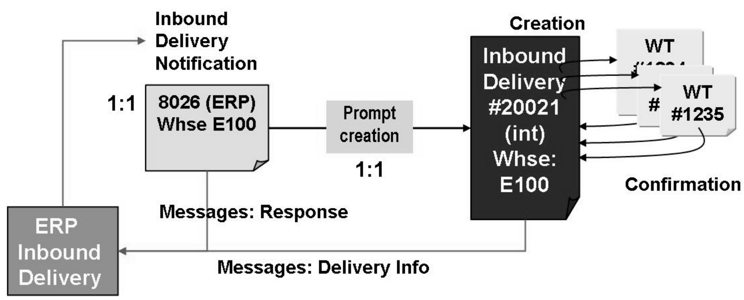

Figure 46: EWM - Inbound Delivery Processing

A ERP Inbound Delivery (originating from an ASN received in the ERP system) is forwarded to EWM. In EWM this message is stored as an Inbound Delivery Notification (IDN), which is used as a storage of the incoming message within EWM. This Inbound Delivery Notification document is not used for processing within EWM and it does not have an EWM specific readable document number. The inbound delivery notification is a document containing all the relevant logistics data in the inbound delivery process right from the origin of the inbound delivery process (shipping notification, delivery note or purchase order, for example). The shipping notification from the supplier is saved in the inbound delivery notification.

The inbound delivery notification is used to save the logistics data transferred from a reference document in order to create an inbound delivery. Using the inbound delivery notification, you can also process or reject incoming changes to an existing inbound delivery.

The delivery process receives a message from a reference document with all the relevant logistics data. An inbound delivery notification is created automatically as a result of this message. All the information contained in the message is saved in the inbound delivery notification. An inbound delivery is created automatically from the inbound delivery notification.

From the Inbound Delivery Notification an Inbound Delivery document is created. The IDN and Inbound Delivery document are for a single warehouse. The Inbound Delivery document has an EWM assigned document number. The Inbound Delivery document can also be used for forecasting the WM capacity load. Site processing like ‘Status in yard’ and EWM processing is done from the Inbound Delivery document. Any changes to the Inbound Delivery are sent back to the ERP System as a kind of EWM delivery information message. An Inbound Delivery document. with status ‘Execution completed’ is the basis for a Proof of Delivery.

The Inbound Delivery document in EWM serves as the reference for the warehouse tasks that move the received products to their putaway storage bins. The inbound delivery is a document containing all the data required for triggering and monitoring

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the complete EWM inbound delivery process. This process starts on receipt of the goods in the yard and ends on transferal of the goods at the final putaway, production or outbound delivery.

The inbound delivery is used as a working object in the inbound delivery process. You use this document in delivery processing when executing the following actions:

- Registering the delivery in the yard
- Unloading the delivery
- Canceling the “unloading of the delivery”
- Placing the delivery into stock (putaway)
- Canceling the “delivery putaway”
- Adjusting the delivery quantity to the quantity posted in the goods receipt (in case of over-delivery or under-delivery.
- Adjusting the delivery quantity and the transferred quantity In this case, the delivery quantity is adjusted to the quantity posted in the goods receipt. The quantity in the inbound delivery notification is also adjusted and a new inbound delivery is created.
- Posting a goods movement
- Canceling a goods movement
- Creating items
- Deleting items

Warehouse Request

A warehouse request is a document that enables the processing of warehouse activities for a specific product. The warehouse activities for a product include the following:

- Picking
- Putaway
- Posting change
- Stock transfer (within warehouse)
- Scrapping

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In Extended Warehouse Management (EWM) the warehouse request document is used to:

- Process specific product quantities within a warehouse for your goods receipt process or goods issue process (for example, for putaway or picking).
- Create posting changes
- Process internal goods movements
- Process scrappings

EWM uses warehouse requests to build waves. EWM works with both inactive and active document versions. In EWM warehouse tasks are created to fulfill the warehouse requests. You can create, process, delete, or archive warehouse requests.

In the goods receipt process, the **Inbound Delivery** document is the warehouse request. The inbound delivery warehouse request document defines, logically, a work list for EWM that determines the put away of the goods being received. EWM uses the warehouse request document, the inbound delivery, to create the warehouse tasks for putaway. Also, EWM executes the posting of goods movements for the goods receipts based on the warehouse request. EWM uses the inbound delivery notification, which is the message from the **SAP ERP system** to create the warehouse request for an inbound delivery.

When an inbound delivery is generated in ERP, ERP sends a message for an inbound delivery notification or posting change request to EWM. In EWM the following processes occur:

- EWM automatically generates a warehouse request using the Post Processing Framework (PPF).
- During automatic creation and saving of the warehouse request, EWM triggers the following:
  - Mapping of delivery data from ERP onto the EWM delivery data.
  - Data enrichment using data from the functions described below.
  - Determination of **warehouse process type,** which controls the processing of a warehouse task in EWM, such as whether EWM is to immediately confirm a warehouse task.
- EWM creates the warehouse tasks. In accordance with the warehouse tasks, EWM creates warehouse orders to assemble work packages for the individual warehouse workers.
- EWM copies most of the settings from Customizing for process control to the delivery document, and displays them on the user interface for the inbound delivery order.

Data Enrichment Functions

The common functions that are performed when creating or changing a warehouse request (either inbound or outbound) automatically, are as follows:

- **Automatic Packing**. EWM automatically creates handling units according to the packing instruction. It uses the condition technique to do this.
- **Connection to SAP Business Information Warehouse**. When a delivery item has been completed in EWM, EWM sends the current data to SAP Business Information Warehouse. A prerequisite for this is that you must have activated the update of delivery items in SAP Business Information Warehouse.
- If no packaging specification exists for the packing of products during goods receipt, EWM can automatically trigger a WebFlow or SAP Alert Framework to notify someone.
- Review of the handling unit type for notified handling units. During creation of an inbound delivery with a corresponding handling unit, delivery processing checks whether the handling unit is permissible for the warehouse.
- Creation of batches.
- Goods receipt posting. If EWM automatically creates a delivery based on a warehouse request from ERP, you can carry out partial goods receipt postings using the warehouse task confirmation. When you confirm a warehouse task, EWM automatically executes a corresponding partial goods receipt posting. It reports this to ERP. With the delivery UI, you can either post the goods receipt for individual handling units only, or you can post it completely.

Active and Inactive Document Versions

Extended Warehouse Management (EWM) can accept or reject change messages for inbound deliveries from the ERP system. EWM uses inactive and active document versions for this. If warehouse activities (follow-on activities) have already begun for inbound deliveries, EWM rejects change messages from the ERP system. For example, EWM has already created a warehouse task (WT) for an inbound delivery. In doing so, EWM has also already set the status type Warehouse Activities to the status value Partially Completed. If warehouse activities (follow-on activities) have already begun for inbound deliveries, EWM rejects the message from the ERP system.

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Handling Unit Integration in Delivery processing

Handling unit integration (HU integration) in delivery processing is used to forward HU data between SAP ERP and Extended Warehouse Management (EWM). The handling unit has a reference to the delivery.

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All HU-relevant processes of the goods receipt process in EWM are based on the correct and complete forwarding of HU data from SAP ERP to EWM. If this forwarding is incorrect or incomplete, errors occur in delivery processing. EWM simultaneously creates inbound deliveries and HUs in HU management. To do so, it uses the HU information from the inbound delivery notification. This means that EWM automatically creates HUs that have been defined in the ERP system.

During goods receipt posting (GR posting), delivery processing determines which products exist in which quantities in the **handling unit warehouse task**. Delivery processing updates these quantities during inbound delivery. You can post the goods receipt (GR) in delivery processing completely or partially. EWM determines the packed quantity from the handling unit information. Delivery processing sets a status for the packed quantity (for example, unpacked, partially packed, completely packed).

Warehouse Task

A **warehouse task** is a document that uses Extended Warehouse Management (EWM) to execute goods movements. Logical or physical goods movements or even stock changes can be the basis for a warehouse task. These include:

- Picks
- Putaways
- Internal movements
- Posting changes
- Goods receipt postings
- Goods issue postings

A warehouse task can be created with either a reference to a warehouse request or without a reference document, for example for internal warehouse goods movements. The following figure shows the different warehouse tasks for products and handling units (HUs):

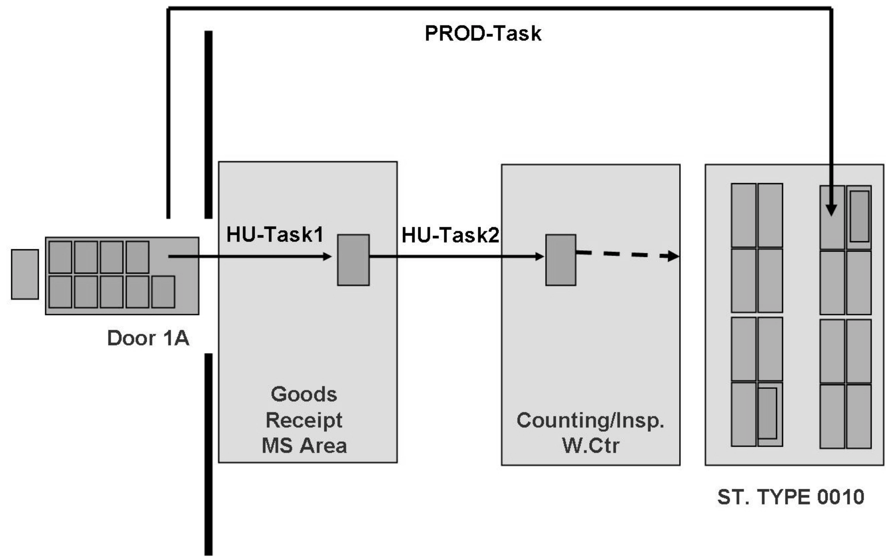

Figure 47: Warehouse Tasks

A **product warehouse task** is a document that helps Extended Warehouse Management (EWM) move products. A product warehouse task (product WT) can be based on physical goods movements or changes in stock. The product WT contains all the information required to execute the physical transfer of products into the warehouse, out of the warehouse, or within the warehouse from one storage bin to another storage bin.

When you confirm a product WT, you inform EWM what you have processed this product WT and that the goods have arrived at their destination. If the planned quantity (target quantity) differs from the actual quantity of stock that is moved, a difference quantity exists. If you confirm a product WT with a difference, the system automatically posts the difference quantity to a “difference interface”. Once confirmed, the product WTs also have a documentation function, since they document movements in the warehouse

Product WT Structure

A product WT contains all necessary information about a goods movement to be executed. It contains:

- What should be moved?
- Which quantity should be moved?
- From where (source storage bin) should the product be moved, and to where (destination storage bin)?

When you create a product WT, it consists of an item with the source storage bin and destination storage bin. When you confirm a product WT, it consists of either an item with the source destination bin or destination storage bin, or it consists of more than one item in the case of partial confirmations. The following characteristics apply to a Product WT:

- For goods receipt postings, the product WT consists of an item that increases the stock.
- For goods issue postings, the product WT consists of an item that decreases the stock.
- For transfer postings, the product WT consists of two items. One item that decreases the stock, and one item that increases the stock.
- In the case of partial confirmations, EWM creates one item for each partial confirmation. You create partial confirmations, for example, when you partially pick from a nested handling unit, or when you confirm different pick handling units.

A product WT reserves the quantities, so that these are no longer available for other product WT's.

Handling Unit Warehouse Task

The Handling Unit (HU) warehouse task is a document that helps Extended Warehouse Management (EWM) to move handling units (HU's). A handling unit warehouse task (HU WT) is based on goods movements.

The HU WT contains all the information required to execute the physical transfer of HU's within the warehouse from one storage bin to another storage bin. As an exception, the HU WT can also be used for the loading and unloading process. When you confirm a HU WT, you inform EWM what you have processed this HU WT and that the goods have arrived at their destination. Once confirmed, the HU WT's also have a documentation function, since they document movements in the warehouse.

HU Warehouse Task Structure

An HU WT contains all necessary information about a goods movement to be executed. It contains:

- Which HU should be moved?
- From where (source storage bin) should the HU be moved, and to where (destination storage bin)?

The HU WT always consists of an item with the source destination bin and destination storage bin. It does not reserve any quantities.

Warehouse Order

In EWM, the **warehouse order** is a document that represents an executable work package that a warehouse employee should complete within a specific time. The warehouse order consists of warehouse tasks or physical inventory items.

When products are received, issued, moved or counted warehouse tasks are created. The warehouse tasks are grouped together into warehouse orders and EWM makes them available for processing. For example, in the goods receiving process, warehouse tasks are created to move the products into the warehouse and to their destination storage bin. EWM groups these tasks together, according to **warehouse order creation rules** to form the warehouse orders. The warehouse order creation rules (WOCR's) are defined in Customizing.

Warehouse Order Creation

Warehouse order creation groups together warehouse tasks into warehouse orders, according to settings in Customizing for warehouse orders, and thus creates optimum work packages for the warehouse. For warehouse order creation, rules are defined with their relevant criteria. Warehouse order creation is particularly suitable for optimizing processes for putaway and picking.

An inbound delivery can contain a number of products to be received into the warehouse. Some products in the goods receipt might be subject to certain EWM processes such as deconsolidation and quality inspections; whereas, other might simple be assigned to a destination storage bin for a direct putaway. After EWM creates the warehouse tasks for the products, the system joins tasks together into warehouse orders according to the configured warehouse order creation rules. A warehouse order can contain warehouse tasks from more than one delivery.

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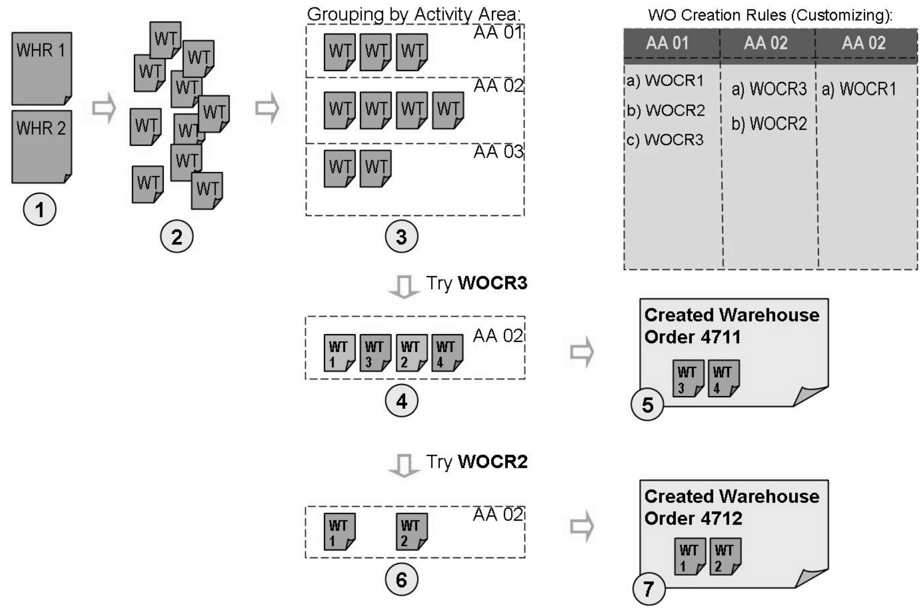

Figure 48: Warehouse Order Creation

During this summarization of the warehouse tasks into warehouse orders, EWM uses the search sequence for WO creation, for example, first rule A, then B, then C. EWM works through the WO creation rules in sequence, as defined for each activity area. The warehouse order creation rules are defined by Activity Area.

Filters and limit values control which warehouse tasks and how many warehouse tasks EWM groups together into a warehouse order. In addition, individual warehouse order creation rules can contain **sort rules**. As soon as EWM applies a WO creation rule, it sorts the warehouse tasks according to the sort rule.

In addition to the sort rules, filter and limit values, WOCR's can also contain parameters for packing and **consolidation groups**. During warehouse order creation, the consolidation group influences which warehouse tasks are permitted to be packed together. EWM determines the consolidation group in the delivery document (the warehouse request document) and copies it to the relevant warehouse tasks. A maximum number of consolidation groups can be specified as a limit value in warehouse order creation.

Since the work packages for the warehouse employee are based on the complete summarization of warehouse tasks into warehouse orders, then after all configured WO creation rules have been applied, no warehouse tasks must be left over that are not assigned to a warehouse order. If EWM has applied all the user-defined WO creation rules for the search sequence, and there are still unprocessed warehouse tasks, the system uses a **remainder rule** . This rule creates warehouse orders for the remaining warehouse tasks. EWM summarizes these warehouse tasks according to the following criteria:

- For each activity area
- For each queue
- For each consolidation group

If the system cannot find a WOCR for an activity area, EWM applies the **standard rule**. The standard rule groups tasks according to the following criteria:

- For each activity area
- For each Queue
- For each delivery

Lesson Summary

You should now be able to:

- Describe the characteristics of the delivery documents used in EWM inbound delivery processing.
- Explain the use of the warehouse task document in the goods receipt process.
- Understand the difference between a product task and an HU task in EWM.
- Create inbound notification and inbound delivery documents in EWM.
- Create warehouse task and warehouse order documents.

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

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Lesson: Storage Control

Lesson Overview

Storage Control in EWM is the technique the system uses to determine the process steps required to perform product movements in the warehouse. In this lesson we will explore the basic methods of storage control in EWM.

Lesson Objectives

After completing this lesson, you will be able to:

- Outline the three basic methods used to direct goods movements in EWM.
- Define the basic putaway functions supported in EWM.
- Describe process-oriented storage control
- Explain layout-oriented storage control and give examples of when it would be appropriate to use it.

Business Example

Understanding the concepts of EWM storage control is key to preparing for the configuration and implementation of warehouse task process.

Goods Receipt Processes

In addition to the basic process of receiving a product quantity into the warehouse and putting it away in a storage bin, many warehouses and distribution centers have additional processing requirements due to the nature of the products being managed. These processes include:

- Unloading
- Counting
- Quality Inspection
- Deconsolidation (unpacking into individual HU's)
- Kitting
- Value-added services

The EWM putaway process supports complex putaway process steps as outlined above. It takes into account your warehouse arrangement (for example, putaway using identification points in a high rack storage area) as well as the process-oriented rules and process flows defined in Customizing (for example, counting requests, repacking). Extended Warehouse Management (EWM) also contains putaway strategies to simplify the search for appropriate storage bins.

In EWM, products can be putaway directly or through the use of **storage control.**

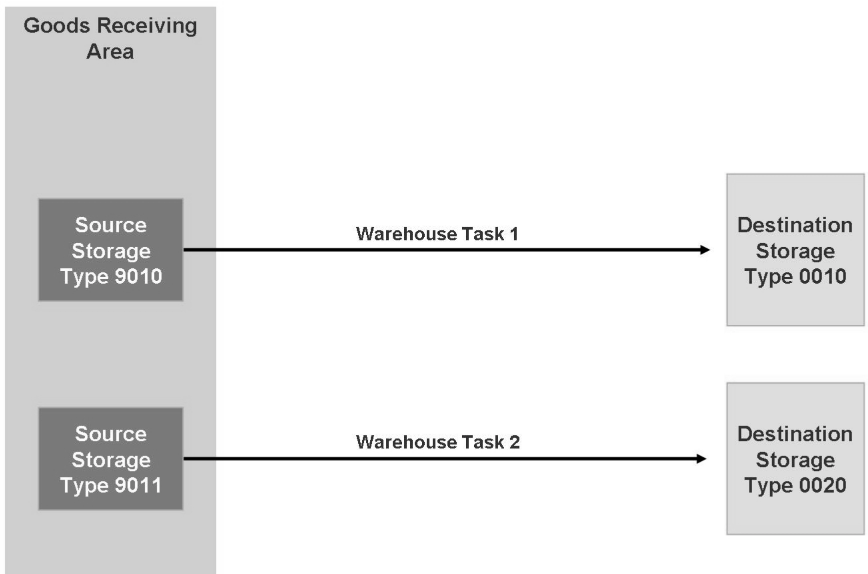

Figure 49: Direct Storage Control for Goods Receipt

Direct stock putaway, as illustrated above does not require the use of process-oriented storage control. The source location can be entered manually, or determined from the warehouse process type assigned to the warehouse request document. The destination location can be entered manually or determined by Customizing settings in EWM.

Direct stock putaway can be used for either HU-managed products or non-HU managed products. However, complex putaway processes require the use of handling units.

Storage Control

In EWM, **process-oriented** as well as **layout-oriented** methods for storage control can be used. The goal of storage control is to enable complex putaway or stock removal process steps based on the warehouse processes or the physical layout of the warehouse/distribution center. During putaway or stock removal, an individual process step can be executed on a single level basis or on multi-level basis (that is, through intermediate storage types).

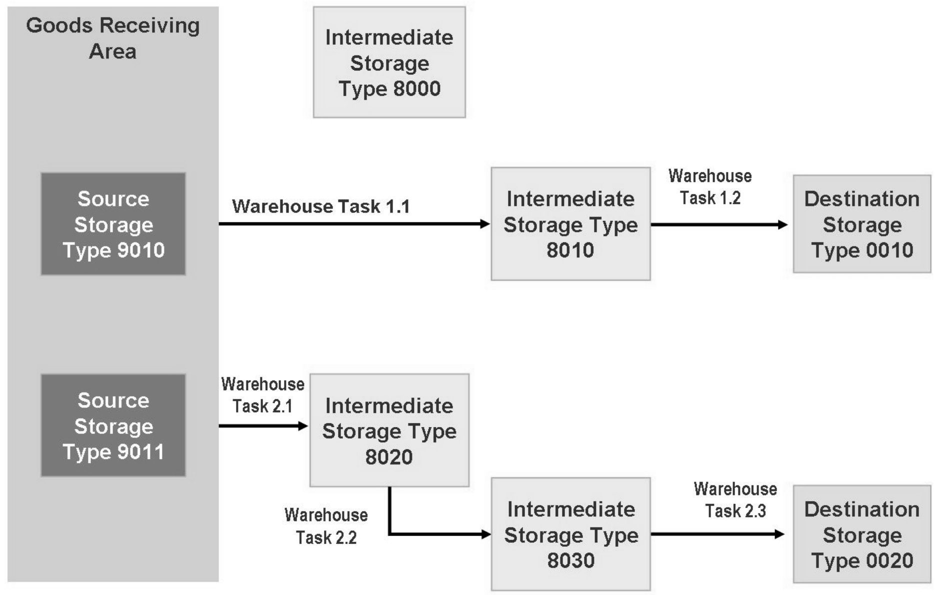

Figure 50: Multi-level Storage Control

If EWM determines that you are to put away a HU from stock using one or more intermediate storage types, it creates one warehouse task per route section for this HU as shown in the illustration above. .

A warehouse task is created that describes the route from source storage type to intermediate storage type. Irrespective of the settings in Customizing, EWM also creates a warehouse task per product contained in the HU. If, for example, an inbound delivery is packed and the HU has no profile for process-oriented storage control, EWM creates product warehouse tasks at putaway.

Based on your settings in Customizing, one warehouse task is created from the intermediate storage type to the next intermediate storage type, or to the final destination storage type. In combined putaway, the final destination storage type can be determined either right at the beginning of the putaway process, or later.

You can carry out different activities at the intermediate storage types. For example, within a putaway process, at an intermediate storage type, you can distribute HUs containing different products to putaway HUs. This process is called deconsolidation. In this case the intermediate storage type represents a physical **work center** in the warehouse. Another intermediate storage type could be used to represent a work center where quality checking or counting is performed. EWM manages the intermediate storage types in the same way as standard storage types. For example, you can subdivide the intermediate storage types into storage sections and storage bins.

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Process-oriented storage control can be combined with layout-oriented storage control. In this case, EWM always executes the process-oriented storage control first. The layout-oriented storage control then checks whether the sequence of putaway process steps is possible in layout view, and if required, adjusts the flow of the putaway or stock removal.

Extended Warehouse Management (EWM) uses the inbound delivery to determine, via delivery type and delivery item among other fields, the **warehouse process type**. The warehouse process type contains the storage process procedure, in other words, the putaway or stock removal process with different activities. EWM transfers this operation to the handling unit to be put away or removed from stock. The handling unit thus contains the information concerning what process steps are required for the putaway or stock removal.

Process-Oriented Storage Control

This type of storage control is used to map complex putaways or stock removals. In doing so, you combine your storage process steps into one storage process. You can also trace the status of the individual process steps.

Process-oriented storage control only operates with handling units.

In customizing the process steps for your complex storage process are defined. A process step is, for example, unloading, counting, or deconsolidating. Extended Warehouse Management (EWM) recognizes internal process steps predefined by SAP and external steps that are configured in Customizing. Your external process steps can be based on the SAP-created internal ones.

In addition, internal or external process steps can be simple, such as unloading, or combined, such as deconsolidating.

During goods receipt or goods issue, EWM copies the predefined process steps from the storage process definition to the handling unit. EWM assigns these process steps to a handling unit as soon as it has created or changed them.

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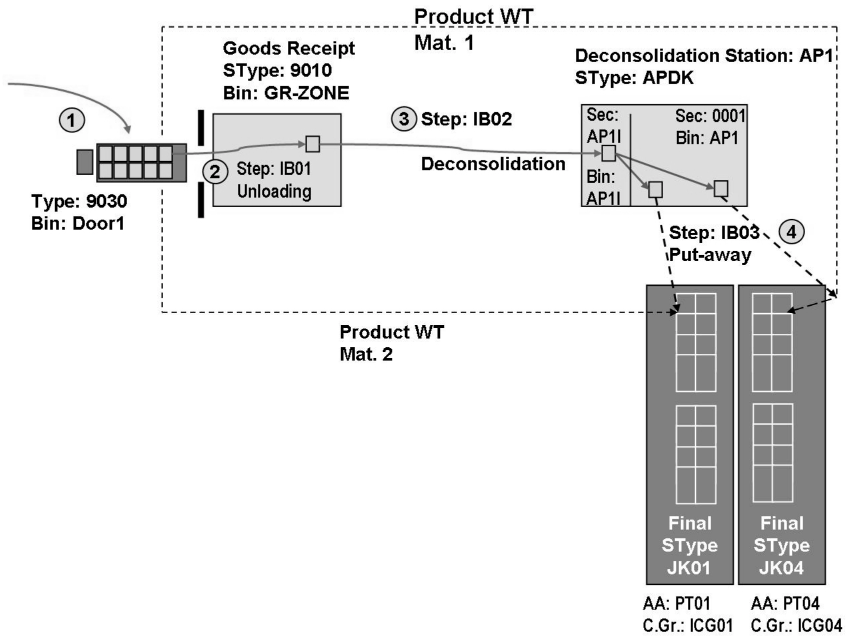


Figure 51: Process-Storage Control with Deconsolidation

The illustration above shows a process-oriented putaway scenario. The scenario is as follows:

1. The transportation Unit arrives at the warehouse door (St. Type: 9030, Bin: Door1
2. A task is created to move the HU's from the Door to the goods receipt staging area (St Type: 9010, Bin: GR-ZONE).
3. Because there are multiple products in the HU, the system generates a task to send the HU to the deconsolidation work center (St. Type: APDK, Sec AP1I, Bin: AP1I).
4. In the deconsolidation work center the products are assigned to separate HU's.
5. The system generates a task to move the deconsolidated products to their final putaway bin.

In the example, the system determined that deconsolidation was required based on the fact that the Consolidation Group determined from the putaway location for each product was different. The following illustration shows this.

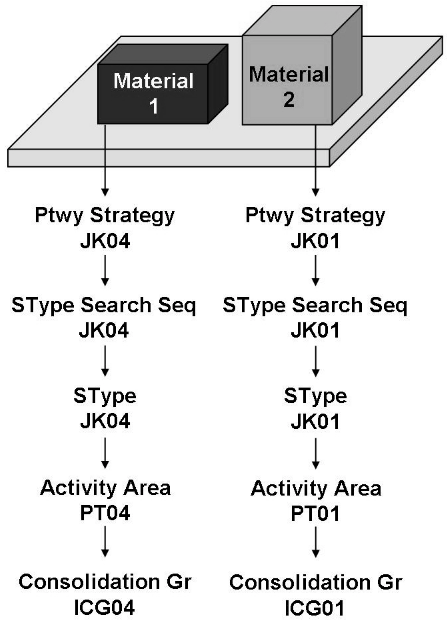


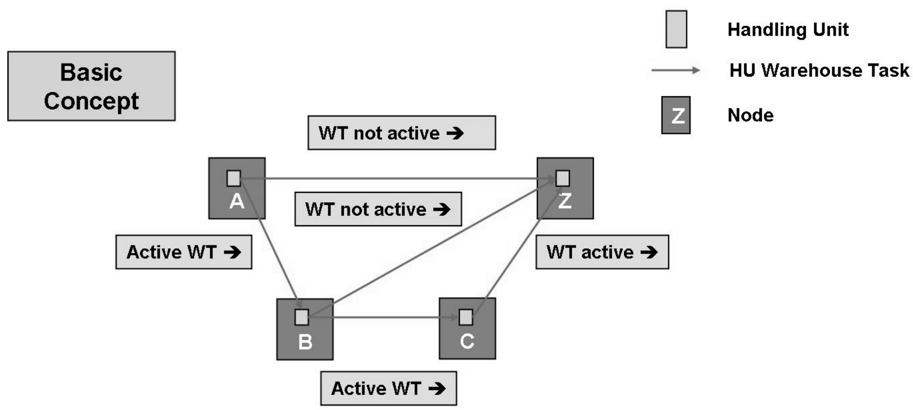
Figure 52: Determination of Deconsolidation

In the graphic above, for each material the system determines a putaway strategy that determines the putaway bin location (St. Type-Section-Bin). The putaway location determines the activity area (bins are assigned to activity areas), A consolidation group is assigned to each activity area. If they are different for products in the same HU, the HU must go to deconsolidation.

Layout-Oriented Storage Control

Layout-oriented storage control is normally used if stock movements in your warehouse do not travel from a source storage bin to a destination location directly, rather travel via intermediate storage bin due to the physical layout of the warehouse, or if automated-storage retrieval-systems or the are in use (AS/RS). For example, you use layout-oriented storage control in the **material flow system** to define conveyor segments.

The layout-oriented storage control only operates with handling units. One exception is if picking or identification points are being used.



From	To	Intermediate
A	Z	B
B	Z	C

Figure 53: Layout-Oriented Storage Control for HU-Movements

In the graphic above, a product pallet is to be moved from storage bin A (goods receiving area) to storage bin Z (high rack storage area), the system should execute a contour and weight check to ensure that the product pallet can be put away in the high rack storage area safely. For this activity, EWM splits the warehouse order into three tasks: one from storage bin A to identification point B, and a second from identification point B to intermediate storage area C. Then an additional check should occur at location C. To move the product from location C to its final storage bin Z, the system generates an additional task.

Use of process-oriented storage control can be combined with the layout-oriented storage control. In this case, EWM always executes the process-oriented storage control first. The layout-oriented storage control then checks whether the sequence of putaway process steps is possible in layout view, and if required, adjusts the flow of the putaway or stock removal.

For example, based on the process-oriented storage control, EWM determined the following putaway process flow:

1. Unloading at door
2. Counting at counting station
3. Quality check
4. Executing value-added services
5. Putaway in the high rack storage area

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However, the layout-oriented storage control determines that a direct putaway in the high rack storage area is not possible and that the putaway must occur with the use of an identification point. So, layout-oriented storage control could modify the tasks to be sequenced as follows:

1. Unloading at door
2. Counting at the counting station
3. Identification of goods at the ID point
4. Putaway in the high rack storage area.

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Exercise 10: Direct Putaway in Inbound Processing

Exercise Objectives

After completing this exercise, you will be able to:

- Perform a direct putaway goods receipt.
- Describe the inbound document flow from the ERP system through the EWM system using direct putaway.

Business Example

Two products will be ordered from the supplier and will be received directly from the door of the warehouse to destination bins.

Task:

You are to create a purchase order in the ERP system followed by the creation of an inbound delivery document. In EWM you will display the inbound delivery notification that was replicated from the ERP inbound delivery.

From the inbound delivery notification document you will go to the inbound delivery document that was created from the inbound delivery notification document. Using the inbound delivery document you are to create the warehouse tasks and corresponding warehouse order for the putaway.

Use the warehouse monitor to display the warehouse putaway tasks and warehouse order. From the warehouse monitor you will confirm the putaway tasks and display the resulting stock balances.

1. In the ERP system, create a purchase order using the information below.

   Header Data:

Vendor	**EWM-VEND**
Purchasing org.	**1000**
Purchasing Group	**001**
Company Code	**1000**

   Line Item 1 Data:

Continued on next page

Material Number	**T-EW03-##**
Quantity	**500**
Date	**Today + 2 business days**
Price	**45.00 EUR**
Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control Key	**ANLI**

Line Item 2 Data:

Material Number	**T-EW04-##**
Quantity	**500**
Date	**Today + 2 business days**
Price	**90.00 EUR**
Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control Key	**ANLI**

PO Number :_____________________________________

2. Create the Inbound Delivery. Enter **GR##-1** in the External ID. Verify that warehouse **E00** is present on the item.

   Inbound Delivery Document Number:_________________________

3. In the EWM system, find the Inbound delivery notification document that was created from the inbound delivery document created in the ERP system.

   Inbound Delivery Notification Document: _____________________

4. From the EWM inbound delivery document create the putaway tasks and corresponding warehouse order.

   Inbound Delivery document :__________________

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5. From the inbound delivery document create the putaway warehouse tasks and warehouse order using the *Follow-on Functions*. Document them below. Also, document the source and destination locations from the warehouse tasks.
6. Display using the warehouse monitor the warehouse tasks and warehouse order you just created.

Warehouse Order	
Warehouse Task 1	
Warehouse Task 2	

7. From the warehouse monitor, confirm the warehouse putaway tasks.
8. Using the warehouse monitor check the stock of the two products.

Solution 10: Direct Putaway in Inbound Processing

Task:

You are to create a purchase order in the ERP system followed by the creation of an inbound delivery document. In EWM you will display the inbound delivery notification that was replicated from the ERP inbound delivery.

From the inbound delivery notification document you will go to the inbound delivery document that was created from the inbound delivery notification document. Using the inbound delivery document you are to create the warehouse tasks and corresponding warehouse order for the putaway.

Use the warehouse monitor to display the warehouse putaway tasks and warehouse order. From the warehouse monitor you will confirm the putaway tasks and display the resulting stock balances.

1. In the ERP system, create a purchase order using the information below.

   Header Data:

Vendor	**EWM-VEND**
Purchasing org.	**1000**
Purchasing Group	**001**
Company Code	**1000**

   Line Item 1 Data:

Material Number	**T-EW03-##**
Quantity	**500**
Date	**Today + 2 business days**
Price	**45.00 EUR**
Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control Key	**ANLI**

   Line Item 2 Data:

Continued on next page

Material Number	**T-EW04-##**
Quantity	**500**
Date	**Today + 2 business days**
Price	**90.00 EUR**
Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control Key	**ANLI**

PO Number :____________________________________

a) Choose *Logistics → Materials Management → Purchasing → Purchase Order → Create Vendor/Supplying Plant Known*

Enter the header data.

Note: The *purchasing org*., *purchasing group* and *company code* fields can be found in the *Org Data* tab in the Header.

b) Enter the Item data from the table above.

Note: The *Plant* and *St. Loc.* fields are to the extreme right of the *Net Price* field. It's easier if you use the *Tab* key to navigate to these fields.

Note: The Confirmation Control Key is located in the Item Detail section of the screen in the *Confirmations* tab.

c) Choose *Save* to create the PO.

d) Write your PO Number in the space above.

2. Create the Inbound Delivery. Enter **GR##-1** in the External ID. Verify that warehouse **E00** is present on the item.

Continued on next page

Inbound Delivery Document Number:________________________

a) Choose *Logistics → Logistics Execution → Inbound Process → Goods Receipt for Inbound Delivery → Inbound Delivery → Create → Single Documents*

b) The Vendor and PO Number should be present on the screen. Choose *Enter*.

c) On the Shipping Notificat. Create: Overview screen choose Header.

d) On the *Header Details* screen, select the *Administration* tab. Enter **GR##-1** in the *External ID* field.

e) Choose *Back*. In the *Overview* screen choose the *Stock Placement* tab. Verify that the Warehouse No.. is **E00**.

f) Choose *Save* to create the inbound delivery.

g) Write the inbound delivery document number in the space above.

3. In the EWM system, find the Inbound delivery notification document that was created from the inbound delivery document created in the ERP system.

   Inbound Delivery Notification Document: ____________________

   a) In the EWM system, choose *Extended Warehouse Management → Delivery Processing → Inbound Delivery → Maintain Inbound Delivery Notification*.

   b) Select *Purchase Order* in the *Find* field. Enter your PO Number in the input field. Choose *Perform Search*.

   c) Verify that the Doc. No, in the header area matches the inbound delivery document number you created in the ERP system. Document the number in the space above.

   d) Choose *Exit*.

4. From the EWM inbound delivery document create the putaway tasks and corresponding warehouse order.

Continued on next page

Inbound Delivery document :__________________

a) Choose *Extended Warehouse Management → Delivery Processing → Inbound Delivery → Maintain Inbound Delivery*

b) Select *ERP Document* in the *Find* field. Enter your inbound delivery document number in the input field. Choose *Perform Search*. The EWM inbound delivery warehouse request document should display. Write the Document number found in the header area in the space above.

c) In the header area switch to *Formview*. Verify the warehouse is **E100**. Go back to *Listview*

d) In the item section in the bottom portion of the screen, select *Formview*. Scroll to the bottom of the screen and document the warehouse process type.

Warehouse Process Type: ______________

e) Go back to *Listview.*

5. From the inbound delivery document create the putaway warehouse tasks and warehouse order using the *Follow-on Functions*. Document them below. Also, document the source and destination locations from the warehouse tasks.

a) From the menu bar choose *Inbound Delivery → Follow-on Functions → Warehouse Task*. The system will now go to the *Create Warehouse Task* transaction.

b) Choose *Select All* to select both line items. In the *Warehouse Request* tab choose *Create + Save.*The system will create two warehouse tasks and one warehouse order. A message will be displayed in the status line that the tasks have been created.

c) Choose *Exit* two times to leave the inbound delivery processing.

6. Display using the warehouse monitor the warehouse tasks and warehouse order you just created.

Continued on next page

Warehouse Order	
Warehouse Task 1	
Warehouse Task 2	

a) Choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*. If a pop-up screen appears enter the following:

Warehouse	**E100**
Monitor	**SAP**

then choose *Execute*.

b) In the hierarchy structure choose*Inbound → Documents*. Double-click on the *Inbound Delivery* node. In the selection screen that appears, enter your EWM Inbound Delivery document number in the *Inbound Delivery* field. Choose *Execute*.

c) Your EWM inbound delivery will display in the parent area on the right side of the screen. Select the *Warehouse Order* button. The warehouse order will display in the lower right side of the screen. Write the warehouse order number in the space above.

d) Select the *Warehouse Task* button. Document the two warehouse tasks above.

e) For each warehouse task, document the source and destination locations by scrolling to the right:

Warehouse Task 1:

Source: St Type:________ Sec: ________ Bin:_____________________

Destin: St Type: ________ Sec:_________ Bin:_____________________

Warehouse Task 2:

Source: St Type:________ Sec: ________ Bin:_____________________

Destin: St Type: ________ Sec:_________ Bin:_____________________

Continued on next page

7. From the warehouse monitor, confirm the warehouse putaway tasks.
   a) Select a warehouse task.
   b) From the *More Methods* icon, choose *Confirm Backgr.*. When the confirmation dialog appears, choose *Enter*.
   c) Check the warehouse task *Status*. It will be **C**. Remain in the warehouse monitor.
   d) Repeat steps a. through c. for the second warehouse task.
8. Using the warehouse monitor check the stock of the two products.
   a) Go to the *Stock and Bin* → *Physical Stock* node. Double-click on the *Physical Stock* node.
   b) In the selection dialog, on the Product Number line choose *Multiple selection* . Enter **T-EW03-## and T-EW04-##** in the *Select Single Values* tab. Choose *Copy* , then choose *Execute* .
   c) Your two products will be displayed showing the putaway storage bins and quantities and other fields.
   d) Choose *Exit* .

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Exercise 11: Complex Putaway with Deconsolidation

Exercise Objectives

After completing this exercise, you will be able to:

- Process a complex putaway from purchase order creation in ERP through deconsolidation to the final destination bin.
- Describe the complex putaway process using process-oriented storage control.

Business Example

IDES, AG receives multiple products packed into the same HU's. These products must be repacked (deconsolidated) before they can be putaway in their destination bins.

Task:

In this exercise, you are to create a purchase order and an inbound delivery document in the ERP system. In the EWM system process the inbound delivery through unloading and goods receipt, deconsolidation and to the final destination bin in the warehouse.

1. Create a purchase order in the ERP system using the header and item information in the tables below.

   Header data:

Vendor	**EWM-VEND**
Purchasing org.	**1000**
Purchasing Group	**001**
Company	**1000**

   Item Data: Material 1

Material	**T-EW01-##**
PO Quantity	**20**
Delivery Date	**Today's Date**
Price	**500.00 EUR**

Continued on next page

Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control key	**ANLI**

Item Data: Material 2

Material	**T-EW02-##**
PO Quantity	**20**
Delivery Date	**Today's Date**
Price	**600.00 EUR**
Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control key	**ANLI**

Purchase Order Number:___________________________

2. Create the Inbound Delivery. Enter **GR##-2** in the External ID. Pack the two materials into a single handling Unit (HU). Verify that warehouse **E00** is present on the item.

   Inbound Delivery Document Number:________________________

   HU number:______________

3. In the EWM system, find the Inbound delivery document that was created from the inbound delivery notification document created in EWM.

   EWM Inbound Delivery Document: ____________________

4. From the inbound delivery create the initial putaway tasks.
5. Open a new session and check the tasks in the Warehouse Monitor. Confirm the open tasks in the Warehouse Monitor.
6. Process the task that moves your HU to the deconsolidation work center.
7. Perform the deconsolidation process. In this step you are to create a new HU and move one of the two products to the new HU thereby separating (deconsolidating) the products so that they can be putaway individually.
8. Return to the Warehouse Monitor Session and complete the putaway process.

Continued on next page

9. Still from the Warehouse Monitor, check the stock for your two products.
10. Verify the goods receipt in the ERP system.

Solution 11: Complex Putaway with Deconsolidation

Task:

In this exercise, you are to create a purchase order and an inbound delivery document in the ERP system. In the EWM system process the inbound delivery through unloading and goods receipt, deconsolidation and to the final destination bin in the warehouse.

1. Create a purchase order in the ERP system using the header and item information in the tables below.

Header data:

Vendor	**EWM-VEND**
Purchasing org.	**1000**
Purchasing Group	**001**
Company	**1000**

Item Data: Material 1

Material	**T-EW01-##**
PO Quantity	**20**
Delivery Date	**Today's Date**
Price	**500.00 EUR**
Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control key	**ANLI**

Item Data: Material 2

Material	**T-EW02-##**
PO Quantity	**20**
Delivery Date	**Today's Date**
Price	**600.00 EUR**

Continued on next page

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Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control key	**ANLI**

Purchase Order Number:____________________________

a) Choose *Logistics → Materials Management → Purchasing → Purchase Order → Create Vendor/Supplying Plant Known*

Enter the header data.

Note: The *purchasing org*., *purchasing group* and *company code* fields can be found in the *Org Data* tab in the Header.

b) Enter the two materials from the table above.

Note: The *Plant* and *St. Loc.* fields are to the extreme right of the *Net Price* field. It's easier if you use the *Tab* key to navigate to these fields.

Note: The Confirmation Control Key is located in the Item Detail section of the screen in the *Confirmations* tab.

Note: You must use *Next Item* to go to the second material item details screen so that you can select the Confirmation Control for the material.

c) Choose *Save* to create the PO.

d) Write your PO Number in the space above.

2. Create the Inbound Delivery. Enter **GR##-2** in the External ID. Pack the two materials into a single handling Unit (HU). Verify that warehouse **E00** is present on the item.

Inbound Delivery Document Number:_________________________

Continued on next page

HU number:______________

a) Choose *Logistics → Logistics Execution → Inbound Process → Goods Receipt for Inbound Delivery → Inbound Delivery → Create → Single Documents*

b) The Vendor and PO Number should be present on the screen. Choose *Enter*.

c) On the Shipping Notificat. Create: Overview screen choose Header.

d) On the *Header Details* screen, select the *Administration* tab. Enter **GR##-2** in the *External ID* field.

e) Choose *Back*. In the *Overview* screen choose the *Stock Placement* tab. Verify that the Warehouse No.. is **E00**.

f) Pack the two materials into a single HU. Choose *Goto → Pack*.

g) In the *Processing of Handling Units for Inbound Delivery* screen, enter packaging material **PKE-095** in the first line of *Packaging Materials* .

Choose *Enter*. A handling unit number will be assigned. Write the HU number in the space above.

h) Select the two materials in the *Materials to be Packed* section of the screen. Choose *Pack*.

i) Choose *Save* to create the inbound delivery.

j) Write the inbound delivery document number in the space above.

3. In the EWM system, find the Inbound delivery document that was created from the inbound delivery notification document created in EWM.

EWM Inbound Delivery Document: ____________________

a) In the EWM system, choose *Extended Warehouse Management → Delivery Processing → Inbound Delivery → Maintain Inbound Delivery* .

b) Select *ERP Document* in the *Find* field. Enter your ERP Inbound Delivery Number in the input field. Choose *Perform Search*.

c) Record the inbound delivery number.

Inbound Delivery Document No.:__________________

d) Your inbound delivery with your two products is displayed. Select the HU tab and record the HU number.

HU Number: ___________________

Continued on next page

4. From the inbound delivery create the initial putaway tasks.

   a) From the top menu select *Inbound Delivery → Follow-On Functions → Warehouse Task*

   b) In the *Create Warehouse Task* screen, select the *Handling Units* tab.

   c) Record the following:

      Source Location: St Type: ________ Sec.: ________ Source Bin: ____________________

   d) Choose *Create and Save*. Three warehouse tasks are created.

Continued on next page

5. Open a new session and check the tasks in the Warehouse Monitor. Confirm the open tasks in the Warehouse Monitor.

   a) Choose *Create Session*

   b) Choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*. If necessary, enter **E100** in the *Warehouse* and select *Monitor* **SAP** from the pop-up dialog.

   c) In the navigation hierarchy, open *Documents*, then double-click on the folder *Warehouse Tasks*.

      In the *Transaction Data* section of the selection screen, enter your *Handling Unit* number. Choose *Execute*. Your three warehouse tasks should display.

   d) Scroll to the right in the task display and note the source and destination locations of each task.

      Note that two of the tasks have *Status* **B - Waiting**, and only one task has *Status* **blank-Open**. This task is the only one available for execution. It moves the HU form the Door to the GR-Zone.

   e) Confirm the open task from the Monitor. Select the task, then choose the *More Methods* icon. From the list choose *Confirm Backgr.*

      You will get a message reporting the confirmation of the task. You will also see the status of the task change to **C-Confirmed.** Two new tasks will also be displayed. One is the goods receipt posting task that is generated automatically during the confirmation process. The other task is a task to move the HU from the unloading area to the deconsolidation work center DEKO. Verify the destination location of this task. Record the task number of this task.

      WT number: _______________

   f) Return to your other session. Choose *Exit*

Continued on next page

6. Process the task that moves your HU to the deconsolidation work center.
   a) Choose *Extended Warehouse Management* → *Execution* → *Confirm Warehouse Task*. If prompted, enter *Warehouse* **E100**.
   b) Select *Warehouse Task* in the Find field. Enter your task number from step e.) above. Select *Execute Search*.

      Your task will be displayed.
   c) Select the *HU WT* tab to view the task data.
   d) Choose *Confirm + Save* to confirm the task.
   e) Return to the Warehouse Monitor session and choose *Refresh*.
   f) You should now see three tasks with *Status* **C-Confirmed**. Two tasks remain in *Status* **B-Waiting**.
   g) Return to the other session. Choose *Exit*.

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7. Perform the deconsolidation process. In this step you are to create a new HU and move one of the two products to the new HU thereby separating (deconsolidating) the products so that they can be putaway individually.

   a) Choose *Extended Warehouse Management* → *Execution* → *Deconsolidation in Goods Receipt*.

   b) In the *Work Center: Deconsolidation* screen, enter *Warehouse* **E100** and Work Center **DEKO**. Enter your HU number in the *Handling Unit* field. Choose *Execute*.

   c) In the *Work Center Deconsolidation Goods Receipt* screen, on the left side you will see your HU and the two products that are contained within.

   d) Select *Expand Subtree*. The system will expand each product line and you will see the warehouse tasks for deconsolidation.

   e) Scroll to the right to see the consolidation groups (CnsGrp) for the two products. Notice that they are different.

   f) Double-click on your handling unit and select the *Detail 1* tab. Note the following:

      Storage Process: ______________

      External Step: ______________

   g) Create a new HU. Under the *Create HU* tab on the right-side of the screen enter packaging material **PKE-095**.

      . Choose the *Execute* button under the *Create HU* tab. A new HU will appear on the left-side of the screen. Document it below:

      New HU: _________________

   h) Drag and drop one of the HU tasks to the new HU so that you have each product in a separate HU.

   i) Select one of the HU's. Choose the *Complete Process Step for HU* icon. Repeat the process for the second HU.

   j) Choose *Save*.

Continued on next page

8. Return to the Warehouse Monitor Session and complete the putaway process.

   a) Select the session with the Warehouse Monitor display. Double-click on the folder *Warehouse Task*. In the selection screen, in the *Transaction Data* section, select *Multiple selection* for the Handling Unit field.

   b) Enter your two HU's, the original and the new one created in deconsolidation, in the *Select Single Values* column. Choose *Copy*. Choose *Execute*.

   c) You should now see two open tasks in the display. Scroll to the right to see the source and destination locations for each task. Note that the destination location for each is different. They are to be putaway in different storage types.

   d) Select the two open tasks in the Monitor. From the *More Methods* icon, choose **Confirm Backgr.**. You will get a system message that the tasks have been confirmed. Choose *Refresh*.

9. Still from the Warehouse Monitor, check the stock for your two products.

   a) Choose *Stock and Bin* from the hierarchy on the left side of the screen. Double-click on *Physical Stock*. In the selection screen use the Product *Multiple selection* to select the bins for your two products. Choose *Execute*.

      You should now see the stock in the bins for your two products.

10. Verify the goods receipt in the ERP system.

    a) In the ERP system, choose*Logistics → Materials Management → Inventory Management → Environment → Stock → Stock Overview*.

    b) Enter one of your products in the Material field and enter Plant **SPCW**. Choose *Execute*.

    c) Your received stock will be in storage location **AF00**. Note that the goods receipt location changed from **RD00** to **AF00**.

Lesson Summary

You should now be able to:

- Outline the three basic methods used to direct goods movements in EWM.
- Define the basic putaway functions supported in EWM.
- Describe process-oriented storage control
- Explain layout-oriented storage control and give examples of when it would be appropriate to use it.

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: Expected Goods Receipts

Lesson Overview

There are situations that commonly occur in warehouse processing that interfere with or prohibit the use of the standard inbound delivery process. For example, goods receipt from production does not include creation of an inbound delivery in the standard process. Another common example, is that goods arrive in a shipment that were not in the advanced shipping notification (ASN) sent by the vendor. Use of the expected goods receipts function will provide solutions to these problems.

Lesson Objectives

After completing this lesson, you will be able to:

- Understand the use of the expected goods receipts processes in receiving from purchase orders and production orders
- Describe the use of the Notification of Expected Goods Receipt and Expected Goods Receipt documents.
- Generate and Delete Expected Goods Receipts.
- Generate Inbound Delivery documents from Expected Goods Receipt documents.

Business Example

At IDES, AG, shipments, at times, arrive with products that are not in the inbound delivery document created from the ASN sent by the vendor. You want to be able to conveniently add these products to the existing inbound delivery document.

Overview

The expected goods receipt processing provides additional options and processing capabilities in handling certain goods receipt situations. A primary feature of expected goods receipt processing is the ability to create a goods receipt within EWM without an inbound delivery in the ERP system. If an ASN/Inbound Delivery has not been created for a purchase order or production order in ERP, the following options are available for processing a goods receipt:

- The inbound delivery can be created manually in ERP. The document will be replicated to EWM in the standard process.
- An expected goods receipt document is created as a template document locally in EWM, which can then be used to generate an inbound delivery manually.
- From the Inbound Delivery user interface in EWM, you can switch to ERP to generate an inbound delivery. You use Business Add-Ins (BAdIs) /SCWM/EX_DLV_ERP_CALL and /SCWM/EX_DLV_ERP_CALL_CTRL to define whether you generate an inbound delivery in ERP or locally in EWM.
- You can use the user interface for the inbound delivery in EWM, and specify the required delivery data without ERP checking this data with the data of the open purchase order. If you are not using any inbound deliveries in the production for your delivered products, the following options are available to you for generating an inbound delivery:
  - You generate an expected goods receipt as a template document locally in EWM, which you can use to generate an inbound delivery manually.
  - In EWM, you choose the user interface for the inbound delivery, and specify the required delivery data.

If an expected goods receipt is being used to generate an inbound delivery manually for a purchase order or production order, this process has the following advantages:

- Execution of the goods receipt process steps occurs in one system only, EWM.
- If ERP is temporarily unavailable, you can still execute the goods receipt process steps.
- You generate an inbound delivery whose data has been checked by both ERP and EWM. This enables you to make sure that you post goods receipt in ERP as well.
- Since the expected goods receipt is based on the data of the open purchase order or open production order, you can use the expected goods receipt as a preview of the goods receipt.

Illustrated below is how the GR process in EWM could use the EGR data as part of the product check-in process.

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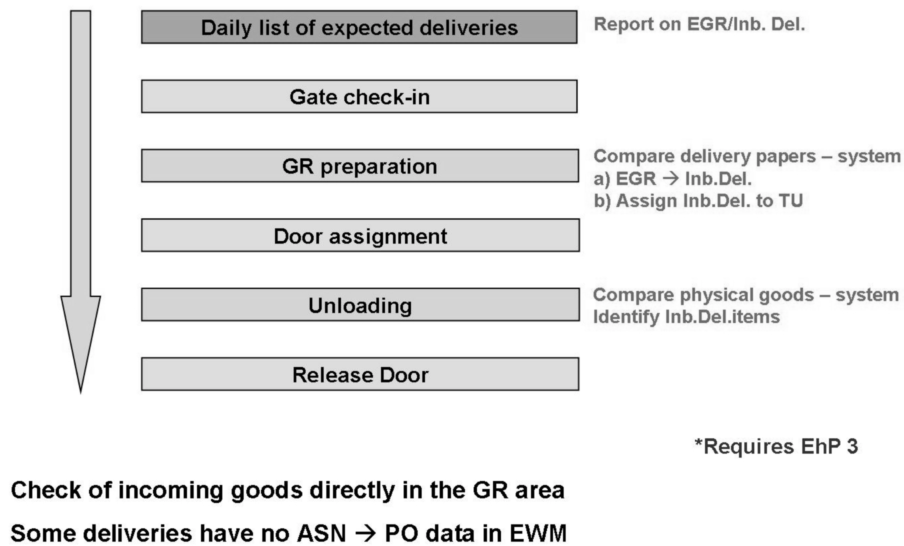

Figure 54: GR Process in EWM based on Expected Goods Receipts

In this process any product being received that does not appear in an existing inbound delivery can still be received. The inbound delivery can be updated from the expected goods receipt data.

Expected goods receipt processing requires the creation and use of two document types in EWM: the Notification of Expected Goods Receipt (GRN) and the Expected Goods Receipt (EGR).

Expected Goods Receipts Documents

The Notification of Expected Goods Receipt (GRN) is created with reference to either a purchase order or production order in the ERP system. It contains a copy of all of the relevant logistics data from the source document. The Expected Goods Receipt document is created from the Notification of Expected Goods Receipt document after it has been activated by EWM.

Created from the Notification of Expected Goods Receipt, the Expected Goods Receipt (EGR) document contains all relevant data from the GRN that represents the items to be received from either a purchase order or production order. The EGR represents a template that enables data from a purchase order or production order to be copied when creating an inbound delivery manually. The following graphic illustrates this process and the document relationships.

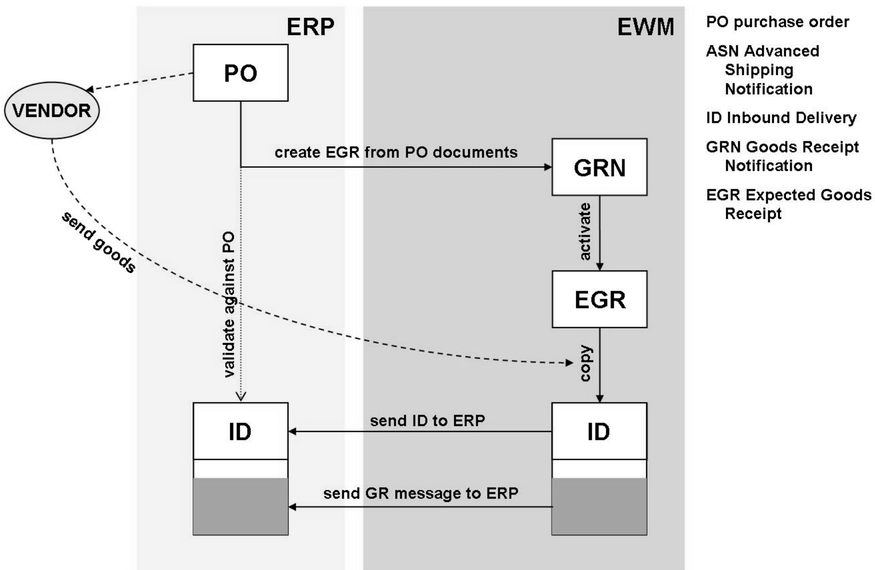

Figure 55: Inbound Delivery Creation Using EGR

The GRN and EGR documents are temporary documents and can represent the products due for goods receipt processing within a certain time period. Therefore, these documents can be deleted regularly and regenerated to represent the list of items in a new time period that are due for receipt. To summarize the characteristics of the expected goods receipt documents you can say that expected goods receipts:

- are created from predecessor documents (purchase order or production order)
- do not exist in ERP, only in EWM
- are not updated
- are temporary
- are deleted regularly
- are not used for EWM execution
- are used to create inbound deliveries
- provide a workload preview

Generating Expected Goods Receipt Documents

There are two basic methods of creating and generating expected goods receipt documents. In EWM, the transaction /SCWM/ERP_EGR_DELETE (report /SCWM/ERP_DLV_DELETE) can be run to request expected goods receipts from the ERP system. A variety of selection criteria can be used to indicate to the system what purchase order and/or production order data to select. This reports can do a mass

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deletion of existing expecting goods receipt documents in EWM and replace them with current expected goods receipt documents. This report is expected to be the normal or regular job that is run as part of expected goods receipt processing.

In the ERP system, transaction code /SPE/EGR (report /SPE/INB_EGR_CREATE) can also be used to select data from purchase orders and/or production orders to create the corresponding GRN and EGR documents in the EWM system. the following is an illustration of the process.

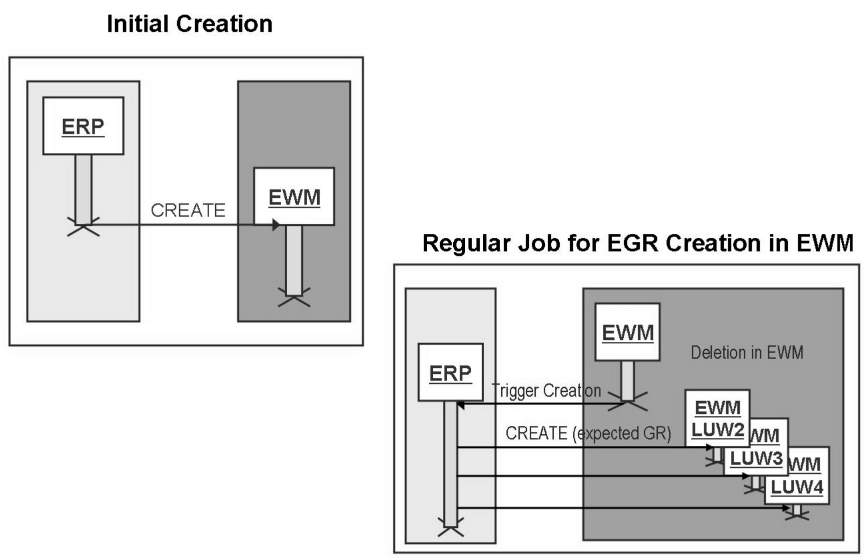

Figure 56: EGR Document Creation Process

The ERP transaction /SPE/EGR can be used to perform the initial creation of the expected goods receipt documents in EWM and transaction /SCWM/ERP_EGR_DELETE can be used for regular updating of the expected goods receipt documents. However, either report can be used to delete and/or generate expected goods receipts.

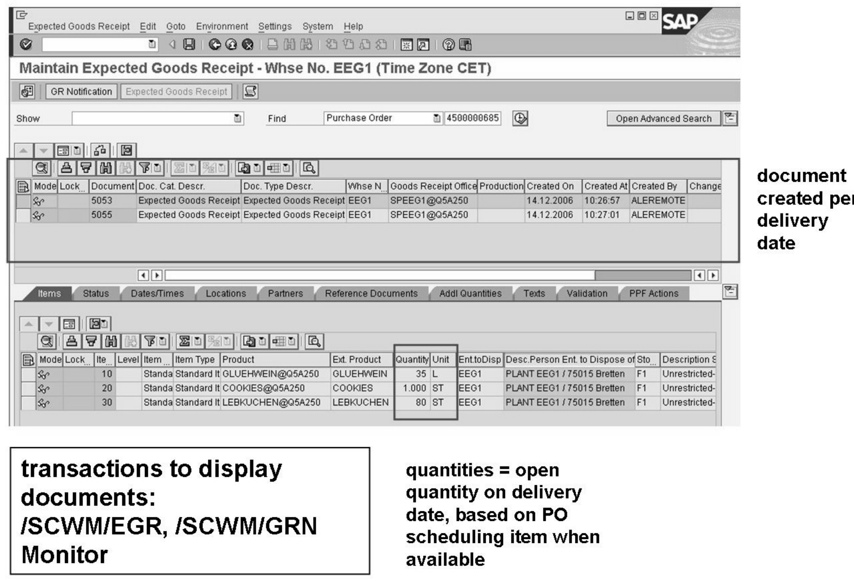

Figure 57: EGR Document

When EGR documents are created, the system will create one document per purchase order/production order per delivery date.

GR Workload List

A by-product of expected goods receipt processing is the ability to display via the Goods Receipt Workload List data that allows for the planning for products that will be received into the warehouse within the chosen time horizon.

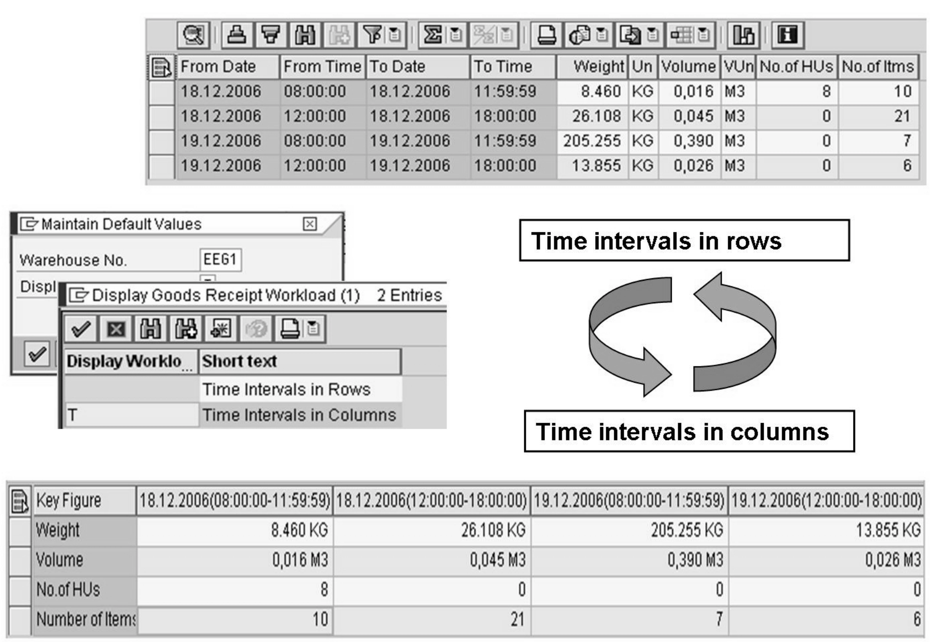

Figure 58: GR Workload List

The GR Workload List is executed from transaction /SCWM/GRWORK. It provide for time-dependent data aggregation based on inbound deliveries and expected goods receipts. Data shown on the report is aggregated at the following levels:

- Number of items
- Number of HU's (via a BAdI)
- Weight and Volume
- Customer-own fields (via BAdi)

Lesson Summary

You should now be able to:

- Understand the use of the expected goods receipts processes in receiving from purchase orders and production orders
- Describe the use of the Notification of Expected Goods Receipt and Expected Goods Receipt documents.
- Generate and Delete Expected Goods Receipts.
- Generate Inbound Delivery documents from Expected Goods Receipt documents.

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: QIE and EWM Quality Management

Lesson Overview

Quality Management in EWM uses the Quality Inspection Engine (QIE) to map inspection processes. In this lesson the concepts and functions provided by the QIE will be present. In addition, the concepts behind use of the QIE in EWM quality inspections processing will be covered. In particular, the counting quality process will be outlined.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the benefits and use of the QIE.
- Understand the underlying data model used by QIE.
- Explain the counting process used as a quality management function within EWM.

Business Example

One of the benefits of using EWM within IDES, AG is the ability to perform quality checks as part of the goods receipt process.

Quality Inspection Engine (QIE)

The introduction of the Quality Inspection Engine into the SCM environment represents a departure from the quality management (QM) function in SAP ERP. It is important to understand the “drivers”behind the creation of QIE. The illustration below contains the rational behind the development of a new quality management engine.

- **Current state**
  - mySAP ERP Quality Management (QM)
    - Comprehensive QM functions
    - Focus on logistics and manufacturing
    - Highly integrated in mySAP PLM/ERP
    - ~ 2800 customers / ~ 3300 installations / ~ 450.000 users
  - But …
    - Lack of services
    - No support of additional processes
    - No integration into new business applications like SCM, CRM
    - Not designed to be implemented in a heterogeneous system landscape
- **For the future: Create a "Quality Inspection Engine" (QIE)**
  - Provide QM services
  - Support QM processes in a heterogeneous system landscape
  - Expand QM functions into additional processes
  - Enable integration of mySAP ERP QM into new business applications

Figure 59: Why QIE?

The expected benefits of QIE are as follows:

- To enable common business practices and process innovation. This will allow supprt of new business processes such as EWM quality management.
- Increase business automation and process efficiency by providing more flexibility in quality management processes. Users can choose between "full-blown" or "lean" implementations of QM. Inspection rules can be configured for different business processes and organizational units.
- Provide deployment flexibility with the ability to adapt to a heterogeneous system landscape. This gives the ability to trigger quality inspections from a 3rd party system. In addition, for EWM the ability to have QM inspections in decentralized warehouses independent of ERP availability.
- Improve user productivity. QIE provides an application program interface (API) as a basis for state-of-the-art front ends (user interfaces).

With the introduction of QIE into the SCM system environment, support of quality management now exists within supply chain execution. It also insures the QM integration of the handling unit in a decentralized warehouse management system such as EWM. And, with QIE quality management processes are possible if a process does not start in the ERP system.

Architecture of QIE

Illustrated below is the architecture of the QIE in an EWM environment.

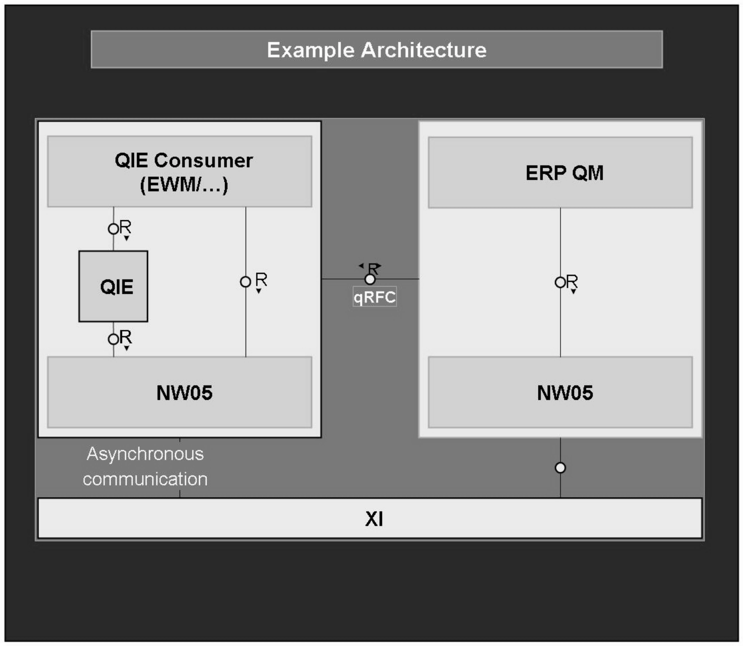

Figure 60: QIE Architecture

In the QIE architecture, the term **QIE consumer** is used to refer to an application that makes use of the QIE functionality. The QIE consumer is generally an independent system that is linked to the QIE via a qRFC and/or XI interface. But it can be a part of the consumer system, such as SCM 2007 (EWM). QIE is independent, however, from the ERP system. It can be connected to an external ERP system for a complete QM process.

The development platform for the QIE is the Web Application Server (WAS). QIE is an engine technically designed as an Add-On. EWM is the first consumer system and uses QIE as a required Add-On.

Inspection Data Model

In the diagram of the QIE inspection data model below are shown the relationships between the master data and the business data object that make up the model.

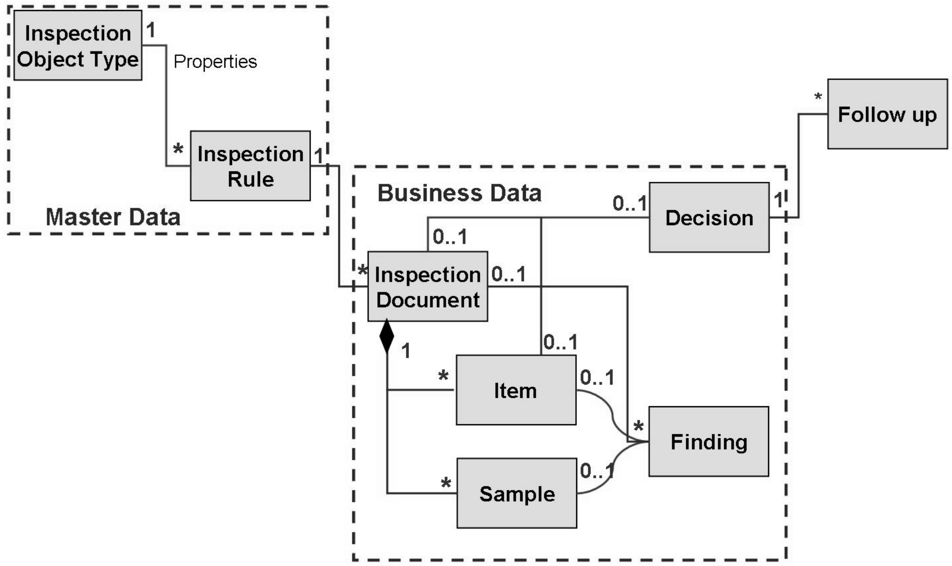

Figure 61: QIE Data Model for Inspection

Inspection object types define the software component, process, and object in which you can create inspection documents in the Quality Inspection Engine (QIE). The Inspection object types for EWM have been pre-created by SAP. In Customizing they are activated for use. The following is the inspection object types (IOT's)supported for EWM:

- Preliminary Inspection Inbound Delivery. Use of this IOT causes the system to automatically create an inspection document for checking complete deliveries.
- Preliminary Inspection Handling Unit. ● For each delivery of a complete commercial truck (with multiple deliveries), you can classify all HU's as “good” or “incorrect”. When you have classified all the HU's, the system automatically creates the HU inspection document. In doing this, it generates one inspection document for each delivery and one item for each HU in this inspection document. You can also decide this directly for the “good” HUs. You then manually process the “bad” HUs in an additional process in the inspection document.
- Counting Inbound Delivery. The system creates this inspection document automatically, depending on Customizing for the inspection document creation within inbound delivery processing. The system releases it when it creates it. Counting is always a 100% inspection, since counting samples is irrational.
- Q-Inspection Returns Delivery. This IOT is used to direct the inspection of customer returns.
- Q-Inspection Product/Batch Inbound Delivery. This IOT drives the inspection of individual products/batches being received into EWM.
- Q-Inspection Product/Batch Warehouse-Internal. This IOT is used to generate the inspection of products/batches that are already present in the warehouse.

Inspection rules are created and assigned to the inspection object types. They contain the guidelines for creating the inspection objects. Fundamentally, they contain the parameters that determine if an object (Inbound delivery, product, batch, HU, etc.) will be subject to a quality inspection and the scope of the check. Properties of the inspection rule are as follows:

- Sampling procedure to be used.
- Dynamic modification (e.g. skip lot according to ISO 2859-1)
- valuation mode (e.g. attributive inspection using non-conforming units)
- Document types (e.g. assignment of an inspection instruction)
- Required samples (type and number)

When an object is selected for inspection an **Inspection Document** is created. The purpose of the inspection document is to collect the data related to the inspection, such as specifications, results and decision. The inspection document also contains a list of the **items** inspected, data related to the **sample** such as sample quantity. The **finding** data describes the deviation from the requirements. **Follow-Up** actions are used to trigger follow-up processes such as putaway, scrapping, stock transfer or return delivery. Follow-up actions are only available for the quality inspection of products.

Within an EWM goods receipt process, it is possible to conduct more than one quality inspection. The diagram below shows a goods receipt process in which two inspections are performed. The first is a "pre-check" when the truck arrives. This is an overall check of the goods as received on the truck. The second quality inspection occurs at the HU level during the unloading process.

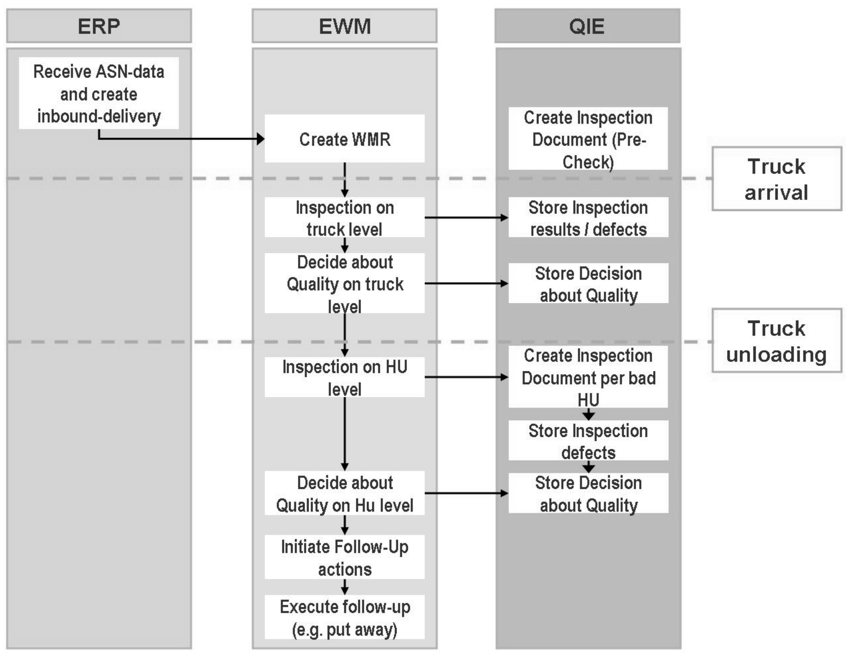

Figure 62: Example: GR from Purchasing Quality Checks

Counting

In this section we will explore a common quality management process used in many warehouses. This process is **counting**. Counting is a quality assurance measure in the goods receipt process used to insure consistency between the quantities entered in the system and the actual quantities. It is one of the inspection object types supported by QIE.

There are two forms of counting: Explicit Counting and Implicit Counting. **Explicit counting** is a formal method of counting that requires the use of a work center commonly called the "counting station." The system determines the location (St.Type, Section, Bin) for the counting station on the basis of the storage control settings. The illustration below is an example of how a work center is used for explicit counting in the putaway process.

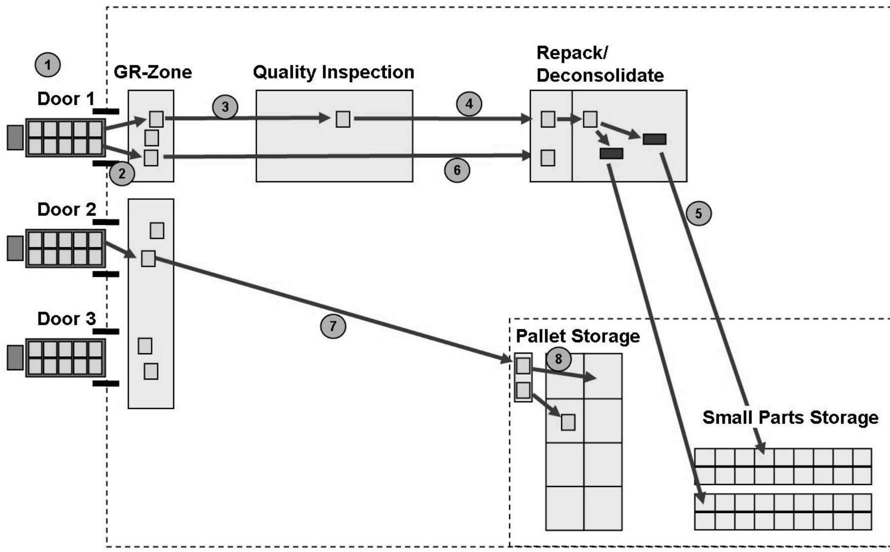

Figure 63: EWM GR Process with Quality Inspection

Explicit counting can only be used for handling units. The following graphic illustrates the data and process flow of explicit counting.

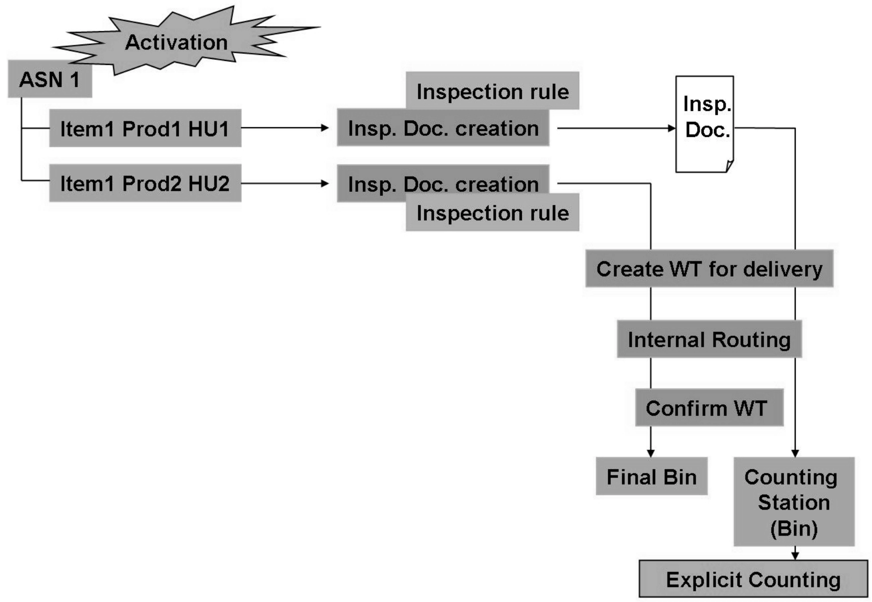

Figure 64: Counting Overview: Explicit Counting

Implicit counting is accomplished as part of the warehouse task processing. It does not use a counting station. If a difference is determined, the warehouse task is confirmed with differences and an exception code is entered. Implicit counting is only used for non-HU product quantities. From the illustration below Prod2 is not in an HU but has been determined by the inspection rule to be subject to counting. Prod2 will be counted and any quantity differences will be recorded in the warehouse task document when it is confirmed.

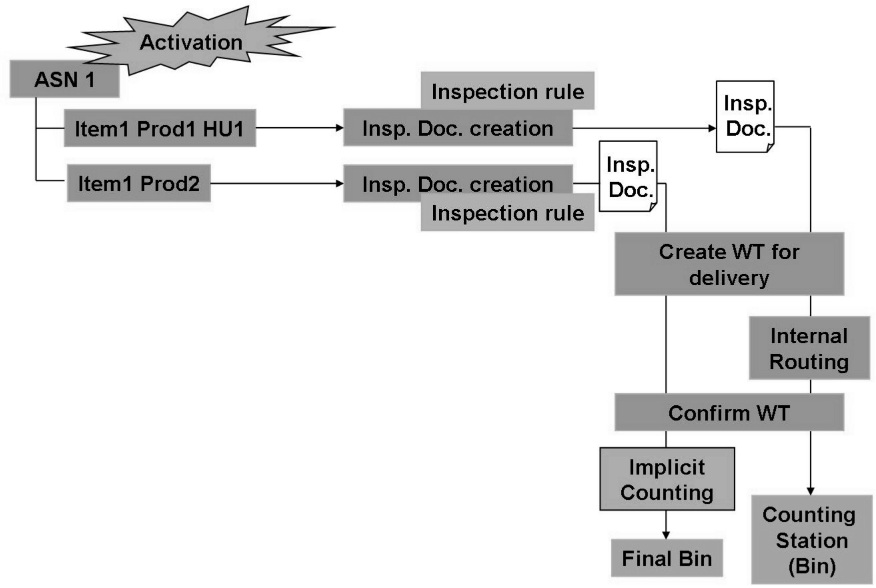

Figure 65: Counting Overview: Implicit Counting

Lesson Summary

You should now be able to:

- Describe the benefits and use of the QIE.
- Understand the underlying data model used by QIE.
- Explain the counting process used as a quality management function within EWM.

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: RFID and EWM

Lesson Overview

In addition to the bar code scanning support in the RF Framework, EWM now supports the use of RFID in both the goods receipt and goods issue processes. This lesson provides a basic overview of the RFID interface with EWM.

Lesson Objectives

After completing this lesson, you will be able to:

- Understand the basic concepts of RFID technology.
- Describe the basic architecture of an SAP Auto-ID infrastructure coupled with EWM.
- Explain how RFID tagged products can be received into EWM.

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Business Example

RFID technology use is spreading rapidly in many industries and as the net cost continues to decline, IDES, AG must be prepared to implement this technology.

RFID Basics

In this lesson some of the basic concepts and baseline knowledge related to RFID will be presented. But, the main focus of this lesson is on the support of RFID enabled processes in Extended Warehouse Management. Information in this lesson will be presented at a high level.

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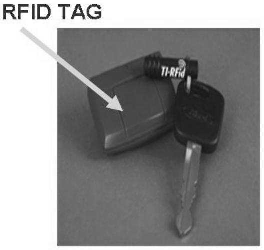
- Radio frequency identification (RFID) is a technology that exists for decades. At a simple level, it is a technology that involves tags that emit radio signals and devices called readers that pick up the signal.
- RFID tags (transponder) can be applied to cases, pallets or product items
- Tags can be read by scanners (devices), e.g. on shipping gates (stationary reader) or with a mobile RFID reader.



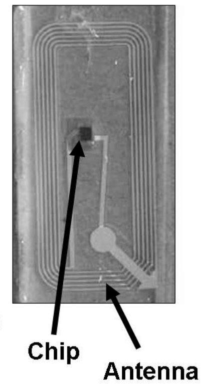


Figure 66: RFID in General

The term, "radio frequency identification" or RFID comes from the technology related to the tags that can be affixed to products or the packaging materials containing products. Information related to the tagged products such as product identification, quantity, descriptive information is electronically embedded in the tags. This is in contrast to bar-coded labels in which information is printed in a coded, machine readable form.

Unlike bar code technology, RFID technology is designed, in general, to make unsupervised reading possible. And, RFID technology allows multiple tags to be read at the same time; whereas, bar code scanning generally requires each item to be scanned individually.

There are two types of tags:

- Passive tags. They carry no on-board power, but derive it from the radio waves emitted by a reader.
- Active tags. They have an on-board power source and have a longer communication range, and, generally, more memory. But, they have a higher cost.

The reach of RFID signals depends on the kind of chip, the frequency, etc. Passive tags normally have a range of less than 10 meters; whereas, active tags can have ranges > 10 meters. In the next graphic you will see an illustration of a basic RFID system.

The graphic below shows the fundamental functioning:

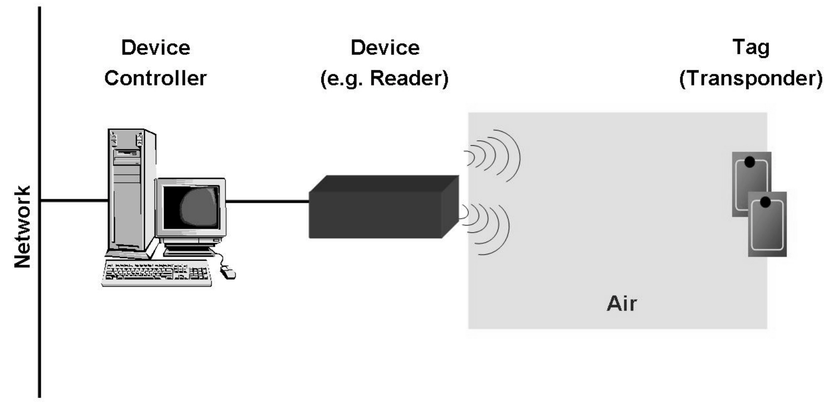


Figure 67: RFID: Technical view

The information that is electronically encoded on a tag is placed there using a process called "tag commissioning"The tag commissioning is normally done as part of the goods issue process before the product is shipped from the warehouse. After the tags are commissioned they can be read by a tag reading device. Data read from the tags are sent from the reader to a device controller and from the device controller the information can be transferred to the appropriate application server.

Overall there are many benefits to using RFID but there are some "challenges" as pointed out in the graphic below.

Compared to e.g. bar codes the usage of RFID tags brings about many advantages:

- An unsupervised identification possible: RFID tags can be read in any orientation without line of sight required
- Multiple reads avoided by anti-collision algorithms
- RFID can be used in harsh environments
- Possible to read from and write to tags =>information stored on the tag is dynamic
- Amount of stored data can be relatively big
- Tags can be reused

… but also some "challenges":

- Tag prices
- Technology restrictions (i.e. metals, liquids for item level)
- Legal / Privacy / Health concerns

Figure 68: RFID: advantages/challenges

When a tag is commissioned, it is encoded with an Electronic Product Code (EPC) that is used in a similar fashion as a Handling Unit. And like a handling unit, the EPC is associated with dynamic data related to the product (s) for which the tag has been commissioned. There are a number of industry and global standards for EPC's. The following graphic illustrates a few of them.

Header	Numbers
31.0000A8900016F000169DC0	

– The Electronic Product Code (EPC) is a unique number that identifies a specific object (not just types of objects) in the supply chain. It can be easily stored on a RFID tag. Once the EPC is retrieved from the tag, it can be associated with dynamic data such as from where an item originated or the date of its production.

– EPC is only an umbrella term. The header determines which kind of EPC is actually used on a tag:

- SGTIN-96,
- SSCC-96,
- SGLN-96, …

Depending on the “Header” the “Numbers” part consists of several different fields

Figure 69: Electronic Product Code (EPC)

EWM and RFID integration

To support RFID in the warehouse processes, EWM is integrated with the SAP Auto-Id Infrastructure (AII). SAP Auto-ID Infrastructure (SAP AII) is an out-of-the-box solution that integrates RFID technology with existing SAP logistics systems and delivers a generic infrastructure that enables integration with heterogeneous system landscapes. The solution consists of one or more SAP AII systems that can be implemented on various types of platforms, from PDA’s through workstations to large servers. SAP AII Integrated with Supply Chain Execution offers the following system integration options:

- Integration with ERP systems
- Integration with SAP Event Management in SAP SCM
- Integration with SAP EWM

SAP Auto-ID Infrastructure (SAP AII) supports the following processes with ERP:

- Outbound Processing ("Slap and Ship")
- Flexible Delivery Processing
- Generation of Pedigree Notifications
- Returnable Transport Items Processing

EWM uses AII as service provider for communication with RFID hardware (reader and printer) and decoding/encoding know how. Only a small amount of master data is needed in AII 5.1. The business logic is completely in EWM. The system uses configured AII knowledge: Hardware connectivity, rule engine and support of all EPC and U.S. Department of Defense (DoD) standards.

RFID processing using the SAP AII includes processing of goods receipts with RID tags. At the unloading point, the RFID tagged merchandise can be scanned by a gate reader. The scanned data is passed from the device controller to the AII system for decoding into task related data processed by EWM. The following illustration shows this process.

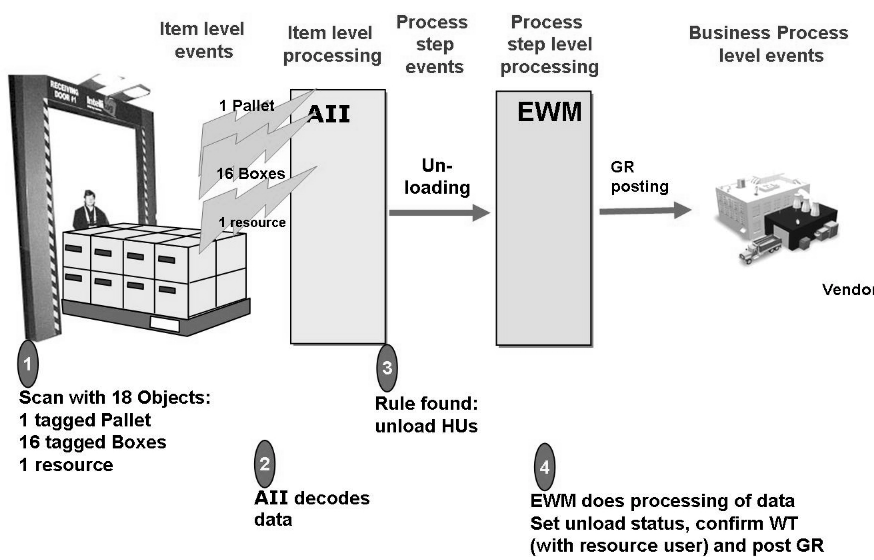


Figure 70: Inbound Process with RFID in EWM

For goods issues in the outbound delivery process, EWM supports the RFID environment by providing the input to tag commissioning and label printing after the goods have been pick, packed and prepared for shipment. As the goods are loaded they can pass though a RFID gate reader that scans the tags and confirms the loaded quantity. Information can then be passed to the ERP system to trigger the sending of the ASN to the customer. This process is illustrated in the following graphic.

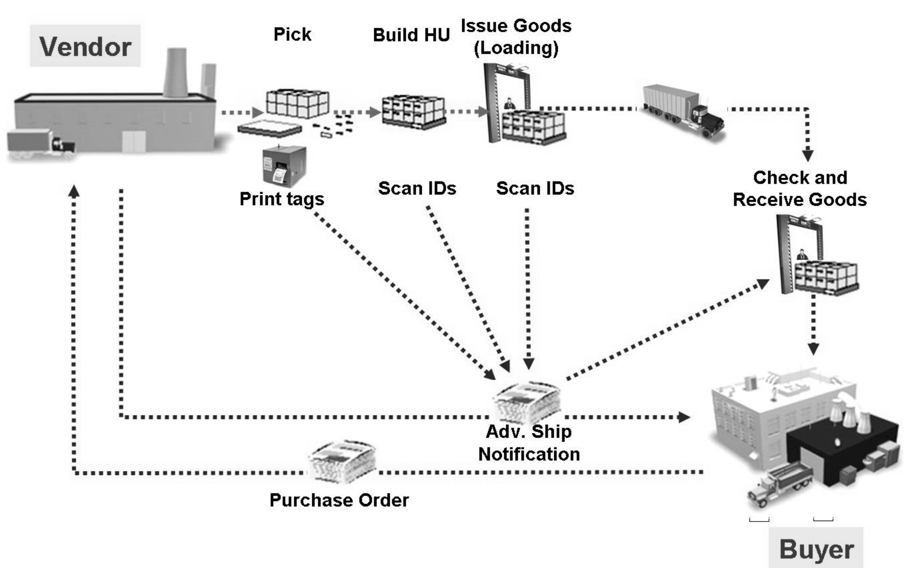


Figure 71: Order Process with RFID in EWM

Lesson Summary

You should now be able to:

- Understand the basic concepts of RFID technology.
- Describe the basic architecture of an SAP Auto-ID infrastructure coupled with EWM.
- Explain how RFID tagged products can be received into EWM.

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

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Lesson: Slotting and Rearrangement

Lesson Overview

A very important function for many warehouses/DC's, slotting and rearrangement is a key function in Extended Warehouse Management. In this lesson the key concepts and functions provided by the slotting and rearrangement processes will be presented.

Lesson Objectives

After completing this lesson, you will be able to:

- Define the terms “slotting” and “rearrangement”.
- Describe the slotting and rearrangement processes.
- Perform slotting and rearrangement in the EWM system.

Business Example

Periodically, IDES, AG wants to relocate products to locations that are more efficient for picking based on the forecasted demand.

Slotting

Slotting is the process of placing goods into a warehouse in a way that ensures the most efficient storage and picking of goods. Slotting determines optimal putaway parameters like storage type, storage section and bin type for a product per warehouse. These planning values are stored in product master and can be activated at any point of time.

Slotting automatically determines a storage concept for a product. It does this by determining the underlying storage parameters that control the putaway of the product.

The slotting process can use a variety of data to determine the putaway control parameters. It can use the following types of data:

- Product data
- Storage requirement data
- Packaging data
- Demand forecasts

During slotting, the system determines the following storage parameters and stores them in the product master:

1. Putaway control indicator (and, optionally, stock removal control indicator)
2. Maximum quantity in storage type
3. Storage section indicator
4. Storage bin types

The system always performs step 1. Steps 2 to 4 are optional. Steps 1, 3, and 4 are performed using the condition technique. Step 4 can also be performed using storage bin type determination rules.

Slotting takes into account master data that is not dependent on the execution process. If the putaway process for a product is dependent on execution parameters, this dependency is taken into account later on during storage bin determination. This does not, however, have an effect on the results of slotting.

An example of product related data that can be used as input for slotting is shown below.

Product related information		
	Field	Value
1	storage condition	3 (not outside)
2	rotate indicator	Y
3	theft-prone	N
4	handling code	200 (metal)
5	demand quantity	700 (per month)
6	number of order lines	50
7	recommended storage quantity	2100
8	storage class	13 (Non-inflammable solides)
9	water pollution classification	1 (Minimal water pollution danger)
10	nesting factor(s)	0.5
11	package type	Default Packaging material (Wooden pallets)
12	material length	0.05 m
13	material width	0.01 m
14	material heigth	0.01 m
15	material weigth	10 g
16	packaging length	0.80 m
17	packaging width	1.0 m
18	packaging height	1.0 m
19	packaging weight	75 kg

Figure 72: Example of Product Related Data

To be able to calculate parameters such as the maximum quantity in the storage type, slotting needs requirement data or forecasted demand for the relevant product. This requirement/demand data can also be used when slotting is used to relocate products based on whether they are “fast” or “slow” moving. This requirement/demand data can come from SAP Advanced Planning and Optimization (APO). Extended Warehouse Management (EWM) stores this information locally in the product master (on the Slotting tab page, Requirement/Demand Data area).

You can also fill these local attributes in EWM with data from other sources. To do this, you have several processing options in the product master, for example, manual input or mass maintenance.

A consideration when using APO planning data: APO and EWM manage requirement data at different organizational levels. APO performs planning processes for locations of the type Plant. EWM stores requirement data at warehouse number level. Slotting assumes that a 1:1 relationship exists between the SAP APO location and the EWM warehouse number. If the relationship is not 1:1, you can use Business Add-Ins (BAdIs) for the conversion.

Slotting Process

The overall slotting process can be seen in the figure below.

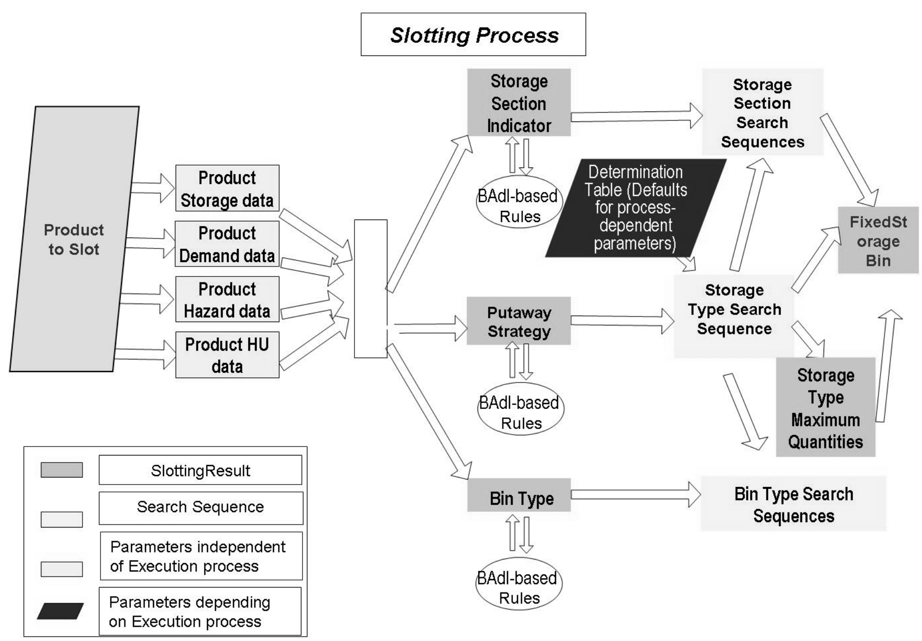

Figure 73: Slotting Process

As illustrated in the diagram above, in the slotting process the determination data is obtained from the system. Then, using the condition technique as the primary driver, the indicators are determined and stored in the warehouse product master.

All the product attributes that form the slotting results exist twice in the product master:

- As active values
- As planned values (can be recognized due to their name)

The exact values that are updated when the results are updated depends on the save mode that you chose when you called slotting.

The save options are as follows:

- **Do Not Save Results** - It is recommended that you use this option if you have performed slotting interactively and you want to analyze the results. If you have performed slotting in the background, you can analyze the log, but you cannot see the results directly.
- **Save Results** - (The system only updates the planned values in the product master.) Depending on the storage bin and stock situations, it can be useful to save the results of slotting as planned values only. The system only keeps the planned values for a possible activation, and does not use them in storage processes.
- **Save and Activate Results** - (The system updates both the planned values and the active values in the product master.) The system updates the results of slotting in the fields for the planned values and the active values in the product master. These new values are then available immediately for all storage processes.

Rearrangement

Rearrangement: allows you to optimize space in a warehouse by moving stock to optimal locations. Rearrangement is based on slotting. Slotting allows you to evaluate the degree of optimality of a material in a location.

In rearrangement, the system compares the current storage type, storage section, and storage bin type with the optimal parameters from slotting. When doing this, it analyzes how well suited the current parameters (storage type, storage section, and storage bin type) are to the product. If they are not optimal, the system proposes an optimum storage bin.

In the following illustrations the process of rearrangement is illustrated. The first figure shows the warehouse before rearrangement takes place. The warehouse has an area for fast-moving items (golden zone). It is positioned along the central aisle of the warehouse to ensure that the picker can reach it easily. The area for slow-moving items is positioned behind this area.

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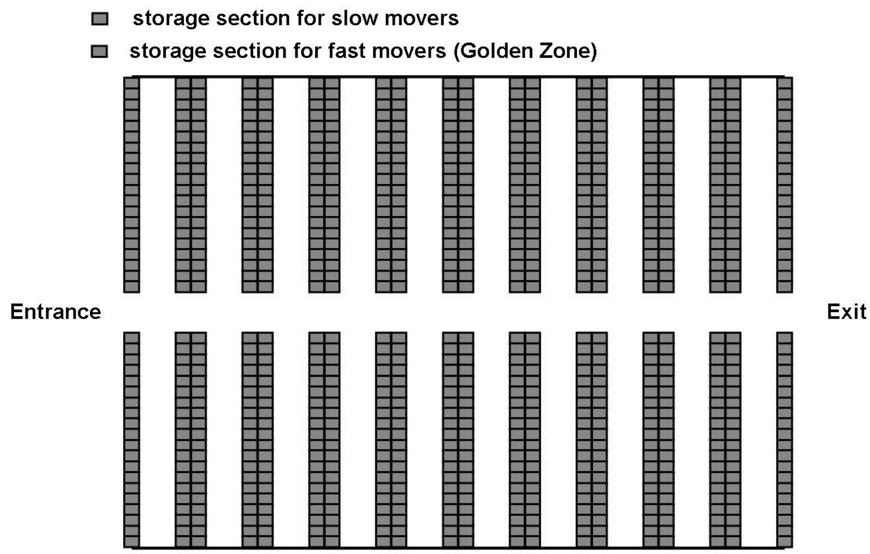

Figure 74: Golden Zone for Fast Movers

The second figure shows a typical pick path before rearrangement takes place. Since some of the storage bins containing the products to be picked are situated a long way from the central aisle in the area for slow-moving items, the picker sometimes has to drive a long way down the side aisles to pick the required products

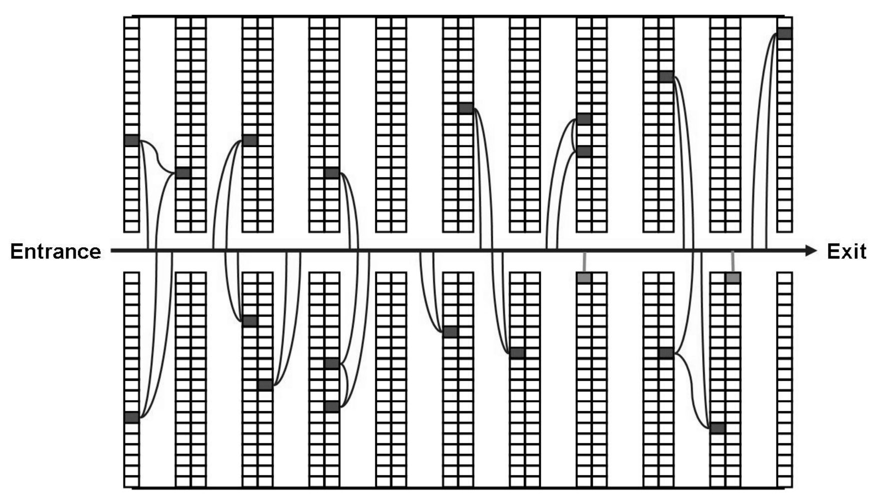

Figure 75: Pick Order Before Optimization

The third figure shows how the system tries to shorten this long pick path during rearrangement by proposing that the fast-moving products are moved to the area for fast-moving items.

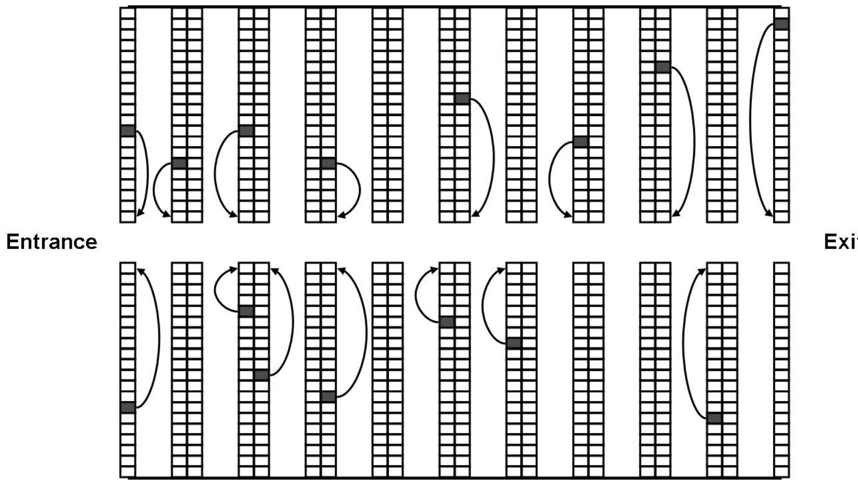

Figure 76: Rearrangement Execution

The fourth figure shows the pick path after rearrangement has taken place. During picking, fast-moving items are often picked. Since these are now closer to the central aisle, the pick path is shorter. Now the picker has to go down a side aisle less frequently to pick products.

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Exercise 12: Slotting

Exercise Objectives

After completing this exercise, you will be able to:

- Perform the slotting process.
- Describe the slotting process and master data required.

Business Example

Periodically the slotting process will be run to insure that products are in the correct location in the warehouse for the most efficient putaway and picking processing. Products that are pilferable should always be stored in storage type 0020.

Task:

Review the condition records required for slotting your products and then perform a slotting run.

1. Review the condition records to be used in the slotting of your products.
2. Check product T-EW01-## to ensure that the demand forecast is present in the slotting data tab.
3. Now, run the slotting process.

Solution 12: Slotting

Task:

Review the condition records required for slotting your products and then perform a slotting run.

1. Review the condition records to be used in the slotting of your products.

   a) Choose *Extended Warehouse Management → Master Data → Slotting → Condition Maintenance for Slotting*

   b) Enter **Z_SLOT** in the *MaintenanceGrp*. Choose *Execute*.

   c) Select the field *Condition Type* from the navigation pane on the left.

   d) Choose the icon *Select Records*.

   e) In the popup screen, under condition type, enter *. choose *Execute*.

   f) You will see the condition records for **PUTW** and **SECT**. PUTW will determine the putaway control indicator for products in warehouse **E100** with the *pilferable* indicator set.

   SECT with requirements indicator **0001** will cause the section indicator to be set to **SLOW** , requirements indicator **0002** will determine the section indicator **MED**, while requirements indicator **0003** will determine the section indicator **FAST**.

2. Check product T-EW01-## to ensure that the demand forecast is present in the slotting data tab.

   a) Choose *Extended Warehouse Management → Master Data → Product → Maintain Warehouse Product*. Enter product **T-EW01-##** in the Product Number. If required, enter **E100** in the *Warehouse No.* and **SPCW** in the *Party Entitled to Dispose*.

   b) Choose *Display*.

   c) Choose the *Slotting* tab. There should be a *Demand Quantity* of **2000**. This represents the forecasted demand for the next six months. Slotting will use this data to determine the storage section.

   d) Choose *Exit* twice.

Continued on next page

3. Now, run the slotting process.
   a) Choose *Extended Warehouse Management → Master Data → Slotting → Slot Products for Warehouse*.
   b) On the Slotting screen: Choose *Multiple Selection* for Products

      . Enter your products **T-EW01-##** and **T-EW03-##** in the *Select Single Values* list. Choose *Copy* .

      In *Location Selection,* enter Warehouse **E100** and *Party Entitled to Dispose* **SPCW**.

      Under Select Slotting Steps make sure only the following settings are mad:

      - **Determine Requirement Quantity Indicator**
      - **Determine Putaway Control Indicator**
      - **Specify Storage Section Indicator**
   c) Choose *Execute* .
   d) Select the lines and choose *Execute* again.
   e) In the log, open the flags under **Procure Requirement Data**, **Determine Requirement Indicator**, and **Determine Putaway Control Indicator**. Under *Storage Type*, see **Determine Section Indicator**.

      The result: the Requirement Indicator should be **0002**. The Storage Section should be **MED** and the Putaway Control Indicator is **0020**.

Lesson Summary

You should now be able to:

- Define the terms “slotting” and “rearrangement”.
- Describe the slotting and rearrangement processes.
- Perform slotting and rearrangement in the EWM system.

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Unit Summary

You should now be able to:

- Describe the goods receipt process flow between the ERP system and the EWM system.
- Outline the use of the inbound delivery document in the goods receipt process.
- Name the EWM documents used to facilitate the physical putaway movements in the warehouse.
- Describe the characteristics of the delivery documents used in EWM inbound delivery processing.
- Explain the use of the warehouse task document in the goods receipt process.
- Understand the difference between a product task and an HU task in EWM.
- Create inbound notification and inbound delivery documents in EWM.
- Create warehouse task and warehouse order documents.
- Outline the three basic methods used to direct goods movements in EWM.
- Define the basic putaway functions supported in EWM.
- Describe process-oriented storage control
- Explain layout-oriented storage control and give examples of when it would be appropriate to use it.
- Understand the use of the expected goods receipts processes in receiving from purchase orders and production orders
- Describe the use of the Notification of Expected Goods Receipt and Expected Goods Receipt documents.
- Generate and Delete Expected Goods Receipts.
- Generate Inbound Delivery documents from Expected Goods Receipt documents.
- Describe the benefits and use of the QIE.
- Understand the underlying data model used by QIE.
- Explain the counting process used as a quality management function within EWM.
- Understand the basic concepts of RFID technology.
- Describe the basic architecture of an SAP Auto-ID infrastructure coupled with EWM.
- Explain how RFID tagged products can be received into EWM.
- Define the terms “slotting” and “rearrangement”.
- Describe the slotting and rearrangement processes.
- Perform slotting and rearrangement in the EWM system.

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Test Your Knowledge

1. A requirement to enable the creation of inbound delivery documents in the SAP ERP system is that the ____ must be set on the line item of each inbound delivery relevant material.

   Fill in the blanks to complete the sentence.

2. What data in the SAP ERP system triggers the goods receipt processing in EWM?

   Choose the correct answer(s).

   □ A The transfer requirement.
   □ B The transfer order.
   □ C The inbound delivery document creation.
   □ D Posting changes

3. What document in EWM contains the same basic information as the inbound delivery document in SAP ERP?

   Choose the correct answer(s).

   □ A The inbound delivery document.
   □ B The inbound delivery notification document.
   □ C The inbound delivery requirement document.
   □ D The transfer requirement.

4. Which of the following processes are considered part of the EWM inbound proces?

   Choose the correct answer(s).

   □ A Slotting
   □ B Deconsolidation
   □ C Value-Added Services (VAS)
   □ D Quality checking
   □ E Wave processing

5. What document in EWM represents an executable work package?

   Choose the correct answer(s).

   □ A Transfer order document
   □ B Inbound delivery document
   □ C Warehouse task
   □ D Warehouse order

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6. what document in EWM serves as the reference for the warehouse tasks that move the received products to their putaway storage bins?

Choose the correct answer(s).

- □ A Inbound delivery notification document
- □ B Warehouse order document
- □ C Transfer order document
- □ D Inbound delivery document
- □ E Inbound delivery order

7. Which of the following are considered warehouse activities?

Choose the correct answer(s).

- □ A picking
- □ B putaway
- □ C posting changes
- □ D stock transfer within the warehouse
- □ E scrapping

8. What document is used to execute goods movements in EWM?

Choose the correct answer(s).

- □ A transfer order
- □ B warehouse task
- □ C warehouse request
- □ D warehouse order

9. What are the two types of warehouse tasks?

Choose the correct answer(s).

- □ A Location tasks
- □ B Stock movement tasks
- □ C Product tasks
- □ D Transfer tasks
- □ E HU tasks

10. In warehouse order creation, what function can be used to limit the amount of work assigned to a warehouse order?

    Choose the correct answer(s).

    □ A Sort rules
    □ B Consolidation groups
    □ C Filters and limit values
    □ D Activity areas

11. What are the two basic methods of storage control in EWM/

    Choose the correct answer(s).

    □ A Combined
    □ B Process-oriented
    □ C HU managed
    □ D Layout-oriented

12. In EWM, you must always use storage control in the putaway process.

    Determine whether this statement is true or false.

    □ True
    □ False

13. HU's must always be putaway using storage control.

    Determine whether this statement is true or false.

    □ True
    □ False

14. What is the process in EWM that allows you to trigger a goods receipt from EWM?

    Choose the correct answer(s).

    □ A Expected goods receipt
    □ B External inbound delivery
    □ C External inbound delivery notification
    □ D Expected inbound delivery

15. The ______________________________ provides a time-dependent data aggregation of anticipated inbound products based on inbound deliveries and expected goods receipts.

    Fill in the blanks to complete the sentence.

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16. What are the possible reference document in ERP for the notification of goods receipt document?

Choose the correct answer(s).

- □ A Transfer requirement
- □ B Production order
- □ C Purchase requisition
- □ D Purchase order
- □ E Material requirement

17. What are some of the characteristics of the expected goods receipt documents?

Choose the correct answer(s).

- □ A They are temporary.
- □ B They are permanent documents and can be archived.
- □ C They only exist in EWM.
- □ D They are used to create inbound delivery documents in EWM.
- □ E They are used to execute goods receipt processing in EWM.

18. At present, the Quality Inspection Engine (QIE) can only be used in inbound processing pf products?

Determine whether this statement is true or false.

- □ True
- □ False

19. What are some of the characteristics of QIE?

Choose the correct answer(s).

- □ A QIE can be run in a decentralized mode.
- □ B QIE is a component of EWM.
- □ C QIE supports the counting function in EWM.
- □ D A number of inspection object types have been pre-defined by SAP for use in EWM.

20. What are the two forms of counting?

Choose the correct answer(s).

- □ A Direct and Indirect
- □ B Implicit and Explicit
- □ C Internal and external
- □ D Cycle counting and continuous

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21. Which of the following statements are true with respect to explicit counting?

Choose the correct answer(s).

- □ A Can only be used with HU's
- □ B Cannot be used with HU's
- □ C Requires the use of a work center
- □ D requires the creation of an explicit counting control document.

22. What are the two types of tags in use today in RFID?

Choose the correct answer(s).

- □ A passive
- □ B cpu-direct
- □ C active
- □ D hard-wired
- □ E local

23. What SAP component supports RFID processing in EWM?

Choose the correct answer(s).

- □ A Auto RFID (ARFID)
- □ B Automatid Input Identification (AII)
- □ C Active ID Identification (AII)
- □ D Auto-Id Infrastructure (AII)

24. What putaway parameters can the slotting process determine?

Choose the correct answer(s).

- □ A Storage section
- □ B Storage type
- □ C Activity type
- □ D Bin type
- □ E Activity area

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25. What types of data can the slotting process use to determine the putaway control parameters?

    Choose the correct answer(s).

    □ A Storage bin quants

    □ B Product data

    □ C Packaging data

    □ D Demand forecasts/requirements

    □ E Storage section

26. Before the rearrangement process can be run slotting must be completed.

    Determine whether this statement is true or false.

    □ True

    □ False

Answers

1. A requirement to enable the creation of inbound delivery documents in the SAP ERP system is that the confirmation control key must be set on the line item of each inbound delivery relevant material.

   Answer: confirmation control key

   The confirmation control key can be set manually at the time the purchase order is created, or it can be set up to be entered automatically based on settings in the vendor master or the vendor info record or from Customizing.

2. What data in the SAP ERP system triggers the goods receipt processing in EWM?

   Answer: C

   When an inbound delivery document is created in the SAP ERP system and one or more materials are EWM relevant, the inbound delivery document data will be replicated to EWM.

3. What document in EWM contains the same basic information as the inbound delivery document in SAP ERP?

   Answer: B

   The ERP inbound delivery document is replicated to EWM as the inbound delivery notification document.

4. Which of the following processes are considered part of the EWM inbound proces?

   Answer: A, B, C, D

   Wave processing is an EWM outbound process.

5. What document in EWM represents an executable work package?

   Answer: D

   The warehouse order represents an amount of work to be carried out by a warehouse resource.

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6. what document in EWM serves as the reference for the warehouse tasks that move the received products to their putaway storage bins?

   Answer: D

   The inbound delivery document in EWM in the warehouse request document for the inbound process.

7. Which of the following are considered warehouse activities?

   Answer: A, B, C, D, E

   All are examples of warehouse activities.

8. What document is used to execute goods movements in EWM?

   Answer: B

   The warehouse task is created for all goods movements in EWM.

9. What are the two types of warehouse tasks?

   Answer: C, E

   Product tasks are used to move products in EWM. HU tasks are used to move products that are in HU's.

10. In warehouse order creation, what function can be used to limit the amount of work assigned to a warehouse order?

    Answer: C

    Filters and limit values control how many warehouse tasks are assigned to a warehouse order. They are part of the warehouse order control rules configuration.

11. What are the two basic methods of storage control in EWM/

    Answer: B, D

    Process-oriented storage control is used to move the products in the goods receipt process considering only the process step requirements. layout-oriented storage control takes into consideration the physical locations of the process steps.

12. In EWM, you must always use storage control in the putaway process.

    Answer: False

    You can use direct putaway if the product being putaway does not have any processing requirement other than to be placed into a storage bin.

13. HU's must always be putaway using storage control.

    Answer: False

    Process-oriented storage control requires the use of handling units. layout-oriented storage control requires the use of HU's unless ID points are used in the process.

14. What is the process in EWM that allows you to trigger a goods receipt from EWM?

    Answer: A

    The expected goods receipt process allows you to create a goods receipt process from EWM rather than from ERP.

15. The GR Workload List provides a time-dependent data aggregation of anticipated inbound products based on inbound deliveries and expected goods receipts.

    Answer: GR Workload List

16. What are the possible reference document in ERP for the notification of goods receipt document?

    Answer: B, D

    The purchase order and the production order in the SAP ERP system can be used as source documents for the notification of goods receipts.

17. What are some of the characteristics of the expected goods receipt documents?

    Answer: A, C, D

    The expected goods receipt documents are temporary documents and are used only to plan and create the EWM inbound delivery documents.

18. At present, the Quality Inspection Engine (QIE) can only be used in inbound processing pf products?

    Answer: True

    There is no support at present for the use of QIE in the goods issue process.

19. What are some of the characteristics of QIE?

    Answer: A, C, D

    QIE is technically a separate system that is used by EWM for certain quality processes in goods receipt processing.

20. What are the two forms of counting?

    Answer: B

    The implicit and explicit counting processes are quality checks to make sure the correct quantity of the product has been received.

21. Which of the following statements are true with respect to explicit counting?

    Answer: A, C

    Explicit counting can only be used with products in HU's and it requires the use of a work center.

22. What are the two types of tags in use today in RFID?

    Answer: A, C

    RFID tags can be divided into two groups: active and passive.

23. What SAP component supports RFID processing in EWM?

    Answer: D

    The SAP component that supports RFID processing is the Auto-Id Infrastructure.

24. What putaway parameters can the slotting process determine?

    Answer: A, B, D

    Slotting can be used to determine the key parameters used to place a product in its optimal location in the warehouse.

25. What types of data can the slotting process use to determine the putaway control parameters?

    Answer: B, C, D

    The slotting process can use a variety of data to determine the putaway control parameters.

26. Before the rearrangement process can be run slotting must be completed.

    Answer: True

    Slotting must be run and completed before rearrangement can be performed.

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Unit 6

Goods Issue Process

Unit Overview

In this unit we will cover the overall goods issue process in Extended Warehouse Management. Triggered by the creation of an EWM-relevant outbound delivery document, the goods issue process includes the picking, miscellaneous internal warehouse processes such as packing and loading and the goods issue inventory update. Explained in this unit is the EWM documents that are used to facilitate the physical movement of the goods through the warehouse in the goods issue process.

Unit Objectives

After completing this unit, you will be able to:

- Explain the data flow from the ERP system to EWM for the outbound process.
- Describe the structure of the outbound delivery document.
- Name the outbound delivery documents that are created in EWM .
- List the EWM documents used in outbound processing.
- Describe the use of the EWM outbound delivery documents.
- Describe the use of Direct Delivery documents in EWM.
- Explain delivery splitting in EWM
- Outline the basic process of warehouse order creation.
- Describe the difference between process and layout storage control.
- Explain direct storage control for stock removal.
- Name the process steps commonly used in process storage control.
- Describe the EWM wave management function.
- Explain the use of the wave template
- Describe the use of automatic wave assignment and the technique used to implement it.
- List examples of value-added services
- Describe how value-added services are integrated into EWM.

- List the levels of a value-added services order.
- Understand the kit-to-order and kit-to-stock processes in Extended Warehouse Management.
- Define the process flow of kit-to-order.
- Outline the processing characteristics of kit-to-stock.]
- Understand the overall concept of replenishment control.
- Describe the data that can influence replenishment of a warehouse product.
- List and describe the types of replenishment control.
- Define the requirements for using serial numbers in EWM.
- Describe the serial number requirement types
- Understand the overall support of serialized products in EWM

Unit Contents

Lesson: Outbound Delivery Processing

Lesson Overview

In this lesson an overview of the basic delivery processing between the ERP System and Extended Warehouse Management (EWM) will be outlined. Information required by EWM for goods issue processing is communicated from the ERP system though the use of the outbound delivery document. This lesson will present the data flow from the ERP system to EWM for the goods issue process.

Lesson Objectives

After completing this lesson, you will be able to:

- Explain the data flow from the ERP system to EWM for the outbound process.
- Describe the structure of the outbound delivery document.
- Name the outbound delivery documents that are created in EWM .

Business Example

Sales orders from either CRM or the ERP system will result in the creation of outbound deliveries when the ordered materials are due for delivery. The materials will be picked, packed and shipped using the Extended Warehouse Management system.

The Sales Order Process

It is important to understand the overall sales order process and how the shipping process using the outbound delivery fits into this process. The sales order process, in industry terms, the “order-to-cash process is illustrated in the figure below.”

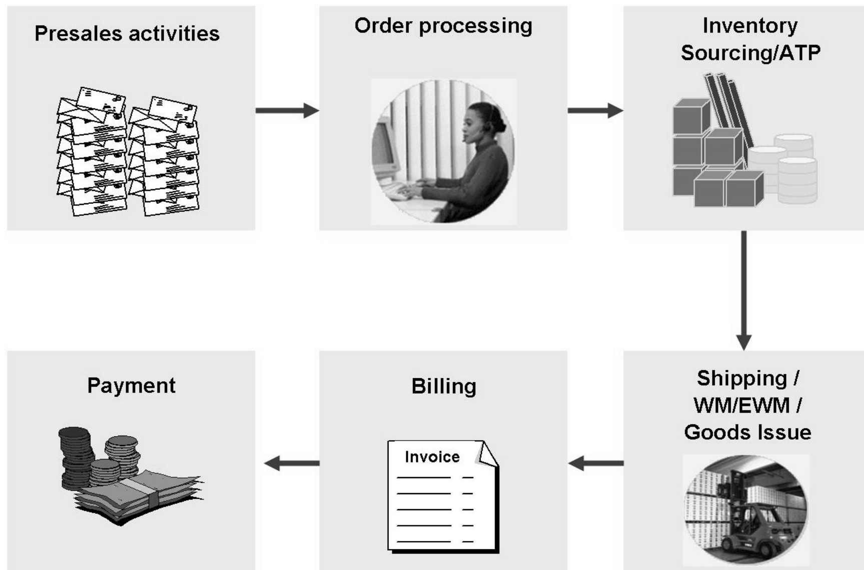

Figure 77: Sales Order Processing

In the ERP system, sales and distribution processing is subdivided into the following areas: sales support, sales, inventory sourcing/available-to-promise, shipping, and billing. Every sales activity made in one of these areas is documented by means of a sales document. Various business transactions in sales, shipping, and billing can be mapped by means of specially configured document types. Each document is assigned an overall status that indicates the processing stage that the document has reached. The overall status is determined from the various statuses in the document. These show what stage the individual steps that make up the sales activity have reached.

Sales and distribution processing interfaces with several other application components such as Materials Management, Financial Accounting and Controlling in the ERP system. In addition, the SD processing can interface to decentralized applications such as SAP Customer Relationship Management (CRM, APO Global Available to Promise (GATP) in APO and Extended Warehouse Management (EWM).

There are certain functions within EWM that require the use of certain external SAP applications. For example, kit-to-order requires the use of CRM for the creation of orders containing kits to be assembled in EWM for shipping. Another function, dynamic route determination, requires the use of Global Available-to-Promise in the Advanced Planning and Optimization (APO) application component.

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Shipping is a follow-on activity to sales. In the Shipping component, you can perform a range of shipping activities such as outbound delivery creation, EWM picking and packing and printing of shipping documents and transportation planning and execution. All of these activities are based on the outbound delivery document. (outbound delivery).

Outbound Processing Document Overview

A range of documents are used in the SAP System to map the individual steps in the outbound/goods issue process. These documents contain relevant information on the business transactions. The various documents represent the individual business processes. The following figure illustrates the key business documents used in the outbound process.

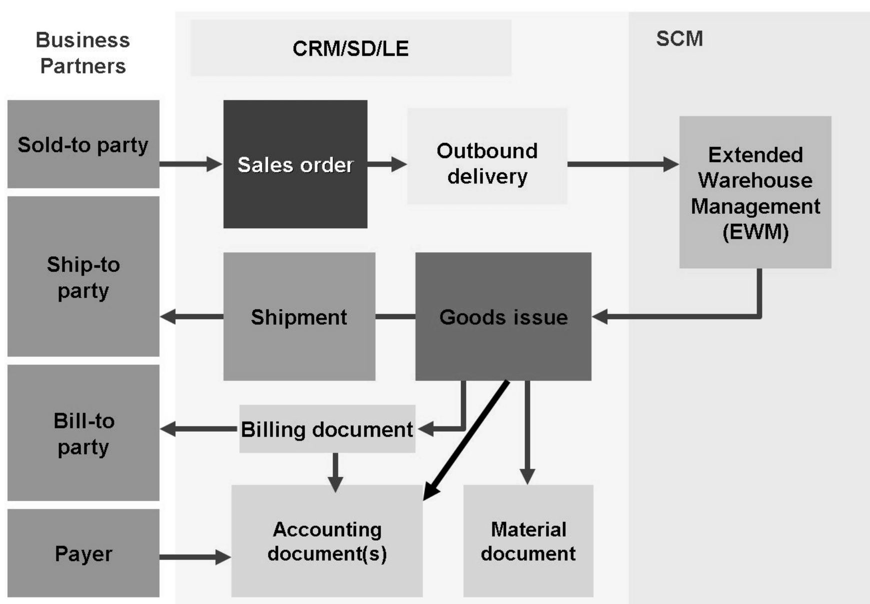

Figure 78: Outbound Process: Document Overview

Sales documents such as sales orders are documents that are created during pre-sales and order processing. Requests for quotations, contracts, scheduling agreements, and standard sales orders are all examples of sales document types.

Outbound deliveries, EWM delivery documents, tasks and warehouse orders are documents created and used in the goods issue process. Transportation shipment documents are also used in the shipping process. As a result of issuing quantities of products in EWM, goods issue documents are created based on information from

EWM. The material document forms the basis of updating plant-storage location stocks in the ERP system. In addition, accounting documents are generated to represent the value of the materials issued from EWM.

After goods are issued, a billing document is issued either in the SAP ERP or SAP CRM system and forms the basis for the corresponding accounting documents. Billing document creation can also be triggered from the Extended Warehouse Management System.

Business partners can be legal entities or natural persons who are involved directly in conducting a business transaction with you. The key business partners are the sold-to, ship-to, bill-to and payer. These four business partner types are required in every sales document.

The outbound business process also includes processing stock transport orders that direct the movement of materials from one warehouse to another. In this process, the source document for the shipping process is not a sales order but a stock transport order that is created in the purchasing application.

The Shipping Process

The shipping process begins when outbound delivery documents are created. A selection is made from either sales documents or stock transport order documents to create a group of corresponding outbound delivery documents. There are two key pieces of information that are required in this selection process: the shipping point and a selection date. Each line item in a sales order and stock transport order has a shipping point determined for it. The shipping point represents a shipping group or a type of shipping (express, export, standard, etc.) within the plant assigned to the material item in the source document. This data is illustrated in the figure below.

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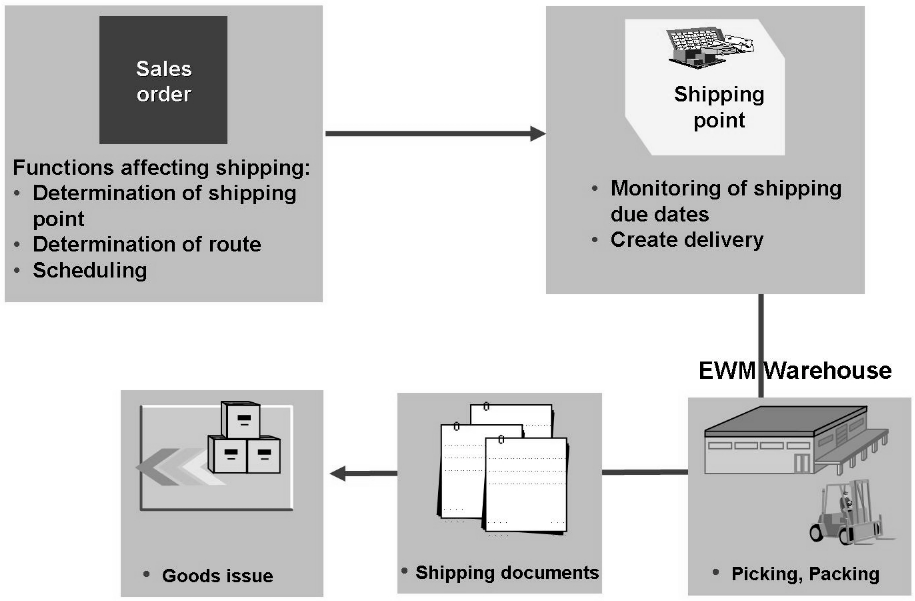

Figure 79: The Shipping Process

The selection date is used to select the materials from the sales documents that are due for delivery. Within the sales document, each line item representing a material the customer wishes to purchase has one or more schedule lines. The schedule lines assigned to the line item contain delivery scheduling dates. The following are the dates contained within a schedule line:

- Requested Delivery Date - this is the date the customer wants the product onsite.
- Goods Issue date - this is the date the goods must be shipped from the warehouse.
- Loading Date - the product must be loaded on the means of transport on this date.
- Transportation Planning Date - the date that transportation planning must begin so that the means of transportation is available on the loading date.
- Material Availability Date - perhaps the most important scheduling date, this is the date the material must be available for picking in the warehouse. This is the date that is confirmed by the availability check/available-to-promise.
- Order Date - the date the material was ordered.

In the following figure the process of backward scheduling is illustrated in which all of the delivery scheduling dates are confirmed.

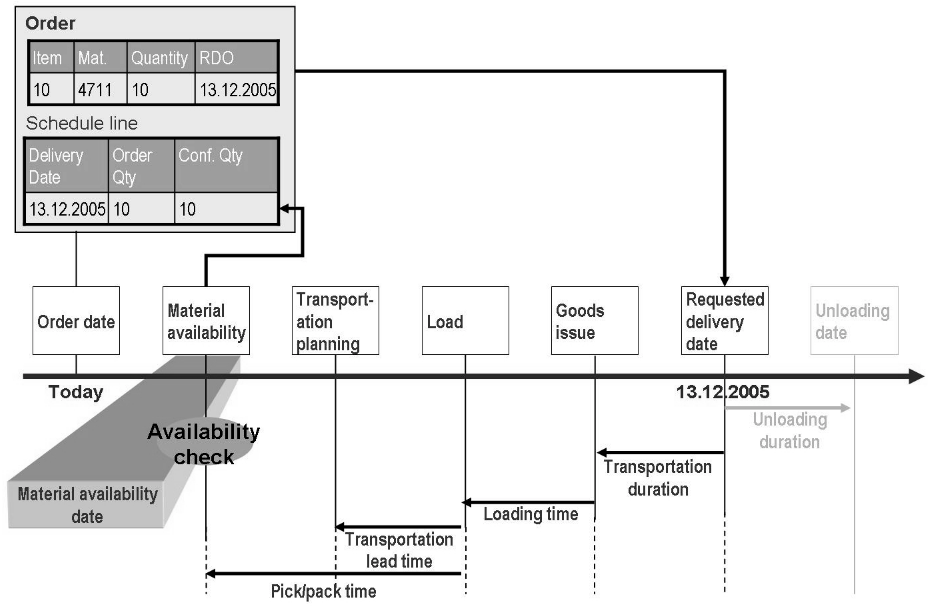

Figure 80: Delivery Scheduling

Delivery scheduling can be performed either by the SD ATP function in ERP or by using the scheduling function in Global Available-to-Promise (GATP) in APO. Both methods use the **backward scheduling** technique to compute the goods issue, loading, transportation planning, and material availability dates from the customer requested delivery date. These dates are computed based on lead times determined from configuration settings contained in their respective systems. If any of the dates lie in the past after the backward scheduling computation, the system will perform **forward scheduling** after the availability checking process has determined a material availability date for the material. The results of the backward/forward scheduling process are stored in the schedule lines of the sales document.

In the outbound delivery creation process, the selection date used in concert with the shipping point selection data, causes the system to an create outbound delivery for all line items within a sales document that have a match on the shipping point and whose schedule line relevant dates are less than or equal to the selection date. The system uses the earlier of the material availability date or the transportation planning date in the selection process. When the outbound delivery document is created, the delivery scheduling dates from the schedule line are copied to the header of the document.

The Outbound Delivery Document

As illustrated in the following illustration, the outbound delivery document, structurally, consists of a header and any number of line items.

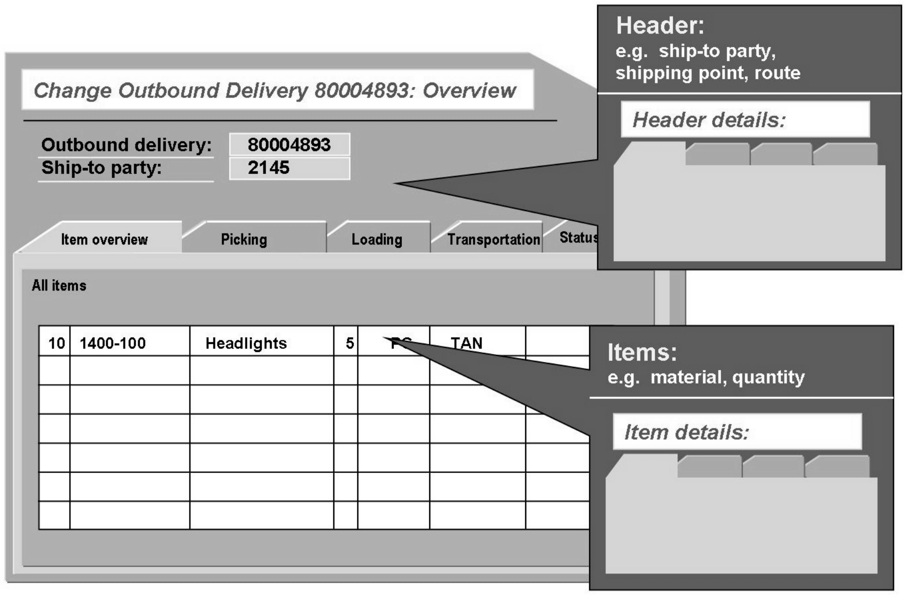

Figure 81: Structure of an Outbound Delivery

The header contains data that applies to the entire document such as partner, output, text, foreign trade and overall status. This means, for example, that the ship-to party, shipping point, and route are unique for each outbound delivery. Weights and volumes for the complete outbound delivery are also stored in the header. Each outbound delivery document is identified with a document type code such as 'LF' for outbound deliveries from sales orders and 'NL' for outbound deliveries created from stock transport orders.

The individual items contain the information relevant to the material to be delivered. Information such as the material number, delivery quantity, item status and organizational data are contained within the delivery line item data. Each line item contains an item category code such as 'TAN' for items from sales orders, 'NLC' for items created from stock transport orders.

EWM Relevance for Outbound Deliveries

When an outbound delivery document is created, the ERP system checks each line item to see if it is relevant for warehouse management processing. This check consists of matching the Plant and Storage Location codes from the delivery line item to the Plant-Storage Location to Warehouse assignment table in customizing. If the ERP system finds a match in this table to a warehouse, it then determines if the warehouse is an “interim” warehouse number for an Extended Warehouse. An “interim” warehouse code is a warehouse number that set up in the standard WM warehouse number table but is cross-reference in customizing to the actual EWM warehouse it represents. If an interim warehouse is found, the system copies the outbound delivery document to the EWM System.

Lesson Summary

You should now be able to:

- Explain the data flow from the ERP system to EWM for the outbound process.
- Describe the structure of the outbound delivery document.
- Name the outbound delivery documents that are created in EWM .

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

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Lesson: EWM Outbound Delivery Documents

Lesson Overview

An important aspect of the outbound processing functions in Extended Warehouse Management is understanding the three delivery document types that are used within EWM in goods issue processing. The purpose of this lesson is to provide foundation knowledge regarding the EWM delivery documents.

Lesson Objectives

After completing this lesson, you will be able to:

- List the EWM documents used in outbound processing.
- Describe the use of the EWM outbound delivery documents.
- Describe the use of Direct Delivery documents in EWM.
- Explain delivery splitting in EWM
- Outline the basic process of warehouse order creation.

Business Example

When an outbound delivery is created in ERP that is relevant for EWM processing, the outbound delivery document will be replicated to EWM for processing. From this document other EWM outbound delivery documents will be created to fulfill particular EWM roles in the good issue process.

EWM Outbound Delivery Documents

In the following diagram is illustrated the basic document creation and process flow related to outbound delivery processing.

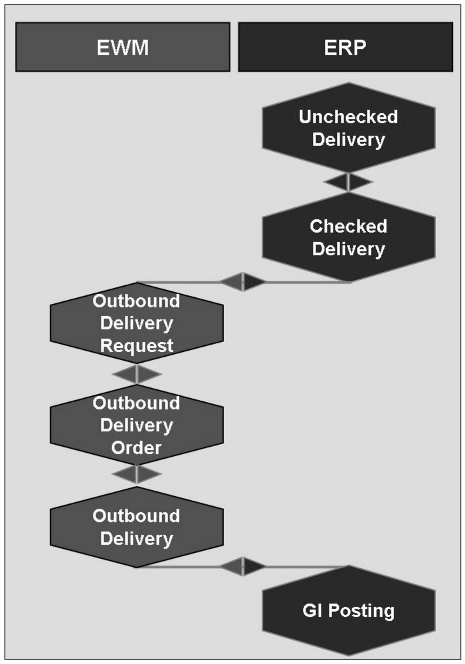

Figure 82: ERP - EWM Delivery Document Processing

In the ERP outbound processing flow, an **unchecked outbound delivery** can be created. This is generally based on delivery processing related to creation of sales orders within the SAP CRM application. For performance reasons, CRM can be configured to suppress the replication of sales documents to the ERP system but create an unchecked delivery in the ERP system.

This business process is particularly useful when you have to process a large order volume. It allows you to process many sales orders, which may contain multiple items, more quickly and efficiently. Amongst other things, you can still change the quantities, ship-to party or location as long as the unchecked deliveries have not been converted into checked deliveries. In normal sales order processing, in which data is replicated in SAP CRM and SAP ERP, this is not possible. Here, the order items are locked and can no longer be changed once delivery has been triggered. Additionally, this can improve system performance, as it is not negatively affected by system-wide locking of sales orders.

The reduced scope of checks for an unchecked delivery refers mainly to the availability check, but may also involve other checks. An unchecked delivery can be converted to a delivery with a document status of “checked”, which can be used for subsequent functions such as picking, packing or posting goods issue. An unchecked delivery is only created when the document to which it refers reflects shipping requirements (meaning that it contains an open confirmed quantity). In an ERP system, the outbound or returns delivery is a delivery that results after all the delivery checks have been completed on an unchecked delivery (especially the ATP check). The checked delivery can be processed without any restrictions. Both outbound deliveries that are created with respect to preceding documents located in the same system, and inbound deliveries, are created as checked deliveries because all the delivery checks have been completed during creation.

Unchecked deliveries that have been converted in the ERP system to **checked deliveries**, or outbound deliveries created in ERP from sales documents that are relevant for processing in an EWM warehouse will be replicated to EWM as an **Outbound Delivery Request** document. The outbound delivery request is a document containing all the relevant logistics data in the outbound delivery process right from the origin of the outbound delivery process (sales order, for example).

The outbound delivery request (ODR) is used to save the transferred data from a reference document in order to create an Outbound Delivery Order (ODO). Using the outbound delivery request, you can also process or reject incoming changes to an existing outbound delivery order. The delivery process receives a message from a reference document in ERP with all the relevant logistics data. An outbound delivery request is created automatically as a result of this message. The delivery process saves the information from the message in the outbound delivery request. The message itself is not saved. An **Outbound Delivery Order (ODO)** is created automatically from the outbound delivery request.

The outbound delivery order is a document containing all the data required for triggering and monitoring the complete outbound delivery process. This process starts with the first planning activities for the outbound delivery and continues until the finished goods have been loaded and sent. You either use the outbound delivery order to preview the planning of pending warehouse activities or to execute the actions required to create the delivery. The outbound delivery order is the warehouse request document for goods issue. You can use the outbound delivery order to execute the following actions:

- Creating the delivery and therefore creating an outbound delivery
- Picking the delivery
- Canceling the “delivery picking”
- Loading the delivery
- Canceling the “delivery loading”
- Setting the status Leave Yard
- Adjusting the delivery quantity to the picked quantity
- Posting a goods movement
- Canceling a goods movement
- Creating and deleting items

From the outbound delivery order the **Outbound Delivery** document is created. The outbound delivery is a document representing the goods to be delivered together to a goods recipient. The outbound delivery is used as the basis for printing the delivery note or for sending a shipping notification. You can execute the following actions using this document:

- Posting a goods movement
- Canceling a goods movement
- Setting the status Leave Yard

For export related goods issues, the outbound delivery might be created before the GI posting in EWM. In other cases the outbound delivery will automatically be created with the GI posting for the Outbound Delivery Order in EWM. You can save, process, delete and archive an outbound delivery. To create an outbound delivery you can select the action Create Outbound Delivery in the outbound delivery order.

Warehouse Request

As mentioned earlier, the outbound delivery order (ODO) serves as the warehouse request document for goods issue processes. This warehouse request defines a work list for Extended Warehouse Management (EWM) that indicates a goods pick.

The warehouse request for an outbound delivery order serves in EWM as basis for the execution of picking activities. For example, EWM uses a warehouse request to create warehouse tasks for picking. As well, EWM executes the posting of goods movements for the goods issue based on the warehouse request.

At the same time as an outbound delivery is generated in ERP, ERP sends a message for an outbound delivery request or posting change request to EWM. EWM automatically generates a warehouse request (the outbound delivery order) using the Post Processing Framework (PPF). During automatic creation and saving of the outbound delivery order, EWM triggers the following:

- Mapping of delivery data from ERP onto the EWM delivery data
- Data enrichment using data from EWM Customizing
- Wave assignment, depending on your Customizing
- Determination of **Warehouse Process Type**, which controls the processing of a warehouse task in EWM, such as whether EWM is to immediately confirm a warehouse task
- Automatic packing - EWM automatically creates handling units according to the packaging specifications. The condition technique is used to make the packaging specification determination. You can assign handling units and cross-delivery handling units to an outbound delivery order. ERP copies this information to the corresponding ERP outbound delivery.

- Connection to SAP Business Information Warehouse - When a delivery item has been completed in EWM, EWM sends the current data to SAP Business Information Warehouse. As a prerequisite, you must have activated the update of delivery items in SAP Business Information Warehouse.
- The additional functions that run automatically, or can be processed manually, when creating or changing an outbound delivery order, enables you to do the following:
  - Rough determination of the picking location - The system determines the source storage bins for a delivery based on the stock removal strategies.
  - Determination of staging area
  - Determination of door assignment
  - Route determination
  - Adding packing items - If, for example, you use recyclable packing materials, you can manually add delivery items for the packing material to an outbound delivery order and then post goods issue again for this packing material.
  - You can control processes for outbound delivery orders as part of the configuration - For example, you can create an invoice before goods issue in the outbound delivery process. You can also do this on the basis of other delivery parameters, for example, the export relevance or the route that is determined. As a prerequisite, you have defined process indicators for the delivery document header and for the delivery document items in Customizing for EWM.
  - You can enter the account assignment on the user interface for the outbound delivery order in the detail view of the item on the Account Assignments tab page. - For example, a department within your company requests consumable material from the warehouse. Inventory management is no longer required for this consumable material. You update the consumable material, for example, for a cost center or project, by entering the account assignment on the user interface for the outbound delivery order.

If wave processing is being used, EWM creates the warehouse tasks at the same time as releasing the wave. Otherwise, warehouse tasks can be created directly from the outbound delivery order. In accordance with the warehouse task processing, EWM creates warehouse orders to assemble work packages for the individual warehouse workers.

Direct Outbound Delivery Order

A Direct Outbound Delivery Order is a document created in EWM without reference to a preceding document such as a sales order or stock transport order. Extended Warehouse Management (EWM) sends the direct outbound delivery order to ERP. The direct outbound delivery order contains the ERP document number. The structure and data of the direct outbound delivery order match those of an outbound delivery order that is triggered in ERP. Direct outbound delivery orders can be used in the following scenarios:

- **Customer Pickup at the warehouse**
  - **Direct sales -** For direct sales, transportation activities do not apply, since the customer asks for the goods and picks them up on-site at the warehouse. You do not need to create a sales order for this. The direct outbound delivery order you generated manually in EWM forms the basis for the delivery in ERP. The delivery in ERP forms the outbound document for billing. You can also trigger direct sales in ERP without generating a sales order.
  - **Account assignment -** For account assignment, transportation activities also do not apply, since the internal or external customer asks for the goods and picks them up on-site in the warehouse. Unlike direct sales, you post a goods issue with account assignment for the goods, for the cost center, for example. You can also trigger goods issue with account assignment in ERP without generating a sales order.
- **Scrapping -** The direct outbound delivery order for scrapping forms the last step in the scrapping process. You post the goods to be scrapped with the goods issue from the warehouse stock. Whereas, you can also trigger the preparation for scrapping – such as collecting goods in a scrapping container – using a posting change request from ERP, you always trigger this last step locally in the warehouse.
- **Kit to stock or reverse kitting -** For kit to stock, you use a value-added service order to create a kit from different components. If you want to reserve the corresponding components, you can use a direct outbound delivery order. When you have created the kit and posted goods issue for the direct outbound delivery order, EWM reduces the stock of the respective components.

Because direct delivery orders are created in EWM, EWM must trigger an availability check. Depending on the system configuration, the check can be performed in ERP or SAP APO (gATP). Other external processes and checks may also have to be performed. The following diagram illustrates the potential external interfaces for direct outbound delivery documents.

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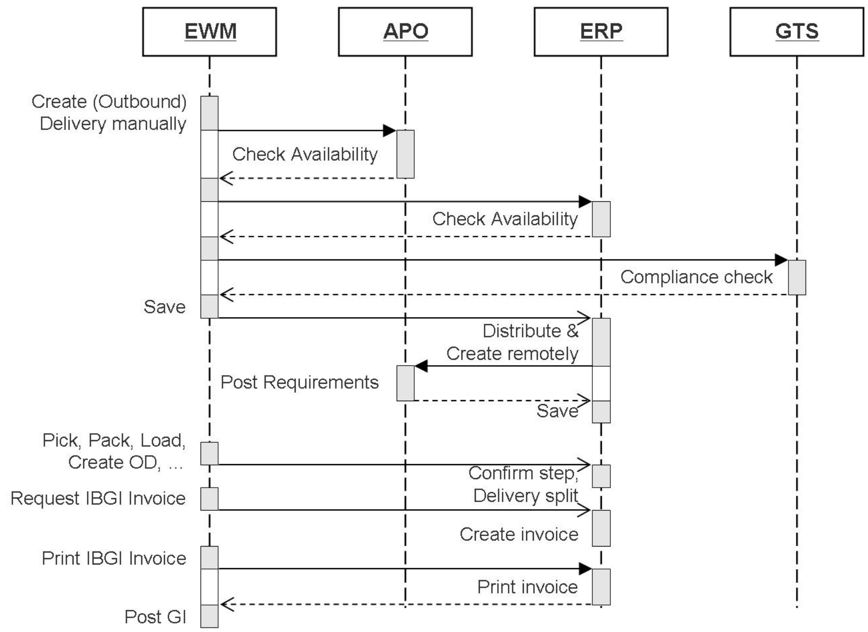

Figure 83: Direct Outbound Delivery with External Processing

Direct outbound delivery orders have the following properties that differentiate them from outbound delivery orders that were generated in EWM based on outbound deliveries created in ERP:

- Necessity of the availability check, as this check is usually triggered in ERP
  To avoid endangering the continual ability to deliver, the planning situation must be adjusted with the availability check. In SAP SCM 5.1, planning-related reservation of the products only takes place if you are using SAP Advanced Planning and Optimization (SAP APO). No reservation takes place for checks in ERP. In exceptional cases, over confirmation may occur.
- A lot of organizational and logistically relevant delivery data that is copied to outbound delivery orders from ERP preceding documents must be specified for the direct outbound delivery orders locally in EWM. Either the data is entered directly, such as the product or quantity, or EWM determines the data automatically using configuration data, such as the goods issue bin for items that are not pick-relevant.
- Because no outbound delivery request from ERP exists for direct outbound delivery orders, actions such as splitting direct outbound delivery orders are not possible. Direct outbound delivery orders are also always checked, meaning they have the status type Locked (Unchecked Item) and status value No, and are immediately ready for processing.

- Use of direct outbound delivery orders requires the use of ERP Enhancement Package 3.
- There are certain constraints in ERP:
  - Credit management is not supported - You cannot use credit management for direct outbound delivery orders
  - The price determination in ERP does not provide you with the same functions as the price determination in the sales order.
  - Support of configurable products is not supported for direct outbound deliveries.
  - Billing in SAP Customer Relationship Management (SAP CRM) for direct outbound delivery orders is not supported.
  - You cannot use bills of materials in direct outbound delivery orders.
  - ERP does not send messages for a direct outbound delivery order to EWM.
- There are also constraints in EWM for direct outbound deliveries:
  - If you are adding packing items to a direct outbound delivery order, EWM cannot perform an availability check for these new delivery items.
  - The kit-to-order process does not support direct outbound delivery orders.
  - Direct outbound delivery orders are not relevant for backorder processing in SAP APO.

Overall ERP - EWM Outbound Delivery Processing

In the following figure, the document flow of ERP outbound delivery document data and EWM outbound documents are illustrated.

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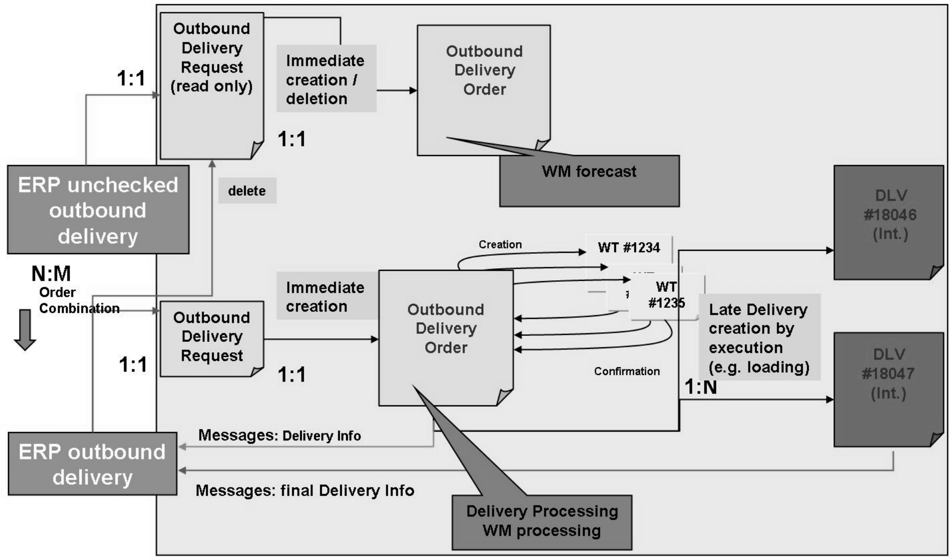

Figure 84: ERP - EWM Document Flow

An ERP **unchecked** outbound delivery is forwarded to EWM where a Outbound Delivery Request and its corresponding Outbound Delivery Order (ODO) is created with status 'blocked for execution'. The outbound delivery order while not executable can be used for work forecasting within EWM. There are no WM objects created which are linked to the ODO, like a wave or a warehouse task, because the ODO is blocked.

In ERP, normal outbound deliveries are created from the unchecked deliveries. This step includes order combination by combining several unchecked deliveries into a normal delivery. The normal deliveries also reflect an early decision on delivery splits. EWM also receives a deletion message for the unchecked delivery and within EWM, the corresponding ODR and ODO are deleted. EWM receives a message containing the normal delivery. For this a new ODR, the ODO is created with a new EWM-specific document number. This new ODO. can be used for EWM execution.

At some execution step (e.g. loading or packing) within EWM processing the final outbound delivery (OD) is created. In the execution step it becomes clear which ODO items are shipped together. This delivery has a new EWM specific document number. There could be a late split, which means a single ODO is split into several deliveries. The creation of a new document allows for keeping all existing links of the ODO to EWM objects, like warehouse tasks (WT's). It is assumed that most of these WTs are still valid, because the late split is done after most of the EWM processing. The delivery has own specific header data, like a manually entered, or measured, gross weight. The outbound delivery (OD) can be used for site processing, like a check-out. And, the OD is the basis for an ASN to the customer.

Delivery Splitting

Although this lesson focuses on the outbound process and related documents, delivery splitting can occur for both inbound and outbound delivery documents. A delivery split can be necessary on inbound when, for example, a delivery arrives in two trucks instead of one. You can simply delete an item of the inbound delivery, or reduce a delivery item quantity. EWM then determines by the default process code, or the process code you enter through the function, "quantity adjustment", that a new inbound is to be created for the remaining quantity.

For outbound delivery requests, a split may be necessary when the system has determined different routes for different items or due to the size, weight, or volume of the items in an outbound delivery order they will not fit on the same truck. For outbound delivery orders, split may be created in the same way as inbound deliveries by changing the delivery quantity and using a process code to generate a delivery for the difference.

In general, if a delivery is split in EWM, this also results in a split in ERP. The point in time, when this split information is communicated to ERP differs between inbound and outbound (e.g. outbound it is communicated at GI while in inbound it is communicated earlier). Also, in outbound there can be multiple splits (e.g. ODR -> ODO -> OD) as the split can be between ODR and ODO and also between ODO and OD.

Warehouse Task

A warehouse task for output processing is a document that uses Extended Warehouse Management (EWM) to execute goods issue movements. Logical or physical goods movements or even stock changes can be the basis for a warehouse task. You can create a warehouse task either with reference to a warehouse request such as the outbound deliver order, or without a reference document, for example for internal goods movements.

Each warehouse task is assigned a warehouse process type that among other functions, identifies the task as either an inbound or outbound movement of product within the warehouse. Just like inbound warehouse tasks, outbound tasks can be either product or handling unit tasks. In its basic form a warehouse task is a document that contains the information about a product to be moved, the quantity to be moved and the source and destination location information related to the movement.

Warehouse Order

When products are to picked from the warehouse, warehouse tasks are created. Then EWM groups these warehouse tasks together into warehouse orders, and makes them available for processing.

A warehouse order is an EWM document that represents an executable work package that a warehouse employee should perform in a specific time-frame. A warehouse order consists of one or more warehouse tasks or physical inventory items.

Warehouse Order Creation

In warehouse order creation, EWM groups warehouse tasks together based on settings in Customizing for warehouse order creation. These Customizing settings are called **warehouse order creation rules (WOCR's)**Warehouse order creation is particularly suitable for optimizing processes for picking.

The following figure illustrates the process of creating warehouse orders in the EWM outbound process. In this illustration the wave picking technique is being used.

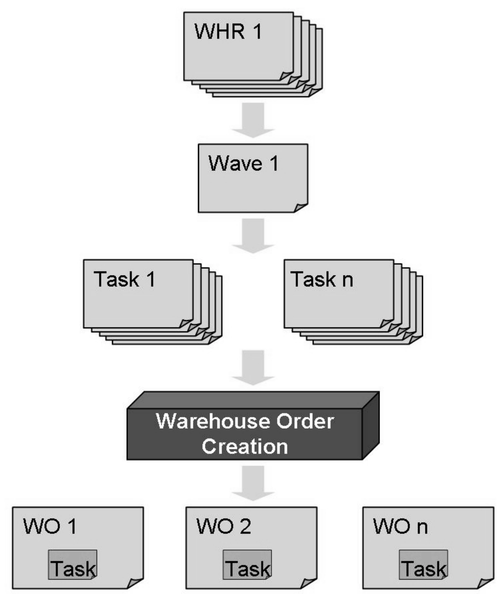

Figure 85: Creation of Warehouse Orders from Waves

A wave consists of a number of outbound delivery orders. After the wave and wave item have been released (either automatically by EWM or manually by a user), EWM creates warehouse tasks. EWM joins the warehouse tasks together into warehouse orders, according to the warehouse order creation rules (WO creation rules) that have been defined in Customizing. A warehouse order can contain warehouse tasks from more than one delivery. The basic process of creating warehouse orders using picking waves is as follows:

1. Warehouse request documents (outbound delivery orders) are created.
2. The warehouse requests are grouped/assigned to a wave.
3. based on the wave, warehouse tasks are created.
4. The tasks are subjected to the warehouse order creation rules process. Warehouse order creation rules are determined based on the activity area assigned to the locations in the tasks.
5. EWM creates the warehouse orders containing the assigned tasks.

Warehouse Order Creation Rules

In this section we will take a closer look at the process EWM uses to create warehouse orders. The figure below shows the detailed steps that EWM uses to assign tasks to warehouse orders.

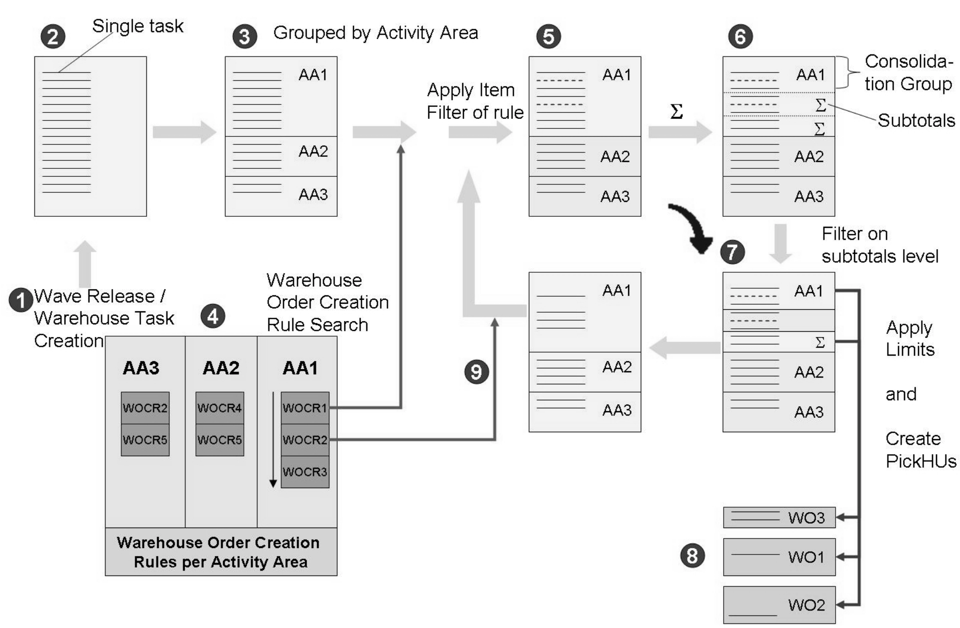

Figure 86: Warehouse Order Creation Rule Process

The following processing steps are performed in the creation of Warehouse orders:

1. The process begins with the release of the wave and the creation of the warehouse tasks.
2. The tasks are sorted by activity area
3. The tasks are grouped by activity area.
4. The activity area has creation rules assigned. These rules are defined in Customizing.
5. Item filters are applied. Examples of filters are minimum/maximum weight, volume, processing time, route, etc. These filters determine whether a given task is assigned to a warehouse order.
6. A Consolidation group is determined based on customizing settings which indicates the items that can be packed and shipped together
7. A filter is applied on the subtotal level which includes limits set in Customizing. The subtotals filter controls how many tasks (e.g. how much work) is assigned to a warehouse order. Steps 5 - 7 is repeated using the next warehouse creation rule until all items are satisfied.
8. The warehouse order is created. The warehouse order is the work package that is delivered to the user for execution.

Exercise 13: Direct Goods Issue

Exercise Objectives

After completing this exercise, you will be able to:

- Create a sales order and outbound delivery in the ERP system
- Display outbound delivery request documents in EWM
- Use the outbound delivery order to process a direct goods issue
- Use the Warehouse Monitor to display and manage warehouse tasks for picking.

Business Example

Orders are received and processed for picking in which the stock is picked form its bin and immediately taken to the goods issue area for loading.

Task:

In the ERP system create a sales order using the data from the table below, then create an outbound delivery. In the EWM system review the outbound delivery request, then use the outbound delivery order to create the picking task. Use the Warehouse Monitor to view the task data and confirm the warehouse picking task.

1. Record the stock balance in Plant **SPCW**, St. Loc. **AF00** for material **T-EW03-##**.

Material	Stock Balance
T-EW03-##	

2. Create a standard sales order in the ERP system from the data below.

   Order Header Data:

Order Type	**OR**
Sold-to customer	**T-E01A-00**
PO Number	**GR##-6-1**
Req.Deliv. Date	**Today + 1 week**

   Item data:

Continued on next page

Material	Order Quantity
T-EW03-##	**5**

Sales Order Number:____________________

3. Create an outbound delivery with reference to the sales order. Verify the plant, storage location and warehouse assignment.

   Delivery Document Number:___________________

4. In the EWM system, view the outbound delivery request document. Note its document number.

   Outbound Delivery Request no.:______________________

5. Use the outbound delivery order to create the warehouse task for picking. Document the following:

   Outbound Delivery Order:___________

   Warehouse Process Type: __________

   Warehouse Order::______________

6. Use the Warehouse Monitor to display the warehouse task for picking. Confirm the task from the Warehouse Monitor.
7. Go to the outbound delivery document and create the outbound delivery document and goods issue.
8. Check the stock in the ERP system in plant **SPCW**, St. Loc. **AF00** for the delivered product.

Material/Product	Stock balance
T-EW03-##	

Solution 13: Direct Goods Issue

Task:

In the ERP system create a sales order using the data from the table below, then create an outbound delivery. In the EWM system review the outbound delivery request, then use the outbound delivery order to create the picking task. Use the Warehouse Monitor to view the task data and confirm the warehouse picking task.

1. Record the stock balance in Plant **SPCW**, St. Loc. **AF00** for material **T-EW03-##**.

Material	Stock Balance
T-EW03-##	

   a) In the ERP system, choose*Logistics → Materials Management → Inventory Management → Environment → Stock → Stock Overview*.

   b) Enter the material number above in the Material field and enter Plant **SPCW**. Choose *Execute*.

   c) Record the stock balance in St. Loc. **AF00**.

   d) Choose *Exit*.

2. Create a standard sales order in the ERP system from the data below.

Order Header Data:

Order Type	**OR**
Sold-to customer	**T-E01A-00**
PO Number	**GR##-6-1**
Req.Deliv. Date	**Today + 1 week**

Item data:

Material	Order Quantity
T-EW03-##	**5**

Continued on next page

Sales Order Number:____________________

a) Choose *Logistics → Sales and Distribution → Sales → Order → Create*

b) On the *Initial Screen*, enter the sales document type from the table above.

Choose *Enter*.

c) In the Overview screen, enter the remaining data from the Header and Item tables above.

d) Choose *Save.*

e) Document the sales order number above.

3. Create an outbound delivery with reference to the sales order. Verify the plant, storage location and warehouse assignment.

Delivery Document Number:___________________

a) Choose *Logistics → Logistics Execution → Outbound Process → Goods Issue for Outbound Delivery → Outbound Delivery → Create → Single Document → With Reference to Sales Order*

b) In the *Create Outbound Delivery with Order Reference* screen, enter or verify the following:

Shipping Point	**1000**
Selection Date	**Today + 1 week**
Sales Order Number	**from previous step**

c) Choose *Enter*.

d) In the *Overview* screen, select the *Picking* tab. Document the following:

Warehouse No.	
Plant	
SLoc.	

e) Choose *Save*.

f) Record the Delivery Document no. above.

4. In the EWM system, view the outbound delivery request document. Note its document number.

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Outbound Delivery Request no.:______________________

a) In the EWM system, choose *Extended Warehouse Management System → Delivery Processing → Outbound Delivery → Maintain Outbound Delivery Request*

b) Select *Sales Order* in the Find field. Enter your sales order number in the input field. Choose *Perform Search*.

The outbound delivery request will display. Record the Doc. No. from the header line:

Outbound Delivery Request No.: ___________________

c) Select *Form View* at the header. Document the following:

Document Type	
Warehouse	
Incoterms	

d) Switch to *List View* at the header.

e) Choose *Exit*.

5. Use the outbound delivery order to create the warehouse task for picking. Document the following:

Outbound Delivery Order:___________

Warehouse Process Type: __________

Continued on next page

Warehouse Order::______________

a) Choose *Extended Warehouse Management System* → *Delivery Processing* → *Maintain Outbound Delivery Order*

b) Choose “ERP Document” in the *Find* field. Enter your outbound delivery document number in the input field.

Choose *Perform Search*. The outbound delivery order (the warehouse request document) will be displayed.

c) Choose *Switch Form View* at the item level.

d) Document the Warehouse Process Type in the table above.

Note: The Warehouse Process Type is in the *Movement Data* section of the Form View Display. You may have to use your scroll bar to move the screen image up to see it.

e) From the menu bar, choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.

f) The *Create Warehouse Task* screen is displayed with information from the Outbound Delivery Order.

g) Choose *Create + Save*.

The warehouse order number will be displayed in the status line. Document it in the space above.

h) Choose *Exit* to leave *Create Warehouse Task*

i) Choose *Exit* to leave the *Outbound Delivery Order* screen.

Continued on next page

6. Use the Warehouse Monitor to display the warehouse task for picking. Confirm the task from the Warehouse Monitor.

   a) Choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*

   b) In the navigation hierarchy, open the *Documents* node. Double-click on *Warehouse Tasks*.

      In the selection screen enter your *warehouse order number* in the corresponding selection field. Choose *Execute*. The warehouse task in the warehouse order will be displayed. Document it in the space below.

      Warehouse Task:__________________

   c) From the warehouse task document the Source and Destination Locations below.

      Source: St Type: ________ Sec;_______ Bin:_____________________

      Destin:St Type:_________ Sec.: ________ Bin:_____________________

   d) Select the warehouse task and using the *More Methods* , select *Confirm Backgr.* The system will display a message that the WT has been confirmed.

   e) Choose *Exit* to leave the Warehouse Monitor.

7. Go to the outbound delivery document and create the outbound delivery document and goods issue.

   a) Choose *Extended Warehouse Management → Delivery Processing → Maintain Outbound Delivery Order*

      In the search field, enter your ERP outbound delivery document number. Choose *Perform Search*.

      The outbound delivery order will be displayed.

   b) Select *Goods Issue*. The Goods Issue status will change to "completed" status.

      The EWM Outbound delivery will be created and the document number displayed in the status line.

      Outbound Delivery Document No.: ________________________

   c) Choose the *Outbound Delivery* button.

   d) In the Maintain Outbound Delivery screen, choose *Leave Yard*.

   e) Choose *Save*.

Continued on next page

8. Check the stock in the ERP system in plant **SPCW**, St. Loc. **AF00** for the delivered product.

Material/Product	Stock balance
T-EW03-##	

   a) In the ERP system, choose*Logistics → Materials Management → Inventory Management → Environment → Stock → Stock Overview*.

   b) Enter the material number above in the Material field and enter Plant **SPCW**. Choose *Execute* .

   c) Record the stock balance in St. Loc. **AF00**.

   d) Choose *Exit* .

Lesson Summary

You should now be able to:

- List the EWM documents used in outbound processing.
- Describe the use of the EWM outbound delivery documents.
- Describe the use of Direct Delivery documents in EWM.
- Explain delivery splitting in EWM
- Outline the basic process of warehouse order creation.

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: Storage Control in Outbound Processes

Lesson Overview

In this lesson we will review the basic concepts and terminology related to EWM storage control.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the difference between process and layout storage control.
- Explain direct storage control for stock removal.
- Name the process steps commonly used in process storage control.

Business Example

The goods issue processing using process and layout storage control can support the routing of picked products through the IDES, AG EWM managed warehouse to support picking, value-added services, packing and loading processes.

Direct Storage Control

Using direct storage control is the simplest form of storage control because in task creation for a goods issue the system only determines the source location from which to pick the product and its quantity and a destination location which is normally a goods issue area. The following graphic illustrates this process.

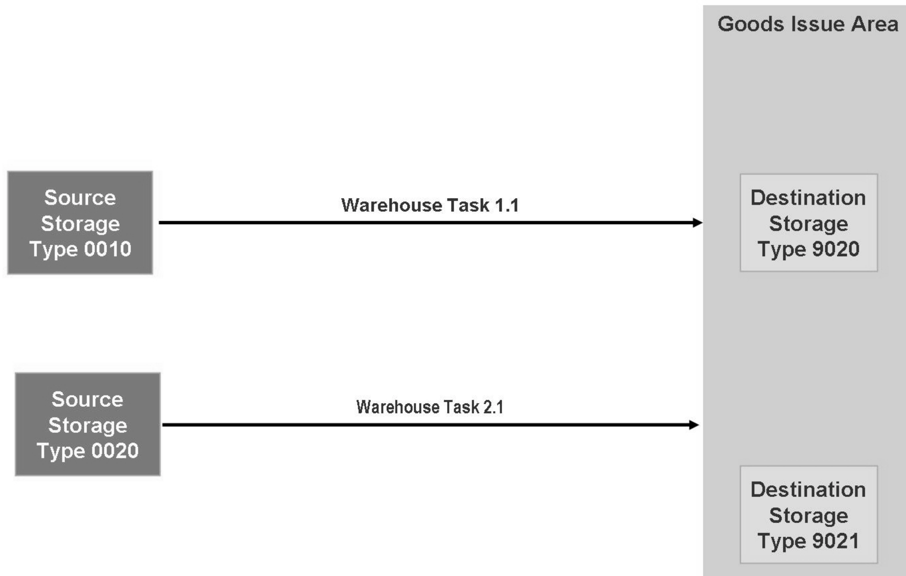

Figure 87: Direct Storage Control

Use of direct storage control does not require configuration of process-oriented or layout-oriented storage control.

Combined Storage Control

If EWM determines that you are to pick a HU from stock using one or more intermediate storage types, it creates one warehouse task per route section for this HU. One warehouse task is created that describes the route from source storage type to an intermediate storage type. And based on your settings in Customizing, the system generates one warehouse task from the intermediate storage type to the next intermediate storage type, or to the final destination storage type.

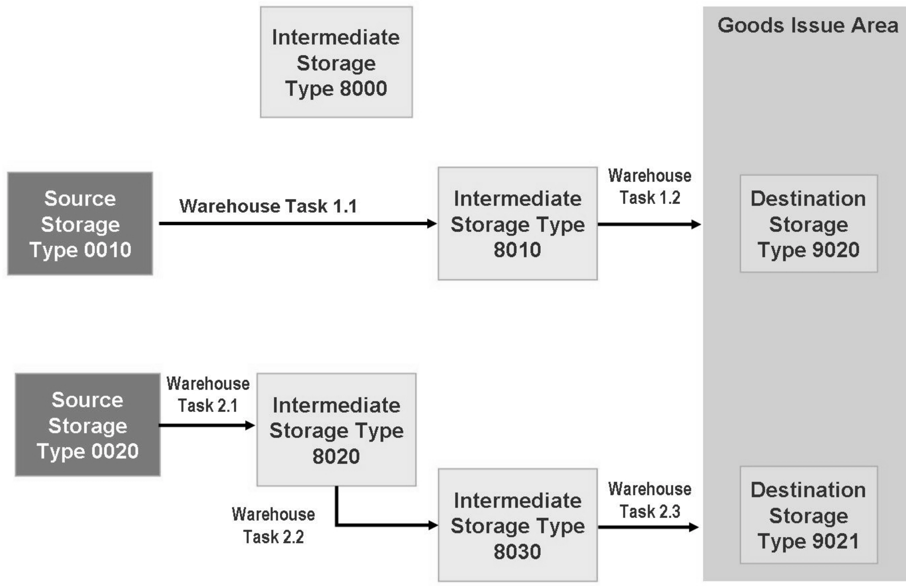

Figure 88: Combined Storage Control for Stock Removal

Different activities can be carried out at the intermediate storage types. For example, within a stock removal process, at an intermediate storage type, you can distribute HUs containing different products to stock removal HUs. In combined stock removal, you can determine the final destination storage type either at the beginning of the stock removal process, or later.

EWM manages the intermediate storage types in the same way as standard storage types. For example, you the storage types can have multiple sections and storage bins.

Process-Oriented Storage Control

Process-oriented storage control is used to map complex stock removal processes. Using this method of stroage control you can combine your storage process steps into one storage process. You can also trace the status of the individual process steps.

It must be remembered that process-oriented storage control only operates with handling units.

In Customizing the process steps that represent the various processes that a product might be required to go through in the warehouse must be defined. A process step in the outbound process could be one of the following:

- PICK - the picking process
- VAS (Value Added Services) - the picked product must go through some process to enhance it's value or meet some customer requirement (e.g. applying price tags, hangers, preservatives, etc.)
- PACK - packaging of the picked product
- STAGE - Stage the picked product for loading
- LOAD - Load the product into its means of transport

Depending on a product's processing requirements it may be required, using process-oriented storage control to go through several process steps in the goods issue process.

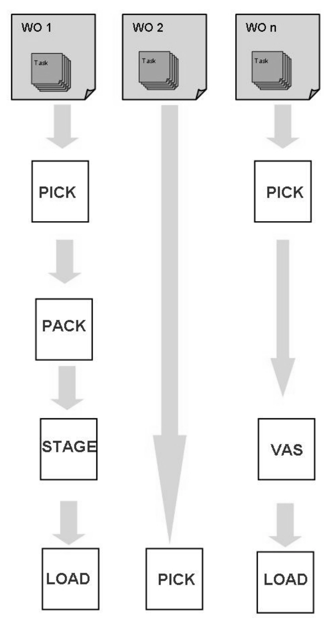

Figure 89: Outbound Processes

As illustrated above, process-oriented storage control can determine different paths for products depending on their processing requirements.

In the following illustration, process-oriented storage control is illustrated for two products that are picked and must be packed together for shipment to the customer.

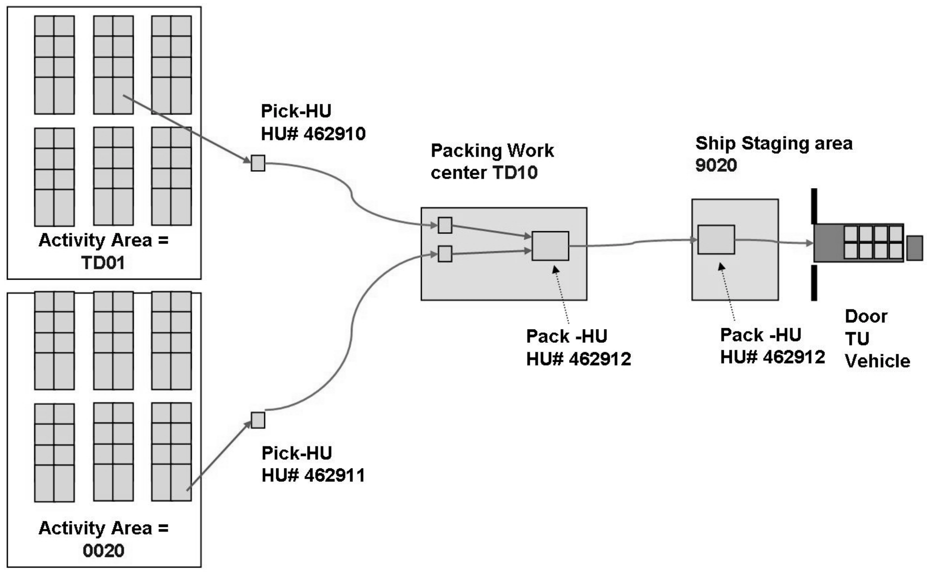

Figure 90: Outbound Process with Process-Oriented Storage Control

The products are picked into pick HU's from their bin locations and transferred to a packing work center where they are packed together. A second task is created that moves the HU to the shipping staging area. From the staging area the HU is loaded onto the TU for shipment.

Layout-Oriented Storage Control

You can use the layout-oriented storage control if stock movements in your warehouse do not travel from a source storage bin to a destination location directly, but rather travel via intermediate storage bin such as a pick point. Pick points are commonly used in material flow systems (MFS) such as automated conveyoring or other automated storage retrieval systems (AS/RS).

The layout-oriented storage control only operates with handling units. One exception for the outbound process is when picking points are used.

Exercise 14: Pick, Pack, Stage and Load

Exercise Objectives

After completing this exercise, you will be able to:

- View and process an outbound delivery order containing multiple materials that have to be picked, packed, staged and loaded for shipment
- Perform process-oriented storage control
- Create pick HU's during warehouse order confirmation
- Create and combine HU's in a Pack Station work center
- Review and confirm warehouse tasks in the Warehouse Monitor

Business Example

In your warehouse it is common to receive delivery notifications for multiple materials that have to be picked, then packed together and staged for shipment.

Task:

Create a sales order in ERP with two materials, then create the outbound delivery document. In EWM, the outbound delivery order will be created and from the ODO, the two products will be picked from different storage types. The products will be taken to a packing work center where they will be packed into a consolidated handling unit. The consolidated HU will then be moved to the goods issue staging area.

1. Create a sales order for two materials using the data from the table below.

   Header Data:

Order Type	**OR**
Sold-to Customer	**T-E01A-00**
PO Number	**GR##-6-2**
Req. Deliv. Date	**Today + 1 week.**

   Item Data:

Material Number	Order quantity
T-EW01-##	**5**
T-EW02-##	**10**

Continued on next page

Sales Order Number:____________________

2. Create an outbound delivery with reference to the sales order. Record the document number.

   Delivery Document No.:____________________

3. Review the distributed outbound delivery order in EWM.

   Outbound Delivery Order:___________

   Warehouse Process Type: __________

4. Create the warehouse pick tasks.

5. Process and confirm the warehouse pick tasks. In the confirmation process, create the pick HU's that each product is picked into. There will be two pick HU's, one for each product.

6. Pack the pick HU's into a consolidated HU at the packing work center.

7. Review the outbound tasks in the Warehouse Monitor and confirm the task that moves the consolidated HU from the packing work center to the staging area.

8. Perform the goods issue process from the outbound delivery order. Create the final outbound delivery and check the delivery out of the yard.

Solution 14: Pick, Pack, Stage and Load

Task:

Create a sales order in ERP with two materials, then create the outbound delivery document. In EWM, the outbound delivery order will be created and from the ODO, the two products will be picked from different storage types. The products will be taken to a packing work center where they will be packed into a consolidated handling unit. The consolidated HU will then be moved to the goods issue staging area.

1. Create a sales order for two materials using the data from the table below.

   Header Data:

Order Type	**OR**
Sold-to Customer	**T-E01A-00**
PO Number	**GR##-6-2**
Req. Deliv. Date	**Today + 1 week.**

   Item Data:

Material Number	Order quantity
T-EW01-##	**5**
T-EW02-##	**10**

   Sales Order Number:____________________

   a) Choose *Logistics → Sales and Distribution → Sales → Order → Create*

   b) On the *Initial Screen*, enter the sales document type from the table above.

      Choose *Enter*.

   c) In the Overview screen, enter the remaining data from the Header and Item tables above.

   d) Choose *Save.*

   e) Document the sales order number above.

2. Create an outbound delivery with reference to the sales order. Record the document number.

Continued on next page

Delivery Document No.:____________________

a) Choose *Logistics → Logistics Execution → Outbound Process → Goods Issue for Outbound Delivery → Outbound Delivery → Create → Single Document → With Reference to Sales Order*

b) In the *Create Outbound Delivery with Order Reference* screen, enter or verify the following:

Shipping Point	**1000**
Selection Date	**Today + 1 week**
Sales Order Number	**from previous step**

c) Choose *Enter*.

d) In the *Overview* screen, select the *Picking* tab. Document the following:

Warehouse No.	
Plant	
SLoc.	

e) Choose *Save*.

f) Record the Delivery Document no. above.

3. Review the distributed outbound delivery order in EWM.

Outbound Delivery Order:___________

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Warehouse Process Type: __________

a) Choose *Extended Warehouse Management System* → *Delivery Processing* → *Maintain Outbound Delivery Order*

b) Choose “ERP Document” in the *Find* field. Enter your outbound delivery document number in the input field.

   Choose *Perform Search*. The outbound delivery order (the warehouse request document) will be displayed.

c) Choose *Switch to Form View* at the item level.

d) Document the Warehouse Process Type in the table above.

   Note: The Warehouse Process Type is at the very bottom of the Form View Display. You may have to use your scroll bar to move the screen image up to see it.

e) View the two products in the lower portion of the screen.

f) Choose *Exit*.

Continued on next page

4. Create the warehouse pick tasks.

   a) Choose *Extended Warehouse Management → Work Scheduling → Create Warehouse Task for Warehouse Request →Stock Removal for Outbound Delivery Order*

   b) Enter the warehouse request number (the outbound delivery order number from above) in the input field. Choose *Perform Search*. The system will display the data from the warehouse request document.

   c) Choose *Select All*. This selects both product lines in the warehouse request document.

   d) Choose the *Create + Save* button.

      The system will display that two warehouse tasks were created. To see the warehouse order numbers created for these two tasks, select *Message Log* or from the menu select *Goto → Message Log (shift-F12).*

      In the log you will see the two task numbers and one warehouse order. Document them.

      Warehouse task: ________________

      Warehouse task: ________________

      Warehouse Order: _________________

   e) Choose Exit.

5. Process and confirm the warehouse pick tasks. In the confirmation process, create the pick HU's that each product is picked into. There will be two pick HU's, one for each product.

   a) Choose *Extended Warehouse Management → Execution → Confirm Warehouse task*

      In the input search field, enter the warehouse order from the previous step. Choose *Perform Search*.

      In the top portion of the screen the warehouse order header information will be displayed. The two warehouse tasks will be displayed on the bottom portion of the screen. Note the warehouse process type.

      Warehouse Process Type: _____________

Continued on next page

It is this process type that controls the process-oriented storage control to drive the pick, pack, stage and load process. Remember, process-oriented storage control only works with HU's. So we must now pack the picked items into pick HU's.

b) Select the *Pick-HU* tab.

c) Select *Create* . This will create a second pick HU.

d) Press *Select All* to select both Pick HU's..

e) Select *Create HU* . This action assigns HU numbers to the two Pick HU's.

f) Find the HU field in the HU line display and record the HU numbers. You might have to expand the field width to see the complete number.

Record the first Pick HU.

Pick HU: __________________

g) Document the second Pick HU:

Pick HU: __________________

h) Select the *Product WT* tab.

i) Press *Select All* to select both tasks.

j) Choose *Confirm in Foreground*. Press *Form View* to enter your pick HU's in the confirmation process.

k) In the first Product Warehouse Task, enter your first pick HU number in the **Destination HU** field. Select the *Down Arrow* to move to the second warehouse task. Enter the second Pick HU in the **Destination HU** field.

l) Choose *Save.*

m) Choose *Exit* .

Continued on next page

6. Pack the pick HU's into a consolidated HU at the packing work center.

   a) Choose *Extended Warehouse Management → Execution → Packing - General* .

      Enter:

Warehouse Number	E100
Work Center	VERP
Handling Unit	Use Multiple selection and enter your two pick HU's/

   b) Choose *Execute*.

      . The two pick HU's will display on the left side.

   c) Create the consolidated HU. Select the Create HU tab on the right side of the screen, if necessary.

      Enter:

Pack material	**PKE-095**

      Select the *Execute* button on the right side of the Create HU section. On the left side of the screen a new HU number will be displayed.

   d) Pack your two pick HU's into the consolidated HU by drag-and-drop (-ing) each of your Pick HU's into the new HU.

   e) Select the Consolidated HU and select the *Complete Process Step for HU*. Note your new Consolidated HU.

      Consolidated HU:______________________

   f) Choose *Exit*.

Continued on next page

7. Review the outbound tasks in the Warehouse Monitor and confirm the task that moves the consolidated HU from the packing work center to the staging area.
   a) Choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.
   b) Select from the hierarchy menu *Outbound → Documents* .

      Double-click on the *Outbound. Delivery Order* folder.
   c) Enter your outbound delivery order number in the *Outb. Delivery Order* field in the selection screen.

      Choose *Execute*.
   d) Select the Outbound Delivery Order and then the *Warehouse Task* button. All of the tasks associated with this outbound delivery order will be displayed.

      You will see that most have a *Status* of **C- Complete**. There will be one task listed that has a *Status* of **blank-Open**. This warehouse task is the task to move the consolidated HU from the work station to the Staging Area. This task was created automatically based on Customizing settings tied to the process step.
   e) Select the unconfirmed task and from the *More Methods i*con, select **Confirm-Backgr.** You have now completed the move to staging.
   f) Choose *Exit*.
8. Perform the goods issue process from the outbound delivery order. Create the final outbound delivery and check the delivery out of the yard.
   a) Choose*Extended Warehouse Management → Outbound Delivery → Maintain Outbound delivery Order*

      Enter the ERP outbound delivery number in the input field for search. Choose *Perform Search* .
   b) Select your document and select the *Goods Issue* button. You will see the Goods Issue status change to **Completed**.
   c) Select your document and choose the *Outbound Delivery* button. The screen will now show the final outbound delivery document and its number. Select the document and choose *Leave Yard.*The delivery process is now completed for your sales order.

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Lesson Summary

You should now be able to:

- Describe the difference between process and layout storage control.
- Explain direct storage control for stock removal.
- Name the process steps commonly used in process storage control.

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

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Lesson: Wave Processing

Lesson Overview

A common outbound process used in many warehouses is wave management in which warehouse picks are assigned to a scheduled "wave". The wave represents a group of work to be done in the warehouse. In this lesson we will explore the EWM wave management function.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the EWM wave management function.
- Explain the use of the wave template
- Describe the use of automatic wave assignment and the technique used to implement it.

Business Example

Wave picking will be used in the IDES, AG warehouses.

Wave Management

You can use Extended Warehouse Management (EWM) to combine items or split items from warehouse requests for outbound deliveries into waves. These waves, however, must be picked and processed at roughly the same time.

A wave is a grouping of warehouse request items used to control the warehouse activities such as picking or posting changes. These groupings are then processed together in subsequent processes. For example, the transfer of all warehouse request items assigned to a wave at a certain point in time to warehouse task creation. The warehouse task items created are then forwarded to warehouse order creation.

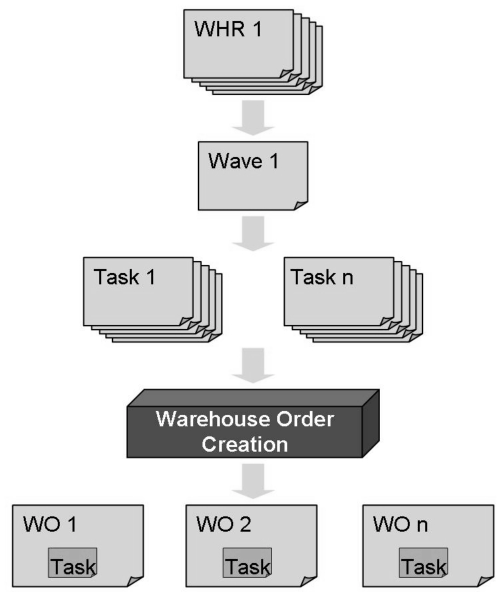

Figure 91: Outbound Process Using Waves

The illustration above shows the basic wave management process. EWM can combine warehouse request items and split items into waves on the basis of criteria such as activity area, route, or product.

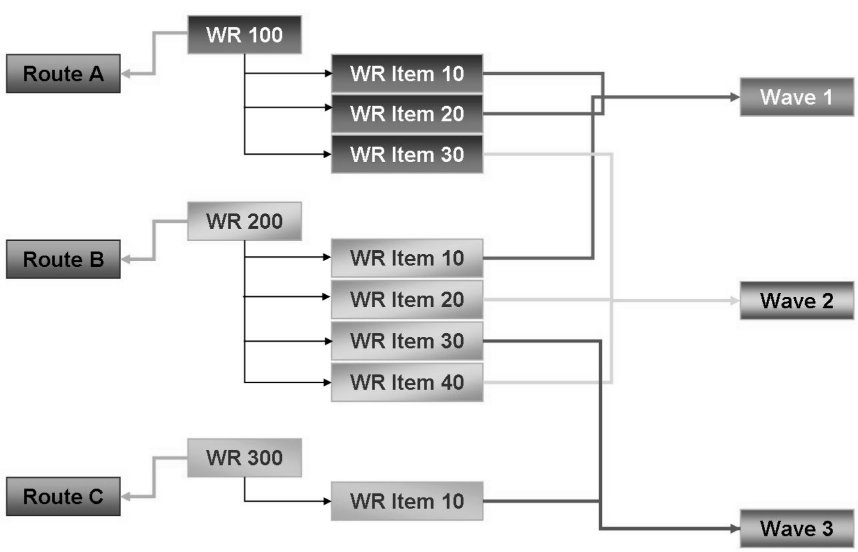

Figure 92: Example - Grouping Wave Request Items

The figure above illustrates how EWM combines warehouse request items from different warehouse request documents with different routes and picking areas into waves. In the illustration, wave processing combines the warehouse request items WR item 10 and WR item 20 from warehouse request 100 and the warehouse request item WR item 10 from warehouse request 200 into wave 1 on the basis of route A.

Wave Templates

Warehouse request items are grouped into waves based on settings in a wave template. The wave template is considered master data in EWM. Wave templates serve as the infrastructure for automatic wave assignment. They enable the same wave attributes to be reused for different warehouse request items that comply with the same conditions.

Wave templates can be used to manually create waves, or, in the case of automatic wave assignment, to assign items or split items from the warehouse requests to existing waves that are based on the wave templates. The wave template contains attributes that are used to determine what warehouse request items are to be included in a wave. The following are examples of these attributes:

- Release method with the possible values Automatic, Immediate, and Manual
- Wave type that enables specific monitoring in the warehouse management monitor
- Wave category that you can use as a filter for warehouse order creation rules
- Data for date and time related fields used to determine wave completion start and completion dates and times among others.
- Capacity profile for defining capacity limits
- Calendar for defining workdays

After the wave template is created it may be applied manually in manual wave creation or it can be determined automatically during warehouse request document processing.

Automatic Wave Assignment

You can automate the assignment of warehouse request items to waves. EWM uses the condition technique to determine wave templates. This enables EWM to determine which wave template corresponds to certain data from the header, item, or split item of a warehouse request. An important aspect of automatic wave assignment is the relationship of the warehouse request planned completion time and the wave completion time determined by a wave template option. The figure below illustrates this relationship.

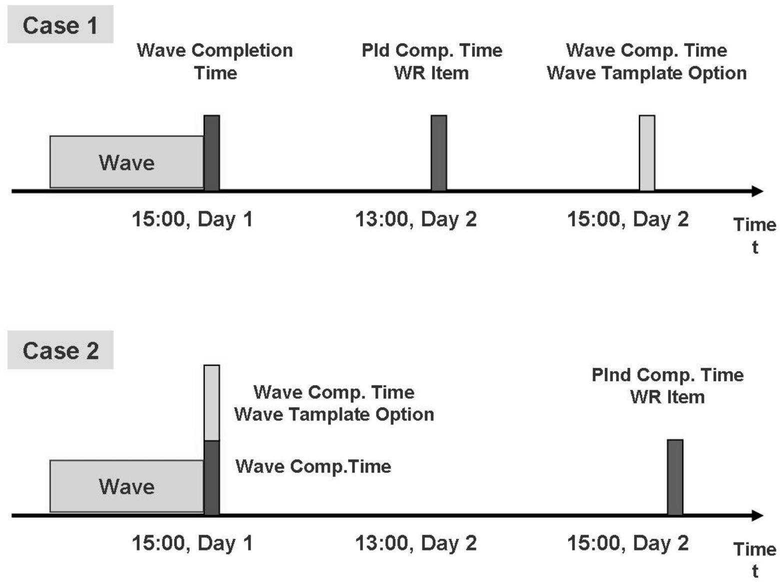

Figure 93: Automatic Wave Assignment

In Case 1 above, the planned completion time of the warehouse request item is 13:00 on day 2. The planned wave completion time is 15:00 on day 2. The planned completion time of the warehouse request item is therefore before the wave completion time that has been specified in the wave template option. EWM schedules the wave to be created with the wave completion date of the day before the planned completion date of the warehouse request item, in other words, 15:00 on day 1.

In the second case, the planned completion time of the warehouse request item is 15:00 on day 1. The planned wave completion time is 13:00 on day 1. The planned completion time of the warehouse request item is therefore after the wave completion time that you have specified in the wave template option. EWM schedules the wave to be created with the wave completion date on the same day as the planned completion date of the warehouse request item, in other words, 13:00 on day 1.

In Customizing the settings are made that the system will use to determine a wave template. Using the condition technique, wave determination procedures containing condition types and access sequences that provide the "search strategy" for determining the wave templates are created. Master data consisting of the field values. In master data you create the condition records that link the conditions with the wave templates.

Automatic wave assignment is triggered by a Customizing setting in the warehouse process type. A warehouse process type is assigned to every warehouse request document.

Wave Processing

After waves have been created they can be processed a number of ways in EWM. Listed below are some of the ways wave processing can be affected to control your warehouse activities:

- Waves can be Locked/Unlocked. This function lets you effectively block and unblock a wave from further processing.
- Waves can be merged.
- Wave release - It is this action that is used to create the warehouse tasks and subsequent warehouse orders for the warehouse request items assigned to a wave.
- Waves can be deleted. All warehouse request items are removed from the wave.

In addition to the various activities related to wave processing, data associated with wave management can be viewed in the warehouse monitor. The activities described in wave processing above can also be initiated from the warehouse monitor.

Exercise 15: Wave Processing

Exercise Objectives

After completing this exercise, you will be able to:

- Perform wave processing in EWM.

Business Example

Each day, wave processing is used in the IDES, AG warehouse to generate the picking tasks and warehouse orders.

Task:

In this exercise we will be grouping outbound delivery orders into a wave for processing. Wave processing will be performed using the user interface (UI) and the Warehouse Monitor. The wave will be processed through goods issue.

1. Review an example of a wave template.
2. Create two sales orders from the data below, and create the corresponding outbound delivery documents that will form the basis of your wave.

   ORDER # 1:

   Header Data:

Order Type	**OR**
Sold-to Customer	**T-E01A-00**
PO Number	**GR##-6-3**
Req. Deliv. Date	**Today + 1 week.**

   Item Data:

Material Number	Order quantity
T-EW01-##	**5**

   Sales Order Number:____________________

   ORDER # 2:

   Header Data:

Continued on next page

Order Type	**OR**
Sold-to Customer	**T-E01A-00**
PO Number	**GR##-6-4**
Req. Deliv. Date	**Today + 1 week.**

Item Data:

Material Number	Order quantity
T-EW01-##	**5**
T-EW02-##	**10**

Record the document numbers below:

Sales Order	**Outbound Delivery**
1.	
2.	

3. Review the outbound delivery orders in EWM. Document the numbers below:

Outbound Delivery Order #1	
Outbound Delivery Order #2	

4. Combine the deliveries into a wave. Document the wave number below:

Wave Number	

5. Process the wave using the Warehouse Monitor. In the Warehouse Monitor, release the wave. In the picking process, create the pick HU's and confirm the warehouse picking.
6. Complete the packing process in the packing work center. You will Complete Process Step for each pick HU individually. This process will create two warehouse tasks to move the pick HU's to the staging area. Document these new tasks.

Continued on next page

Task #1	
Task #2	

7. Confirm each task into the material staging area.
8. Post the goods Issue, create the final delivery document, and perform the *Leave Yard* process for each delivery document.

Solution 15: Wave Processing

Task:

In this exercise we will be grouping outbound delivery orders into a wave for processing. Wave processing will be performed using the user interface (UI) and the Warehouse Monitor. The wave will be processed through goods issue.

1. Review an example of a wave template.
   a) Go to *Extended Warehouse Management → Work Scheduling → Wave Management → Maintain Wave Templates*
   b) Review the wave template. In the template you should see data such as the:
      - Wave cutoff time
      - Wave Release time
      - Pick Completion time
      - Pack Completion time
      - Capacity Profile assignment
      - Wave calendar

      You can also specify how the wave will be released; for example, according to release date and time, immediately, or manually from the Warehouse Monitor.
   c) After reviewing the wave template, choose *Exit*.
2. Create two sales orders from the data below, and create the corresponding outbound delivery documents that will form the basis of your wave.

   ORDER # 1:

   Header Data:

Order Type	**OR**
Sold-to Customer	**T-E01A-00**
PO Number	**GR##-6-3**
Req. Deliv. Date	**Today + 1 week.**

   Item Data:

Continued on next page

Material Number	Order quantity
T-EW01-##	**5**

Sales Order Number:____________________

ORDER # 2:

Header Data:

Order Type	**OR**
Sold-to Customer	**T-E01A-00**
PO Number	**GR##-6-4**
Req. Deliv. Date	**Today + 1 week.**

Item Data:

Material Number	Order quantity
T-EW01-##	**5**
T-EW02-##	**10**

Record the document numbers below:

Continued on next page

Sales Order	Outbound Delivery
1.	
2.	

a) Choose *Logistics → Sales and Distribution → Sales → Order → Create*

b) On the *Initial Screen*, enter the sales document type from the table above.

Choose *Enter*.

c) In the Overview screen, enter the remaining data from the Header and Item tables above.

d) Choose *Save.*

e) Document the sales order number above.

f) Repeat the process for the second sales order. Record the sales order above.

g) Choose *Logistics → Logistics Execution → Outbound Process → Goods Issue for Outbound Delivery → Outbound Delivery → Create → Single Document → With Reference to Sales Order*

h) In the *Create Outbound Delivery with Order Reference* screen, enter or verify the following:

Shipping Point	**1000**
Selection Date	**Today + 1 week**
Sales Order Number	**from previous step**

i) Choose *Enter*.

j) Choose *Save*.

k) Record the Delivery Document no. above.

l) Repeat the delivery creation steps for the remaining sales order.

3. Review the outbound delivery orders in EWM. Document the numbers below:

Continued on next page

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Outbound Delivery Order #1	
Outbound Delivery Order #2	

a) Choose *Extended Warehouse Management System* → *Delivery Processing* → *Maintain Outbound Delivery Order*

b) Choose “ERP Document” in the *Find* field. Enter the first r outbound delivery document number in the input field.

Choose *Perform Search*. The outbound delivery order (the warehouse request document) will be displayed.

c) Enter the Outbound Delivery order number in the table above. This is your warehouse request number.

d) Perform the lookup of the Outbound Delivery Order for the second delivery document. using the steps above and record the warehouse request number in the table above.

e) Choose *Exit*.

4. Combine the deliveries into a wave. Document the wave number below:

Continued on next page

Wave Number	

a) Choose *Extended Warehouse Management System → Work Scheduling → Maintain Waves*.

b) Select *Create*. Select *Switch to Form View*. Here you can see additional information which can be added such as: Wave template, cutoff dates, capacity profile, description, etc.

c) Enter **GR## Wave Processing** in the *Description* field.

d) Choose *Switch to List View*.

e) On the lower screen, select the *Warehouse Request* tab.

f) Select the *Open Advanced Search* button. On the Document Number line, choose Multiple selection

. Enter the two warehouse request document numbers in the *Select Single Values* tab. Choose *Copy*

g) Choose *Advanced Search*. Your warehouse requests will be displayed. Choose *Select All*. Then choose *Assign* to assign your warehouse requests to the new wave you created.

h) Select the *Items*tab. The wave now has three items assigned. The wave could be released directly from this UI or from the Warehouse Monitor. In this exercise, you will release the wave from the Monitor.

i) Choose *Save*.

.

Note your Wave number: ______________

5. Process the wave using the Warehouse Monitor. In the Warehouse Monitor, release the wave. In the picking process, create the pick HU's and confirm the warehouse picking.

a) Choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.

b) Select from the hierarchy menu *Outbound → Documents*. Double-click on the *Wave* folder.

Enter your wave number in the *Wave* field and choose *Execute*.

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c) Select the wave on the right side of the screen and select the *Wave Item*button. You will see all the items assigned to the wave in the child area at the lower right portion of the screen.

d) Select the *More Methods* icon at the top of the screen and select **Release Wave**. The system will display the total number of warehouse tasks created. Select the *Warehouse Task* button to view the tasks.

e) Choose the *Warehouse Order* button. Click on the *Warehouse Order* number to launch the *Confirm Warehouse Task in Warehouse Number E100* transaction.

f) Select the *Pick-HU* tab. Then, select Create . Select your new line item and then choose *Switch to Form View*.

g) Enter the packaging material shown below.

Packaging Material	**PKE-095**

Choose the *Create HU* button.If you receive an informational log message, just close the message window. Note your Pick HU number below.

Pick HU #1:_________________

Repeat the process to create the second Pick HU.

Pick HU #2:_________________

h) Select the *Product WT* tab. Choose *Select All* to select all of the line items. Choose the *Confirm in Foreground* button. Then select the *Switch to Form View* icon to enter your Pick HU's in the confirmation process.

i) In the first two product warehouse tasks, enter Pick HU #1 in the *Destination HU* field. Next, select *Down* and verify that Pick HU #2 is in the *Destination HU* field. If not, or it is Pick HU #1, change the value to Pick HU #2.

j) Choose *Save*.

k) Choose *Exit* to return to the Warehouse Monitor, then choose *Exit* again to leave the Monitor.

6. Complete the packing process in the packing work center. You will Complete Process Step for each pick HU individually. This process will create two warehouse tasks to move the pick HU's to the staging area. Document these new tasks.

Continued on next page

Task #1	
Task #2	

a) Go to *Extended Warehouse Management → Execution → Packing - General*

.

b) In the *Work Center: Packing - General* screen enter the following in the selection fields.

Warehouse Number	**E100**
Work Center	**VERP**
Handling Unit	**Your two Pick HU's (Note: Use the Multiple Selection)**

c) Choose *Execute*.

d) Under the *Outbound Section for Work Center 'Pack'* select the first Pack HU and choose *Complete Process Step for HU*.

e) Repeat the previous step for the second Pick HU. We could consolidate these HU's onto another HU, but in this exercise you will ship the HU's on the original pick HU.

f) Choose Save. Upon saving, you will see two additional warehouse tasks automatically created and displayed on the Work Center screen. These are the warehouse tasks to move the pallets to the staging area. Note the tasks.

Warehouse task #1:__________________

Warehouse task #2:__________________

g) Choose *Save*. Choose *Exit.*

Continued on next page

7. Confirm each task into the material staging area.

   a) Go to *Extended Warehouse Management* → *Execution* → *Confirm Warehouse Task*.

   b) In the *Find*, select **Warehouse Task** and enter, in the selection value field, the first warehouse task number from the last step. Choose *Execute Search*

   c) Select the *HU WT* tab. Choose *Confirm* + *Save*. Repeat this step for the second warehouse task.

   d) Choose *Exit* .

8. Post the goods Issue, create the final delivery document, and perform the *Leave Yard* process for each delivery document.

   a) Choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound delivery* → *Maintain Outbound Delivery Order*.

   b) In the *Find* selection, choose **ERP Document** , then enter the first outbound delivery document number you created in ERP. Choose *Perform Search*.

   c) Select the document and choose the *Goods issue* button. The *Goods issue status* will change to **Completed**.

   d) Select your document and then the *Outbound Delivery* button. In the *Maintain Outb. Delivery* screen, choose the *Leave Yard* button. The delivery has now been checked out of the yard.

   e) Choose *Save*.

   f) Choose *Back* to return to the *Maintain Outb. Deliv. Order* transaction.

   g) Repeat steps b. thru f. for your second ERP delivery document.

   h) Choose *Exit* .

Lesson Summary

You should now be able to:

- Describe the EWM wave management function.
- Explain the use of the wave template
- Describe the use of automatic wave assignment and the technique used to implement it.

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: Value Added Services

Lesson Overview

Extended Warehouse Management supports value-added services (VAS) processing as one of its core functions. In this lesson we will review the basics of value-added services.

Lesson Objectives

After completing this lesson, you will be able to:

- List examples of value-added services
- Describe how value-added services are integrated into EWM.
- List the levels of a value-added services order.

Business Example

In our IDES, AG warehouse will be using value-added services for kitting.

Value-Added Services (VAS)

Typical Value-Added Services (VAS) activities are assembling products, packing products, labeling, or kitting. Here, both the goods receipt process and the goods issue process in the warehouse change. In addition, you can then use process-oriented storage control to execute interim steps before final putaway or before staging in the goods issue area. In these interim steps, the VAS order defines which product processing must be performed by warehouse employees in the work centers, for example. You can also use a VAS order in the goods issue process to assemble kits for your customers, and to pack them on a customer-specific basis using this VAS order.

As mentioned above, the VAS order is the central EWM document that controls a VAS process.

VAS Order

When created, the VAS order is the instruction to perform a value-added service (VAS) for one or more products with reference to a delivery item. A value-added service order (VAS order) links delivery items to a packing instruction and contains details from within the delivery and packaging specification. A VAS order is also a document with which you can inform warehouse employees about what work they have to perform, and with which products. You can also use VAS orders to track work that is done. This is illustrated in the figure below.

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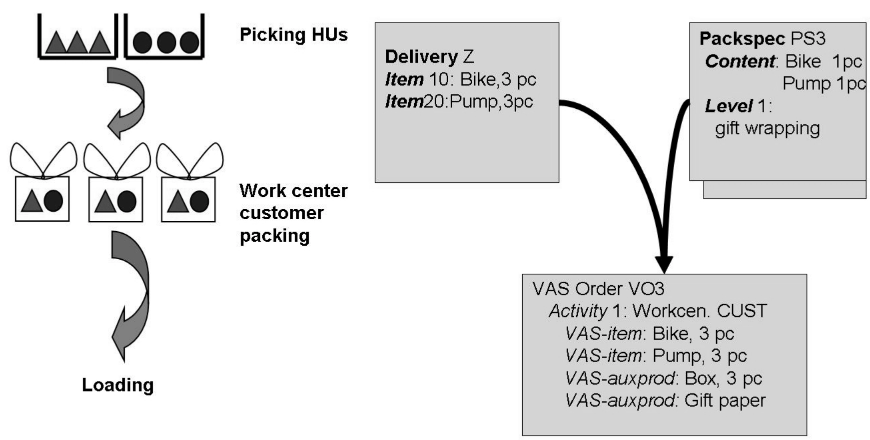

Figure 94: VAS Order Components

In the illustration above, a VAS order is created with reference to an outbound delivery order and the required packaging specification. The packaging specification uses the packaging specification levels to inform the VAS order about the VAS activities that the warehouse employees have to perform in the warehouse. Information in the delivery provides the VAS order with the exact amount of work to be performed.

Structurally, the VAS order contains the following components:

- Order header
- List of VAS activities
- Items
- Auxiliary products

Creation of the VAS order can occur manually or automatically. The automatic VAS order generation process can be configured to create the VAS order when the warehouse request document is created, or, for VAS processing during goods receipt, when the goods receipt posting is made.

Goods Issue Process with VAS Order

Although VAS processing is possible in both goods receipt and goods issue processes, in this lesson we will use a goods issue process as an example. A common process in many large warehouses/DC's is using VAS in a kit-to-order scenario. The figure below illustrates the basic process.

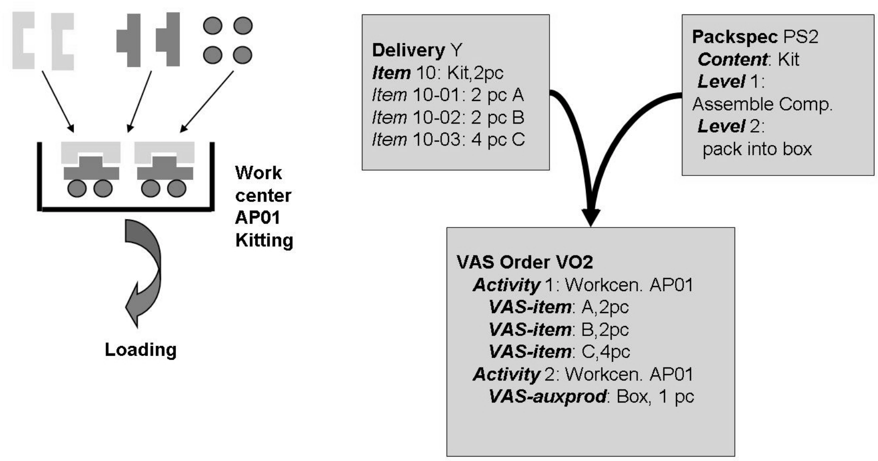

Figure 95: VAS and kitting

In the figure above, an outbound delivery order containing items for a kit-to-order was created and the corresponding VAS order was generated that brings together the kit-to-order items and the packaging specification containing the kitting instructions. In warehouse task creation, warehouse tasks are created to pick the product components for the kit and move them to the kitting work center. The goods issue process changes when used in connection with value-added services. It is common to perform the required VAS activities for a VAS order at special work centers in an interim step, before shipping the products to the customers. This process can be used to pack products for your customers on a customer-specific basis, for example.

In addition to the support of a kitting process in VAS, product packing is another common process in goods issue. A VAS order can be created that, in concert with packaging specifications can be used to direct the packing of products after they are picked.

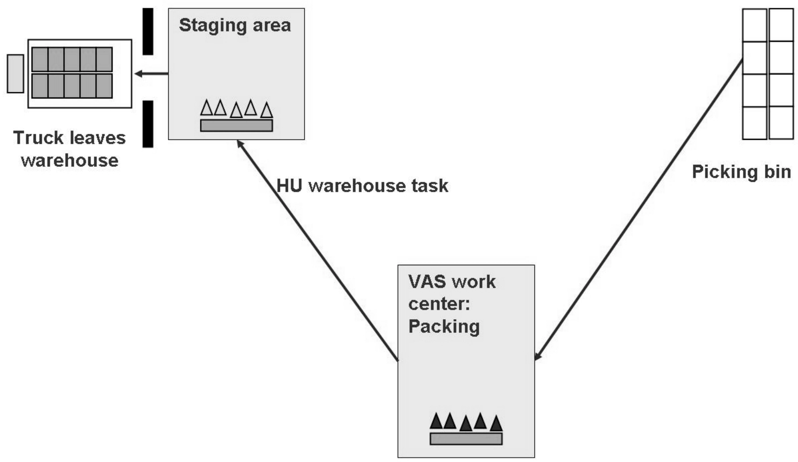

Figure 96: VAS Packing Using Storage Control

In the figure above, VAS processing of packing using storage control is illustrated. From the outbound delivery order, tasks are created to pick the product from their storage bins and move them to a the work center where the packing will be done. The packing will be documented using a VAS order. Upon completion of the packing process, tasks will be created to move the HU's containing the packed products to the goods issue staging area.

VAS Data and Output

In addition to viewing the VAS data from the VAS order, VAS orders can be printed for use by employees in a VAS work center. VAS data can also be viewed in the warehouse monitor.

Auxiliary Product Consumption Posting

For the value-added services performed at the work centers, you can record which auxiliary products you used for particular activities, and in what quantities. Auxiliary products used in VAS processing are products such the packaging materials, strapping, shrink wrap, hangers, labels and miscellaneous supplies.

If the consumption relevance for the required auxiliary products for value-added services has been set , and a special storage bin has been assigned in the VAS work center for the auxiliary products, consumption can be recorded for all auxiliary products in the system.

Lesson Summary

You should now be able to:

- List examples of value-added services
- Describe how value-added services are integrated into EWM.
- List the levels of a value-added services order.

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: Kitting

Lesson Overview

In this lesson we will review the kitting functionality in EWM. Two kitting processes are supported in EWM: kit-to-order and kit-to-stock. The processing characteristics of both processes will be examined in this lesson.

Lesson Objectives

After completing this lesson, you will be able to:

- Understand the kit-to-order and kit-to-stock processes in Extended Warehouse Management.
- Define the process flow of kit-to-order.
- Outline the processing characteristics of kit-to-stock.]

Business Example

In IDES, AG, sales of kits to-order are made to customers who require custom assembled kits of service parts. IDES, AG also sells prepackaged service repair kits. These kits are made as a VAS process in the warehouse.

Kits and Kitting

A kit is a list of products that are always delivered together. Kits can be a group of materials used to repair a piece of machinery, or they can be add-on products for other products, they can be a display or assortment of products to sell in a retail store, or they can be an assortment of tools used for a particular repair or assembly task.

Extended Warehouse Management (EWM) does not save the kits as master data, instead it receives the information about the structure of a kit in the form of items of an outbound delivery from the SAP ERP system. The structure containing the kit in the outbound delivery, in combination with a packaging specification, is used as a basis for assembling or producing a kit in EWM.

A kit can consist of the following levels:

- Kit header - represents the finished kit
- Kit component - a product in the kit

EWM does not support nested kits, that is, kits within kits.

The process of building or assembling kits is called “kitting”. EWM supports the kit-to-order and the kit-to-stock kitting processes. In the kit-to-order process, each kit is assembled based on a customer order, similar in function to a make-to-order manufacturing process. To support sales of pre-assembled kits, EWM also provides a kit-to-stock process in which kits are pre-assembled and placed into stock.

Illustrated below are examples of a simple kit and a complex kit.

Item Category	Product	Quantity UoM	UEPOS	UEPVW
10 KIT	Brake Kit	1 PC		
20 KOMP	Brake rotor disc	2 PC	10	K
30 KOMP	Carbon-metallic pads	4 PC	10	K

Figure 97: Simple Kit

Item Category	Product	Quantity UoM	UEPOS	UEPVW
10 KIT	Brake Kit	5 PC		
20 KOMP	Brake rotor disc	10 PC	10	K
30 KOMP	Carbon-metallic pads	20 PC	10	K
40 TAP2	Stainless steel brake lines V1.0	20 PC	**10**	**K**
50 KOMP	Stainless steel brake lines V1.0	4 PC	40	R
60 KOMP	Stainless steel brake lines V2.0	16 PC	40	R
70 TAP2	Brake fluid 1,5L	10 PC	**10**	**K**
80 KOMP	Brake fluid 1,0L	10 PC	70	R
90 KOMP	Brake fluid 0,5L	10 PC	70	R

Figure 98: Complex Kit - Exploded

Although EWM supports the kitting processes, there is no master data, such as a bill-of-material (BOM) stored in EWM. The kit is represented as a hierarchy of items of an outbound delivery order. In kit-to-stock, EWM can reference a BOM stored in the ERP system.

Kit-to-Order

With the kit-to-order process, the system can automatically create the tasks and data necessary to assemble kits for a specific outbound delivery order, if the kit is not in stock.

The kit-to-order process requires the use of SAP CRM, Release 5.0 or higher.

The following rules apply to kits:

- A kit is always delivered in full to a customer
- The kit header and kit components are always scheduled for the same date.
- All components for the kit must come from the same warehouse
- Kit prices are always calculated at the header level.
- The kit header and kit components have a quantity ratio - defined by the kit structure - to each other.

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The following chart illustrates the kit-to-stock processes and integration with other non-EWM components.

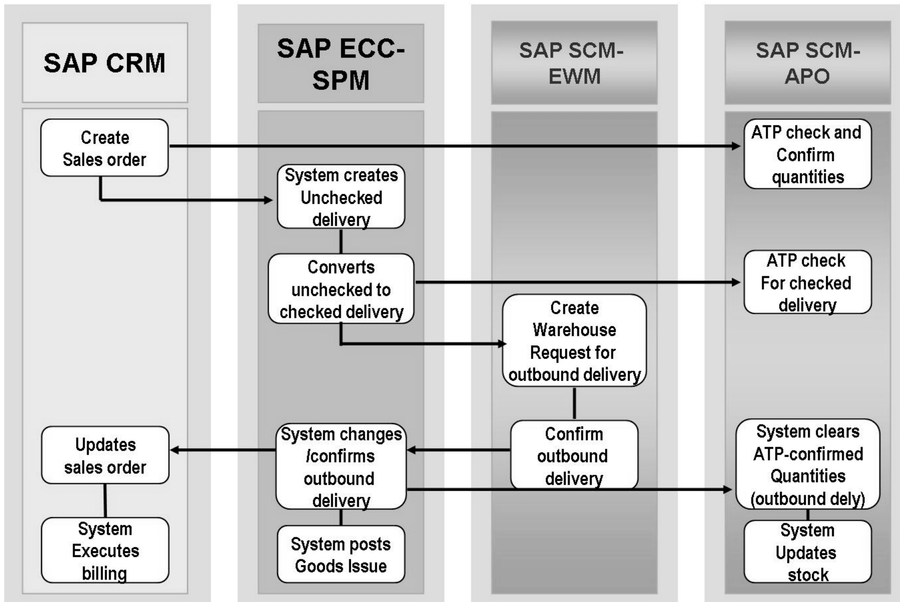

Figure 99: Kit-to-Order Process Flow

The kit-to-order process consists of the following steps:

1. A sales order is created in SAP CRM that contains a kit item.
2. For a requirement from the sales order, the system triggers the rule-based ATP check in SAP SCM. The system determines one or more rules with replacements. One of the replacements is a kit.
3. The system checks whether the kit is in stock. If the kit is not in stock, the production that is activated in the validation rule creates a kit structure that contains the kit components that the system requires to assemble the kit. The system then performs the ATP check for the kit components and confirms the quantities for the sales order.
4. The system creates an unchecked delivery in ERP without creating an SD order
5. In ERP the unchecked delivery is converted to a checked delivery. The checked delivery is replicated to the EWM system (outbound delivery request)
6. EWM creates a warehouse request (outbound delivery order) for the outbound delivery request. This process triggers the kit-to-order process.
7. The kit components are picked and assembled into the finished kits.
8. The system confirms the delivery and the goods issue is posted for the kits.
9. The sales order is updated and the billing is triggered for the order.

Kitting in kit-to-order processing can be performed though the use of VAS Order and a corresponding work center, or the kitting can be performed as part of the picking process.

Kitting with a VAS Order

Value-Added Service orders can be generated automatically or manually for kitting. Based on Customizing settings the VAS order can be created automatically. The VAS order is generated for the kit header item and a packaging specification must exist for the kit header item with a level type of “Kitting.”. Use of a VAS order in kitting also means that a work center is assigned where the kitting will be performed. After the VAS order is created, the picking tasks are created to pick the kit components into pick HU's and deliver them to the kitting work center. The kitting is performed in accordance with the instructions in the VAS order. Tasks are then created to move the completed kits to the goods issue zone. Upon confirmation that the goods movements to the goods issue zone has been completed, the post goods issue is performed for the warehouse request.

Kitting During Picking Without a VAS Order

You can use this process in Extended Warehouse Management (EWM) to create a kit during picking. This process is suitable for the following cases:

- You do not require detailed documentation of the kitting procedure in EWM.
- You assemble the kits during picking, that is, you do not perform kitting at special work centers.

Without a VAS order, you can only find information about kitting in the information for the kit in the outbound delivery and in the kitting instruction that may exist in the form of free text for the warehouse request item of the kit header.

Using this technique, the kit components are generally picked from stock into pick HU's. that represent the kits.

Kit to Stock

This process is used to create kits and then transfer them to stock. This provides you with a simple, streamlined kit creation process that is executed and documented in the warehouse. You can either trigger kit creation manually in the ERP system based on a production order or in the EWM system directly, using a value-added service order (VAS order). You can also perform reverse kitting, which you can use to split up a kit back into its components.

The kit-to-stock process can begin either in the ERP system or the EWM system. Irrespective of where the process is triggered, kit-to-stock requires the use of an inbound and an outbound delivery document. The illustration below illustrates the basic process.

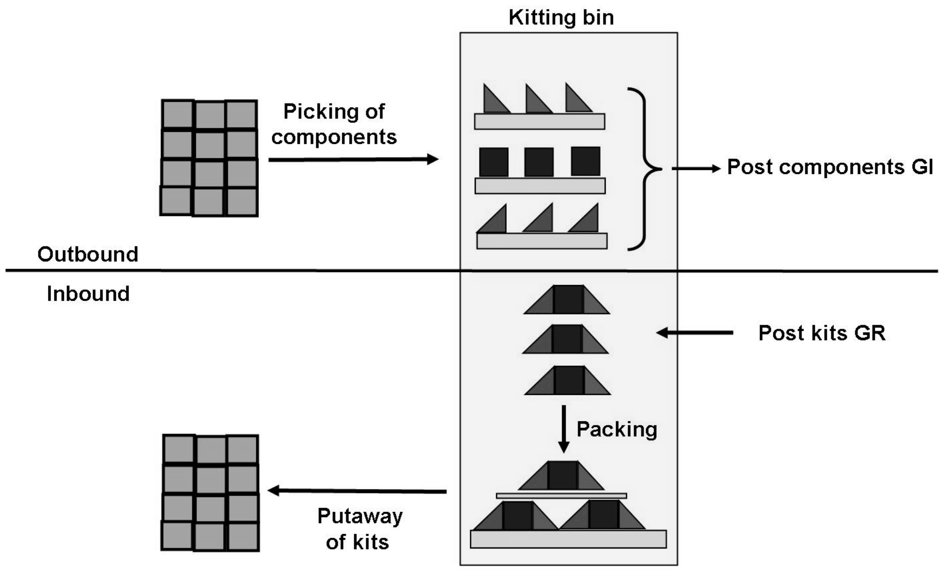

Figure 100: Kit-to-Stock Process

The outbound delivery order, the warehouse request document, contains the component items for the kit. It is the source document for the VAS order and the warehouse tasks to pick the component items for movement to the kitting work center. Use of a VAS order is mandatory for kit-to-stock items. After the kits are assembled, the goods issue posting is triggered from the delivery document.

The inbound delivery document contains the kit header product that represents the completed kits and quantity. After the kits are completed, the inbound delivery is used to post the goods receipt for the finished kits into stock and to serve as the source of the warehouse tasks to place the kits into stock.

Although created at the same time, the inbound and outbound documents are processed independently of each other. For example, the goods receipt of the finished kits can be performed before the goods issue posting of the kit components.

As outlined earlier, the kit-to-stock process can begin in either the ERP system or the EWM system. To start the process in ERP with a production order requires the use of EnP 3. The production order can be created manually, or automatically from planning. From the production order, the inbound delivery is created containing the kit header product, and an outbound delivery is created with the kit component items. The two deliveries are copied to the EWM system.

To start the kit-to-stock process in the EWM system, a VAS order must be created manually. A packaging specification must exist for the kit product. If a bill-of-material exists for the product in the ERP system it can be entered into the VAS order, otherwise the kit components have to be entered manually. EWM creates an inbound delivery

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document with the kit header product and an outbound delivery order for the kit component products. The EWM system transfers both deliveries to the ERP system. It should be noted that the EWM system does not create an outbound delivery request or an inbound delivery notification for the warehouse request documents it created.

Reverse Kitting

This process can be used to split kits up into their components. You start the process by manually creating a VAS order for reverse kitting.. You can start this process only in the EWM system.

The overall process of reverse kitting is very similar to kit-to-stock. When the VAS order is created to begin the reverse kitting process, two deliveries are created: an inbound delivery document containing the kit components and, an outbound delivery order containing the kit product. These deliveries are copied to the ERP system.

A bill-of-material can be entered in the VAS order for the kit, if it exists in ERP; otherwise, the kit components have to be entered manually.

By confirming goods issue of the kit and goods receipt of the kit components, goods issue and goods receipt are automatically posted in the ERP system.

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Lesson Summary

You should now be able to:

- Understand the kit-to-order and kit-to-stock processes in Extended Warehouse Management.
- Define the process flow of kit-to-order.
- Outline the processing characteristics of kit-to-stock.]

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: Replenishment

Lesson Overview

Many warehouses have dedicated picking areas that serve as the primary picking locations for materials to be shipped. As the storage bins are depleted of stock they must be replenished. This lesson examines the various replenishment methods provided by EWM for storage bin replenishment.

Lesson Objectives

After completing this lesson, you will be able to:

- Understand the overall concept of replenishment control.
- Describe the data that can influence replenishment of a warehouse product.
- List and describe the types of replenishment control.

Business Example

In the warehouse, of the model company, IDES,AG, fixed bin picking is being used. The bins in the storage type used for the picking area must be replenished on a regular basis.

Concept

Many warehouses use a dedicated area in the warehouse for a primary picking area. Normally, one or more storage types are configured for “fixed-bin ”picking as a stock removal strategy. Products stored in bins in the fixed-bin storage type will become depleted over time and must be replenished. An influencing factors for the replenishment quantity could be predefined stock levels, or demand forecasts.

EWM provides predefined techniques for replenishment of storage bins. You can use any or all of these techniques in the warehouse to replenish storage bins. Before the replenishment control is used however certain data fields in the warehouse product master must be updated. The fields that play a primary role in determining the replenishment quantity are as follows:

- Minimum Stocking Quantity
- Maximum Stocking Quantity
- Replenishment Quantity

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The replenishment control fields above can be specified at the storage type level in the warehouse product master or at the storage bin level. The data for the replenishment control fields can be entered manually or they can be determined via the slotting process.

After the replenishment control data has been entered or determined, replenishment processing can begin. The replenishment control type is assigned to the storage type in Customizing. Some of the replenishment control types require additional settings in Customizing.

Replenishment Control Types

In this section we will review the various replenishment control types and their characteristics.

Planned Replenishment

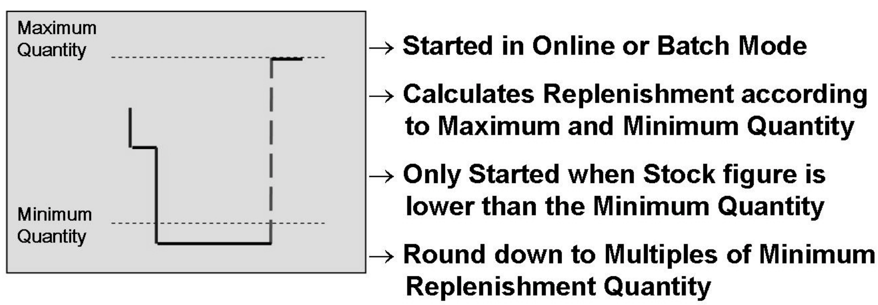


Figure 101: Planned Replenishment

You can start planned replenishment either interactively or in the background. The system calculates the replenishment in accordance with the defined minimum quantity and maximum quantity. Replenishment control is triggered when the stock is less than the minimum quantity. The system rounds down the replenishment quantity, in other words, the quantity of the warehouse task or the warehouse request, to a multiple of the minimum replenishment quantity.

Order-related Replenishment

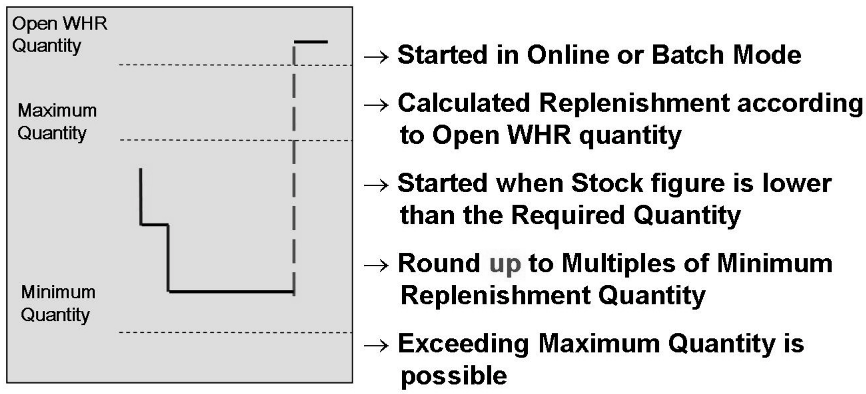


Figure 102: Order-related Replenishment

You can start order-related replenishment either interactively or in the background. The system calculates the replenishment in accordance with the quantity of the selected open warehouse requests. Replenishment control is triggered when the stock is less than the required quantity. The system rounds up the replenishment quantity to a multiple of the minimum replenishment quantity. The maximum quantity can be exceeded.

Automatic Replenishment

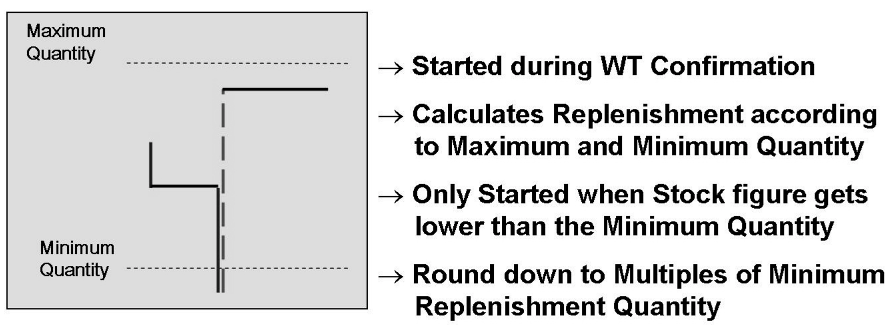
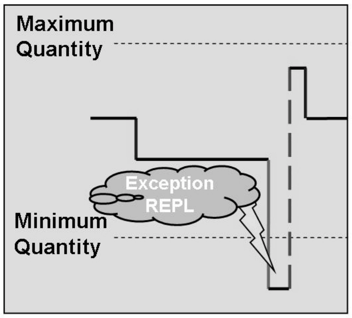


Figure 103: Automatic Replenishment

The system starts automatic replenishment in the background when a warehouse task is confirmed. It calculates the replenishment in accordance with the maximum and minimum quantity. Replenishment control is triggered when the stock is less than the minimum quantity. The system rounds down the replenishment quantity to a multiple of the minimum replenishment quantity.

Direct Replenishment



→ **Started during a Pick Denial when Exception Code points to the Internal Process Code "Replenishment"**

→ **Only possible for Fixed Bin Scenario**

→ **Calculated Replenishment according to Maximum and Minimum Quantity**

→ **Assume that Bin Quantity is Zero**

→ **Round down to Multiples of Minimum Replenishment Quantity**

→ **Picker performs the Replenishment (*Picker Directed Replenishment*)**

Figure 104: Direct Replenishment

Direct replenishment is only possible in fixed storage bin scenarios. It is started during a bin denial when an exception code refers to the internal process code Replenishment. The system calculates the replenishment in accordance with the maximum and minimum quantity. Here it assumes that the quantity at the storage bin is zero. The system rounds down the replenishment quantity to a multiple of the minimum replenishment quantity.

Direct replenishment can be performed by the picker (picker-directed replenishment). In this case, a warehouse task is displayed for the replenishment as the next item to be processed in the picker's warehouse order. As a prerequisite, the system must have found stock in the permitted storage types. Picker-directed replenishment is only possible in radio frequency scenarios

Lesson Summary

You should now be able to:

- Understand the overall concept of replenishment control.
- Describe the data that can influence replenishment of a warehouse product.
- List and describe the types of replenishment control.

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Lesson: Serial Numbers in EWM

Lesson Overview

The use of serialized products in Extended Warehouse Management is the subject of this lesson.

Lesson Objectives

After completing this lesson, you will be able to:

- Define the requirements for using serial numbers in EWM.
- Describe the serial number requirement types
- Understand the overall support of serialized products in EWM

Business Example

Certain products stored in the IDES, AG warehouse are serialized and must be tracked within the warehouse by using their serial numbers in addition to their product codes.

The Serial Number

A serial number is a character string that is assigned to each individual piece of a material in order to differentiate the individual piece from all other pieces. The combination of product number and serial number is unique.

In Extended Warehouse Management a serial number can be up to 30 characters in length. However, to remain compatible with the SAP ERP system, the serial number length must be restricted to 18 characters. There is a BAdI available, however, that can be used to map EWM serial numbers to ERP serial numbers.

Serial Number Profile

A serial number profile is a four-character code created in Customizing, that determines the conditions and business transactions for issuing serial numbers to serialized products. You must assign a serial number profile in the product master records for products that require serial numbers.

In the system configuration in Customizing of the ERP system, you define a serial number profile that is valid for all warehouse numbers, in other words, is warehouse-number independent. You can, however, define a warehouse-number dependent serial number profile in Customizing for Extended Warehouse Management. EWM will first search for the warehouse number-dependent serial number profile.

Only if it does not find one does it use the warehouse number-independent serial number profile. In this way, you can make a product require a serial number in one warehouse and not require one in another warehouse.

Serial Number Requirement Types

An important setting in the serial number profile is the serial number requirement type. This code is used to specify at what level the serial number is tracked within EWM.

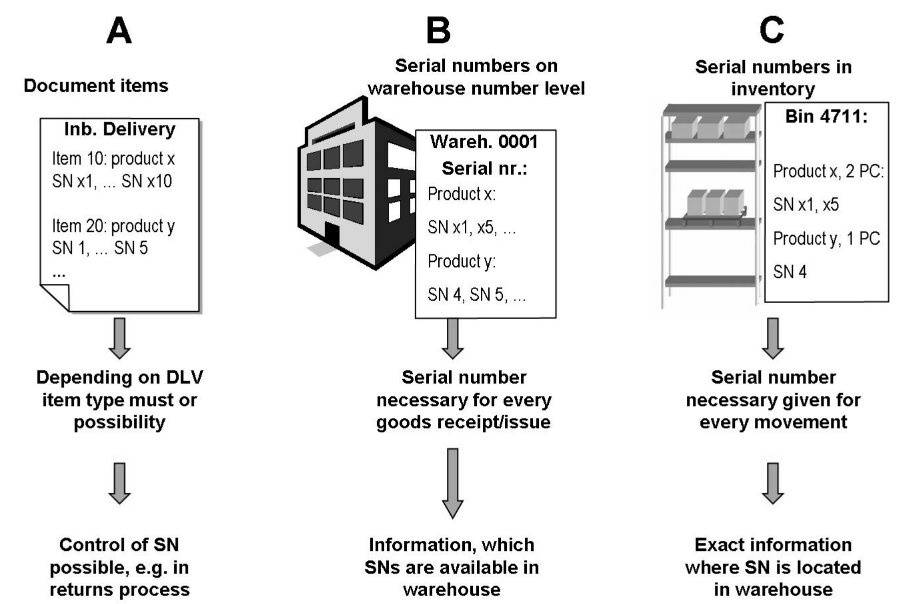


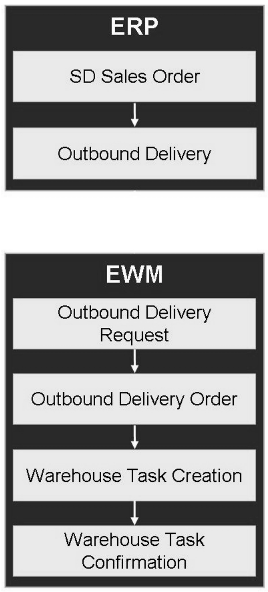
Figure 105: Serial Number Requirement

The following are the serial number requirement types:

- **A** - Serial Numbers for Document Items - the serial number is required only at the document level.
- **B** - Serial Numbers on Warehouse Number Level - Serial numbers are required for all goods receipts/issues and are maintained at the warehouse level.
- **C** - Serial Numbers required for every warehouse movement. They are maintained at the bin level.
- **D** - No serial number requirement. - This setting is used primarily when some products are serialized in some warehouses but not in others.

Ordering of Specific Serial Numbers

In the ERP system serial numbers can be entered in either the sales order or the delivery document. These specific serial numbers can be processed in EWM as shown in the diagram below.



- **Predetermined serial numbers are specified via sales order in ERP system**
- **Predetermined serial numbers are forwarded via the ERP outbound delivery to EWM outbound delivery request and outbound delivery order**
- **Predetermined serial numbers are picked (Pick Denial possible)**
- ***requires EhP 3**

Figure 106: Ordering of Specific Serial Numbers

If the serial number from ERP cannot be located in the EWM system a pick denial will occur.

Provisional Serial Number

A provisional serial number is Character string that the system automatically assigns to products requiring serial numbers (serial numbers at warehouse number level or in inventory management). The provisional serial number must be replaced before the execution of certain process steps in the goods receipt process, by entering a valid serial number manually.

Extended Warehouse Management (EWM) always requires the serial numbers at the warehouse number level or in inventory management before the goods receipt posting. If you set the **Prov SNs** indicator in Customizing, EWM automatically assigns a provisional serial number, if you have not already entered a valid serial number. You replace this serial number with your own in a subsequent goods receipt process.

Provisional serial numbers always begin with $ and have 30 characters.

Example: You unload a commercial truck and post the goods receipt. At this point, you do not want to specify any serial numbers. You want to wait until deconsolidation before entering the serial numbers.

Serial Number Monitoring

Serial number data can be displayed using the warehouse monitor.

- **Warehouse Management Monitor (e.g. serial number movements, current location/handling unit of specified serial number**
- **Radio Frequency (e.g. serial number query)**
- **Display of serial numbers for confirmed warehouse tasks (e.g. EWM monitor)**

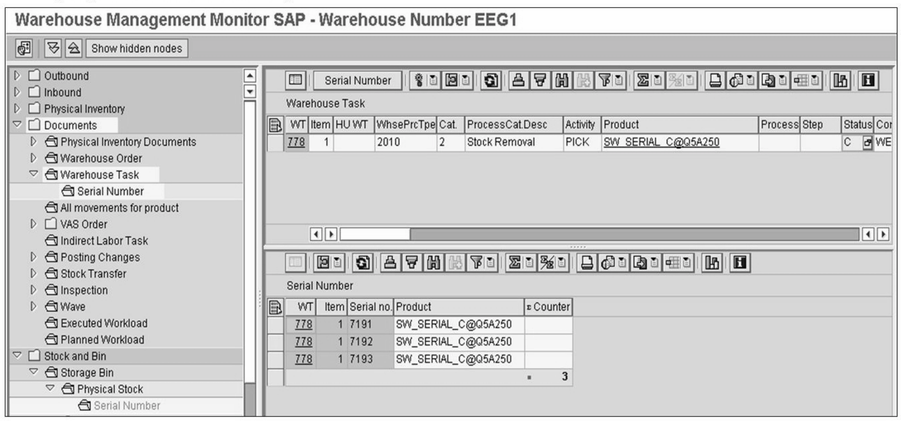


Figure 107: Serial Number Display in the Warehouse Monitor

Lesson Summary

You should now be able to:

- Define the requirements for using serial numbers in EWM.
- Describe the serial number requirement types
- Understand the overall support of serialized products in EWM

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

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Unit Summary

You should now be able to:

- Explain the data flow from the ERP system to EWM for the outbound process.
- Describe the structure of the outbound delivery document.
- Name the outbound delivery documents that are created in EWM .
- List the EWM documents used in outbound processing.
- Describe the use of the EWM outbound delivery documents.
- Describe the use of Direct Delivery documents in EWM.
- Explain delivery splitting in EWM
- Outline the basic process of warehouse order creation.
- Describe the difference between process and layout storage control.
- Explain direct storage control for stock removal.
- Name the process steps commonly used in process storage control.
- Describe the EWM wave management function.
- Explain the use of the wave template
- Describe the use of automatic wave assignment and the technique used to implement it.
- List examples of value-added services
- Describe how value-added services are integrated into EWM.
- List the levels of a value-added services order.
- Understand the kit-to-order and kit-to-stock processes in Extended Warehouse Management.
- Define the process flow of kit-to-order.
- Outline the processing characteristics of kit-to-stock.]
- Understand the overall concept of replenishment control.
- Describe the data that can influence replenishment of a warehouse product.
- List and describe the types of replenishment control.
- Define the requirements for using serial numbers in EWM.
- Describe the serial number requirement types
- Understand the overall support of serialized products in EWM

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Test Your Knowledge

1. What documents can be found in the goods issue process?

   Choose the correct answer(s).

   □ A Sales order
   □ B Production order
   □ C Outbound delivery
   □ D Transfer order
   □ E Billing document

2. What is the document that begins the outbound process in the EWM system?

   Choose the correct answer(s).

   □ A Outbound delivery request
   □ B Outbound delivery document in ERP
   □ C Transfer requirement
   □ D Material document

3. which of the following dates are delivery scheduling dates in ERP?

   Choose the correct answer(s).

   □ A Material availability date
   □ B Customer requested delivery date
   □ C Transportation planning date
   □ D Loading date
   □ E Goods issue date

4. What SAP components can be used to perform delivery scheduling?

   Choose the correct answer(s).

   □ A Sales and Distribution in SAP ERP
   □ B SAP CRM
   □ C SAP APO Global Available to Promise
   □ D EWM
   □ E SAP Event Management

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5. What SAP component generates unchecked delivery documents?

   Choose the correct answer(s).

   □ A Sales and distribution
   □ B SAP Customer Relationship Management (SAP CRM)
   □ C Logistics execution
   □ D EWM

6. What document in EWM will be created from an unchecked or checked ERP delivery document?

   Choose the correct answer(s).

   □ A Outbound delivery Request
   □ B Outbound delivery order
   □ C Outbound delivery
   □ D Warehouse order

7. An outbound delivery order can be created from an unchecked delivery document.

   Determine whether this statement is true or false.

   □ True
   □ False

8. In what EWM document is the warehouse process type assigned?

   Choose the correct answer(s).

   □ A Outbound delivery request
   □ B Warehouse order
   □ C Outbound delivery
   □ D Outbound delivery order

9. From what EWM document is the EWM outbound delivery document created?

   Choose the correct answer(s).

   □ A Warehouse order
   □ B Sales order
   □ C Outbound delivery request
   □ D Outbound delivery order

10. Delivery splitting can only occur in the ERP system.

    Determine whether this statement is true or false.

    □ True

    □ False

11. Which of the following are process steps in process-oriented storage control for outbound processing?

    Choose the correct answer(s).

    □ A Picking

    □ B deconsolidation

    □ C VAS

    □ D Packing

    □ E Loading

12. Wave management assembles the outbound delivery notification documents into waves for processing.

    Determine whether this statement is true or false.

    □ True

    □ False

13. What are the components that are contained within a VAS order?

    Choose the correct answer(s).

    □ A Order header

    □ B List of VAS activities

    □ C Bill-of-material

    □ D Items

    □ E Auxiliary products

14. A _________________ is the instruction to perform value-added services for one or more products with reference to a delivery item.

    Fill in the blanks to complete the sentence.

15. What are the three kitting processes available in EWM?

    Choose the correct answer(s).

    □ A Kit-to-order
    □ B Kit de-stocking
    □ C Kit rebuild
    □ D Kit-to-stock
    □ E Reverse kitting

16. Kit-to-order requires the use of SAP CRM.

    Determine whether this statement is true or false.

    □ True
    □ False

17. What are the fields in the warehouse product master that play a central role in replenishment of storage bins?

    Choose the correct answer(s).

    □ A EOQ
    □ B Storage Type Control
    □ C Minimum stocking quantity
    □ D Maximum stocking quantity
    □ E Replenishment Quantity
    □ F Bin rounding

18. What is the replenishment type that allows a bin replenishment to be done by a picker.

    Choose the correct answer(s).

    □ A Order-related replenishment.
    □ B Automatic replenishment
    □ C Planned replenishment
    □ D Direct replenishment

19. A character string that is system assigned that is used as a placeholder for a serial number is called a ____.

    Fill in the blanks to complete the sentence.

20. Serial numbers can be maintained at the storage bin level in EWM.

Determine whether this statement is true or false.

- □ True
- □ False

Answers

1. What documents can be found in the goods issue process?

   Answer: A, C, E

   All of these documents are part of the central document flow in goods issue in the SAP ERP system.

2. What is the document that begins the outbound process in the EWM system?

   Answer: B

   When the outbound delivery document in SAP ERP has EWM relevant materials it is replicated to EWM as the outbound delivery notification.

3. which of the following dates are delivery scheduling dates in ERP?

   Answer: A, B, C, D, E

   All of these dates are included in the delivery scheduling process.

4. What SAP components can be used to perform delivery scheduling?

   Answer: A, C

   Delivery scheduling is performed by either SD or APO Global ATP.

5. What SAP component generates unchecked delivery documents?

   Answer: B

   Unchecked deliveries are created by SAP CRM in the SAP ERP system.

6. What document in EWM will be created from an unchecked or checked ERP delivery document?

   Answer: A

   The outbound delivery request document is created in EWm for all EWM relevant outbound delivery documents created in ERP.

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7. An outbound delivery order can be created from an unchecked delivery document.

   Answer: False

   An outbound delivery order can be created only from a checked delivery document.

8. In what EWM document is the warehouse process type assigned?

   Answer: D

   The warehouse process type is assigned to the warehouse request document, the outbound delivery order.

9. From what EWM document is the EWM outbound delivery document created?

   Answer: D

   The outbound delivery is always created from the EWM outbound delivery order.

10. Delivery splitting can only occur in the ERP system.

    Answer: False

    Delivery splitting can be done in the EWM system. The new delivery documents created in EWM are relicated to the ERP system.

11. Which of the following are process steps in process-oriented storage control for outbound processing?

    Answer: A, C, D, E

    A goods issue for a product may require the product to go through one or more of the process steps.

12. Wave management assembles the outbound delivery notification documents into waves for processing.

    Answer: False

    Wave managment uses the outbound delivery order to form waves because it is the warehouse request document.

13. What are the components that are contained within a VAS order?

    Answer: A, B, D, E

    The VAS order does nor contain a bill-of-material. Logically it is linked to a packaging specification.

14. A VAS order is the instruction to perform value-added services for one or more products with reference to a delivery item.

    Answer: VAS order

    The VAS order is the required document in VAS processing.

15. What are the three kitting processes available in EWM?

    Answer: A, D, E

    EWM supports kit-to-order, kit-ti-stock and reverse kitting.

16. Kit-to-order requires the use of SAP CRM.

    Answer: True

    Kit-to-order in EWM is only supported using SAP CRM.

17. What are the fields in the warehouse product master that play a central role in replenishment of storage bins?

    Answer: C, D, E

    Generally, the replenishment process uses a min-max replenishment technique.

18. What is the replenishment type that allows a bin replenishment to be done by a picker.

    Answer: D

    Direct replenishment is only possible using RF.

19. A character string that is system assigned that is used as a placeholder for a serial number is called a Provisional serial number.

    Answer: Provisional serial number

20. Serial numbers can be maintained at the storage bin level in EWM.

    Answer: True

    The 'serial numbers in inventory' serial number requirement type allows this form of serial number control,

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Unit 7

Labor Management

Unit Overview

The Labor Management application in Extended Warehouse Management allows you to control and better use warehouse resources to maintain margin expectations. In addition, better control and use of warehouse resources allows a warehouse to detect inefficiencies and unproductive activities in the warehouse processes and take corrective measures. In this unit we will explore the Labor Management application area within EWM.

Unit Objectives

After completing this unit, you will be able to:

- List the major features of labor management
- Describe the use of planned and executed workload items.
- Create a labor management resource
- Define the purpose of engineered labor standards.
- Create indirect labor tasks.
- Explain the use and types of measurement services.

Unit Contents

Lesson: Introduction to Labor Management

Lesson Overview

Labor Management allows customers to manage and better use warehouse resources to lower costs. This lesson provides an overview of the EWM labor management application.

Lesson Objectives

After completing this lesson, you will be able to:

- List the major features of labor management
- Describe the use of planned and executed workload items.
- Create a labor management resource
- Define the purpose of engineered labor standards.
- Create indirect labor tasks.
- Explain the use and types of measurement services.

Business Example

To more effectively manage its warehouse resources and performance, IDES, AG will implement labor management within its EWM environment.

Overview

Labor Management (LM) provides you with a series of functions that can help you plan labor times and resources in your warehouse more effectively, thereby making your warehouse more productive. You use these functions to measure, plan, simulate, and visualize the activities in your warehouse.

Using engineered labor standards, LM gives you the ability to compare and evaluate the performance of your warehouse employees. After executing planned work, a comparison can be made between the planned and actual times, and trigger incentives such as bonus payments using a connected HR system.

LM enhances the comprehensive warehouse management offered by Extended Warehouse Management and was developed as an addition to EWM. LM is service-oriented and uses measurement services in planning. It supports processes such as analytical functions by providing BI Content for EWM. The information from BI is normally used for long-term, strategic planning, in addition to the short-term, operational planning that is provided by the planning and simulation functionality in Labor Management.

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Labor Management provides the following functions:

- LM-specific master data, such as processors, and the formula and condition editors
- Indirect labor for recording additional work
- Defining engineered labor standards
- Creating planned and executed workload
- Labor Management in the warehouse management monitor
- Performing operational planning
- Employee performance

Labor Management Activation

Before you can use any function in Labor Management, LM must be activated in Customizing. labor Management is activated on the warehouse level and at the internal process step level. The following graphic illustrates the basic setting.

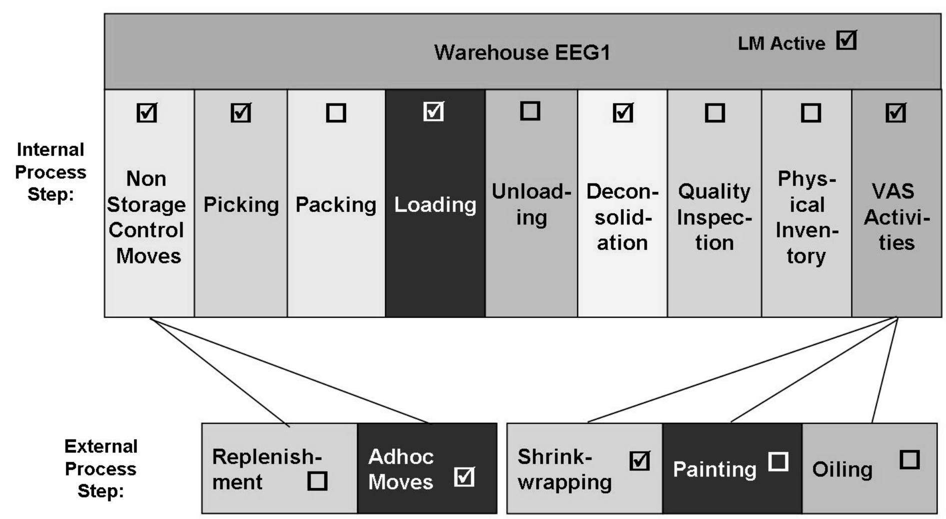

Figure 108: Labor Management Activation

Labor management can also be deactivated for selected external process steps.

After LM is activated, certain processing transactions will require that a processor, and the start and end times will have to be entered. The transactions affected are:

- Warehouse Order confirmation
- Physical Inventory processing and counting
- VAS processing transactions
- Quality Management related transactions
- In work center related transactions, the end times will be determined automatically from the warehouse time if not entered manually.
- In RF, start and end times will be determined automatically.
- In RF and work center transactions the processor will be determined through the system user.

Master Data

In addition to the data already provided in EWM, Labor Management requires to use of Processor master data. A processor is a person who operates a vehicle or other resource. The processor includes skills (licenses) and is the resource driver or a warehouse employee. The Processor is defined as a business partner with role **processor**.

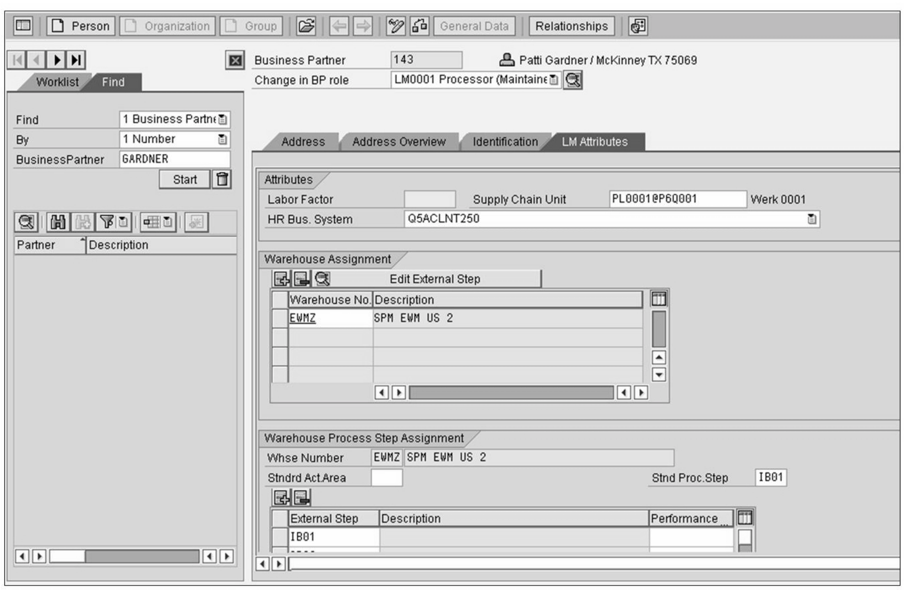

Figure 109: Business Partner - Processor

Along with address data and assigning the user-name to the processor, you specify in which warehouse a resource works, and which processes they support. The Labor Factor can be used to enter a rate for a worker. This could be a standard or actual amount. You can also define (by selecting relationships) whether a processor is a member of a group, or a group leader.

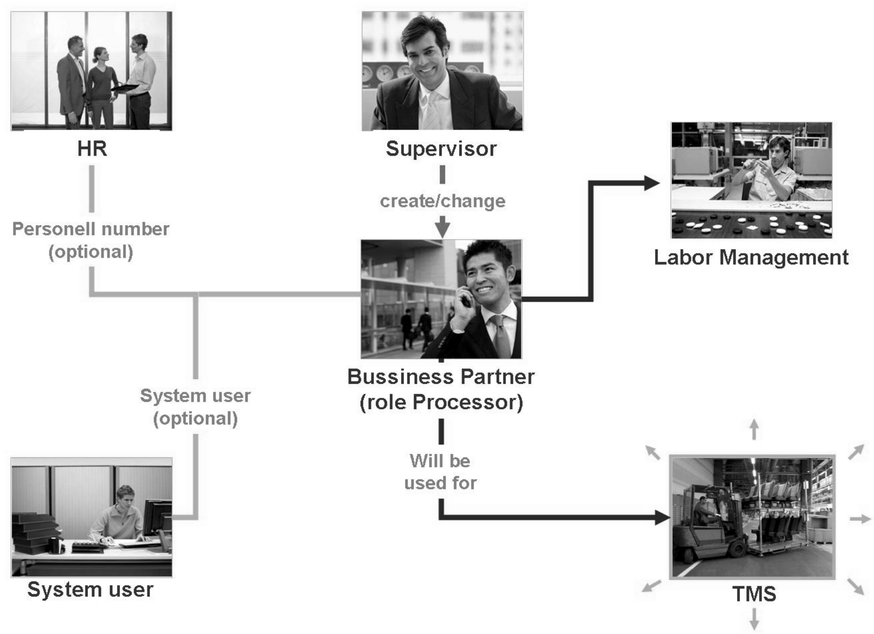

Figure 110: Processor Record

The processor uses the Business Partner with the role Processor (LM0001). Utilizing the business partner allows us to use the processor role in other applications. The processor record is entered once, and then available to labor management as well as additional applications.

Information related to processors can also be viewed in the warehouse monitor.

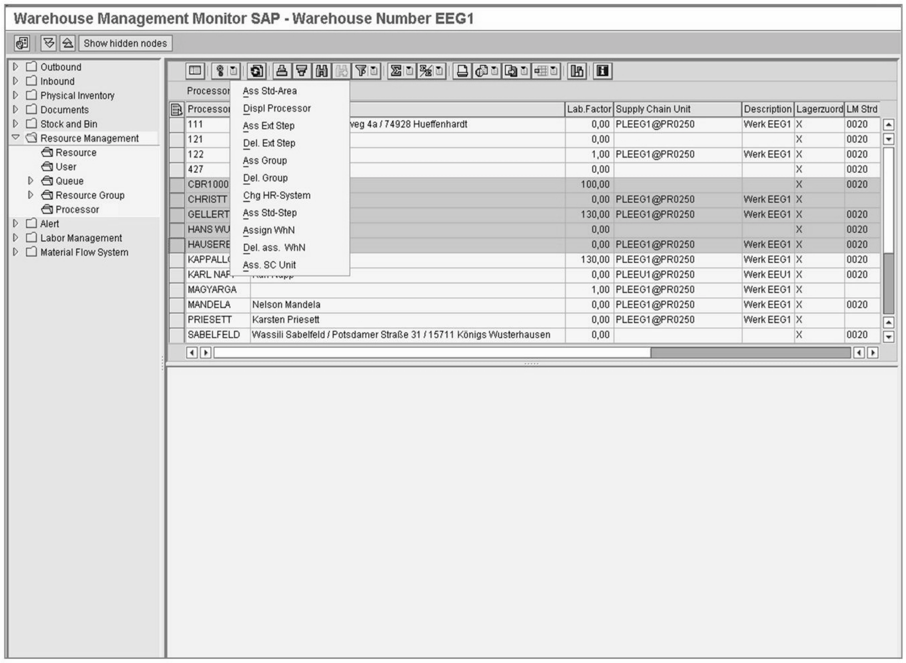

Figure 111: Warehouse Monitor - processor Data

The warehouse monitor can be used to perform mass maintenance of processors to assign:

- Processor group
- Warehouse
- External process step in the warehouse
- Standard activity area/external process step
- HR-System, if available
- Home location, Supply-Chain-Unit

If a processor uses RF, he or she will be linked to their processor number though their system user-id. When a processor executes a warehouse order, the start date-time will automatically be assigned and the end date-time will automatically be logged when the warehouse order is confirmed.

The processor, warehouse manager, or group leader can use the warehouse monitor to display LM-relevant information. For example, you can evaluate the efficiency of your employees, or the weight that was moved in a particular activity area in one day. The following nodes are defined:

- **Planned workload** - The planned workload reflects the work expected in the warehouse. Each data record references an open object that is still to be processed, such as an open warehouse task. You can use the planned workload to perform planning in your warehouse.
- **Executed workload** - The executed workload reflects the completed work in your warehouse. Each data record references a completed object, such as confirmed warehouse tasks.
- **Labor utilization** - Labor utilization is the aggregated view of the executed workload. You can use the **Efficiency** to evaluate the performance of your employees. Under **Utilization**, you can use the actual data comparison, direct an indirect labor, and attendance of the processor to evaluate the performance of the processor.
- **Indirect labor tasks**

Labor Time Definitions

There are three basic types of labor time that is tracked in Labor Management: Direct labor, Indirect labor and Unproductive time as shown in the figure below.

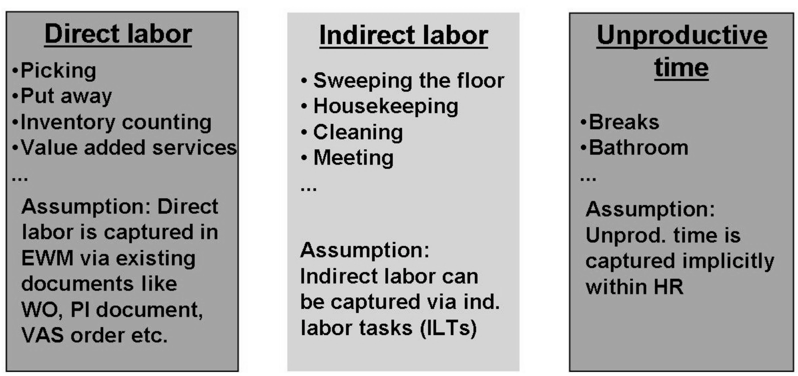

Figure 112: Labor Definitions

Direct labor is captured in the EWM documents for warehouse orders, VAS orders and physical inventory. Indirect labor is recorded by creating indirect labor tasks (ILT's). Unproductive time is captured implicitly within HR.

Planned and Executed Workload

The system uses this function for each external process step and activity area to automatically create a document for the planned workload. You use this document as a basis for planning your resources. After performing the work, you can use the executed workload to compare the planned and actual durations. You can forward the result of your evaluation to an HR system, using a performance document, to trigger payment of a bonus, for example.

Each task in the warehouse has a certain workload. You can only plan this workload if the scope of the task involved is fixed, for example, if a warehouse order that has various warehouse tasks has been created. After executing the work, additional data is then available, such as which worker executed the work, the exact start and finish time, and the resources used.

In the executed workload, you can compare the planned and actual duration for:

- Warehouse orders
- VAS Orders
- Quality Inspection documents
- Physical Inventory documents
- Indirect labor

You can use the information contained within the planned workload document to make strategic decisions. For example, this enables you to use the total of all planned activities in a particular activity area, on a particular day, to plan the number of employees for this day, in this activity area.

In a similar way, you can use the information in the executed workload to compare the performance of individual employees and groups, and to forward this data to a connected HR system to trigger payment of a bonus, for example. To do this, you must create a performance document for an employee for a particular evaluation period.

To capture data for planned and executed workload corresponding documents are created in EWM.

Planned Workload Document

The planned workload document contains data relevant for Labor Management, including information about:

- Activity area
- Activity (external process step)
- Quantity (optional)
- Planned duration calculated using engineered labor standards
- Planned end date
- Travel distance, if defined
- Capacity data, such as weight or volume

Data for the planned execution duration is calculated using the **engineered labor standards**. For warehouse orders, the travel distance or travel time can also be included in this calculation. The data record also contains a link to the generating document in the form of an object reference, such as a link to the QM document or warehouse order. You can use the data of all planned workload records in Planning and Simulation to determine how much work arises in the individual activity areas, and of which type. After executing the planned work, the system forwards the relevant information to the executed workload document, and then deletes the planned workload document.

Executed Workload Document

This central document contains all Labor-Management-relevant data that you can use to compare the planned and actual times objectively. While the work is being executed, the system or user records the name of the processor and the start and end time. The following is the key data stored in the executed workload document:

- Reference document that caused the workload (reference object type, ID of the reference document)
- Activity area
- Activity (external process step)
- Planned duration
- Adjusted planned duration
- Actual duration
- Start and end time of the execution
- Processor
- Weight, volume, calculated travel distance and calculated vertical travel distance, capacity consumption
- Number of subordinate items or documents belonging to the reference document
- Status

The information in the executed workload can be used to compare the performance of individual employees and groups, and to forward this data to a connected HR system to trigger payment of a bonus, for example. To do this, however, you must create a performance document for an employee for a particular evaluation period.

Performance Document

Performance documents are used to evaluate executed workload (EWL) cumulatively for each processor. A performance document enables you to perform an employee-related evaluation of the executed workloads (EWL) for a chosen time period. It contains the cumulative planned and actual execution durations of the assigned executed workload (EWL), and the labor time of the employee, and therefore enables you to draw conclusions about the performance or utilization of the employee. You create a performance document for a processor.

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Engineered Labor Standards (ELS)

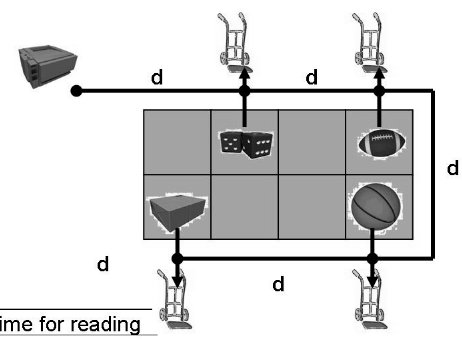
This function is used to define the times that are required to execute an activity in the warehouse. The system calculates engineered labor standards (ELS) when:

- Creating a document, when the system generates planned workload
- Confirming a document, when the system generates executed workload

The system saves the labor standards in the planned workload as planned duration, and in the executed workload as an adjusted planned duration. The final data is only available when the document is confirmed because only then is the executing resource known and therefore also the:

- Speed of the resource
- Last position of the resource prior to executing the activity
- Travel distance allowed for the resource

The system uses this additional data for the travel distance calculation. It saves the results of the travel distance calculation in the planned and executed workload. You can include a formula or condition as parameters when defining the engineered labor standards.



	Time (s)	Reason
Read document	5	Constant time for reading
Walk to first bin	15	Travel time
Pick toy	10	Time for picking dependant on weight
Walk to next bin	11	Travel time
Pick toy	20	Time for picking dependant on weight
Walk to next bin	13	Travel time
Pick toy	2	Time for picking dependant on weight
Walk to next bin	35	Travel time
Pick carton	8	Time for picking dependant on weight
Walk to packing station	60	Travel time
Total time	179	

Figure 113: How long should it take?

To use ELS to calculate the activity times, in configuration the activity is subdivided into work steps, which the warehouse worker must execute sequentially, which make up a work step sequence. The planned time for the activity is then made up of the total of all planned times of the individual work steps in the work step sequence.

A constant or a formula is used to determine the planned time of a work step. You can make multiple entries for these, and use conditions to define the ones you want to be use for the calculation.

The fields that are used in the formulas and conditions are dependent on the object type which is used in defining the engineered labor standards. This means, for example, that it is not possible to use product information to calculate the ELS of a warehouse order directly, as this may collect warehouse tasks that have different products.

Engineered labor standards data can be uploaded from another external system. There are two ways to upload existing data:

- By uploading a local file, such as a Comma-Separated-Values file (CSV file).
- By uploading a file from an application server. In this case, Extended Warehouse Management (EWM) uses a connection to the Legacy System Migration Workbench (LSMW).

The data formats for the uploaded data can be found in the Labor Management documentation.

Travel Distance Calculation

The travel distance calculation calculates the travel distance that a warehouse worker must travel to execute a warehouse order. There are two types of networks:

- Storage-type-specific networks, which you define for each storage type
- Global network that connects the storage-type-specific networks to each other.

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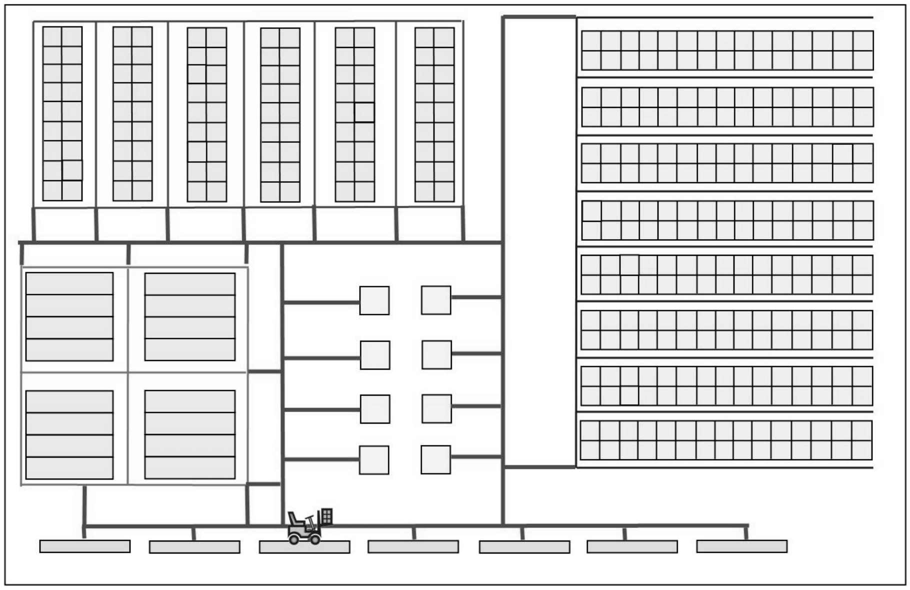

Figure 114: TDC Network

The networks can be created manually or programmatically. If a network is not generated the system uses one of two distance calculation techniques: the Euclidean or the Manhattan method as illustrated below.

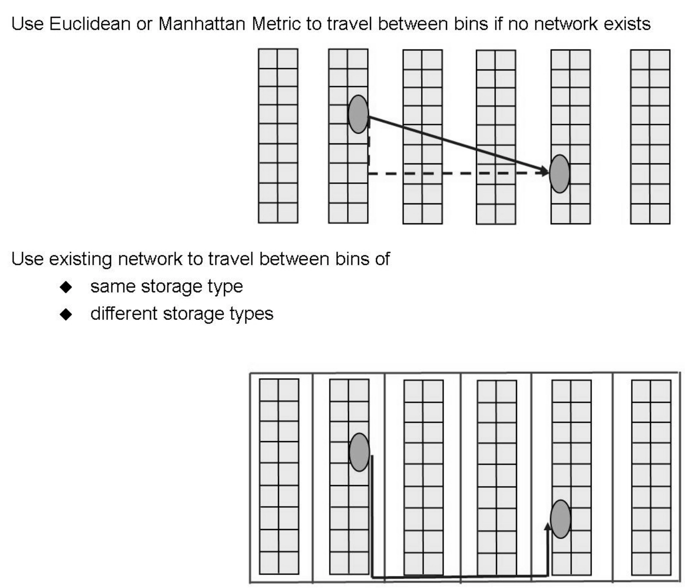

Figure 115: Travel Distance Calculation Techniques

The calculation of the shortest path within a network uses several heuristics:

- Use fast depth first search to get first solution
- Use breadth first search to improve first solution

In addition to calculating the travel distance, the system determines the time required by a worker to execute the warehouse order, depending on the speed of the resource used.

The system saves the result of the travel distance calculation in the planned and executed workload, if Labor Management (LM) is activated. The result of the travel distance calculation is used for:

- Planning the workers in Labor Management (LM)
- Calculating engineered labor standards (ELS)
- Calculating the latest start time for a warehouse order.

Indirect labor

Indirect labor documents are used to record indirect labor tasks such as cleaning, meeting attendance, sweeping, training, etc. Desktop and RF transactions are provided to record indirect labor tasks and times. An authorization concept is used to differentiate indirect labor tasks from direct labor tasks based on the activity and the processor.

Measurement Services

Measurement services can be used to define your own warehouse key figures supported by the system. You map your key figures using tailored and calculated measurement services (TMS and CMS). You start these using the program Start Measurement Services, which you can schedule to run regularly. Examples of warehouse key figures include:

- Outbound deliveries that have left the warehouse more than 24 hours late
- Number of open physical inventory documents that are older than 1 day old
- Number of handling units in goods receipt

Basically, a measurement service performs a query and returns a key figure. Basic, tailer and calculated services can be built, used by other EWM applications and can be extracted to SAP BI. The determined key figures are used in the following functions:

- Warehouse management monitor, for creating a tailored measurement service (TMS) under certain conditions
- Operational planning in Labor Management and for calculating engineered labor standards
- Warehouse Cockpit, to monitor the results graphically
- BI Content of Extended Warehouse Management

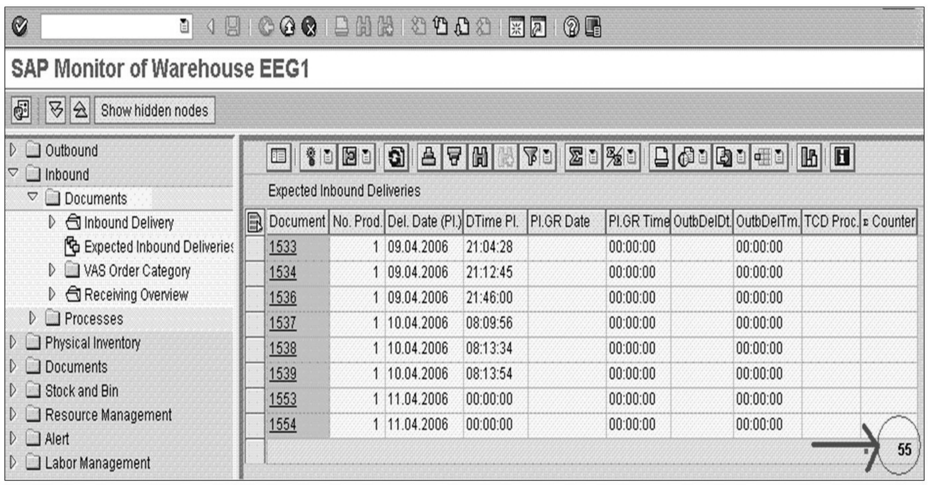

Figure 116: Measurement Service in the Warehouse Monitor

An example of a basic measurement service is shown below for the counts of posted physical inventory documents.

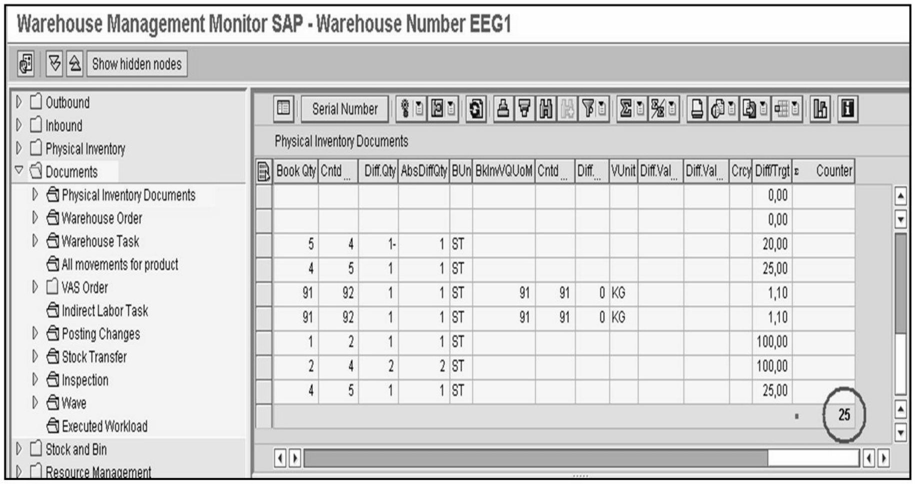

Figure 117: Measurement Service in Warehouse Monitor

Basic management services can be grouped based on business requirements such as Inbound, outbound, VAS , transportation.

SAP delivers BMS groups and 52 individual BMS's. You can create additional BMS functions. A BMS is a function module.

Tailored Measurement Service (TMS)

A tailored measurement service (TMS) is based on a basic measurement service (BMS) selected by you. BMS's are the building blocks of your warehouse key figures, and cannot be used on their own. You can split these up into BMS groups, according to your business requirements. A BMS is a query to a business object, which the system executes without the user having to make an entry. Examples of BMS's are number of inbound deliveries, or number of warehouse tasks.

A user can create a TMS by using a BMS coupled with a variant. The TMS can be used by other LM applications such as the LM cockpit or LM planning.

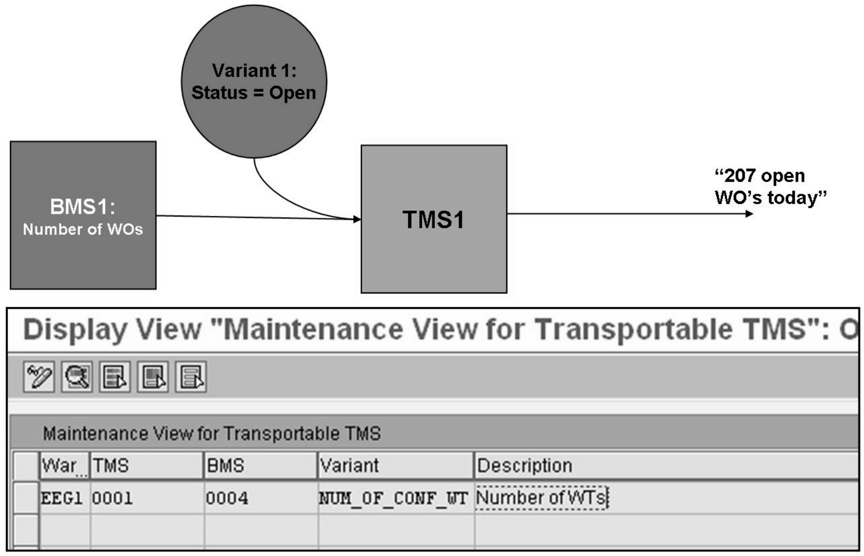

Figure 118: Example - Tailored Management Service

Calculated Measurement Service

A calculated management service (CMS) is a reuse of a tailored measurement service to build more complex formulas. As the name implies, a calculated measurement service involves a calculation using one or more formulas.

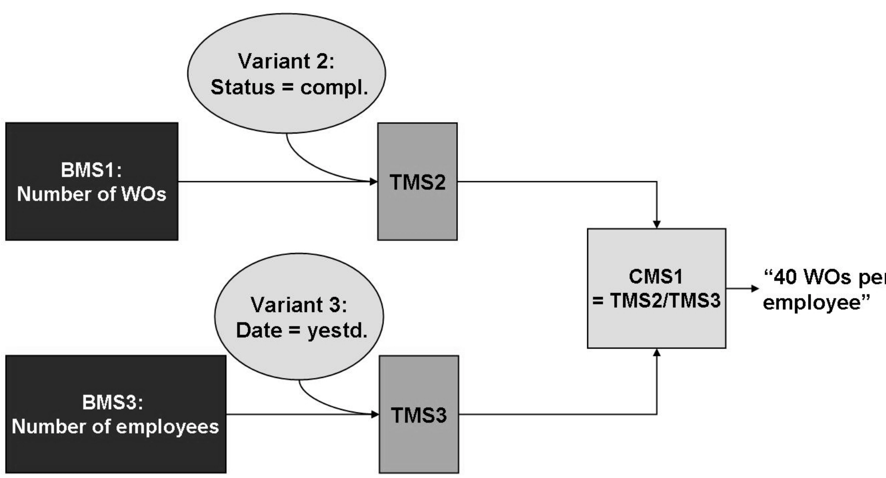

Figure 119: Example - Calculated Measurement Service

A calculated measurement service:

- can be evaluated (reported)
- returns a numeric value (in the case of non-numeric values a “1”.
- Can be used in the Easy Graphics Framework (EGF), or by other KPI reporting tools
- Contains functionality to evaluate and list results
- Can be used to trigger alerts
- Results are stored in a buffer table

The figure above shows an example of using tailored and calculated measurement services. A warehouse manager wants to know each morning how many warehouse orders a processor has executed the previous day. For this he makes the following settings:

1. He starts by defining a TMS based on the BMS he requires. He selects BMS 1 “Number of Warehouse Orders“ and BMS 2 ”Number of Processors“.
2. He then adjusts these to match his requirements, by creating selection variants 1 and 2.
3. He creates CMS 1 in the formula editor in such a away that TMS 1 is divided by TMS 2. As a result, he is given the number of warehouse orders per processor, for example 40 warehouse orders per processor.

Measurement Services (MS) Results

Measurement services results can be used to evaluate and store measurement services results, so they can be used by others. They have the following characteristics:

- Used to evaluate Calculated and tailored measurement services
- Can be scheduled to run periodically
- Results are stored in a buffer table
- Result list is displayed on the screen
- Result can be stored in a local file on a PC
- Result can be stored in a logical file on the server

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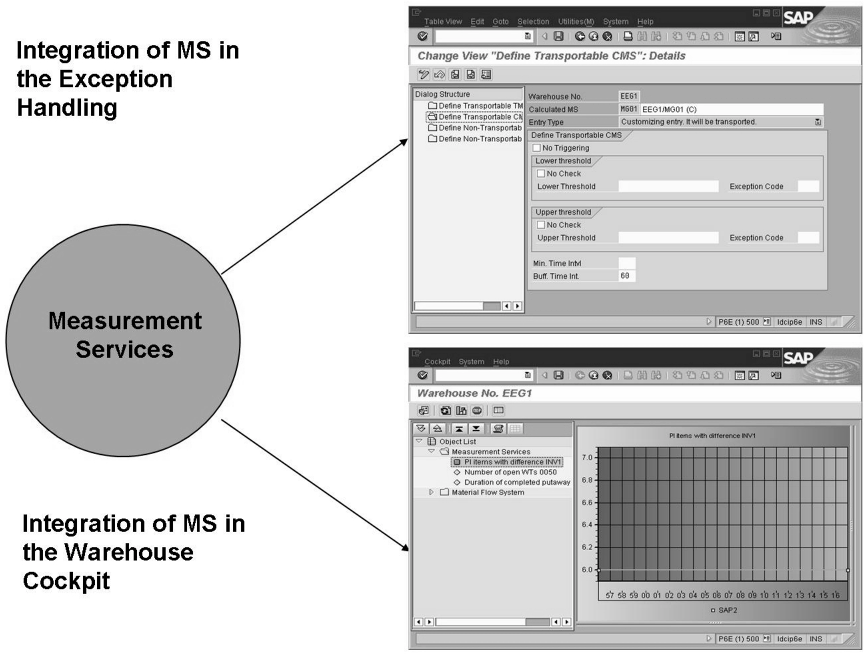

Figure 120: Integration of Measurement Services

For each key figure in a MS you can do the following:

- Set upper and lower thresholds per MS
- Set exception codes if the thresholds are exceed or fall short
- Trigger a workflow based on exception codes, such as creating a warehouse task
- Trigger an alert based on exception codes, such as sending a message

The thresholds are checked during the report processing in which the MS is scheduled or during the automatic refresh in the Warehouse Cockpit.

Formula and Condition Editors

There is a transaction code for the Formula editor and another for the Condition Editor. These editors enable the creation of formulas and conditions for engineered labor standards, preprocessing and operational planning. A Formula Type is used to distinguish between the formulas and conditions for the different processes.

Formulas/Conditions are based on fields defined for the different processes. Formulas/Conditions of one process can be reused in other formulas/conditions of the same process. And, calculated measurement services can be used in some formula types.

Planning and Simulation

Planning and simulation includes two primary functions:

1. Operational planning, including preprocessing
2. Simulation of planning

Preprocessing operational planning is necessary, for example, when the user wants to plan work that has to be done the next day but there are no warehouse internal documents available. Preprocessing gives an overview of the workload that arises at a particular time for inbound and outbound deliveries or in the physical inventory for cycle counting. In terms of time, this determination comes before the execution, meaning before warehouse tasks and warehouse orders are created for delivery items or for cycle-counting documents. The result of the preprocessing is only used for planning purposes; it does not affect the actual execution.

The following diagram illustrates the planning process.

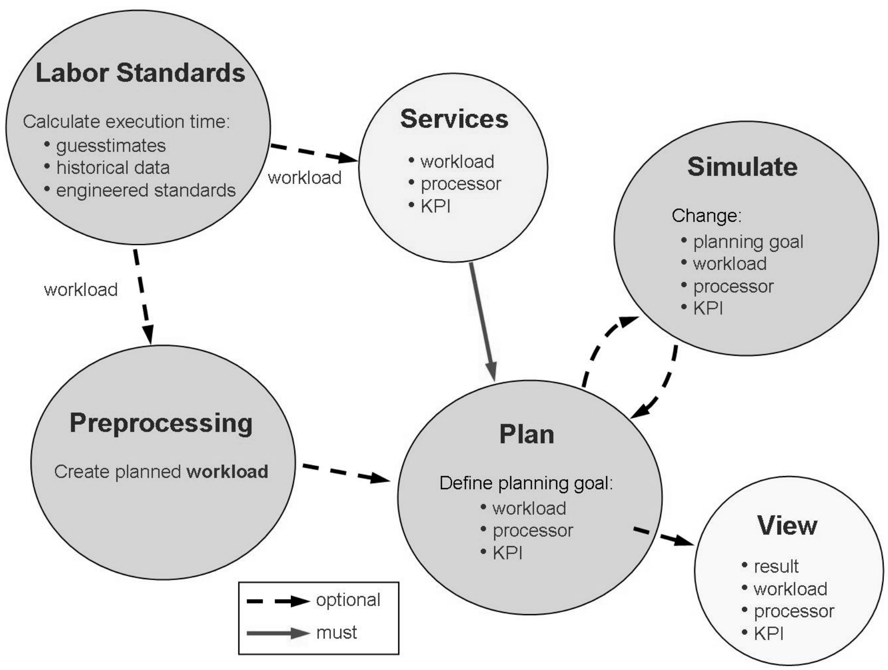

Figure 121: Basic concepts of Planning

Operational Planning

This function to define the calculated planning goals based on the workload, processors, and a calculated measurement service (CMS). You create the planning formula in the formula editor. A planning formula is valid for one warehouse number and external process step, and is intended for calculating the number of required employees based on the planned workload, for example. The planning is based on:

- The calculated measurement service (CMS)
- Aggregated information:
  - Planned workload
  - Planned workload that you created using preprocessing
  - Information about the processors

Operational Planning is generally:

- provides a short-term overview of the warehouse (next hours or days)
- used for short-term determination of work and resources
- a rough estimate of the workload
- considers one or more activity areas and external process steps
- based on preprocessing
- based on the aggregated values (workload, processor) and measurement services.

Operational Simulation

This function is used to find out how changes in the planning environment, such as expected workload, would affect the result. The planning data can be changed manually, and then the planning formulas reevaluated based on this changed data. You can change the aggregated information, such as planned workload and processor, as well as the detailed data of the individually planned workload records, individual processors, and the results of the calculated measurement services.

The system only saves the changes temporarily. When the transaction is closed, the system discards the changes.

After each manual change, the system initializes the result of the planning formula. If automatic planning is activated, the result is calculated again each time a manual change takes place.

Visualization

The visualization function of labor management includes the display and reporting, using various tools, of LM data. For example, events and alerts can be triggered based on exceptions reported by measurement services. It also includes the following:

- Workforce analytics and reporting of:
  - Actual vs. planned task time
  - A review of performance data across multiple facilities using common metrics
- SAP BI integration with:
  - Extractors
  - BI Content
  - Strategic planning
  - Drill-down visibility

Various LM metrics can be reported visually using the Warehouse Cockpit as shown in the following figure.

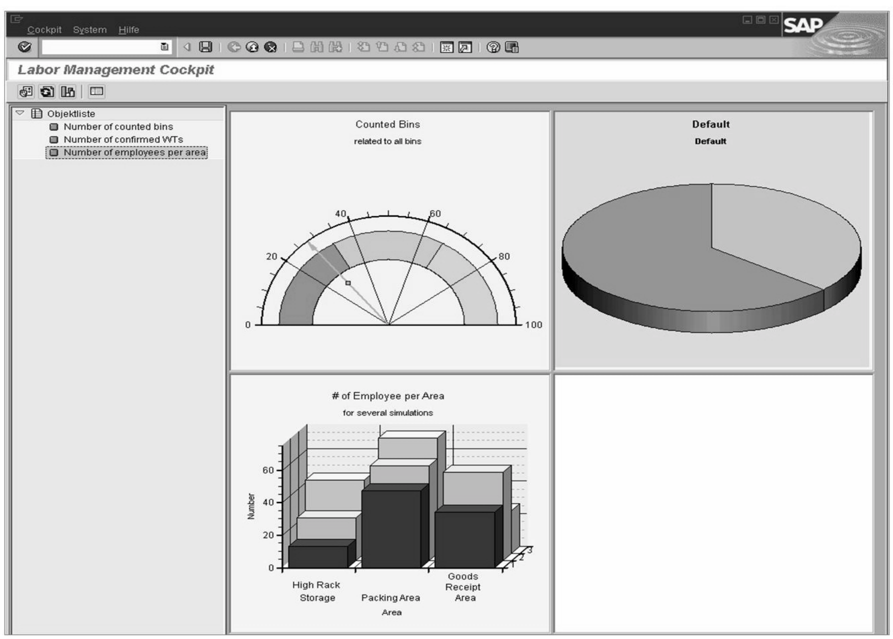

Figure 122: Warehouse Cockpit

In addition to the Warehouse Cockpit, data from LM can also be graphically displayed using the Easy Graphics Framework (EGF) tool.

Exercise 16: Create a Processor Business Partner

Exercise Objectives

After completing this exercise, you will be able to:
- Create a processor record in EWM
- Assign your processor record to a resource so that you can process work in the warehouse using the RF framework.

Business Example

IDES, AG has configured and activated Labor Management for use in picking. To track picking activities and performance using Labor management, each warehouse worker must have a processor business partner record created.

Task:

In this exercise you will create yourself as a processor for labor management.

1. Create a processor record in EWM.

Solution 16: Create a Processor Business Partner

Task:

In this exercise you will create yourself as a processor for labor management.

1. Create a processor record in EWM.

   a) Choose *Extended Warehouse Management → Master Data → Resource Management → Processor → Create Processor*

   b) In the *Address* tab, enter the following data:

First Name	**your choice**
Last Name	**your choice**
Search Term 1/2	**GR##**
Street/House Number	**Haupstrasse / 123**
Postal Code/City	**69190 / Walldorf**
Country	**DE**

   c) Choose the *Identification* tab. Enter the following:

User Name	**EWM100-##**

   d) Go to the *LM Attributes* tab. Enter the following:

Supply Chain Unit	**SPCW**
Warehouse Number	**E100**

   Choose *Enter*.

   e) In the Warehouse Assignment section, assign the process steps relevant for the processor. Select the warehouse number line containing the E100 warehouse.

   f) Choose *Create External Step*. This will open the *External Step* entry in the *Warehouse Process Step Assignment* section below.

Continued on next page

g) Enter the following external steps. Select *Insert Row* after entering each external step except the last one.

External Steps
OB01
OB02
OB03
OB04
PILM
CLLM

Note: For each external step there is a Performance Level that allows you to indicate the efficiency of a worker in case the efficiency is not 100%. If you have a new worker who is operating at 50% efficiency while learning, it can be taken into account for planning purposes.

h)

Note: In the *Attributes* section of this tab, you can enter a value for the processor. This can be a standard labor rate for the employee, which can then be used in conjunction with a BADI.

i) Choose *Save*.

j) Note the Processor Number:

Processor Number	

k) Choose *Exit*.

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Exercise 17: Labor Management Analytics

Exercise Objectives

After completing this exercise, you will be able to:

- Create a tailored measurement service.
- Display a tailored measurement service in the Warehouse cockpit.

Business Example

Information can be obtained and, or calculated in Labor Management and then presented graphically in the Warehouse Cockpit.

Task:

In this exercise, you will create a tailored management service and display it in the Warehouse Cockpit.

1. Create a tailored measurement service using the wizard. Before starting the exercise, make sure you have two sessions open.
2. View the service in the Warehouse Cockpit.

Solution 17: Labor Management Analytics

Task:

In this exercise, you will create a tailored management service and display it in the Warehouse Cockpit.

1. Create a tailored measurement service using the wizard. Before starting the exercise, make sure you have two sessions open.

   a) Go to *Extended Warehouse Management → Settings → Measurement Services → Tailored Measurement Services with Wizard.*

   b) In the wizard, choose *Continue*, then choose the *Create* radio button. Choose *Continue*.

   c) On the next screen, enter the following:

Field Name	Field Entry
Warehouse Number	**E100**
Measurement Service	**GR##**
Description	**GR## Measurement Service**

   Choose *Continue.*

   d) In the *Select BMS* screen, choose the following:

BMS Group	**03 Warehouse Tasks**
BMS	**0004 Number of Warehouse Tasks**

   Note the Warehouse Monitor Node where the data will be found:

   ____

   ____

   Choose *Continue.*

   e) In the *Select Variant* screen create a variant for your service. Enter the following:

Variant	**GR##V**

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Choose the *Create/Edit Variant* button.

f) A data selection screen will appear. Choose the **Open WTs** and **Confirmed WTs** options. The choose *Save as Variant* at the bottom of the screen. On the *Variants Attributes* screen, enter the following:

Variant	**GR##V**
Meaning	**Open and Confirmed Tasks Gr ##**

Choose *Save* to save the variant.

On the selection screen choose *Execute*.

In the *Select Variant* screen, choose *Continue*.

g) The next screen is the *Edit Attributes*. You could enter upper or lower threshold values along with *Exception Codes* that could be triggered if the thresholds are exceeded. You will not enter any values here. Choose *Continue*.

h) In the Test MS screen you will test your measurement service. Choose *Test Service*. In the *Result* field will be displayed the total number of open and confirmed tasks.

i) To verify the Results, go to the Warehouse Monitor in your second session. Choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*. Navigate to the node documented above (*Documents → Warehouse Tasks)* and double click on *Warehouse Tasks*. In the selection screen, choose *Get variant* and select your variant. Select *Choose* . Select *Execute* in the Selection screen. A list of tasks meeting the selection criteria will be displayed.

j) To verify the count determined by the measurement service test, enable the count in the task display. Select *Change Layout* to the right of the *Select Layout* .

In the Change layout screen, select **Counter** from the list of fields in the *Column Set* area. Choose to move the **Counter** field to the list of fields in the *Displayed Fields* list.

Choose *Transfer* to return to the Task list and the Counter will now display on the bottom of the right side of the task display. The value should match the total number of tasks displayed in the measurement service test.

Continued on next page

k) Return to the session with the Tailored Measurement Service wizard.

Choose *Continue*. Choose *Complete*.

2. View the service in the Warehouse Cockpit.

a) Choose *Extended Warehouse Management → Monitoring → Warehouse Cockpit*. In the pop-up: *EGF Implementation*, select **WHS_Cockpit** and *Enter*.

b) From the Object List section, select *Show Hidden Objects* . In the pop up, select your service to display. Your service is listed here preceded by the warehouse number and followed by a letter. Choose *Enter*.

c) To display the service, double click on it and it will show on the right side of the display in one of the panels.

d) You can further subdivide the panels with a right click and select **Insert Grid**. You can select the number of rows and columns.

e) You can also change the graph type by right clicking on the graphic and choosing *Display Object* and choosing another type such as **speedometer**.

f) If you select *Refresh History* , the system will display a log so you can see how often your service is being refreshed. This display is shown at the bottom left.

g) Choose *Exit* .

Exercise 18: Pre-processing in Labor management (Optional)

Exercise Objectives

After completing this exercise, you will be able to:

- Manually create a wave in EWM
- Create a Planning Goal in EWM
- Run pre-processing to check labor requirements based on a formula.

Business Example

Pre-processing will be run for picking waves to determine how many employees will be required to perform the work.

Task:

A planning goal will be created in this exercise based on weight. The assumption is that one resource can carry 100 kg. You will create outbound deliveries in ERP, build a wave in EWM and check resource requirements for completing the wave.

1. Create three deliveries in ERP using the create delivery without order reference using the data below.

   Header data for the three deliveries:

Shipping Point	**1000**
Delivery Type	**LO**
Sales Organization	**1000**
Distribution Channel	**10**
Division	**00**
Ship-to Party	**T-E01A-00**
Planned GI Date	**Today's date**

   Item data for Delivery #1:

Continued on next page

Material	**T-EW04-##**
Delivery Quantity	**60**
Picking tab: Plant	**SPCW**
Picking tab: St. Loc	**AF00**

Delivery Document No.: ________________________

Item data for Delivery #2:

Material	**T-EW04-##**
Delivery Quantity	**30**
Picking tab: Plant	**SPCW**
Picking tab: St. Loc	**AF00**

Delivery Document No.: ________________________

Item data for Delivery #3:

Material	**T-EW04-##**
Delivery Quantity	**50**
Picking tab: Plant	**SPCW**
Picking tab: St. Loc	**AF00**

Delivery Document No.: ________________________

2. View the deliveries in EWM.
3. Create a wave manually in EWM.
4. Create a planning goal using the formula editor.
5. Run Pre-Processing.

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Solution 18: Pre-processing in Labor management (Optional)

Task:

A planning goal will be created in this exercise based on weight. The assumption is that one resource can carry 100 kg. You will create outbound deliveries in ERP, build a wave in EWM and check resource requirements for completing the wave.

1. Create three deliveries in ERP using the create delivery without order reference using the data below.

   Header data for the three deliveries:

Shipping Point	**1000**
Delivery Type	**LO**
Sales Organization	**1000**
Distribution Channel	**10**
Division	**00**
Ship-to Party	**T-E01A-00**
Planned GI Date	**Today's date**

   Item data for Delivery #1:

Material	**T-EW04-##**
Delivery Quantity	**60**
Picking tab: Plant	**SPCW**
Picking tab: St. Loc	**AF00**

   Delivery Document No.: ________________________

   Item data for Delivery #2:

Material	**T-EW04-##**
Delivery Quantity	**30**
Picking tab: Plant	**SPCW**
Picking tab: St. Loc	**AF00**

Continued on next page

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Delivery Document No.: ________________________

Item data for Delivery #3:

Material	**T-EW04-##**
Delivery Quantity	**50**
Picking tab: Plant	**SPCW**
Picking tab: St. Loc	**AF00**

Delivery Document No.: ________________________

a) Go to *Logistics → Logistics Execution → Outbound Process → Goods Issue for Outbound Delivery → Outbound Delivery → Create → Single Document → Without Order Reference*

b) Enter the *Shipping Point*, the *Delivery Type* and the *Sales Area* fields from the table above. Choose *Enter*.

c) Enter the *Sold-to party*, *Planned GI* date, *Material Number* and *Delivery Quantity* from the tables above. Choose *Enter*. A message will display in the *Status* line regarding the division code of the material being different from the division code entered. Choose *Enter* to disregard.

Disregard any messages regarding delivery scheduling.

d) Choose the *Picking* tab. The *Plant* and *SLoc* fields should match the corresponding fields in the tables above.

e) Choose *Save*.

f) Record the delivery document number in the spaces above.

g) Repeat the process for the remaining two delivery documents.

Continued on next page

2. View the deliveries in EWM.
   a) Go to *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
   b) Choose *Open Advanced Search*. In the selection screen use the *Multiple selection* to enter your three ERP Document numbers. Choose *Copy*, then choose the *Execute Advanced Search* button.

      Choose *Close Advanced Search*.
   c) Note the three ODO document numbers:

ODO Document numbers:

   d) Choose *Exit*
3. Create a wave manually in EWM.
   a) Choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → *Maintain Waves*.
   b) Choose *Create*.
   c) At the bottom portion of the screen choose the tab: *Warehouse Requests*.
   d) Select *Open Advanced Search*. Using the *Multiple selection* on the Document Number Line, enter your three ODO document numbers from the table above. Choose *Copy* in the Multiple selection screen.
   e) Choose *Execute Advanced Search*. When the three documents are displayed, choose *Select All*, then choose the *Assign* icon.
   f) Note your Wave number:____________
   g) Choose *Save*.
   h) Choose *Exit*.

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4. Create a planning goal using the formula editor.

   a) Choose *Extended Warehouse management → Settings → Labor Management → Formula Editor*.

   b) Highlight the *Planning Goals* folder.

   c) Choose *Create*.

      Enter the data form the table below in the corresponding screen fields.

Field Name	Field Entry
Formula	**PP##**
Description	**Number of FTE's for Wave Planning Gr ##**
External Step	**PILM**
Formula Type	**F** (Planning Goal)
Active	**Set this indicator**

   d) From the list of fields at the bottom of the screen, double click on **A_WEIGHT**.

   e) Double click on \ (Division).

   f) Double click on **Number** , then enter **100** in the Number pop up and the *Enter*.

   g) Choose *Save*.

   h) Choose *Exit*.

Continued on next page

5. Run Pre-Processing.

   a) Choose *Extended Warehouse Management* → *Labor Management* → *Planning* → *Planning and Simulation*.

   b) Select *Open Advanced Search* and enter the fields in the table below in the corresponding fields in the search screen.

External Process Step	**PILM**
Obj Type	**K**
Use Preprocessing	**Selected**
Wave	**Your Wave Number**

   c) Select the *A/B* icon and assign your planning goal.

   d) Choose *Execute Advance Search*. Choose *Close Advanced Search*.

   e) If necessary, select the line that displays representing your picking wave.

   f) Choose *Evaluate Planning Formula* (Execute Planning). The results of the planning goal is displayed in the *Result* column. You can see additional details in the *Workload Data* tab at the bottom.

   g) Choose *Exit*.

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Exercise 19: Process a Pick Task Relevant for Labor management (Optional)

Exercise Objectives

After completing this exercise, you will be able to:

- Create a Delivery in ERP
- See the Purpose of the Process Type Indicator in the Warehouse Product Master
- Process a Pick with Labor Management
- Review Employee Efficiency

Business Example

Picks of certain products are relevant for Labor Management processing.

Task:

Create an outbound delivery in ERP and process it in EWM as a task relevant for Labor Management. Following the pick, you will check your efficiency using the RF Framework.

1. Check the warehouse product master to see the Process Type Indicator that will cause the use of warehouse process type 2080 to be used for pick tasks related to the product. WPT 2080 is configured as a Labor Management relevant process

2. Create an outbound delivery without order reference in ERP using data from the tables below.

   Header data for the delivery:

Shipping Point	**1000**
Delivery Type	**LO**
Sales Organization	**1000**
Distribution Channel	**10**
Division	**00**
Ship-to Party	**T-E01A-00**
Planned GI Date	**Today's date**

   Item data for Delivery:

Continued on next page

Material	**T-EW04-##**
Delivery Quantity	**10**
Picking tab: Plant	**SPCW**
Picking tab: St. Loc	**AF00**

Delivery Document No.: ________________________

3. View the delivery in EWM.
4. Process the warehouse order using RF.

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Solution 19: Process a Pick Task Relevant for Labor management (Optional)

Task:

Create an outbound delivery in ERP and process it in EWM as a task relevant for Labor Management. Following the pick, you will check your efficiency using the RF Framework.

1. Check the warehouse product master to see the Process Type Indicator that will cause the use of warehouse process type 2080 to be used for pick tasks related to the product. WPT 2080 is configured as a Labor Management relevant process

   a) Choose *Extended Warehouse Management → Master data → Product → Maintain Warehouse Product*.

   b) To access the product, enter the data from the table below in the corresponding fields in the transaction.

Product Number	**T-EW04-##**
Warehouse Number	**E100**
Party Entitled to Dispose	**SPCW**

   c) Choose **Display**.

   d) Select the *Whse Data* tab. Check the Proc.Type Det.Ind. field. It should have a value of **80**. In warehouse process type determination, this value causes WPT 2080 to be determined. WPT 2080, and related process-oriented storage control settings are configured to be Labor Management relevant.

   e) Choose *Exit*.

2. Create an outbound delivery without order reference in ERP using data from the tables below.

   Header data for the delivery:

Shipping Point	**1000**
Delivery Type	**LO**
Sales Organization	**1000**
Distribution Channel	**10**

Continued on next page

Division	**00**
Ship-to Party	**T-E01A-00**
Planned GI Date	**Today's date**

Item data for Delivery:

Material	**T-EW04-##**
Delivery Quantity	**10**
Picking tab: Plant	**SPCW**
Picking tab: St. Loc	**AF00**

Delivery Document No.: ________________________

a) Go to *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *Without Order Reference*

b) Enter the *Shipping Point*, the *Delivery Type* and the *Sales Area* fields from the table above. Choose *Enter*.

c) Enter the *Sold-to party*, *Planned GI* date, *Material Number* and *Delivery Quantity* from the tables above. Choose *Enter*. A message will display in the *Status* line regarding the division code of the material being different from the division code entered. Choose *Enter* to disregard.

Disregard any messages regarding delivery scheduling.

d) Choose the *Picking* tab. The *Plant* and *SLoc* fields should match the corresponding fields in the tables above.

e) Choose *Save*.

f) Record the delivery document number in the space above.

Continued on next page

3. View the delivery in EWM.
   a) Go to *Extended Warehouse Management → Delivery Processing → Outbound Delivery → Maintain Outbound Delivery Order*.
   b) Change the *Find* selection to **ERP Document** and enter the outbound delivery document in the search field. Choose *Perform Search*. Note the ODO document number: ________________
   c) From the top menu bar choose *Outbound Delivery Order → Follow-On Functions → Create Task*.
   d) In the Create Warehouse Task screen, choose the *Create + Save* button.
   e) Note the Warehouse Order Number:__________________
   f) Choose *Exit* .
4. Process the warehouse order using RF.
   a) Go to *Extended Warehouse Management → Execution → Log on to RF Environment*
   b) Choose *04 - Outbound Process → 01 Picking → 04 Picking by Warehouse Order*.
   c) Enter the warehouse order number you documented above. Enter pack material, PKE-095 and select **F4 - Next.**
   d) Choose **F4 - Next**. Verify all the data fields and then choose *Enter*. You should return to the RF menu.
   e) To check your efficiency from RF, enter **F7 -Back** to the RF main menu. Choose **05 Internal Processes**, then click on the down arrow to select *08 Labor Management → Display Employee Self Service*. Enter **1 Today**, and your efficiency will be displayed.
   f) Use **F7 - Back** to go back to the RF Main menu. choose **F1** to log off.

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Exercise 20: Indirect Labor Tasks (Optional)

Exercise Objectives

After completing this exercise, you will be able to:

- Create and Confirm Indirect Labor Task on desktop.
- Create and Confirm Indirect Labor task via RF
- Review Employee Efficiency in Warehouse Monitor

Business Example

You want to record indirect labor such as cleaning, meeting attendance, and sweeping in Labor managment.

Task:

Create and confirm indirect labor tasks using both the desktop and RF transactions. Following task confirmation, you will review the efficiency reports available using the Warehouse Monitor.

1. Create and confirm an indirect labor task via the desktop.
2. Create and confirm an Indirect labor task from RF.
3. View the efficiency data form the Warehouse Monitor.

Solution 20: Indirect Labor Tasks (Optional)

Task:

Create and confirm indirect labor tasks using both the desktop and RF transactions. Following task confirmation, you will review the efficiency reports available using the Warehouse Monitor.

1. Create and confirm an indirect labor task via the desktop.

   a) Choose *Extended Warehouse Management* → *Labor Management* → *Maintain Indirect labor Task*.

   b) Choose *Create*. Enter the following in the pop up:

External Step	**CLLM**
Processor	**Your processor number form the Create Processor exercise.**

   Choose *Continue*.

   c) Choose *Switch to Form View*. Use the push buttons Set Start Time and Set End Time to enter the times. You can also enter a planned execution duration time. This will be used in the efficiency calculation. If you leave this field blank, the efficiency will be 100%.

   You can also enter notes using the *Create/Change Note* icon. This note will be visible on the desktop or from the Warehouse Monitor.

   d) Choose Save.

   e) Choose *Exit*.

Continued on next page

2. Create and confirm an Indirect labor task from RF.

   a) Choose *Extended Warehouse Management System → Execution → Log on to RF Environment*.

   b) From the RF Menu, choose *05 Internal Processes*, choose the down arrow, then *08 Labor Management → 01 Indirect labor Task Recording*

   c) Select **F3 - New**. Enter the External Step, **CLLM**. Here you can select **F1 Start** to assign the start date and time, **F2 End** , the end date and time. Enter dates of your own choosing.

   d) Choose **F4 Save.**

   e) Choose **F7 Back**, then **F1 Logoff**.

3. View the efficiency data form the Warehouse Monitor.

   a) Go to *Extended Warehouse Management → Monitoring → Warehouse Monitor*

   b) Choose *Labor Management* from the hierarchy node structure.

   c) Double click on *Labor Utilization*. Enter your Processor Number and choose *Execute*. Choose Form View to see the details in a one-page format. You can explore other Labor Management reports under this node.

   d) Choose *Exit*.

Lesson Summary

You should now be able to:

- List the major features of labor management
- Describe the use of planned and executed workload items.
- Create a labor management resource
- Define the purpose of engineered labor standards.
- Create indirect labor tasks.
- Explain the use and types of measurement services.

Related Information

- http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Unit Summary

You should now be able to:

- List the major features of labor management
- Describe the use of planned and executed workload items.
- Create a labor management resource
- Define the purpose of engineered labor standards.
- Create indirect labor tasks.
- Explain the use and types of measurement services.

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Test Your Knowledge

1. Labor management can only be activated at the warehouse level in EWM.

   Determine whether this statement is true or false.

   □ True

   □ False

2. Which of the following are functions provided by Labor Management?

   Choose the correct answer(s).

   □ A Indirect labor recording

   □ B Defining engineered labor standards

   □ C Creation of planned and executed workloads

   □ D Employee performance

   □ E Warehouse pay rate evaluation

3. In Labor Management, a person who operates a vehicle or other warehouse resource is defined as a ________________.

   Fill in the blanks to complete the sentence.

4. What are the documents created in labor Management and form the basis for reporting labor utilization.

   Choose the correct answer(s).

   □ A Planned Workload document

   □ B Estimated workload document

   □ C Actual workload document

   □ D Executed workload document.

   □ E Performance document

5. The function that is used to define the times that are required to execute an activity in the warehouse is called ____.

   Fill in the blanks to complete the sentence.

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Answers

1. Labor management can only be activated at the warehouse level in EWM.

   Answer: False

   Labor Management can be activated at the Process Step level.

2. Which of the following are functions provided by Labor Management?

   Answer: A, B, C, D

   Labor management does not have any functionality regarding wage rates or compensation.

3. In Labor Management, a person who operates a vehicle or other warehouse resource is defined as a Processor.

   Answer: Processor

   Each warehouse employee is set up as a Processor. The processor is a business partner role.

4. What are the documents created in labor Management and form the basis for reporting labor utilization.

   Answer: A, D, E

   The planned and executed workload documents are used to record the data relevant to labor management reporting. The performance document is used to report executed workload by processor.

5. The function that is used to define the times that are required to execute an activity in the warehouse is called Engineered labor Standards (ELS).

   Answer: Engineered labor Standards (ELS)

   The system uses ELS when creating the planned workloads and also when the system is generating the executed workload document.

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Unit 8

Yard Management

Unit Overview

Yard Management is an EWM function that can be used to manage the flow of vehicles that arrive to deliver or pick up merchandise from the warehouse. In the lesson in this unit, you will learn the fundamental structure of the Yard and the processes related to the movement of vehicles into the yard, within the yard, yard-to-warehouse door and door to yard departure.

Unit Objectives

After completing this unit, you will be able to:

- Outline the features and functions related to the yard management component of EWM.
- List the organizational data required by yard management
- Describe the business processes related to yard management.

Unit Contents

Lesson: Yard Management

Lesson Overview

In this lesson the yard management function of Extended Warehouse Management will be explored. Included in this lesson will be the organizational data, the business processes and the display of yard management data.

Lesson Objectives

After completing this lesson, you will be able to:

- Outline the features and functions related to the yard management component of EWM.
- List the organizational data required by yard management
- Describe the business processes related to yard management.

Business Example

The warehouse at IDES, AG is a large distribution center where many vehicles enter and leave during the day. Yard management will be used to monitor and control the flow of these vehicles.

Overview

Yard Management is an application that is used to manage your yards. A yard is generally an adjacent area outside a warehouse where vehicles and transportation units are being processed, waiting to be processed, or waiting to be collected by an external carrier.

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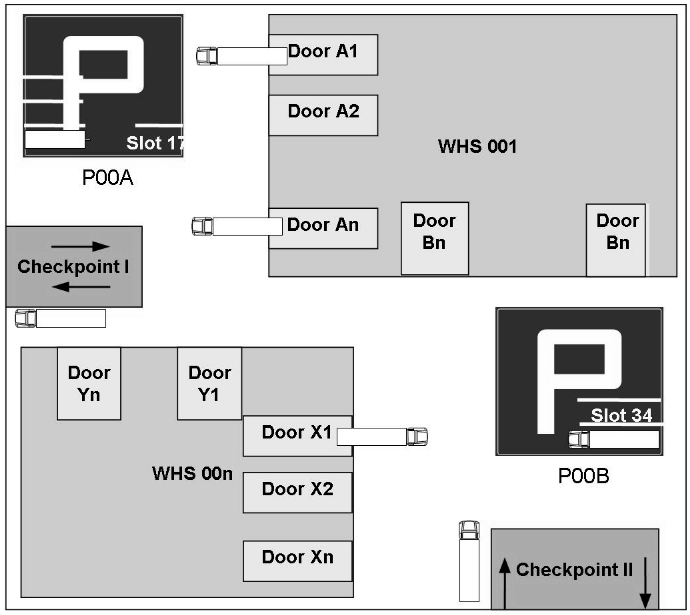

Figure 123: Warehouse Yard Example

There are three component to yard management:

1. Yard Location Management - in this component the physical locations (parking lots, doors) are mapped to the objects (trucks) to system entities (storage bins and transport units).
2. Yard Movements - this component represents the physical movements by the trucks by “moving ”transport units and vehicles within the yard locations.
3. Yard Stock - this component reports the transport units content to support and control the loading and unloading activities.

Movements are managed within a yard using warehouse tasks (WT's). And, the warehouse monitor can be used to display data related your yard.

Yard Structure

A yard is based on the warehouse structure of Extended Warehouse Management (EWM). A yard can be represented by a separate storage type in a warehouse. However, it can also be configured with a separate warehouse number, which must then include a storage type that has the role “Yard”. In both cases, you can use one yard for multiple warehouses. Conversely, you can define a warehouse with multiple yards. You map the corresponding storage bins as yard bins, which you can group into yard sections, the same as for the warehouse. Storage bins in the yard are used to represent the following:

- **Parking spaces** - You map parking spaces as standard storage bins with standard storage sections and standard storage bin types.
- **Checkpoints** - all vehicles must enter and leave through a checkpoint. The checkpoint represents a supply chain unit with its own address data.
- **Doors** - the door connects the yard to the warehouse. It is important for stock posting and yard movements.

Yard bins can also be grouped into yard sections. The following figure shows a yard that has been defined as a separate storage type.

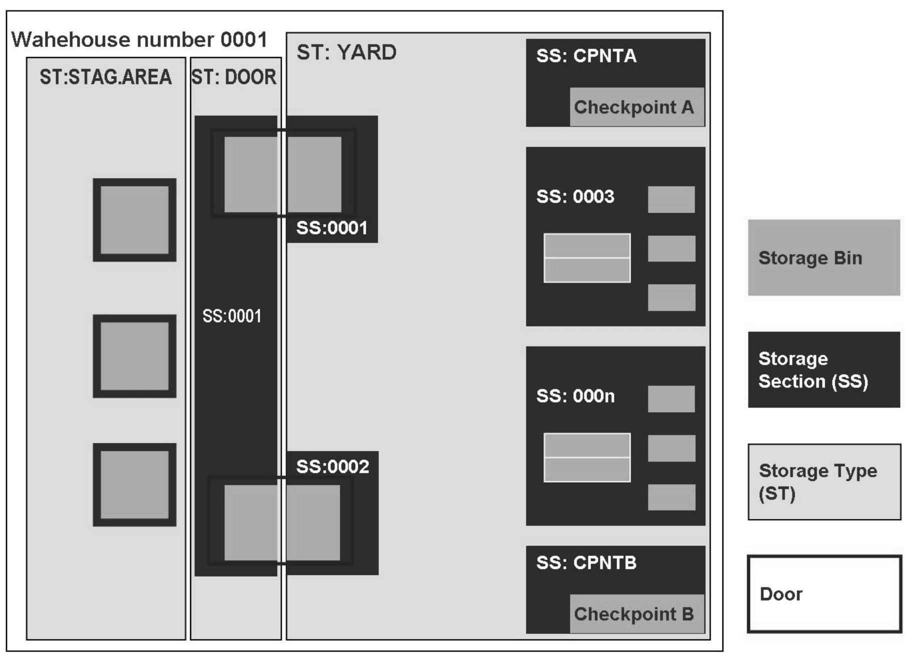

Figure 124: A Yard Mapped to EWM Structures

Checkpoint

The checkpoint is a significant part of the yard structure because it is a location where vehicles and transportation units (TUs) arrive at or leave the yard. Physically, the checkpoint can represent a physical gate at the yard entrance, or a virtual gate from which data is transmitted electronically.

The checkpoint is where you register the arrival of vehicles and TUs in the yard and their departure from it. This is required by the system.

You map checkpoints using yard bins. You must assign each checkpoint to a yard bin. This assignment must be unique, meaning you cannot assign two checkpoints to the same yard bin. You must also assign each checkpoint to a Supply Chain Unit (SCU), such as the SCU of the warehouse.

Yard Management Business Process

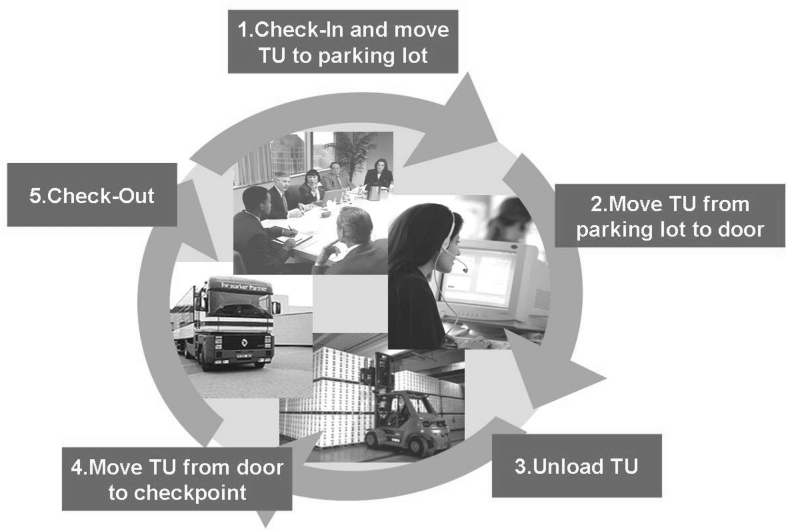

Figure 125: Yard Management Business Process

The Yard Management business process is as follows:

1. A **Transportation Unit (TU)** arrives at the checkpoint and is checked-in. The checkpoint is where you register the vehicles and transportation units (TUs) that arrive in or leave the yard, by setting the status for the arrival at the checkpoint. Registering vehicles and TUs that arrive in the yard is a prerequisite for yard movements. The exact steps that are executed at the checkpoint depend on whether you have obtained the vehicle data and TU data in advance through advanced shipping notification, for example, or whether you first have to record this when the vehicle has arrived.

   If a door is not available for loading/unloading the TU is moved to a parking space in the yard parking lot.
2. When a warehouse door becomes available, the TU is moved to the assigned door from the parking lot.
3. The TU in unloaded.
4. The TU is moved from the door to the checkpoint.
5. The TU is“ checked-out”.

Before a vehicle arrives at the yard, or when it arrives at the checkpoint, it is assigned a TU number. The TU is, in actuality, a handling unit number assigned by the system.

Yard Movements

Yard movements enable you to move transportation units (TUs) from one yard bin to another inside a yard. Possible types of yard movement are as follows:

- The TU arrives at the checkpoint and is moved to a parking space or to the door.
- A TU is moved from a parking space to the door, or from the door to a parking space.
- A TU is moved within the yard, from one parking space to another, or from one door to another.

Each time you want to move a TU in the yard, you have to create a warehouse task (WT) manually. To do this, you use the standard functions for creating and confirming WTs. The following figure shows the relationship between a TU and the relevant HU for the TU.

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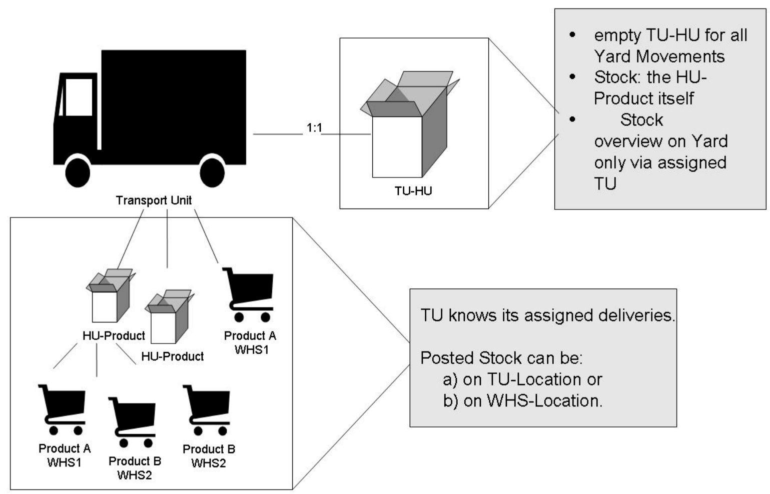

Figure 126: Yard Stock - Visibility

The relationship between the empty HU and the TU is always 1:1. WT's for yard movements are always HU WT's. The system does not use product WT's because quantities are not considered in yard movements.

Yard movements can be executed using a desktop transaction or RF. Both are illustrated below.

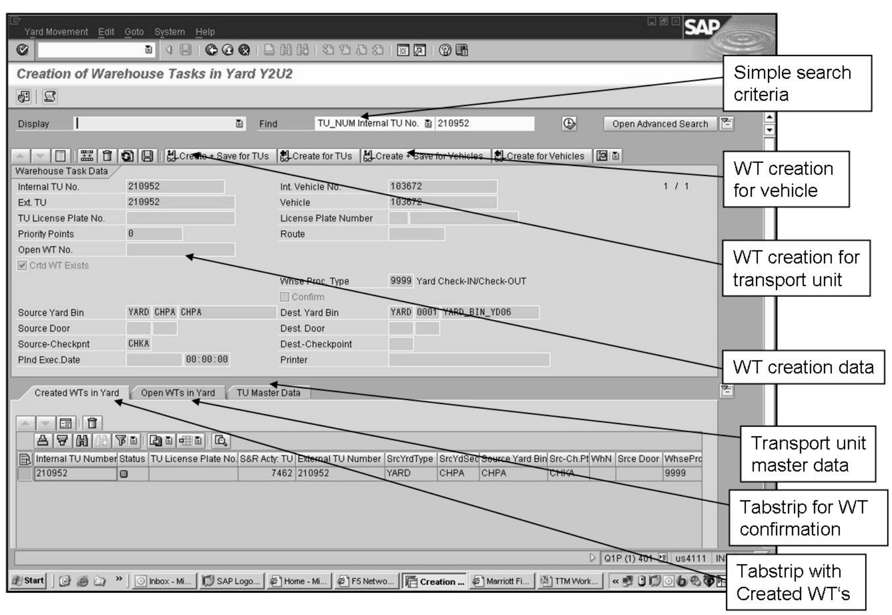

Figure 127: Yard Movements - Desktop Overview

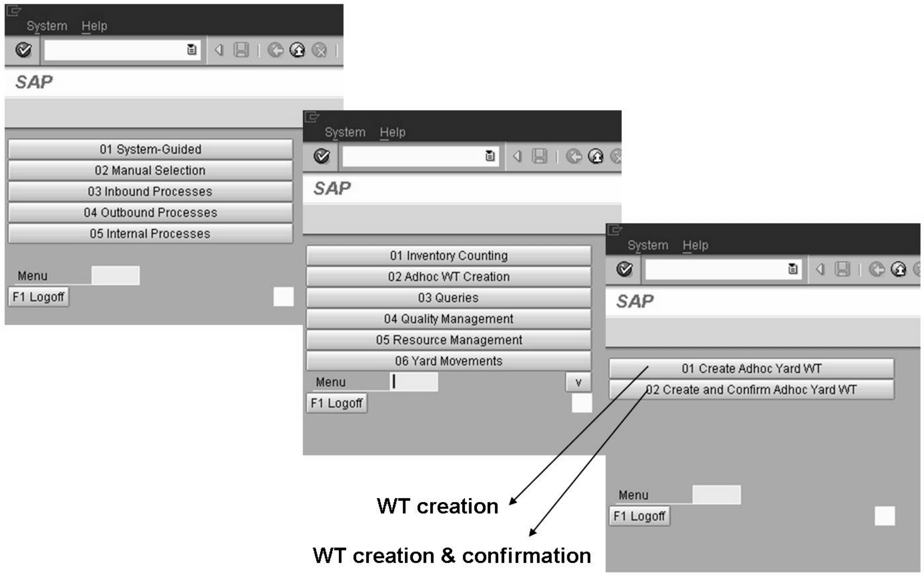

Figure 128: Yard Movements - RF Overview

Yard Monitoring

The yard location monitor is part of the warehouse monitor. Displays are available to display the TU's in the yard by location, stock on TU, and yard moves.

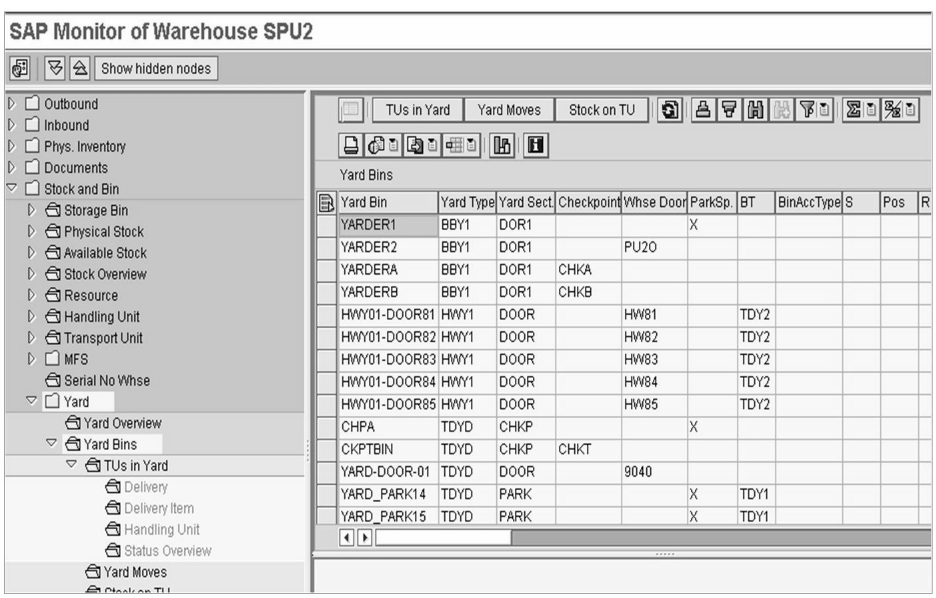

Figure 129: Yard Monitor in Warehouse Monitor

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Exercise 21: Yard Management Process in Receiving

Exercise Objectives

After completing this exercise, you will be able to:

- Describe the use of yard management in the inbound process.
- Create a TU that represents a vehicle.
- Use yard management to record, track and move vehicles entering and leaving the yard.

Business Example

IDES, AG must use the EWM yard management function to manage the large number of vehicles that arrive and depart the yard adjacent to its distribution center.

Task:

In this exercise, you will process an inbound trailer which is delivering a product in Handling Units. The trailer will be checked into the yard and then moved to an available dock door where the handling units contained in the trailer will be unloaded and then put away.

The empty trailer will then be moved to the checkpoint and checked out of the yard. The yard moves, the unloading tasks and the put-away can be done using the User Interface (UI) or the RF transactions. In this exercise you will use the UI transactions to facilitate the process.

1. Create a purchase order and inbound delivery in the ERP system using the data in the table below.

   Header Data:

Vendor	**EWM-VEND**
Purchasing org.	**1000**
Purchasing Group	**001**
Company Code	**1000**

   Line Item Data:

Continued on next page

Material Number	**T-EW01-##**
Quantity	**50**
Date	**Today + 2 business days**
Price	**600.00 EUR**
Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control Key	**ANLI**

PO Number :___________________________________

2. Create the Inbound Delivery. Enter **GR##-8-1** in the External ID. Verify that warehouse **E00** is present on the item.

   Inbound Delivery Document Number:_______________________

3. The goods are being scheduled for delivery, so create a TU in the EWM system and assign to the TU the inbound delivery.
4. The TU arrives, so you must check the vehicle into the yard.
5. Move the TU to the warehouse door.
6. Unload the HU from the TU.
7. Perform the putaway of the HU.
8. Check the TU out of the yard and perform goods receipt.

Solution 21: Yard Management Process in Receiving

Task:

In this exercise, you will process an inbound trailer which is delivering a product in Handling Units. The trailer will be checked into the yard and then moved to an available dock door where the handling units contained in the trailer will be unloaded and then put away.

The empty trailer will then be moved to the checkpoint and checked out of the yard. The yard moves, the unloading tasks and the put-away can be done using the User Interface (UI) or the RF transactions. In this exercise you will use the UI transactions to facilitate the process.

1. Create a purchase order and inbound delivery in the ERP system using the data in the table below.

   Header Data:

Vendor	**EWM-VEND**
Purchasing org.	**1000**
Purchasing Group	**001**
Company Code	**1000**

   Line Item Data:

Material Number	**T-EW01-##**
Quantity	**50**
Date	**Today + 2 business days**
Price	**600.00 EUR**
Plant	**SPCW**
St. Loc.	**RD00**
Confirmation Control Key	**ANLI**

   PO Number :____________________________________

Continued on next page

a) Choose *Logistics → Materials Management → Purchasing → Purchase Order → Create Vendor/Supplying Plant Known*

Enter the header data.

Note: The *purchasing org.*, *purchasing group* and *company code* fields can be found in the *Org Data* tab in the Header.

b) Enter the Item data from the table above.

Note: The *Plant* and *St. Loc.* fields are to the extreme right of the *Net Price* field. It's easier if you use the *Tab* key to navigate to these fields.

Note: The Confirmation Control Key is located in the Item Detail section of the screen in the *Confirmations* tab.

c) Choose *Save* to create the PO.

d) Write your PO Number in the space above.

2. Create the Inbound Delivery. Enter **GR##-8-1** in the External ID. Verify that warehouse **E00** is present on the item.

Continued on next page

Inbound Delivery Document Number:________________________

a) Choose *Logistics → Logistics Execution → Inbound Process → Goods Receipt for Inbound Delivery → Inbound Delivery → Create → Single Documents*

b) The Vendor and PO Number should be present on the screen. Choose *Enter*.

c) On the Shipping Notificat. Create: Overview screen choose Header.

d) On the *Header Details* screen, select the *Administration* tab. Enter **GR##-8-1** in the *External ID* field.

e) Choose *Back*. In the *Overview* screen choose the *Stock Placement* tab. Verify that the Warehouse No.. is **E00**.

f) Pack the material into a single HU. Choose *Goto → Pack*.

g) In the *Processing of Handling Units for Inbound Delivery* screen, enter packaging material **PKE-095** in the first line of *Packaging Materials* .

   Choose *Enter*. A handling unit number will be assigned. Write the HU number in the space above.

h) Select the material in the *Materials to be Packed* section of the screen. Choose *Pack*.

i) Choose *Save* to create the inbound delivery.

j) Write the inbound delivery document number in the space above.

Continued on next page

3. The goods are being scheduled for delivery, so create a TU in the EWM system and assign to the TU the inbound delivery.

   a) Go to *Extended Warehouse Management → Shipping and Receiving → Process Transportation Unit*.

   b) At the top left of the screen, select the Default Values icon. Enter the following data:

Warehouse	**E100**
Yard Warehouse	**Y100**
Checkpoint	**CHKA**

   Choose *Enter*.

   c) Under the Transportation Unit tab, select *Create Transp. Unit*. Enter the following data:

Means of Transport	**TRK**
Packing Material	**TME-130**
S&R Acty Direc.	**Inbound**

   Choose *Enter*.

   d) Assign your inbound delivery created in the previous exercise step to your newly created TU by selecting your TU, then select *Assign Del. Immed...*. Enter the following data to select your delivery.

Warehouse Number	E100
ERP Document	Your inbound delivery document created in ERP.

   Choose *Execute*. You will see your delivery assigned at the bottom of the screen in the *Assigned Del.* tab.

   e) Choose *Save*. Note your TU Number below.

   TU Number: ______________________

   f) Choose *Exit*.

Continued on next page

4. The TU arrives, so you must check the vehicle into the yard.
   a) Choose *Extended Warehouse Management → Shipping and Receiving → Yard Management → Arrival at/Departure from Checkpoint.*
   b) Change the *Find* selection to **Internal Number of Transportation Unit** and enter your TU from the previous exercise step in the selection field. Choose *Search* .
   c) Select your TU number and select *Arrival at Checkpoint*.
   d) Choose *Exit* .
5. Move the TU to the warehouse door.
   a) Choose *Extended Warehouse Management → Shipping and Receiving → Yard management → Create Warehouse Task in Yard*.
   b) In the *Find* selection option field, choose **Internal TU No.**, then enter your TU number in the selection field. Choose *Search*.
   c) Select your TU number, then choose *Switch to Form View* and enter the following:

Warehouse Proc Type	9999
Destination Door	Enter E100 in the first field, then select DR## from the pull down list in the second field. Make sure your door has a check mark in the *Free Door* column.

   Select *Create + Save for TUs*. You will see on the lower half of the screen the warehouse task that was created to move the TU to the door.
   d) Select the line and select *WT in Yard* to confirm the warehouse task in background.
   e) Choose *Save*.
   f) Choose *Exit* .

Continued on next page

6. Unload the HU from the TU.

   a) Choose *Extended Warehouse Management → Shipping and receiving → Unload*.

   b) In the *Find* selection field, choose **Transportation Unit**, and enter your TU number in the selection field. Choose *Search*.

   c) The TU unload task are displayed on the lower portion of the screen. Select the HU and choose *Unload WT* on the lower portion of the screen.

   d) Choose *Save*. Note your HU number.

      HU Number: ________________________

   e) Choose *Exit*.

7. Perform the putaway of the HU.

   a) Choose *Extended Warehouse Management → Execution → Confirm Warehouse Task*.

   b) Search using your source HU number from the previous exercise step. Choose *Search*.

   c) Because this is a process-oriented storage control putaway, the warehouse task is automatically created in a planned status when the unloading task is created. After the unloading task is complete, the putaway task is then open for processing.

   d) Confirm the unloading task. Select the HU-WT tab, then select the task. Choose *Confirm*.

   e) Choose *Save*.

   f) Re-execute the search on the source HU. Now, you can see both the confirmed unloading warehouse order and the now active warehouse order for putaway.

   g) Select the open warehouse order and choose *Details*. Choose the *Product WT* tab and you will see your destination storage type, section and bin.

   h) Select the line item and choose *Confirm* to confirm the warehouse task in the background.

   i) Choose *Save*.

   j) Choose *Exit*

Continued on next page

8. Check the TU out of the yard and perform goods receipt.
   a) Choose *Extended Warehouse Management → Shipping and Receiving → Maintain Transportation Unit*.
   b) In the *Find* selection, choose **Internal TU**, and enter your TU number in the selection field. Choose *Search* .
   c) Select your TU number and choose from the menu bar *Action → Door → Departure from Door*. Next, select from the menu *Action → Checkpoint → Departure and Save*. Your TU has now departed from the yard.
   d) Choose *Save*.
   e) Select the *Status* tab on the lower portion of the screen. here you will see a check mark, time and date for all activities you completed on this TU.
   f) Choose *Exit* .

Lesson Summary

You should now be able to:

- Outline the features and functions related to the yard management component of EWM.
- List the organizational data required by yard management
- Describe the business processes related to yard management.

Related Information

http://help.sap.com Select SAP Business Suite, then SAP Extended Warehouse Management

Unit Summary

You should now be able to:

- Outline the features and functions related to the yard management component of EWM.
- List the organizational data required by yard management
- Describe the business processes related to yard management.

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Test Your Knowledge

1. What are the components of Yard Management?

   Choose the correct answer(s).

   □ A Vehicle inspection
   □ B Yard routes
   □ C Yard location management
   □ D Yard security
   □ E Yard movements
   □ F Yard stock

2. What organizational unit is used to represent parking spaces, checkpoints and doors.

   Choose the correct answer(s).

   □ A Storage section
   □ B Material staging area
   □ C Storage bin
   □ D Storage type

3. The location where all vehicles enter and leave a yard is the ____________________.

   Fill in the blanks to complete the sentence.

4. All yard movements are carried out using warehouse tasks.

   Determine whether this statement is true or false.

   □ True
   □ False

Answers

1. What are the components of Yard Management?

   Answer: C, E, F

   Yard management is a supporting function in EWM and is not required to be used.

2. What organizational unit is used to represent parking spaces, checkpoints and doors.

   Answer: C

   Eac door, parking space and checkpoint is represented by a unique storage bin.

3. The location where all vehicles enter and leave a yard is the Checkpoint.

   Answer: Checkpoint

   At least one checkpoint must be defined per yard.

4. All yard movements are carried out using warehouse tasks.

   Answer: True

   All TU movements are made by creating warehouse tasks.

Course Summary

You should now be able to:

- Describe the Extended Warehouse Management system environment for both centralized and decentralized operation.
- List and define the organizational elements used by the EWM system and describe their relationships. In addition, you will be able to describe the master data requirements of EWM and explain how material master data and partner data can be transferred from the ERP system to the EWM system.
- Use the Warehouse Monitor to display EWM data and execute various warehouse processes. You will also be able to use the RF framework to process EWM transactions in an RF-enabled setting.
- Process EWM transactions in inbound and outbound processes and understand the roles that various EWM documents play in the processes.
- Describe various EWM internal processes such as Labor Management and Slotting.

Related Information

- The documentation for the Extended Warehouse Management system can be found in the SAP Help Portal () In the Help Portal select SAP Business Suite tab, then from the dialog on the left side of the screen, select SAP Extended Warehouse Management under SAP Supply Chain Management.

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Feedback

SAP AG has made every effort in the preparation of this course to ensure the accuracy and completeness of the materials. If you have any corrections or suggestions for improvement, please record them in the appropriate place in the course evaluation.

