

EWM120

Extended Warehouse Management Customizing – Part Two

SAP SCM

Date _____
Training Center _____
Instructors _____
Education Website _____

Participant Handbook

Course Version: 95
Course Duration: 5 Day(s)
Material Number: 50099421



An SAP course - use it to learn, reference it for work

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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
<i>Example text</i>	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 and external.
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.

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.

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Course Overview

This course expands the basic processes covered in the EWM110. More complex, specialized processes and topics are discussed.

Target Audience

This course is intended for the following audiences:

- Customer project team members
- SAP consultants
- SAP partners

Course Prerequisites

Required Knowledge

- EWM110



Course Goals

This course will prepare you to:

- Set up processes for value added services, quality management, and cross docking
- Make use of optimizations in Extended Warehouse Management, such as grouping deliveries for waves, organizing two-step picking, and resource management
- Expand your warehouse through integration of yard management or transportation planning
- Integrate production and relevant master data, such as serial numbers, or processes like kitting
- Make use of technologies like wireless devices or material flow systems in your warehouse



Course Objectives

After completing this course, you will be able to:

- Create wave templates and set up the determination of wave templates for your deliveries
- Offer better value to customers by using value-added services
- Process cross-docking and describe the different cross-docking scenarios

- Create deliveries from EWM for special purposes
- Organizes movements on the yard and determine staging areas and doors
- Plan transportation in ERP or EWM
- Make optimal use of your workforce through resource management and the RF framework
- Explain the possibilities of MFS integration
- Create the production supply and receive materials from production into your warehouse
- Set up quality management for your goods receipt processes in EWM

Unit 1

More About EWM

Unit Overview

As a participant of EWM120, you should already have some knowledge about Extended Warehouse Management. In this unit we will repeat some basic concepts of EWM and set up warehouse numbers for use in this course.



Unit Objectives

After completing this unit, you will be able to:

- Describe the warehouse scenario used in EWM120

Unit Contents

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Lesson: Scenario Introduction

Lesson Overview

In this lesson you will create some initial settings that are required for other lessons in this course. This will help you to understand the system setup used in this course and to review the basic settings required for SAP Extended Warehouse Management.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the warehouse scenario used in EWM120

Business Example

Your company is planning to implement SAP EWM. You have basic integration and process knowledge from participating in EWM110 and want to learn other processes that are taught in EWM120. You want to understand the scenario used in this course.

SAP Extended Warehouse Management

SAP Extended Warehouse Management (SAP EWM) offers you flexible, automated support for processing various goods movements and for managing stocks in your warehouse complex. The system supports planned and efficient processing of all logistics activities in your warehouse. It is the most advanced and flexible of the warehouse solutions offered by SAP.



All based on the same solution in SAP ERP

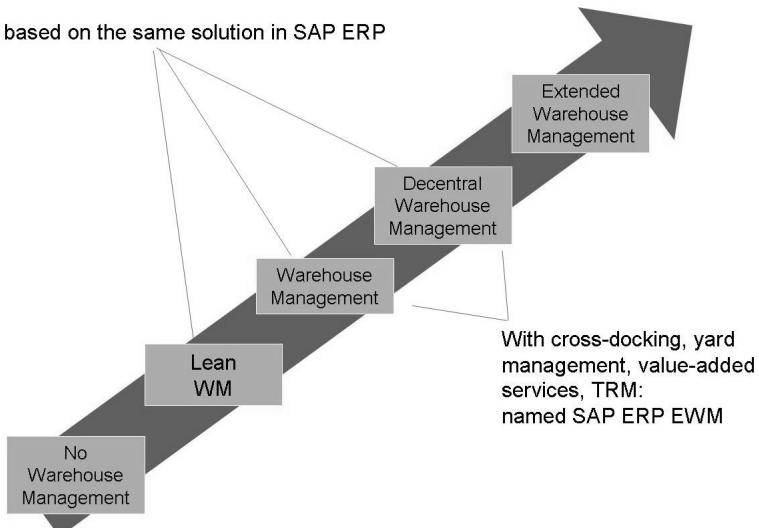


Figure 1: SAP Warehouse Management Solutions

SAP EWM uses the SAP SCM core and can share one server with other SAP SCM applications like Advanced Planning and Optimization (APO) or Event Management (EM). In regards to performance considerations, SAP EWM can also run on its own server. Additionally, SAP EWM can be deployed on top of an SAP ERP system. That way the system resources are shared. Nevertheless, SAP EWM still behaves like a decentralized system, and the communication requirements are the same as before.



Centralized Scenario

Decentralized ERP Scenario

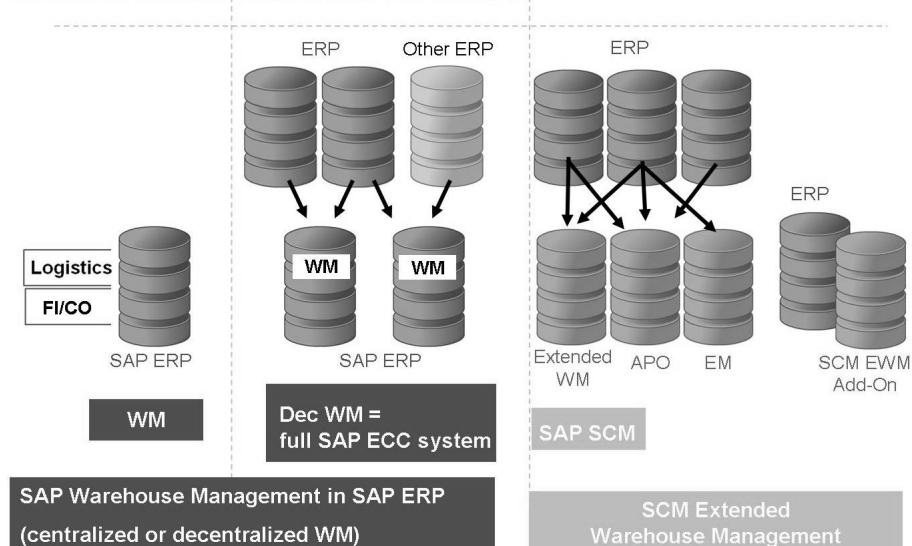


Figure 2: Warehouse Management and SAP EWM Implementation Scenarios

The usage of SAP EWM is determined by the settings in the warehouse number in ERP. The setup of this warehouse number shows the ERP system what solution is being used: warehouse management in the central system, a decentralized WM, or SAP Extended Warehouse Management.

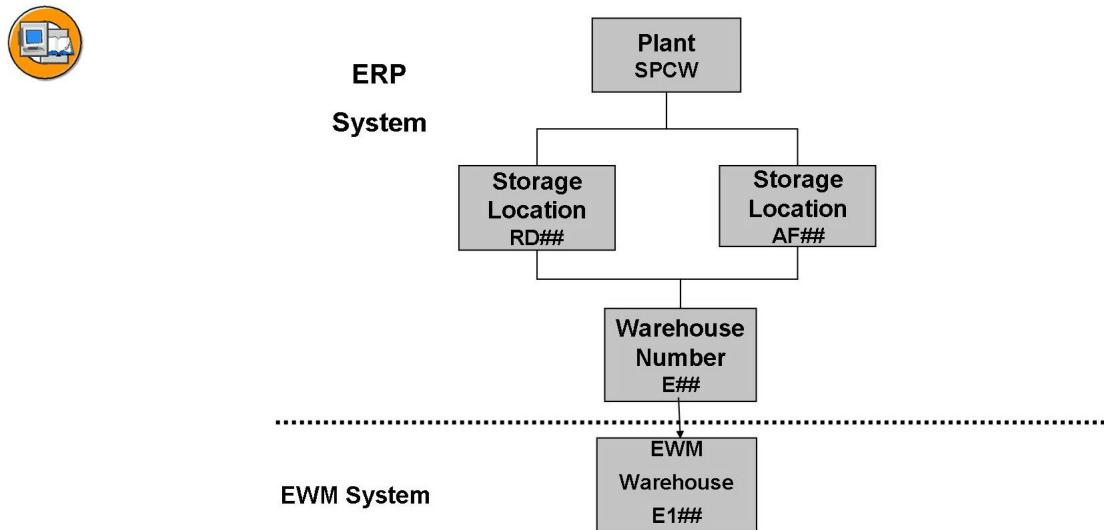


Figure 3: Organizational Connection Through the Warehouse Number

SAP EWM requires an assignment of ERP warehouse numbers to SAP EWM warehouse numbers, as the names in EWM can be longer and do not have to correspond to the names in ERP.

The communication between ERP and SAP EWM happens in two different ways:

- For master data, the **core interface** (CIF) is used. CIF is the technology generally used for communication between ERP and SCM. For SAP EWM, the master data is only transferred from ERP to EWM; there is no communication back via CIF.
- For communicating delivery information between the systems, a **separate distribution model**, which uses queued remote function calls (qRFCs), is set up. This distribution model exists already in SAP EWM. You have to create it in customizing in ERP for every warehouse number you activate as administrated by SAP EWM.

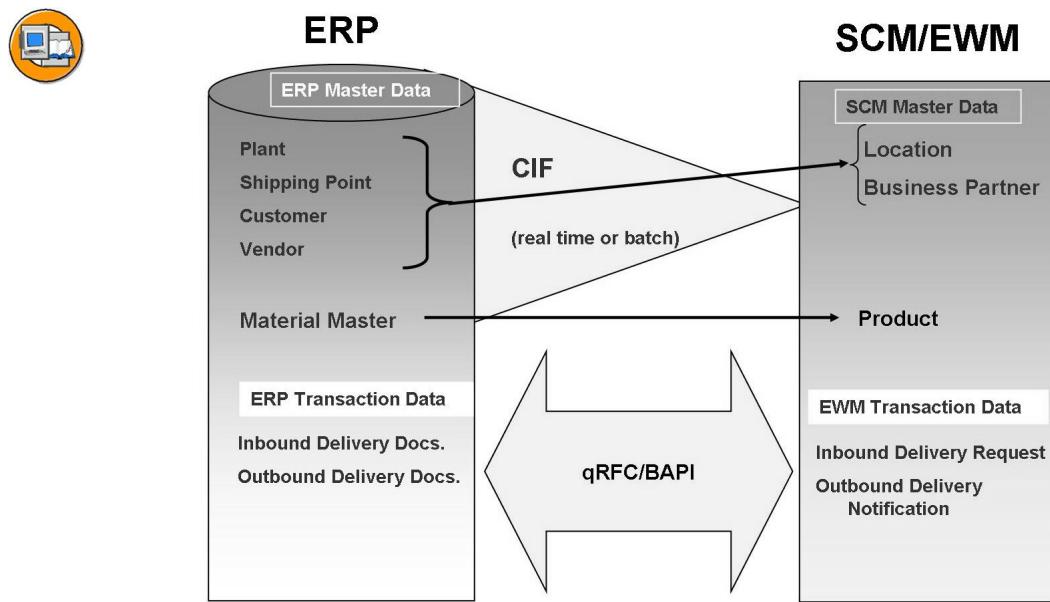


Figure 4: Communication Between ERP and EWM

Exercise 1: EWM120 Introduction

Exercise Objectives

After completing this exercise, you will be able to:

- Create the initial setup required for the other exercises in EWM120
- Repeat some of the settings taught in EWM110

Business Example

You want to understand the scenario used in EWM120.

Task 1:

Set up the warehouse number E## in ECC for use with EWM.

1. Activate your warehouse number E## in ECC for the usage of SAP Extended Warehouse Management. You use queued and serialized RFCS and batch determination shall be done in SAP EWM.
2. Check the integration model for the warehouse number E##. The logical system name of the EWM system is “APOCLNT800”, and the distribution model view is “EWM”.

Task 2:

Set up the warehouse number E1## in EWM to work for the warehouse number E##. The storage locations AF## and RD## are used.

1. Connect the warehouse E1## in EWM to the E## in the Business System R3_800.
2. As the communication between ERP and EWM is via deliveries, we always require inbound deliveries for purchase orders. For this we need a **Confirmation Control Key** in the purchase order. So we do not have to enter this every time, set the confirmation for inbound deliveries for your plant, SPCW, and storage location RD##.
3. Storage location **AF##** shall be assigned to availability group **002**, and storage location **RD##** to the availability group **001**.

Task 3:

Create a CIF integration model. Activate the integration model and check that the products, locations, and business partners have been created.

1. Create a CIF integration model for all your materials (that means ending on your group number).

Continued on next page

<i>Model Name</i>	GR##EWM120
<i>Logical System</i>	APOCLNT800
<i>APO Application</i>	MD

<i>Materials</i>	T-EW*##
<i>Plant (just for material selection)</i>	SPCW

Save a variant for your selection (*Variant Name*: **GR##EWM120**; *Description*: **MD for EWM120**) and create the integration model.

2. Activate the integration model.

<i>Model Name</i>	GR##EWM120
<i>Logical System</i>	APOCLNT800
<i>APO Application</i>	MD

Task 4:

Change the storage type 0010 and block bins in the upper levels.

1. Remove the HU requirement and the HU type check in your storage type 0010.
2. Block all the bins in the levels above level 01 in our storage type 0010 for putaway. This storage type has eight levels, so you have to block levels **02 to 08**.



Hint: Use the Warehouse Management Monitor for blocking and unblocking bins.

Task 5:

Create a new storage type search sequence 0010 to putaway products directly into the storage type 0010.

1. Create a new storage type search sequence, **0010**, for **Putaway in Storage Type 0010**.
2. Assign storage type **0010** to the new storage type search sequence.
3. Define a new putaway control indicator, **0010**.
4. Create a new storage type search sequence for putaway. Products with the Putaway Control Indicator **0010** shall use Search Sequence **0010**.

Continued on next page

Task 6:

Create warehouse products and packaging specifications.

1. Create warehouse products for the following products: **T-EW04-##**, **T-EW05-##**, and **T-EW06-##**. The Putaway Control Indicator for these products shall be **0010**.
2. Create packaging specifications as specified below. The Packaging Specification Group is always **SAP**.

<i>Description</i>	Palletization T-EW04-##
Determination	
<i>Condition Type</i>	OPAL
<i>SC Unit</i>	E1##
<i>Product</i>	T-EW04-##
Content	
<i>Product</i>	T-EW04-##
<i>Quantity</i>	1
Main Level	
<i>Target Qty</i>	100
<i>Packaging Material</i>	PKE-090

<i>Description</i>	Palletization T-EW05-##
Determination	
<i>Condition Type</i>	OPAL
<i>SC Unit</i>	E1##
<i>Product</i>	T-EW05-##
Content	
<i>Product</i>	T-EW05-##
<i>Quantity</i>	1
Main Level	
<i>Target Qty</i>	50
<i>Packaging Material</i>	PKE-090

Continued on next page

<i>Description</i>	Palletization T-EW06-##
Determination	
<i>Condition Type</i>	OPAL
<i>SC Unit</i>	E1##
<i>Product</i>	T-EW06-##
Content	
<i>Product</i>	T-EW06-##
<i>Quantity</i>	1
Main Level	
<i>Target Qty</i>	200
<i>Packaging Material</i>	PKE-090

Task 7:

Test your settings. Create an inbound delivery for a already existing purchase order. Create the warehouse tasks and confirm them.

1. Create the inbound delivery for the purchase order. The vendor is **EWM-VEND**. Use the **purchasing group 0##** as selection criteria and enter **GR##-01** as *External ID*.

Inbound delivery:

2. Create the *Warehouse Tasks* for the inbound delivery and confirm them.

EWM inbound delivery:

Task 8:

Remove the block for putaway in storage type 0010 again.

1. Unblock all the bins of storage type 0010.



Hint: Use the Warehouse Management Monitor to block and unblock bins.

Solution 1: EWM120 Introduction

Task 1:

Set up the warehouse number E## in ECC for use with EWM.

1. Activate your warehouse number E## in ECC for the usage of SAP Extended Warehouse Management. You use queued and serialized RFCS and batch determination shall be done in SAP EWM.
 - a) Select in the implementation guide (IMG) of the **ECC** system by choosing *Logistics Execution → Extended Warehouse Management Integration → Basic Setup of EWM Connectivity → Maintain Extended WM-Specific Parameters*.
 - b) Position on warehouse E## and set the *Ext. WM* entry to **E ERP with EWM (Extended Warehouse Management)**.

Check the entries for the other fields:

<i>Comm. WM</i>	Q Queued and Serialized Asynchronous RFC
<i>UD</i>	leave blank
<i>Dist. Mode</i>	Distribution immediately at document creation (default)
<i>SN Dec. WM</i>	x (default)
<i>BatchDetEW</i>	x
<i>GR from EWM only</i>	leave blank

- c) *Save*  your entry.
 - d) Choose *Exit*  to leave the transaction.
2. Check the integration model for the warehouse number E##. The logical system name of the EWM system is “APOCLNT800”, and the distribution model view is “EWM”.
 - a) Select in the implementation guide (IMG) of the **ECC** system: *Logistics Execution → Extended Warehouse Management Integration → Basic Setup of EWM Connectivity → Generate Distribution Model ERP=>EWM*.
 - b)

Enter the following parameters:

Continued on next page

<i>Warehouse Number</i>	E##
<i>EWM's Logical System</i>	APOCLNT800
<i>Distribution Model View</i>	EWM
<i>Objects</i>	Select: Both
<i>Action</i>	Select: Check entries

- c) Choose *Execute* and check if the pop-up displays **Everything OK for WhseNo E##.**



Hint: Contact your instructor if the messages indicates an error.

- d) Choose *Exit* to leave the transaction.

Task 2:

Set up the warehouse number E1## in EWM to work for the warehouse number E##. The storage locations AF## and RD## are used.

1. Connect the warehouse E1## in EWM to the E## in the Business System R3_800.
 - a) Select in the implementation guide (IMG) of the **EWM** system:
Extended Warehouse Management → Interfaces → ERP Integration → General Settings → Map Warehouse Numbers from ERP System to EWM.
 - b) Choose the *New Entries* button.
 - c) Create the following new entry:

<i>Business System</i>	<i>WNo ERP</i>	<i>Warehouse Number</i>
R3_800	E##	E1##

- d) *Save* your entry.
- e) Choose *Exit* to leave the transaction.

Continued on next page

2. As the communication between ERP and EWM is via deliveries, we always require inbound deliveries for purchase orders. For this we need a **Confirmation Control Key** in the purchase order. So we do not have to enter this every time, set the confirmation for inbound deliveries for your plant, SPCW, and storage location RD##.
- Select in the IMG of your ECC system: *Logistics Execution → Shipping → Deliveries → Define Order Confirmation for Inbound Deliveries*.
 - Choose the *New Entries* button.
 - Create the following new entry:

<i>Cat</i>	F
<i>OTyp</i>	NB
<i>Plnt</i>	SPCW
<i>SLoc</i>	RD##
<i>Ctr:</i>	ANLI

- Choose *Exit*  to leave the transaction.
3. Storage location **AF##** shall be assigned to availability group **002**, and storage location **RD##** to the availability group **001**.
- Select in the implementation guide (IMG) of the **EWM** system *Extended Warehouse Management → Interfaces → ERP Integration → Goods Movement → Map Storage Locations from ERP System to EWM*.
 - Create two new entries:

<i>Plnt</i>	<i>Sloc</i>	<i>Logical System</i>	<i>Warehouse Number</i>	<i>Agr</i>
SPCW	AF##	T90CLNT090	E1##	002
SPCW	RD##	T90CLNT090	E1##	001

- Save  your entries.
- Choose *Exit*  to leave the transaction.

Task 3:

Create a CIF integration model. Activate the integration model and check that the products, locations, and business partners have been created.

- Create a CIF integration model for all your materials (that means ending on your group number).

Continued on next page

<i>Model Name</i>	GR##EWM120
<i>Logical System</i>	APOCLNT800
<i>APO Application</i>	MD

<i>Materials</i>	T-EW*##
<i>Plant (just for material selection)</i>	SPCW

Save a variant for your selection (*Variant Name*: **GR##EWM120**; *Description*: **MD for EWM120**) and create the integration model.

- a) Select in the Easy Access Menu of your ECC system: *Logistics* → *Central Functions* → *Supply Chain Planning Interface* → *Core Interface Advanced Planner and Optimizer* → *Integration Model* → *Create*.
 - b) Flag the *Materials* field .
Enter in the section *General Selection Options for Materials* for the *Material* **T-EW*##** and the *Plnt*, **SPCW**.
 - c) Choose *Save* to save your selection as a variant. Enter the *Variant Name*: **GR##EWM120** and the *Description*: **MD## for EWM120** and choose *Save* again.
 - d) Choose *Execute* and control the number of selected **Filter Objects**. There should be 30 Material Master Data.
 - e) Choose *Generate IM* .
 - f) Choose *Exit* twice to leave the transaction.
2. Activate the integration model.

Continued on next page

<i>Model Name</i>	GR##EWM120
<i>Logical System</i>	APOCLNT800
<i>APO Application</i>	MD

- a) In the Easy Access Menu of your ECC system, choose *Logistics* → *Central Functions* → *Supply Chain Planning Interface* → *Core Interface Advanced Planner and Optimizer* → *Integration Model* → *Activate*.
The *Selection Criteria* field should already be filled.
- b) Choose *Execute* .
- c) Select the line **MD** and select the integration model. Set it to **Active** (either by clicking on the *New Status* field or by selecting the *Active/Inactive* button), then select *Start* (Activation) .
- d) Check if the log shows any error messages.
- e) Choose *Exit* .

Task 4:

Change the storage type 0010 and block bins in the upper levels.

1. Remove the HU requirement and the HU type check in your storage type 0010.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Define Storage Type*.
 - b) *Position...* on your *Warehouse No.* **E1##** and the *Storage Type* **0010**.
 - c) Select the entry and choose *Details* .
 - d) Remove the entry for *HU Requirement* and the flag for *HU Type Check*.
 - e) *Save*  your changes.
 - f) Choose *Exit* .

Continued on next page

2. Block all the bins in the levels above level 01 in our storage type 0010 for putaway. This storage type has eight levels, so you have to block levels **02 to 08**.



Hint: Use the Warehouse Management Monitor for blocking and unblocking bins.

- a) In the Easy Access Menu of your EWM system, choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.
- b) If required, enter the *Warehouse Number* **E1##** and the *Monitor* **SAP**.
- c) Choose *Stock and Bin → Storage Bin*.
- d) In the dialog box, enter *Storage Type* **0010** and *Level* **02 to 08**. Choose *Execute* .
- e) Use  *Select All* to select all bins.
- f) Select the *Other Methods* dropdown icon and select the entry *Block Putaway*.

Task 5:

Create a new storage type search sequence 0010 to putaway products directly into the storage type 0010.

1. Create a new storage type search sequence, **0010**, for **Putaway in Storage Type 0010**.

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Goods Receipt Process → Strategies → Storage Type Search → Define Storage Type Search Sequence for Putaway*.
- b) Choose the *New Entries* button.
- c) Create the following new entry:

<i>Warehouse Number</i>	E1##
<i>Storage Type Search Seq.</i>	0010
<i>Description</i>	Putaway in Storage Type 0010

- d) *Save*  your new entry.
- e) Choose *Exit* .

Continued on next page

2. Assign storage type **0010** to the new storage type search sequence.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Goods Receipt Process* → *Strategies* → *Storage Type Search* → *Assign Storage Types to Storage Type Search Sequence*.
 - Choose the *New Entries* button.
 - Create the following new entry:

<i>Warehouse Number</i>	E1##
<i>Stor. Type Srch Seq.</i>	0010
<i>Storage Type</i>	0010

- Save  your new entry.
 - Choose *Exit* .
3. Define a new putaway control indicator, **0010**.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Goods Receipt Process* → *Strategies* → *Storage Type Search* → *Define Putaway Control Indicator*.
 - Choose the *New Entries* button.
 - Create the following new entry:

<i>Warehouse Number</i>	E1##
<i>PutawayControlInd.</i>	0010
<i>Description</i>	Putaway in Storage Type 0010

- Save  your new entry.
- Choose *Exit* .

Continued on next page

4. Create a new storage type search sequence for putaway. Products with the Putaway Control Indicator **0010** shall use Search Sequence **0010**.
- In the IMG of your EWM system, choose *Extended Warehouse Management → Goods Receipt Process → Strategies → Storage Type Search → Specify Storage Type Search Sequence for Putaway*.
 - Choose the *New Entries* button.
 - Create the following new entry:

<i>Warehouse Number</i>	E1##
<i>PACI</i>	0010
<i>Srch Seq.</i>	0010

- Save*  your new entry.
- Choose Exit* .

Task 6:

Create warehouse products and packaging specifications.

- Create warehouse products for the following products: **T-EW04-##**, **T-EW05-##**, and **T-EW06-##**. The Putaway Control Indicator for these products shall be **0010**.
 - In the Easy Access Menu of your EWM system, choose *Extended Warehouse Management → Master Data → Product → Maintain Warehouse Product*.
 - Enter the *Product Number* **T-EW04-##**, the *Warehouse No.* **E1##**, and the *Party Entitled to Dispose* **SPCW**.
 - Choose *Create* .
 - Select the *Whse Data* tab.
 - Enter the *Putaway Control Ind.* **0010**.
 - Save*  the new warehouse product.
 - Choose Exit* .
 - Repeat the process for *Product Number* **T-EW05-##** and **T-EW06-##**.
- Create packaging specifications as specified below. The Packaging Specification Group is always **SAP**.

Continued on next page

<i>Description</i>	Palletization T-EW04-##
Determination	
<i>Condition Type</i>	OPAL
<i>SC Unit</i>	E1##
<i>Product</i>	T-EW04-##
Content	
<i>Product</i>	T-EW04-##
<i>Quantity</i>	1
Main Level	
<i>Target Qty</i>	100
<i>Packaging Material</i>	PKE-090

<i>Description</i>	Palletization T-EW05-##
Determination	
<i>Condition Type</i>	OPAL
<i>SC Unit</i>	E1##
<i>Product</i>	T-EW05-##
Content	
<i>Product</i>	T-EW05-##
<i>Quantity</i>	1
Main Level	
<i>Target Qty</i>	50
<i>Packaging Material</i>	PKE-090

<i>Description</i>	Palletization T-EW06-##
Determination	
<i>Condition Type</i>	OPAL
<i>SC Unit</i>	E1##
<i>Product</i>	T-EW06-##
Content	
<i>Product</i>	T-EW06-##
<i>Quantity</i>	1

Continued on next page

Main Level	
<i>Target Qty</i>	200
<i>Packaging Material</i>	PKE-090

- a) In the Easy Access Menu of your EWM system, choose *Extended Warehouse Management → Master Data → Packaging Specification → Maintain Packaging Specification*.
- b) Choose *Add a new line* 
- c) In the *PS Group* field, select **SAP**, then press the *Enter* key.
- d) Select your packaging specification row, then choose *Change* .
- e) In the *Packaging Specification* area on the right side of the screen, enter the *Description* from the table above.
- f) On the *Determination* tab, enter the **CCtC OPAL** and press **Enter**. Enter the *SC Unit* and the *Product*.
- g) Choose the *Add Product* line from the *Add Level or Content*  dropdown icon.
- h) Open the *Content* node by selecting .
- i) Choose *Product*.
- j) In the *Content* section on the right side of the screen, enter your product number in the *Product* field.
Press **Enter**.
- k) In the *Packspec./Level/Elements* column, select the *Main packaging material* entry. That will open up the main level for entry.
- l) Enter the *Target Qty* and the *Pack. Material* from the table.
- m) Choose *Activate* . Your packaging specification is saved and is now ready for use.
- n) Repeat the process for the other two products.



Hint: You can use *Copy Packspec*  to use the existing packaging specification as template, but please pay attention to the *Target Quantity* of each material.

Continued on next page

Task 7:

Test your settings. Create an inbound delivery for a already existing purchase order. Create the warehouse tasks and confirm them.

1. Create the inbound delivery for the purchase order. The vendor is **EWM-VEND**. Use the **purchasing group 0##** as selection criteria and enter **GR##-01** as *External ID*.

Inbound delivery:

-
- a) In the Easy Access Menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) Enter the *Vendor* **EWM-VEND**, the *External ID* **GR##-01** and choose *Purchase Orders*.
 - c) Enter the *Purchasing Group* **0##**.
 - d) Choose *Execute*. The system should find 1 purchase order with 14 items.
 - e) Choose to select all items.
 - f) Choose *Adopt selected*.
 - g) Save your inbound delivery. Note down the inbound delivery number.
 - h) Choose *Exit* to end the transaction.

2. Create the *Warehouse Tasks* for the inbound delivery and confirm them.

Continued on next page

EWM inbound delivery:

- a) In the Easy Access Menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
- b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search*  . Note down the number of the inbound delivery.
- c) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
- d) Choose *Create + Save*  .
- e) Choose *Warehouse Task* → *Confirm*.
- f) Use *Select All*  to select all warehouse orders.
- g) Choose *Confirm + Save*.
- h) Choose *Exit*  three times to end the transaction.

Task 8:

Remove the block for putaway in storage type 0010 again.

1. Unblock all the bins of storage type 0010.



Hint: Use the Warehouse Management Monitor to block and unblock bins.

- a) In the Easy Access Menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
- b) Choose *Stock and Bin* → *Storage Bin*.
- c) In the dialog box, enter *Storage Type 0010*. Choose *Execute*  .
- d) Use *Select All*  to select all bins.
- e) Select the *Other Methods* dropdown icon and select the entry *Unblock Putaway*.



Lesson Summary

You should now be able to:

- Describe the warehouse scenario used in EWM120



Unit Summary

You should now be able to:

- Describe the warehouse scenario used in EWM120

Unit 2

Extend Working with Deliveries

Unit Overview

A warehouse should offer more than just the best storage bin for a material. The number of individual picking and putaway processes should be kept to a minimum, and additional services should also be offered, as required. In this unit you will learn how to combine deliveries for optimized stock removal and how to include additional services. We will discuss the different cross-docking possibilities in EWM and how to create direct outbound deliveries in EWM.



Unit Objectives

After completing this unit, you will be able to:

- Create waves in EWM
- Set up the wave determination
- Set up and use two-step picking
- Use value-added services
- Create packaging specifications for value-added services
- Create and determine a work center for value-added services
- Describe the various cross-docking possibilities in EWM
- Set up EWM-triggered cross-docking
- Create direct outbound deliveries in EWM
- Set up the direct outbound delivery process in EWM and ERP

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Lesson: Combining Deliveries

Lesson Overview

In this lesson you will learn how to group deliveries in a wave and how to organize a two-step picking process in the system. These variations help to reduce individual picking steps.



Lesson Objectives

After completing this lesson, you will be able to:

- Create waves in EWM
- Set up the wave determination
- Set up and use two-step picking

Business Example

Several deliveries often leave the warehouse at the same time, combined together in a shipment or loaded in one truck. To combine deliveries, you create waves, which gives you better control over the time for picking and the workload.

Waves

Waves are groupings of warehouse request items (that is, the items of outbound delivery orders) to control warehouse activities, like picking. These groupings are then processed together in subsequent processes, for example the transfer of all warehouse request items assigned to a wave to warehouse task creation.

Extended Warehouse Management can combine warehouse request items and split items into waves on the basis of criteria such as activity area, route, or product. You can create waves automatically or manually with the use of existing wave templates. If you want to manually create a wave, on the *SAP Easy Access* screen, choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → */SCWM/WAVE Maintain Waves* and then choose *Create*. EWM creates an empty wave. You must manually enter the remaining information, for example, the assignment of warehouse request items.

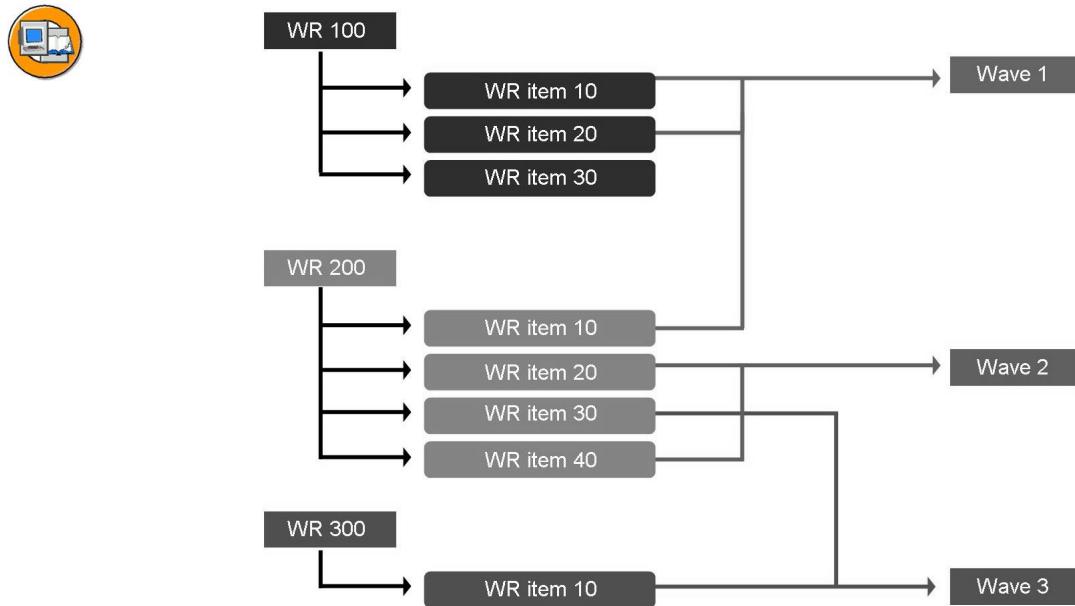


Figure 5: Wave Management – Grouping Warehouse Request Items

Automatic Wave Assignment

You can automate the assignment of warehouse request items to waves. Extended Warehouse Management 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.

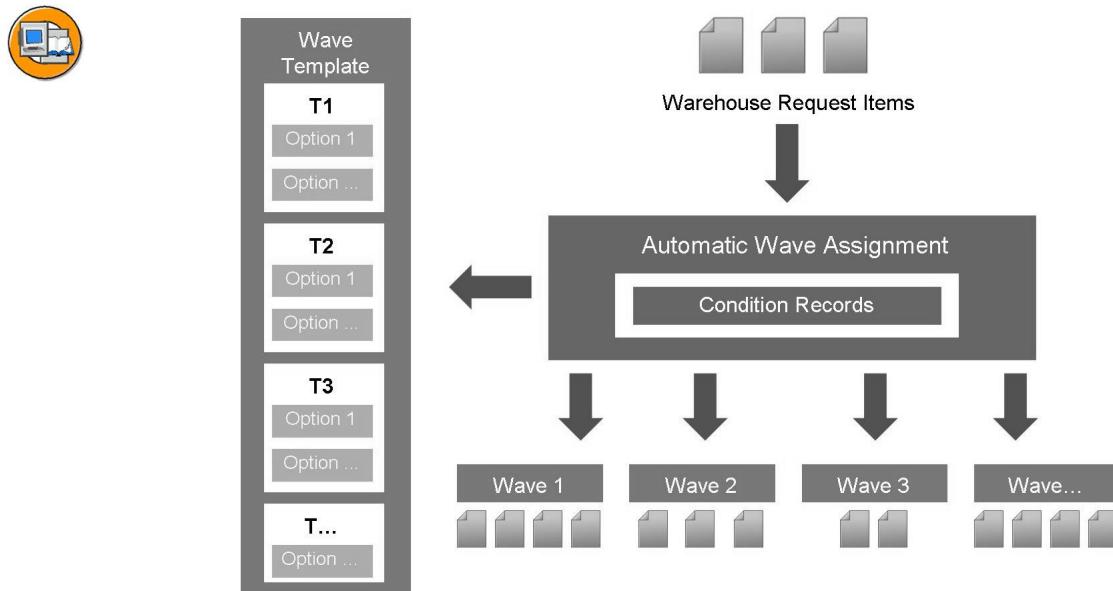


Figure 6: Automatic Wave Assignment with Wave Templates

Prerequisites are that you:

- Have created wave templates
- Have defined the conditions for wave template determination
- Have created condition records that connect the conditions and wave templates
- Have set the *Automatic Wave Creation* indicator for the warehouse process type that is found for the warehouse request item

EWM performs automatic wave assignment as follows:

EWM has multiple warehouse request items.

1. After you or EWM have created or changed a warehouse request, EWM creates a **Post Processing Framework action** (PPF action).
2. When this PPF action is processed, EWM uses the condition technique to determine valid wave templates for the delivery for each warehouse request item. Depending on your settings for the condition technique, EWM determines one or more valid wave templates for each item or split item in the warehouse request.
3. EWM reads the attribute data for each wave template.
4. For each wave template, EWM determines whether the wave to be created lies within the period of time between the actual point in time and the planned completion time for the warehouse request item. The actual point in time is the current system date and system time. Depending on whether a relevant wave exists already, and whether it has already been released, EWM uses this wave or creates a new one.

EWM determines the following times:

- (a) EWM determines the planned completion time of the warehouse request item and the wave completion time for each item or split item in a warehouse request that EWM has not yet assigned to a wave.

Planned completion time for warehouse request item: For stock removal, EWM uses the planned date and the planned time for departure from yard. If these dates are not available, EWM uses the dates for the goods issue start for outbound deliveries. In the case of internal stock transfers or posting change deliveries, EWM uses the dates from the date/time category “Warehouse Activities End Date/Time.”

Wave completion time: EWM determines the date and time for wave completion for each wave template option. If the planned completion time for the warehouse request item is before the wave completion time specified in the template option, EWM sets the wave completion date to that of the **day before** the planned completion date for the warehouse request item. If the planned completion time of the warehouse request item is after the wave completion time or is the same as the wave completion time specified in the wave template option, EWM sets the

wave completion date to the planned completion date of the warehouse request item. EWM changes only the wave completion date on the basis of the situations described.

The following figures show the complete situation.

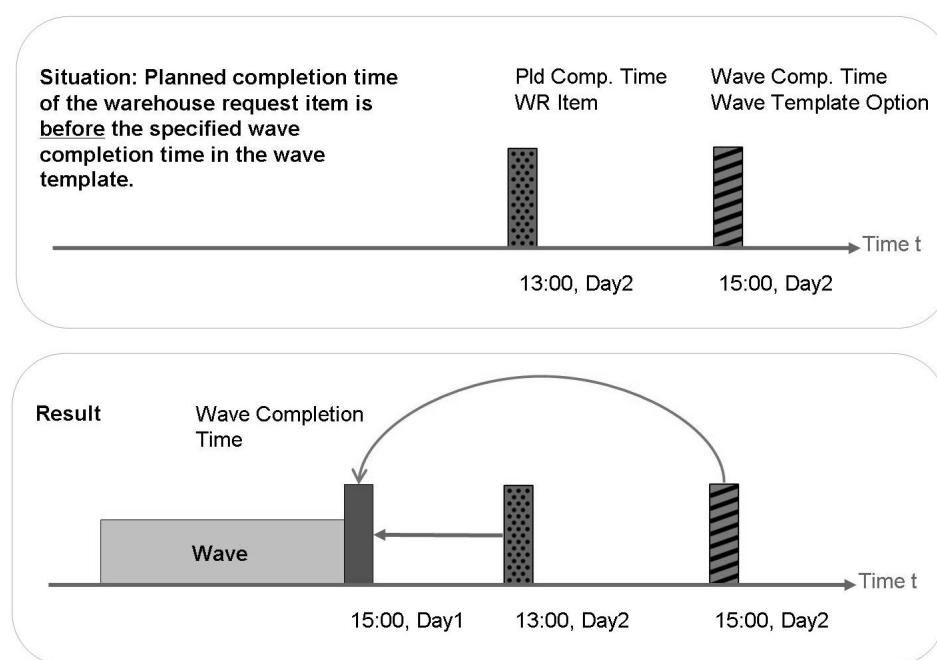


Figure 7: Automatic Wave Assignment – Case 1

In the first case, 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. As such, the planned completion time of the warehouse request item occurs before the wave completion time that you 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.

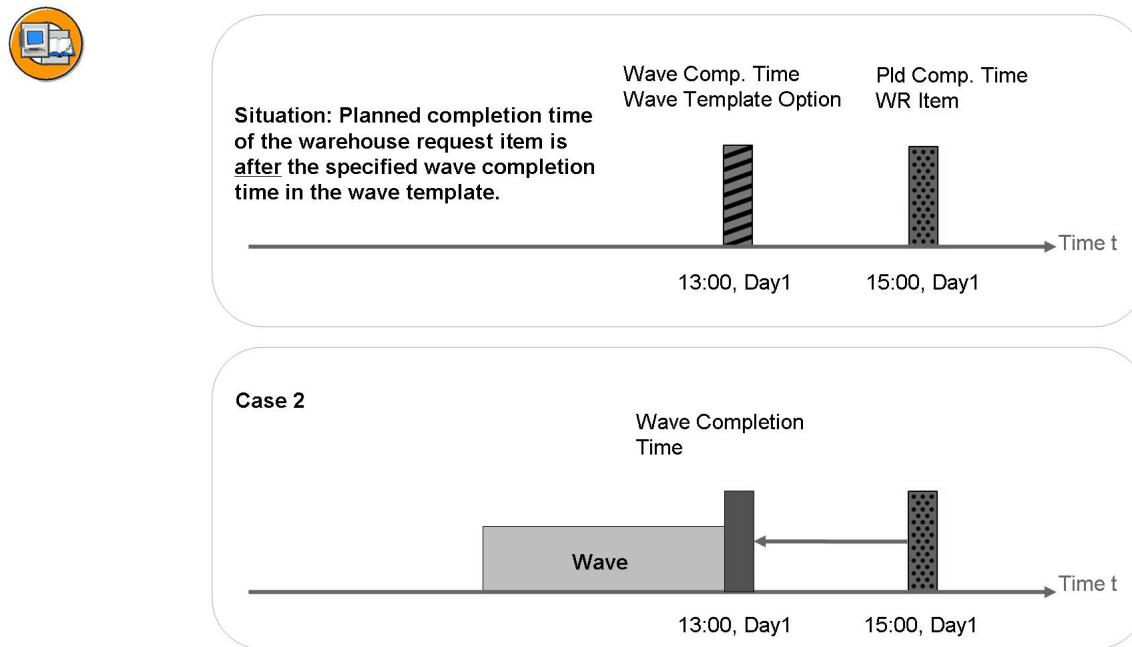


Figure 8: Automatic Wave Assignment – Case 2

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. As such, the planned completion time of the warehouse request item occurs after the wave completion time that you 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.



Hint: EWM calculates the dates for a wave template option in accordance with the calendar that you specified in the wave template.

(b) Lock time

The lock time is the time up to which you can add items to the wave. EWM calculates the lock date, lock time, release date, and release time using the date and time of the wave completion.

If any of these times are **before** the actual point in time, the wave template option is invalid.

5. EWM attempts to find a valid wave template.

(a) If the dates and times for the lock and the release are **after** the actual point in time, the wave template option is valid and EWM uses all the dates in the wave template.

(b) If the dates and times for the lock and the release are **before** the actual point in time, the wave template option is not valid and EWM does not use the wave template option with **this** date.

c) If EWM does not find a valid wave template option in the past for an item or split item in a warehouse request, EWM executes the following:

 **Note:** “In the past” refers to the planned completion time of the warehouse request item, but the determination of a valid wave template still occurs after the actual point in time.

EWM determines the date and time for the wave completion. If the planned completion time of the warehouse request item is either **before** the wave completion time or **is the same as** the wave completion time, EWM sets the wave completion date to the day after the planned completion date. If the planned completion time of the warehouse request item is **after** the wave completion time, EWM sets the wave completion date to the planned completion date of the warehouse request item.

- EWM then determines the date and time for wave completion for each wave template option (see previous step).
- If EWM does not find a valid wave template, it adds a day to the wave completion date. EWM repeats the calculation for the wave completion time and the lock time.

6. EWM determines the sequence for the best wave template and wave template option. To do this, EWM sorts the wave templates that were determined according to the level number and counter number in the determination procedure of the condition technique and according to the access number of the access sequence. Within the same level number, counter number, and access number, EWM sorts the wave templates and wave template options that were determined by the wave completion time that is closest to the planned completion time of the warehouse request item. This means that the wave template option with the wave completion time closest to the planned completion time is first within a block of possible waves for the same level number, counter number, and access number.

7. EWM transfers the results, in other words, all valid wave templates and wave template options for each item or split item, in a warehouse request to Business Add-In (BAdI) /SCWM/EX_WAVE_PLAN, method CHANGE_WAVES.

8. EWM assigns a wave or wave template to each item or split item in a warehouse request. EWM checks whether a wave already exists for this wave template option.

If no corresponding wave exists, EWM creates a new wave with the wave template option that was determined. EWM assigns the item or split item in the warehouse request to this wave.

If an exception occurs, the wave template option is invalid. For example, the wave exceeds the wave capacity. EWM then attempts to create a corresponding wave using the next wave template option.

If a corresponding wave exists already, EWM assigns the item or split item in the warehouse request to this wave.

If an exception occurs, the wave template option is invalid. For example, the wave exceeds the wave capacity. EWM then attempts to create a corresponding wave using the next wave template option.

If a corresponding wave exists already and has been released, EWM attempts to create a corresponding wave with the next wave template option. EWM then assigns the item or split item in the warehouse request to this wave.

You can permit exceptions by setting the Wave Assignment Also Possible After Wave Release indicator. This enables you to assign another warehouse request item to a wave that has already been released, in other words, the wave template option is valid in this instance.

Wave Templates

A wave template is a schema that defines the attributes of all the waves that are based on it. It serves as the infrastructure for automatic wave assignment. Wave templates enable the same wave attributes to be reused for different warehouse request items that comply with the same conditions. You can also use wave templates 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.

Structure

A wave template may consist of one or more wave template options.

Wave Template Attributes

The following attributes are available for wave templates:

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

Wave Assignment Also Possible After Wave Release indicator that you can use to assign additional warehouse request items to a wave that has already been released

Control for bin denial, where you can choose between the following:

- You can leave an item in a wave, in other words, release it again later.
- You can remove an item from a wave, in other words, reassign the item.
- You can have the system immediately create a warehouse task with an alternative source bin.

Wave Template Option Attributes

The following attributes are available for wave templates options:

Data for date and time:

- Lock time: The time up to which you can add items to the wave
- The number of days before the wave completion date that is used to define the lock date (lock days)
- Release time: The time by which the wave must be released
- The number of days before the wave completion date that is used to define the release date (release days)
- Picking completion time: the time by which you must have completed picking for the wave
- The number of days before the wave completion date that is used to define the picking completion date (pick completion days)
- Packing completion time: The time by which you must have completed packing for the wave.
- The number of days before the wave completion date that is used to define the packing completion date (packing completion days)
- Staging completion time: The time by which you must have completed material staging for the wave
- The number of days before the wave completion date that is used to define the staging completion date (staging completion days)
- Wave completion time: The time when the completion of all processing operations for the wave is planned

Calendar for defining workdays

Staging area group for the resulting warehouse tasks (WTs)

Staging area for the resulting WTs

Indicator for special activity that determines another activity: You can use this activity to change the activity category that is defined by the warehouse request. All WTs created when the wave is released receive the new activity (and thus the corresponding activity area and pick path).

Mode that applies to all WTs created when the wave is released

A mode is a state that determines the following:

- Weighting factors used for warehouse order prioritization
- Time intervals and units of measure for rounding latest starting dates (LSDs)

Capacity profile for defining capacity limits

Wave Processing

You can process waves and thereby control your warehouse activities in the following ways:

- Lock or unlock

You can lock a wave with the status *I* (initial). As a result, the status of the wave becomes *H* (locked). When you unlock a wave, EWM resets the status of the wave to *I*. You cannot release locked waves automatically.

- Merge

You can merge as many waves as you want. The prerequisites are:

The waves have not yet been released, in other words, they have the status I (initial, wave is created) or H (hold, wave is locked).

All the waves have the same status, either I or H.

EWM assigns warehouse request items to the waves. When you merge waves, EWM assigns all the warehouse request items for the selected waves to the first wave selected. EWM always uses the name of the top row. For example, you have waves 123, 456, and 789. If you select and merge these, EWM merges these three waves into wave 123.

- Release

Waves are used to create warehouse tasks and warehouse orders. They can be released in the following ways:

- Automatically

EWM creates a job that automatically releases waves on the release day and at the release time.

- Immediately

When you or EWM create a wave, EWM releases this wave immediately.

- Manually

You can manually release a wave at any point in time in the monitor or in wave processing. When you manually release waves, you can also release locked waves. In this case, EWM sets the status *Locked* for the warehouse orders created. As a result, these warehouse orders are locked for further processing for the time being.

When you or EWM release a wave to generate warehouse tasks, EWM copies the staging area and the mode of the wave to warehouse task. You can release waves multiple times. For example, if you release a wave, but EWM can only generate some of the required warehouse tasks since there is not enough stock, you can release the wave again at a later point in time. You can display the log by using the *Release Log* button. To do so, on the *SAP Easy Access* screen, choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → *Maintain Waves*.

- Subsystem

You can release a wave for a downstream subsystem. As a result, EWM transfers the warehouse orders to the downstream subsystem.

- Assign or remove assignment

You can assign warehouse request items to a wave or remove the assignment. Here, the lock time for the wave must not have expired yet. Moreover, the wave must not have been released yet. If you have set the *Wave Assignment Also Possible After Wave Release* indicator as an attribute in the wave template, you can, however, assign an additional warehouse request item to waves that have already been released.

- **Split**

You can select a warehouse request item and remove it from the current wave. EWM creates a copy of the wave and assigns the warehouse request item to the copy.

- **Assign automatically**

EWM automatically assigns the chosen warehouse request items to waves. To do this, the system uses the same logic as for the automatic wave assignment.

- **Delete**

When EWM deletes a wave, it removes the assignment of all the warehouse request items to the wave. EWM deletes a wave completely; in other words, you can no longer archive it.

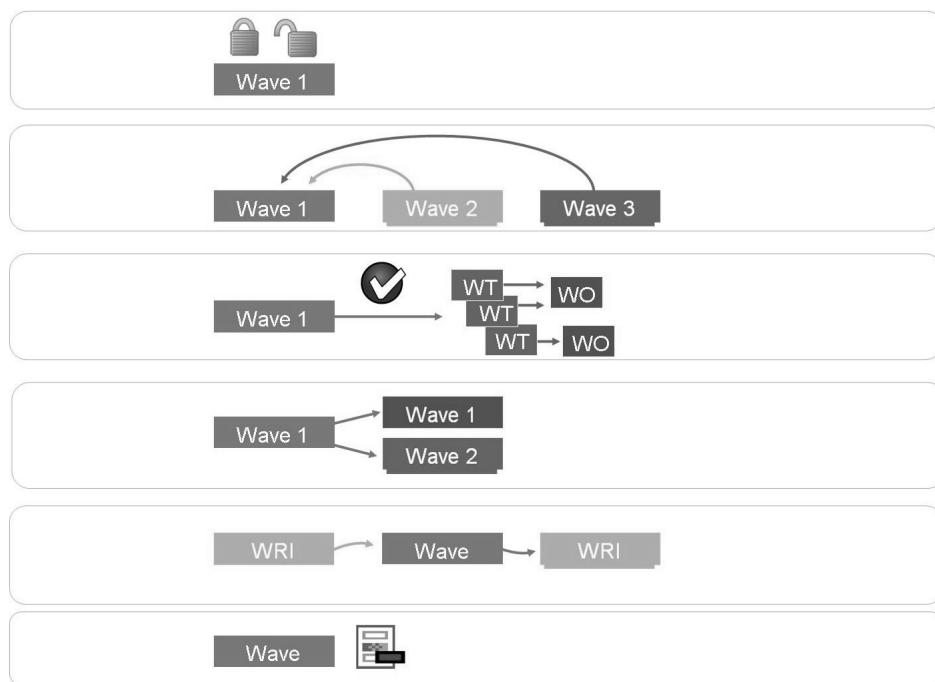


Figure 9: Processing Waves

If you want EWM to save the logs for the wave, you have to create an entry for the warehouse and the subobject WAVE (wave processing), as well an entry for the warehouse and the subobject WAVE_REL (wave release). For example, you can define that you want to see all messages in the application log with the status *Additional Information*. You have made these settings on the *SAP Easy Access* screen under *Extended Warehouse Management* → *Settings* → *Activate Application Log*.

Assignment of an Item to Different Waves

The *Rough Withdrawal Bin Determination* flag in the warehouse process type is used in wave creation.

The following figure shows how EWM assigns a warehouse request item with different partial quantities to different waves if the rough picking location determination process yields different items due to a quantity-dependent picking strategy.

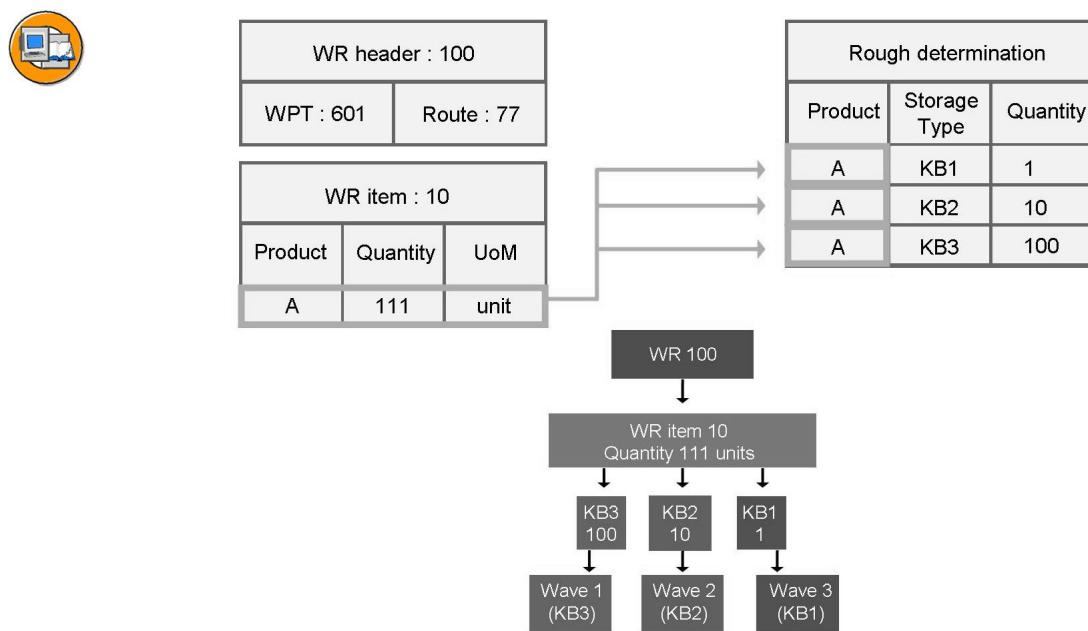


Figure 10: Assignment of an Item to Different Waves

In rough picking location determination, EWM assigns warehouse request item 10 with a quantity of 111 of product A to three different storage types for picking in accordance with the quantity-dependent picking strategy. One piece is assigned to storage type PA1, 10 pieces are assigned to storage type PA2, and 100 pieces are assigned to storage type PA3.

Two-Step Picking

In the case of two-step picking, the picking process is split into two separate steps. You optimize the picking process by collectively removing products from your warehouse for multiple outbound deliveries in the first step, and assigning the products that you have withdrawn to the relevant outbound deliveries in the second step. In this way, you pick a large number of outbound deliveries on a collective basis. Another advantage of two-step picking is that you can minimize the total number of picking operations performed during picking by removing the total required quantity of the products in a cross-requirement way in the first step. Moreover, stock removal and allocation are two separate warehouse processes. You create a separate warehouse task for each of these steps.

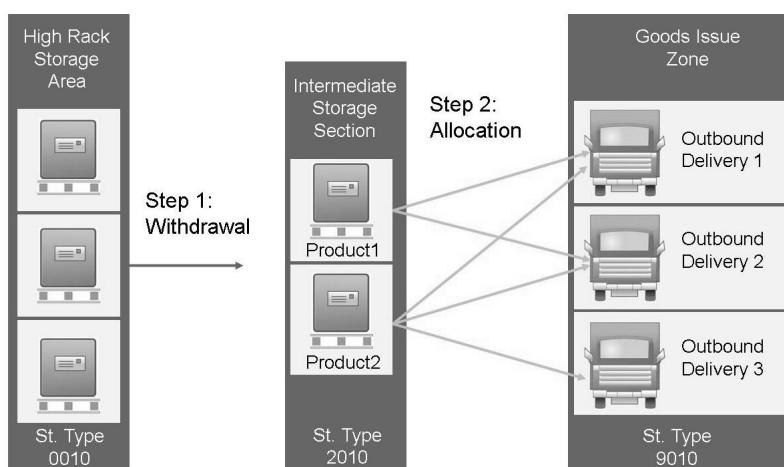


Figure 11: Two-Step Picking

Two-step picking splits the picking process in the warehouse into two separate steps:

1. In the first picking step, the withdrawal, the following sub-steps occur:
 - a) You combine the outbound deliveries into a wave.
 - b) As soon as you form a group of outbound deliveries, EWM determines the relevance of the corresponding products to two-step picking. You can change the relevance of the entire wave to two-step picking by changing the value in the *Two-Step Pick* field on the user interface for wave maintenance (no entry = not relevant, Two = two-step picking).
 - c) You create the withdrawal warehouse tasks for the wave, in other words, wave release for the **withdrawal** step. To do so, on the *SAP Easy Access* screen, choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → *Maintain Waves*. Select the wave and then choose the *Release Withdrawal* pushbutton. As a result, the release of the first step of picking is completed.
 - d) You pick the entire product quantity to fulfill the requirements from multiple deliveries.
 - e) You confirm the warehouse tasks for the withdrawal step and, in doing so, you confirm that the necessary products are in the intermediate storage section.
2. In the second picking step, the allocation, the following sub-steps occur:
 - a) You create warehouse tasks for the allocation step, in other words, wave release for the **allocation** step. In doing so, you distribute the total quantity that has been picked among the individual requirements.
 - b) You transport the products that belong to a wave from the intermediate storage section to the destination storage bins (for example, to a goods issue zone or packing station).
 - c) You confirm the warehouse tasks for the allocation step and, in doing so, you confirm that the necessary products are in the destination storage bins.

Prerequisites

1. You have activated two-step picking in Customizing for Extended Warehouse Management (EWM). If you want to define the two-step process on a product basis, set the *2-Step Matl-Dep.* indicator as well. EWM uses this indicator to determine in the product master record on the *Warehouse Data* tab page whether you want to pick this product directly from the warehouse or whether you intend to use two-step picking for this product.
2. You have defined a warehouse process type for the first picking step. In the standard system, the warehouse process type 2020 is defined for the first picking step.
3. You have assigned the warehouse process type for the first picking step to the warehouse number.
4. You have created a storage type and storage bins for the intermediate storage section. In the standard system, the storage type 2010 is defined for this purpose.
5. The stock removal strategy for the second picking step must find the storage type of the intermediate storage section. You control this by setting the 2 indicator for two-step picking in Customizing for the storage type search sequence.
6. You have combined the outbound deliveries into a wave.

Exercise 2: Create a Wave Manually

Exercise Objectives

After completing this exercise, you will be able to:

- Create a wave and assign items to a wave
- Release a wave for picking

Business Example

You want to combine deliveries for the same customer for the picking process. For this you combine the deliveries manually in a wave.

Task:

Create outbound deliveries and assign the items to a wave. Release the wave and confirm the picking process.

1. Create outbound deliveries in the ERP system for already existing orders.
Use the following selection criteria:

<i>Shipping Point/Receiving Pt</i>	z0##
<i>Deliv. Creation Date</i>	Today
<i>To</i>	Today + 10 days
<i>Department (on the Sales Orders tab)</i>	0002

Confirm that three sales orders have been found. Create the deliveries in the background and use the protocol to display the delivery numbers.

ERP outbound delivery 1:

ERP outbound delivery 2:

ERP outbound delivery 3:

2. Look for the outbound delivery orders in EWM.

EWM outbound delivery order 1:

EWM outbound delivery order 2:

Continued on next page

EWM outbound delivery order 3:

3. Create a wave without any reference to a template or wave type. Give it the description “Wave1##”.

Wave: _____

4. Assign the items of the three outbound delivery orders to the new created wave.

5. Create the warehouse tasks for the wave by releasing it. Note down the document numbers and confirm the picking.

Warehouse order: _____

Warehouse task 1: _____

Warehouse task 2: _____

Warehouse task 3: _____

Warehouse task 4: _____

Warehouse task 5: _____

Solution 2: Create a Wave Manually

Task:

Create outbound deliveries and assign the items to a wave. Release the wave and confirm the picking process.

1. Create outbound deliveries in the ERP system for already existing orders. Use the following selection criteria:

<i>Shipping Point/Receiving Pt</i>	z0##
<i>Deliv. Creation Date</i>	Today
<i>To</i>	Today + 10 days
<i>Department (on the Sales Orders tab)</i>	0002

Confirm that three sales orders have been found. Create the deliveries in the background and use the protocol to display the delivery numbers.

ERP outbound delivery 1:

ERP outbound delivery 2:

ERP outbound delivery 3:

- a) In the *ERP Easy Access* menu, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Collective Processing of Documents Due for Delivery* → *Sales Orders*. Enter *Shipping Point/Receiving Pt* and the *Deliv. Creation Date* range as in the table.

Select the *Sales Orders* tab and enter the *Department 0002*.

- b) Choose *Execute* .
- c) Confirm that three sales orders have been found. Select all items with  and choose *Background* .
- d) Use *Log for delivery creation*  to display the log. Select the line in the log and choose the *Documents* button. Note down the document numbers.
- e) Choose *Exit*  to leave the transaction.

2. Look for the outbound delivery orders in EWM.

Continued on next page

EWM outbound delivery order 1:

EWM outbound delivery order 2:

EWM outbound delivery order 3:

- a) In the *EWM Easy Access* menu, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*. Click on the button *Open Advanced Search*. Enter the ERP delivery numbers in the *ERP Document* field (the numbers should be in sequence, so you can enter them as *From* and *to*). Start the search with *Advanced Search* and *Close Advanced Search* again.
 - b) You can check the ERP outbound delivery numbers on the tab *Reference Documents*. Note down the document numbers of the EWM outbound delivery orders.
 - c) Choose *Exit* to leave the transaction.
3. Create a wave without any reference to a template or wave type. Give it the description “Wave1##”.
- Wave: _____
- a) In the *EWM Easy Access* menu, choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → *Maintain Waves*. Choose *Create* .
 - b) Enter the *Description* **Wave1##**.
 - c) Note down the wave number.
4. Assign the items of the three outbound delivery orders to the new created wave.
- a) Select the *Warehouse Requests* tab. Choose the *Open Advanced Search* button. Enter the ERP outbound delivery order numbers in the *Document Number* field (their numbers should be sequentially, so you can enter them as *From* and *to*). Start the search with *Advanced Search* .
 - b) Select all items with and choose *Assign* .
 - c) Check on the *Items* tab that all items have been assigned.
 - d) *Save* the wave.
5. Create the warehouse tasks for the wave by releasing it. Note down the document numbers and confirm the picking.

Continued on next page

Warehouse order: _____

Warehouse task 1: _____

Warehouse task 2: _____

Warehouse task 3: _____

Warehouse task 4: _____

Warehouse task 5: _____

- a) Confirm that the wave is selected. Choose *Release* .
- b) Select the *Warehouse Orders* tab. Note down the number of the warehouse order.
- c) Confirm that the warehouse order is selected. Select the drop-down icon *Display Additional Data* . Select the entry *Warehouse Order*.



Hint: This icon works as a direct icon as well as a drop-down icon. If you click on the center of the icon the transaction for the confirmation of the warehouse order is opened. If you click on the right side of the icon a drop-down list is shown.

Note down the numbers of the warehouse tasks. Select *Confirm + Save*. Choose *Back*  to exit the transaction.

Exercise 3: Automatic Wave Assignment with Wave Template

Exercise Objectives

After completing this exercise, you will be able to:

- Set up the automatic wave assignment
- Define wave templates
- Release waves

Business Example

You want to combine deliveries to reduce the individual movements in the picking process. The deliveries shall be assigned automatically to a wave.

Task:

Create a wave template and the condition records for the automatic wave assignment. Create deliveries and confirm that they have been assigned to a wave. Release the wave and confirm the picking.

1. Create a wave template with the following details:

<i>Template</i>	<i>Description</i>	<i>Rlse Mthd (Wave Release Method)</i>	<i>Wave Type</i>	<i>Category</i>	<i>P (Behavior During Pick Denial)</i>
5##	Product	A Auto- matic	WT01	C1	Leave Item in Wave (Re- lease later)

Time attributes for the wave template:

Continued on next page

Wave Template Option	Wave Cutoff Time	Wave Release Time	Pick. Compl	Pack. Compl.	Stag. Compl	Wave Compl	Calendar	CapacProfil
1	10:00	10:05	10:10	10:15	10:20	10:30	01	C1
2	15:00	15:05	15:10	15:15	15:20	15:30	01	C1
3	18:00	18:05	18:10	18:15	18:20	18:30	01	C1

2. Create condition records for the wave template determination.

Doc. Cat.	Whse No.	Product	Template
PDO	E1##	T-EW50-##	5##
PDO	E1##	T-EW51-##	5##

3. Activate the automatic wave creation for the warehouse process type 2010 in your warehouse E1##.
4. Assign the determination procedure “WAVE” to the document type “OUTB” for your warehouse number E1##.
5. Create outbound deliveries in the ERP system for already existing orders. Use the following selection criteria:

Shipping Point/Receiving Pt	z0##
Deliv. Creation Date	Today
To	Today + 10 days
Department (on the tab Sales Orders)	0003

Confirm that two sales orders have been found. Create the deliveries in the background and use the protocol to display the delivery numbers.

ERP outbound delivery 1:

ERP outbound delivery 2:

ERP outbound delivery 3:

6. Look for the outbound delivery orders in EWM and confirm that the automatic assignment to a wave was done.

Continued on next page

EWM outbound delivery order 1:

EWM outbound delivery order 2:

EWM outbound delivery order 3:

7. Release the wave and confirm the picking process via the warehouse management monitor. Note down the document numbers.

Warehouse order: _____

Warehouse task 1: _____

Warehouse task 2: _____

Warehouse task 3: _____

Warehouse task 4: _____

Warehouse task 5: _____

Solution 3: Automatic Wave Assignment with Wave Template

Task:

Create a wave template and the condition records for the automatic wave assignment. Create deliveries and confirm that they have been assigned to a wave. Release the wave and confirm the picking.

1. Create a wave template with the following details:

Template	Description	Rlse Mthd (Wave Release Method)	Wave Type	Category	P (Behavior During Pick Denial)
5##	Product	A Automatic	WT01	C1	Leave Item in Wave (Release later)

Time attributes for the wave template:

Wave Template Option	Wave Cutoff Time	Wave Release Time	Pick. Compl	Pack. Compl.	Stag. Compl	Wave Compl	Calendar	CapacProfil
1	10:00	10:05	10:10	10:15	10:20	10:30	01	C1
2	15:00	15:05	15:10	15:15	15:20	15:30	01	C1
3	18:00	18:05	18:10	18:15	18:20	18:30	01	C1

- a) In the *EWM Easy Access* menu, choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → *Maintain Wave Templates*. Create a template with the following details:
- b) In the *Determine Work Area: Entry* dialog box, enter your *Warehouse Number* **E1##** and choose *Continue* .
- c) Use the *Display* → *Change* icon  to switch to change mode.

Continued on next page

Choose *New Entries* and enter the template details as in the table. Press **Enter**.

- d) Select the new template and choose *Define Wave Template Time Attributes*.

Choose *New Entries* and enter the time attribute details as in the table. Press **Enter**.

- e) Save  the new template.
- f) Choose *Exit*  to leave the transaction.

2. Create condition records for the wave template determination.

Doc. Cat.	Whse No.	Product	Template
PDO	E1##	T-EW50-##	5##
PDO	E1##	T-EW51-##	5##

- a) Choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → *Maintain Conditions for Determining Wave Templates*.
- b) Select the F4 Help in the *Item area* for the *CCtC* field. In the dialog box, select *CCTC WAVE* and choose *Copy* .
- c) Enter the details for the two condition records as per the table.



Hint: Enter the details for the first condition records, then press **Enter**. Then the next line for entries is opened automatically.

- d) Save  the new condition records.
- e) Choose *Exit*  to leave the transaction.

3. Activate the automatic wave creation for the warehouse process type 2010 in your warehouse E1##.

- a) In the IMG of the EWM system, choose *Extended Warehouse Management* → *Goods Issue Process* → *Wave Management* → *General Settings* → *Set Automatic Wave Generation for Warehouse Process Type*.
- b) Position on *Warehouse Number* **E1##** and *Whse Proc. Type* **2010**.
- c) Set the flag for *AutoWave*. Save  the new entry.
- d) Choose *Exit*  to leave the transaction.

Continued on next page

4. Assign the determination procedure “WAVE” to the document type “OUTB” for your warehouse number E1##.
- In the IMG of the EWM system, choose *Extended Warehouse Management → Goods Issue Process → Wave Management → Wave Template Determination → Assign Procedure to Document Type*.
 - Choose *New Entries* and create an entry with the following details:

<i>Warehouse Number</i>	<i>Doc. Cat.</i>	<i>Doc. Type</i>	<i>Procedure</i>
E1##	PDO Outbound Delivery Order	OUTB	WAVE

Save  the new entry.

- Choose *Exit*  to leave the transaction.
5. Create outbound deliveries in the ERP system for already existing orders. Use the following selection criteria:

<i>Shipping Point/Receiving Pt</i>	z0##
<i>Deliv. Creation Date</i>	Today
<i>To</i>	Today + 10 days
<i>Department (on the tab Sales Orders)</i>	0003

Confirm that two sales orders have been found. Create the deliveries in the background and use the protocol to display the delivery numbers.

ERP outbound delivery 1:

ERP outbound delivery 2:

Continued on next page

ERP outbound delivery 3:

-
- a) In the *ERP Easy Access* menu, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Collective Processing of Documents Due for Delivery* → *Sales Orders*. Enter *Shipping Point/Receiving Pt* and the *Deliv. Creation Date* range as in the table.
Select the *Sales Orders* tab and enter *Department 0003*.
 - b) Choose *Execute* .
 - c) Confirm that three sales orders have been found. Select all items with  and choose *Background* .
 - d) Use the *Log for delivery creation*  to display the log. Select the line in the log and choose the *Documents* button. Note down the document numbers.
 - e) Choose *Exit*  to leave the transaction.
6. Look for the outbound delivery orders in EWM and confirm that the automatic assignment to a wave was done.

EWM outbound delivery order 1:

EWM outbound delivery order 2:

EWM outbound delivery order 3:

- a) In the *EWM Easy Access* menu, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*. Choose the *Open Advanced Search* button. Enter the ERP delivery numbers in the *ERP Document* field (their numbers should be in sequence, so you can enter them as *From* and *to*). Start the search with *Advanced Search*  and *Close Advanced Search* again.
- b) You can check the ERP outbound delivery numbers on the *Reference Documents* tab. Note down the document numbers of the EWM outbound delivery orders.
- c) Select one of the outbound delivery orders and select the *PPF Actions* tab. Confirm if the action *Assign Warehouse Request to Wave* has the *Status Successfully Processed*.
- d) Choose *Exit*  to leave the transaction.

Continued on next page

7. Release the wave and confirm the picking process via the warehouse management monitor. Note down the document numbers.

Warehouse order: _____

Warehouse task 1: _____

Warehouse task 2: _____

Warehouse task 3: _____

Warehouse task 4: _____

Warehouse task 5: _____

- a) Open the warehouse management monitor in the *EWM Easy Access* menu: *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
- b) Choose *Outbound* → *Documents* → *Wave*. Double-click for the selection pop-up. Enter *Wave Type WT01* and choose *Execute* .
- c) Select the last wave and confirm that it is the correct one by selecting *Wave Item*. Check if the *Doc. No.* corresponds to the outbound delivery orders.
- d) In the upper view area, select the drop-down icon *More methods* and choose the entry *Release Wave*.
- e) Choose the *Warehouse Order* button in the upper view area and note down the document number.
- f) Choose the *Warehouse Task* button in the upper view area and note down the document numbers.
- g) Choose the *Warehouse Order* button in the upper view area again. Select the warehouse order in the lower view area, click on the *More methods* drop-down icon, and choose the entry *Confirm Backgr*.

Exercise 4: Two-Step Picking

Exercise Objectives

After completing this exercise, you will be able to:

- Set up two-step picking

Business Example

Sometimes it is better to pick a bigger quantity of one material from the high rack area and to distribute the material into different deliveries in a special storage type. This way the movements in the high rack area can be reduced and fewer open pallets are in that area.

Task 1:

Set up the two-step picking process.

1. Set up the two-step procedure for your warehouse number E1##. You want to have the two-step picking product dependent and the warehouse process type for the withdrawal step is 2020.
Dest. Stor. Type: _____
2. Confirm the destination storage type and storage bin of the warehouse process type 2020.
Dest. Stor. Bin: _____
3. Create a storage type search sequence **PIC2 - Two-Step Picking** for the allocation step. The allocation step is the second step in the two-step picking process, the products need to be picked from the storage type 2010.
4. Set up the determination of the new storage type search sequence for the two-step process and warehouse process type 2010. You also need to set up that for the warehouse process type 2020 the storage type search sequence **PICK** is used.
5. Create a new entry for the access strategy in the determination sequence. The entry should be for the combination of *2SP* and *Proc.Type* and it should be the first entry.
6. Maintain the **two-step relevance** for the warehouse products T-EW52## and T-EW53##. The two-step picking flag is on the *Whse Data* tab, in the subsection *Stock Removal*. Enter a **2** for *Two-Step via Two-Step Procedure*.
7. Create condition records for the wave template determination.

Continued on next page

Doc. Cat.	Whse No.	Product	Template
PDO	E1##	T-EW52-##	5##
PDO	E1##	T-EW53-##	5##

Task 2:

Test the two-step picking process.

1. Create outbound deliveries in the ERP system for already existing orders.
Use the following selection criteria:

Shipping Point/Receiving Pt	z0##
Deliv. Creation Date	Today
To	Today + 10 days
Department (on the tab Sales Orders)	0004

Confirm that two sales orders have been found. Create the deliveries in the background and use the protocol to display the delivery numbers.

ERP outbound delivery 1:

ERP outbound delivery 2:

2. Look for the outbound delivery orders in EWM and confirm that the automatic assignment to a wave was done.

EWM outbound delivery order 1:

EWM outbound delivery order 2:

3. Release the wave and confirm the picking process via the warehouse management monitor. Note down the document numbers.

Warehouse order 1 (for withdrawal):

Warehouse task 1 (for withdrawal):

Warehouse task 2 (for withdrawal):

Continued on next page

Warehouse order 2 (for subdivision and picking):

Warehouse task 3: _____

Warehouse task 4: _____

Warehouse task 5: _____

Warehouse order 3 (for subdivision):

Warehouse task 6: _____

Warehouse task 7: _____

Solution 4: Two-Step Picking

Task 1:

Set up the two-step picking process.

1. Set up the two-step procedure for your warehouse number E1##. You want to have the two-step picking product dependent and the warehouse process type for the withdrawal step is 2020.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Goods Issue Process* → *Wave Management* → *General Settings* → *Set up Two-Step Picking*.
 - b) Position on your *Warehouse Number* **E1##** and select **2 - Two-Step via Two-Step Procedure** for the *Relevance for Two-Step Pick*. Set the flag for *2-St.Prod.-Dep.* and enter **2020** as *Process Type*.
 - c) Save  the new entry.
 - d) Choose *Exit*  to leave the transaction.
2. Confirm the destination storage type and storage bin of the warehouse process type 2020.

Dest. Stor. Type: _____

Dest. Stor. Bin: _____

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Warehouse Process Type*.
- b) Position on your *Warehouse Number* **E1##** and the *Warehouse Process Type* **2020**.
- c) Choose *Details* .
- d) Note down the *Dest.Stor.Type* and the *Dest.Stor.Bin*.
- e) Choose *Exit*  to leave the transaction.

Continued on next page

3. Create a storage type search sequence **PIC2 - Two-Step Picking** for the allocation step. The allocation step is the second step in the two-step picking process, the products need to be picked from the storage type 2010.

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Goods Issue Process → Strategies → Specify Storage Type Search Sequence*.
- b) Choose *New Entries*.
- c) Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>Storage Type Search Seq.</i>	PIC2
<i>Description</i>	Two-Step Picking

- d) Select the new entry and choose *Assign Storage Type to Storage Type Search Seq.* in the *Dialog Structure*.
- e) Choose *New Entries*.
- f) Enter *Storage Type 2010* in the first line.
- g) Save  the new entry.
- h) Choose *Exit*  to leave the transaction.
4. Set up the determination of the new storage type search sequence for the two-step process and warehouse process type 2010. You also need to set up that for the warehouse process type 2020 the storage type search sequence **PICK** is used.
- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Goods Issue Process → Strategies → Determine Storage Type Search Sequence for Stock Removal*
- b) Choose *New Entries*.
- c) Create two new entries with the following details:

<i>Warehouse Number</i>	<i>2</i>	<i>Whse Process Type / Group</i>	<i>Storage Type Search Seq.</i>	<i>RemR</i>
E1##	set flag	2010	Pic2	FIFO
E1##	-	2020	Pick	FIFO

- d) Save  the new entries.

Continued on next page

- e) Choose *Exit*  to leave the transaction.
5. Create a new entry for the access strategy in the determination sequence. The entry should be for the combination of *2SP* and *Proc.Type* and it should be the first entry.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Goods Issue Process* → *Strategies* → *Optimization of Access Strategies for Stor. Type Search Sequence*.
 - Choose *New Entries*.
 - Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>Sequence No.</i>	2
<i>2SP</i>	set flag
<i>Proc.Type</i>	set flag

Press **Enter**. Select the new entry and move the entry one level up with the *Next value; previous entry*  button.

-  **Hint:** The new entry should then have the *Sequence No. 1*.
- Save  the new entry.
 - Choose *Exit*  to leave the transaction.

Continued on next page

6. Maintain the **two-step relevance** for the warehouse products T-EW52-## and T-EW53-##. The two-step picking flag is on the *Whse Data* tab, in the subsection *Stock Removal*. Enter a **2** for *Two-Step via Two-Step Procedure*.

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Product* → *Maintain Warehouse Product*.
- Enter the following details:

<i>Product Number</i>	T-EW52-##
<i>Warehouse No.</i>	E1##
<i>Party Entitled to Dispos</i>	SPCW

- Choose *Change* .
- Select the tab *Whse Data* and look for the field *Two-Step Picking*.
- Enter **2** - Two-Step via Two-Step Procedure.
- Save*  your changes.
- Choose *Exit*  to leave the transaction.
- Repeat these steps for *Product Number*: **T-EW53-##**.

7. Create condition records for the wave template determination.

<i>Doc. Cat.</i>	<i>Whse No.</i>	<i>Product</i>	<i>Template</i>
PDO	E1##	T-EW52-##	5##
PDO	E1##	T-EW53-##	5##

- Choose *Extended Warehouse Management* → *Work Scheduling* → *Wave Management* → *Maintain Conditions for Determining Wave Templates*.
- Select the F4 Help in the *Item area* for the field *CCtC*. In the dialog box, select *CCTC WAVE* and choose *Copy* .
- Enter the details for the two condition records as per the table.



Hint: Enter the details for the first condition records, then press **Enter**. Then the next line for entries is opened automatically.

- Save*  the new condition records.
- Choose *Exit*  to leave the transaction.

Continued on next page

Task 2:

Test the two-step picking process.

1. Create outbound deliveries in the ERP system for already existing orders.
Use the following selection criteria:

<i>Shipping Point/Receiving Pt</i>	z0##
<i>Deliv. Creation Date</i>	Today
<i>To</i>	Today + 10 days
<i>Department (on the tab Sales Orders)</i>	0004

Confirm that two sales orders have been found. Create the deliveries in the background and use the protocol to display the delivery numbers.

ERP outbound delivery 1:

ERP outbound delivery 2:

- a) In the *ERP Easy Access* menu, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Collective Processing of Documents Due for Delivery* → *Sales Orders*. Enter *Shipping Point/Receiving Pt* and the *Deliv. Creation Date* range as in the table.
Select the tab *Sales Orders* and enter the *Department 0004*.
b) Choose *Execute*  .
c) Confirm that two sales orders have been found. Select all items with  and choose *Background*  .
d) Use the *Log for delivery creation*  to display the log. Select the line in the log and choose the *Documents* button. Note down the document numbers.
e) Choose *Exit*  to leave the transaction.
2. Look for the outbound delivery orders in EWM and confirm that the automatic assignment to a wave was done.

EWM outbound delivery order 1:

Continued on next page

EWM outbound delivery order 2:

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*. Click on the *Open Advanced Search* button. Enter the ERP delivery numbers as *ERP Document* (they numbers should be in sequence, so you can enter them as *From* and *to*). Start the search with *Advanced Search* and *Close Advanced Search* again.
 - b) You can check the ERP outbound delivery numbers on the *Reference Documents* tab. Note down the document numbers of the EWM outbound delivery orders.
 - c) Select one of the outbound delivery orders and select the *PPF Actions* tab. Confirm if the action *Assign Warehouse Request to Wave* has the *Status Successfully Processed*.
 - d) Choose *Exit* to leave the transaction.
3. Release the wave and confirm the picking process via the warehouse management monitor. Note down the document numbers.

Warehouse order 1 (for withdrawal):

Warehouse task 1 (for withdrawal):

Warehouse task 2 (for withdrawal):

Warehouse order 2 (for subdivision and picking):

Warehouse task 3: _____

Warehouse task 4: _____

Warehouse task 5: _____

Warehouse order 3 (for subdivision):

Warehouse task 6: _____

Warehouse task 7: _____

- a) Open the warehouse management monitor in the *EWM Easy Access* menu: *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.

Continued on next page

- b) Choose *Outbound* → *Documents* → *Wave*. Double-click for the selection pop-up. Enter *Wave Type* **WT01** and choose *Execute* .
- c) Select the last wave and confirm that it is the correct one by choosing *Wave Item*. Check if the *Doc. No.* correspond to the Outbound Delivery Orders.
- d) In the upper view area, select the drop-down icon *More methods* and choose the entry *Release Wave*.
- e) In the dialog box for the release type, select *Release Withdrawal* and make sure that the *Release Subdivision* is **NOT** marked.
Choose *Continue* .
- f) Choose the *Warehouse Order* button in the upper view area and note down the document number.
- g) Choose the *Warehouse Task* button in the upper view area.



Hint: There should be two warehouse tasks: one for product T-EW52-## and one for product T-EW53-##, both for storage type 2020.

- Note down the document numbers.
- h) Choose the *Warehouse Order* button in the upper view area again. Select the warehouse order in the lower view area, click on the drop-down icon *More methods* and choose the entry *Confirm Backgr.*
 - i) In the upper view area, select again the drop-down icon *More methods* and choose the entry *Release Wave*.
 - j) In the dialog box for the release type, choose *Release Subdivision*.
Choose *Continue*.
 - k) Choose the *Warehouse Order* button in the upper view area and note down the document numbers.



Hint: There should be two new warehouse orders.

- l) Choose the *Warehouse Task* button in the upper view area and note down the document numbers.



Hint: There should be five new warehouse tasks.

Continued on next page

- m) Choose the *Warehouse Order* button in the upper view area again. Select the warehouse order one by one in the lower view area, click on the drop-down icon *More methods* and choose the entry *Confirm Backgr.*



Lesson Summary

You should now be able to:

- Create waves in EWM
- Set up the wave determination
- Set up and use two-step picking

Lesson: Add Value for Your Customers

Lesson Overview

In this lesson, you will learn about value-added services and how they are set up.



Lesson Objectives

After completing this lesson, you will be able to:

- Use value-added services
- Create packaging specifications for value-added services
- Create and determine a work center for value-added services

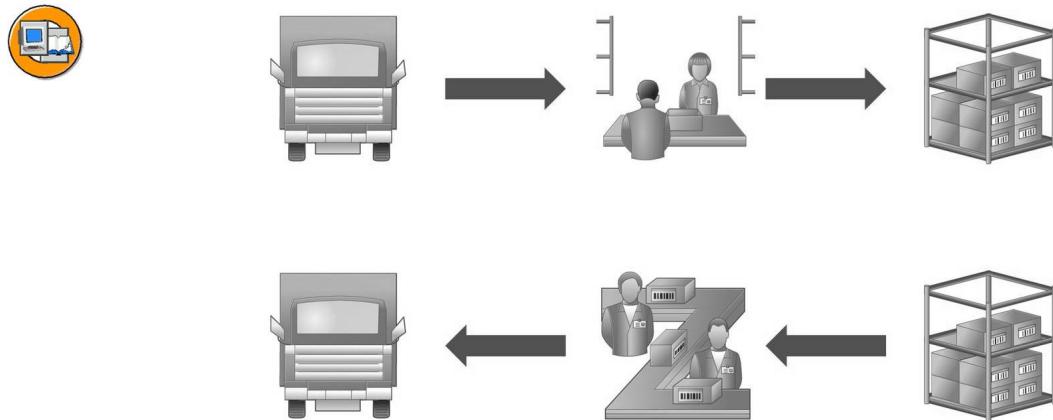
Business Example

Your customers want you to pack their materials depending on their individual requirements. By offering these services to your customers, you raise the value of your goods. But value-added services can also be used internally, for example, to prepare goods for longer storage in the warehouse.

Value-Added Services (VAS)

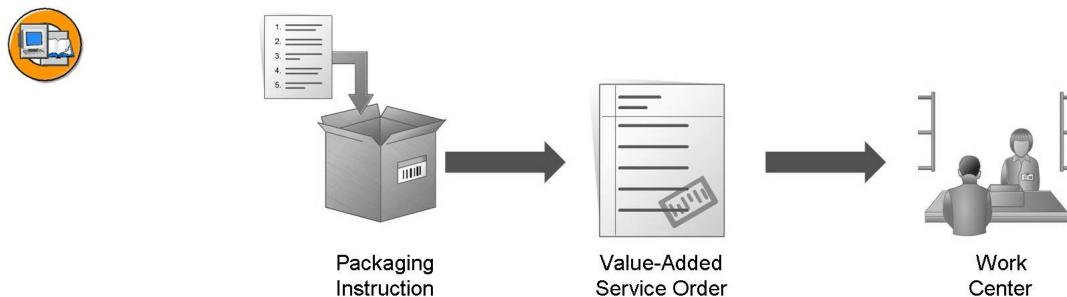
Value-added services enhance the value of a product in the warehouse.

You can use a **value-added service order** (VAS order) to perform value-added services in the warehouse through VAS activities, and to document them. Typical 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 an ideal case, 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.

**Figure 12: Value-Added Services**

Performing Value-Added Services

The **value-added service order** is an instruction to perform a value-added service (VAS) for one or more products with reference to a delivery item. It links delivery items to a packing instruction and contains details from within the delivery and packaging specification. With this document you can inform warehouse employees about what work they have to perform, and with which products. You can also use VAS orders to log work that is done.

**Figure 13: Elements for Value-Added Services**

Value-Added Service Instructions

You must always create a VAS order on the basis of a delivery **with a packaging specification**.

Work Centers for Value-Added Services

The VAS activities are done at work centers, which are specially designed for these kind of activities.

Value-Added Service Process

Value-added services can be used in inbound or outbound processes; in the outbound process, you can also use the VAS order to assemble kits at the work centers (“Kit to Order”).

As prerequisite, an inbound delivery or an outbound delivery order exists, as does a valid packaging specification, meaning that the system can create a VAS order. If you want to map automatic creation of warehouse tasks as an interim step in the system for the work centers where you are executing value-added services, you must have already configured process-oriented storage control in Customizing for value-added services.

Depending on how you use storage control, the following options are available in the goods receipt or the goods issue process for performing value-added services using a VAS order:

- You are using process-oriented storage control:
 1. The system creates a VAS order based on the inbound delivery or the outbound delivery order.
 2. For each item, the system determines the corresponding packaging specification.
 3. The system then creates **handling unit warehouse tasks** that contain a work center as the destination storage location in accordance with the VAS order. Here, each VAS activity represents a separate process step with a corresponding warehouse task. You can define as many interim steps for the products as you require. All of these interim steps are of the type **VAS possible**.
 4. After completing all value-added services, the system moves the products in the goods issue area or the final storage bin.

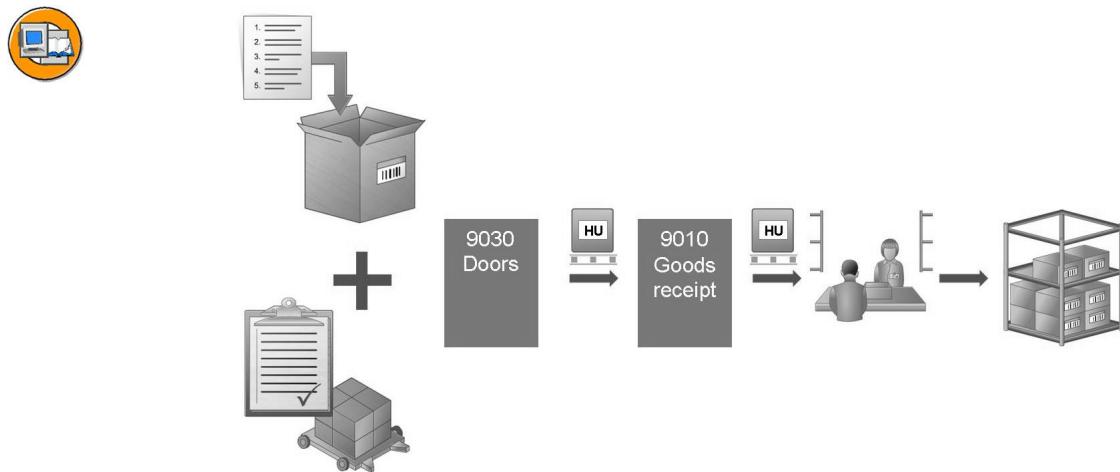


Figure 14: Value-Added Services with Process-Oriented Storage Control

- You have only defined the individual process steps, and are not using process-oriented storage control:
 1. The system creates a VAS order based on the inbound delivery or the outbound delivery order.
 2. For each item, the system determines the corresponding packaging specification.
 3. The system then creates **product warehouse tasks** that contain a work center as the destination storage location in accordance with the VAS order. Here, each VAS activity represents a separate process step with a corresponding warehouse task. You can define as many interim steps for the products as you require.
 4. After completing all value-added services, the system moves the products in the final storage bin or the goods issue area.

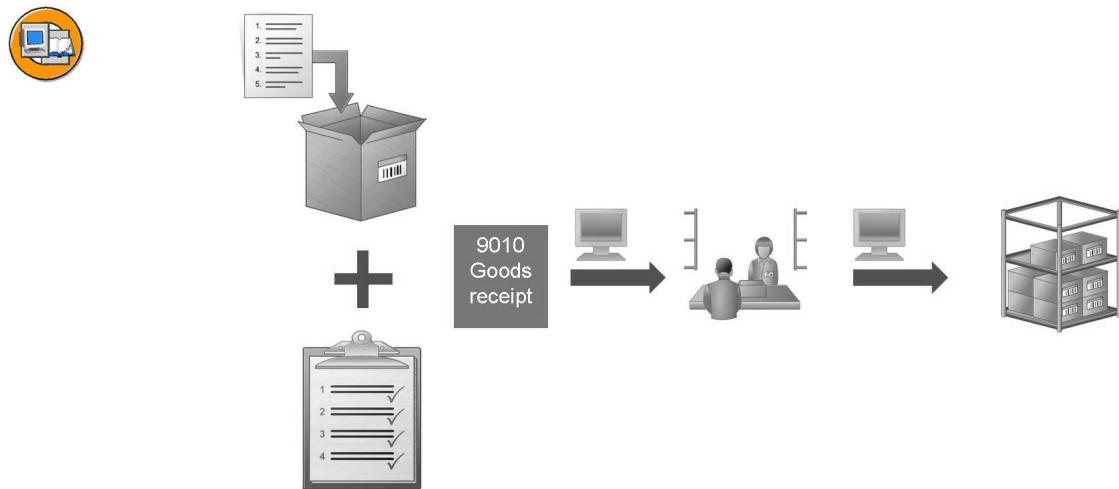


Figure 15: Value-Added Service with Process Step (Without Process-Oriented Storage Control)

- You are not using process-oriented storage control, and you have not defined any process steps:
 1. The system creates a VAS order based on the inbound delivery or the outbound delivery order.
 2. For each item, the system determines the corresponding packaging specification.
 3. You print out the VAS order and the warehouse employees undertake the VAS activities at the work centers manually.
 4. As soon as the VAS activities are completed, you can enter a confirmation in the system. The products then are moved to the final storage bin or the goods issue area.

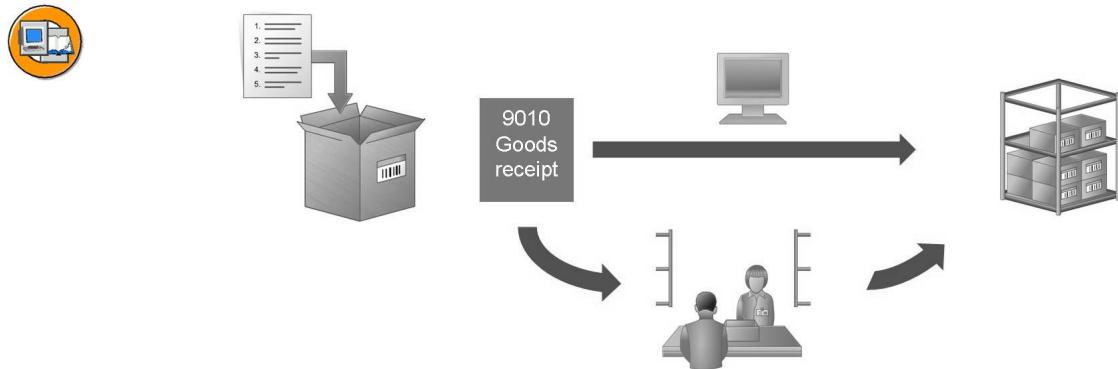


Figure 16: Value-Added Service Without Process

- You are using the VAS order for kitting (for outbound only):
 1. The system creates a VAS order with corresponding kit components based on a packaging specification for the kit header and the kit items in the outbound delivery.
 2. You can use the VAS order at the work center provided to assemble the kit components into a kit.

Create and Edit Value-Added Service Orders

If, for example, your supplier ships products to you, that should be packaged, but you notice in the goods receipt area that the products are not, you can create VAS orders manually. If you notice that a VAS order does not have a work center, for example, you can also add this data. You can also use this function to print VAS orders again and to delete VAS orders.

You find all the transactions for creating and editing VAS orders in the *Easy Access* menu under *Extended Warehouse Management → Work Scheduling → Value Added Services (VAS)*. To log on to a VAS work center and to confirm the work progress for VAS activities, chose *Extended Warehouse Management → Execution → Create Confirmation for VAS*.

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 amounts.

Required settings for the consumption posting are:

- You have set the *Consumption-Relevant for VAS* indicator in the storage data of the product master for the products for which you want to record consumption posting.
- You have assigned a storage bin to a work center or to a warehouse number from where you post the auxiliary products in goods issue. The stock of the auxiliary products is located in this storage bin, and this stock is then also consumed by this storage bin as part of the value-added services.
- You have maintained a packaging specification and have assigned auxiliary packaging materials to the packaging specification levels (such as preservation or packing into individual containers).
- If you want to use customer-specific movement types in the ERP system, you can define these in Customizing.

If you do not define your own, the standard movement types 291 and 292 are used for consumption posting in the ERP system.

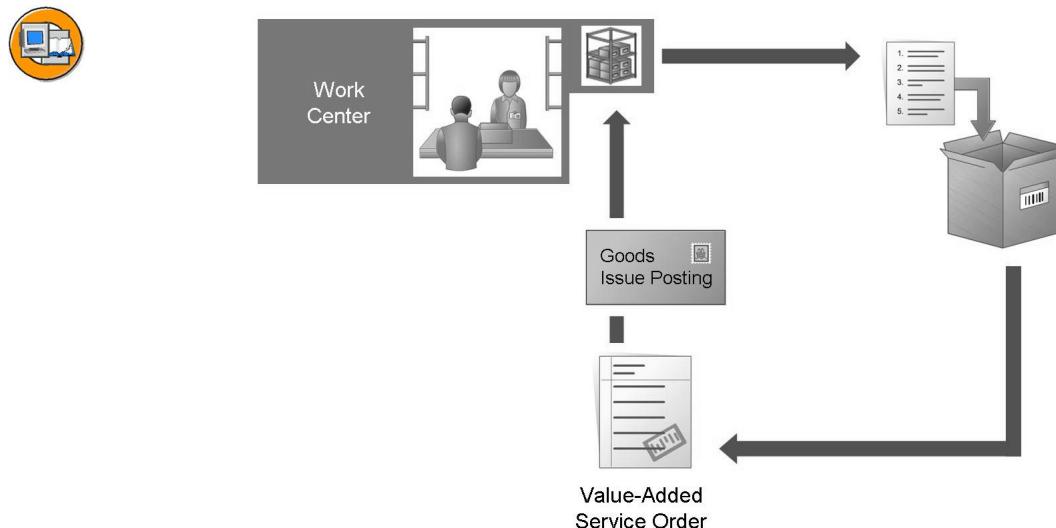


Figure 17: Auxiliary Product Consumption Posting

The system uses the following criteria to automatically determine the quantity of respective auxiliary products that is to be posted:

- The status confirmation for a VAS order
- The VAS activity confirmation
- The quantity confirmation for a VAS activity

The system determines the respective quantities by using the quantity ratios in the packaging specification of the products being processed. However, you can also manually overwrite the quantity determined by the system (such as for unplanned overconsumption or underconsumption).

When you save the confirmation, the system performs consumption posting for the auxiliary products. You can also change quantities of auxiliary products that have already been posted. If you enter a negative value for the quantity of auxiliary product being posted, the consumption is reduced and the system increases the stock in the storage bin. If you enter a quantity to be posted additionally, you can increase the consumption at a later time.

Exercise 5: Value-Added Service

Exercise Objectives

After completing this exercise, you will be able to:

- Set up the VAS process with process-oriented storage control
- Create the required work centers for the VAS process

Business Example

Sometimes materials need to be stored for a long time. To preserve them, it might be necessary to oil and repack the materials before storage.

Task 1:

Set up a VAS process for oiling and packing the material when it arrives and test the process.

1. Create a packaging specification for the VAS oiling and packing. Product T-EW55-## will be oiled and then packed first. The packaging specification group is VAS1. The step for the oiling process is VOIL, the packaging material is PKE-090, and the process step for the packaging is VS02. 20 pieces of the material will be packed in one pallet.

<i>PS Group</i>	VAS1
<i>Description</i>	Oil and Pack Product before Storage
Condition record	
<i>CCtC</i>	OVS1
<i>SC Unit</i>	E1##
<i>Product</i>	T-EW55-##
<i>Ship-from</i>	EWM-VEND
Content / Product	
<i>Product</i>	T-EW55-##
VAS Oiling	
<i>External Step</i>	VOIL
<i>Text</i>	Oil Material
Pack Product to Carton/Crate	
<i>Pack. Material</i>	PKE-090

Continued on next page

<i>HU Type</i>	E1
<i>External Step</i>	VS02
<i>Target Qty</i>	20

2. Create a new work center layout, **VAS1 – Value-Added Services (VAS)**, based on the existing work center layout, **KITR**.
3. Create two new work centers as described the table:

<i>Ware-house No.</i>	<i>Work Center</i>	<i>De-scrip-tion</i>	<i>Ex-ternal Step</i>	<i>Stor-age Type</i>	<i>In-bound Sec-tion</i>	<i>Out-bound Sec-tion</i>	<i>Repack WPT</i>	<i>Work Cen-ter Lay-out</i>
E1##	WOIL	Oil-ing Sta-tion	VOIL	WOIL	0001	0001	3040	VAS1
E1##	VAS2	Pack af-ter oil-ing	VS02	8050	0001	0001	3040	VAS1

4. Create storage bins in the storage type for the VAS activities. The details for the storage bins are:

<i>Ware-house No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>	<i>Storage Section</i>	<i>Stor. Bin Type</i>	<i>X Coor-dinate</i>	<i>Y Coor-dinate</i>
E1##	WOIL	WOIL	0001	W001	40	40
E1##	VAS2	8050	0001	W001	40	50

5. Assign the new bins to the work centers.
6. Set up the process-oriented storage control for the VAS process. The storage process details are:

Continued on next page

<i>Warehouse No.</i>	E1##
<i>Storage Process</i>	VOIL
<i>Description</i>	Oiling Process
<i>Direction</i>	Putaway

Assigned storage process steps:

<i>Step</i>	<i>Auto. WT</i>	<i>Prod/HU WT</i>
VOIL	X	
VS02	X	X
IB03		

The destination storage bins are:

<i>Ware-house No.</i>	<i>External Step</i>	<i>Source storage type</i>	<i>Whse Proc. Type</i>	<i>Desti-nation storage type</i>	<i>Desti-nation storage section</i>	<i>Desti-nation storage bin</i>
E1##	VOIL		1013	WOIL	0001	WOIL
E1##	VS02	WOIL	3060	8050	0001	VAS2

7. The determination of the process orientated storage control is done by the **warehouse process type**. We will use the process type **1013** for this. Enter the new storage control in this process type.
8. Set up the determination of the packaging specification and the VAS relevance for your products. Enter the product group type **VA** for the *Product Group Type for Determining VAS Packaging Specification*. Set the VAS relevance as following:

<i>Warehouse Number</i>	E1##
<i>Doc. Cat.</i>	PDI Inbound Delivery
<i>Doc. Type</i>	INB
<i>Item Type</i>	IDLV
<i>Product Group</i>	VAS-GROUP
<i>Procedure</i>	OVSI

Continued on next page

<i>VAS Order</i>	1 Create When Creating Warehouse Request/Warehouse Req. Item
<i>PS Exist. Check</i>	Do not conduct existence check
<i>Partner Role</i>	SFPRT
<i>Date / Time Type</i>	TDELIVERY

9. Maintain the product master data for **T-EW55-##**. Enter the *product group type* **VIA** and the *Product Group* **VAS-GROUP** in the product master.
 Additionally enter the *process type determination indicator* **02** and the *putaway control indicator* **0030** in warehouse product T-EW55-##.

Task 2:

Test the value-added service process.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW55-##
<i>PO Quantity</i>	20
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

-
2. Create the inbound delivery and **pack in this inbound delivery** into one **PKE-095**.

Inbound delivery (ERP):

Continued on next page

HU: _____

3. Check if a VAS order has been created. Look up the inbound delivery number and create the warehouse task.

VAS order: _____

Inbound delivery (EWM):

4. Confirm the warehouse tasks and the steps on the different work centers (do not forget to move the material in between). Finally, put away the product.



Hint: It is recommended to use the WH Monitor for most steps and to have two separate sessions (one for the WH Monitor and one for the other transactions).

Solution 5: Value-Added Service

Task 1:

Set up a VAS process for oiling and packing the material when it arrives and test the process.

1. Create a packaging specification for the VAS oiling and packing. Product T-EW55## will be oiled and then packed first. The packaging specification group is VAS1. The step for the oiling process is VOIL, the packaging material is PKE-090, and the process step for the packaging is VS02. 20 pieces of the material will be packed in one pallet.

<i>PS Group</i>	VAS1
<i>Description</i>	Oil and Pack Product before Storage
Condition record	
<i>CCtC</i>	OVS1
<i>SC Unit</i>	E1##
<i>Product</i>	T-EW55-##
<i>Ship-from</i>	EWM-VEND
Content / Product	
<i>Product</i>	T-EW55-##
VAS Oiling	
<i>External Step</i>	VOIL
<i>Text</i>	Oil Material
Pack Product to Carton/Crate	
<i>Pack. Material</i>	PKE-090
<i>HU Type</i>	E1
<i>External Step</i>	VS02
<i>Target Qty</i>	20

- a) In the *Easy Access Mmenu* of your EWM system, choose *Extended Warehouse Management → Master Data → Packaging Specification → Maintain Packaging Specification*.
- b) Choose *Add a new line*  .
- c) In the *PS Group* field, select *VAS1*, then press **Enter**.
- d) Select your packaging specification row, then choose *Change* .

Continued on next page

- e) In the *Packaging Specification* area on the right side of the screen, enter the *Description* from the table above.
- f) Under the *Determination* tab, enter the *SC Unit*, the *Product* and the *Ship-from* from the table above.
Press **Enter**.
- g) Highlight the *Content* line under the *Packspec./Level/Elements* column.
- h) Choose the *Add Product* from the *Add Level or Content*  icon.
- i) Open the *Content* node by selecting .
- j) Click on *Product*.
- k) In the *Content* section on the right side of the screen, enter your product number in the *Product* field.
Press **Enter**.
- l) In the *Packspec./Level/Elements* column, click on the *VAS - Oiling* line.
On the right side of the screen, select the *Warehouse* tab. Enter the *External Step* **VOIL**.
Select the *Text* tab. Set the flag for *Print Long Text* and enter the text:
Oil Material.
- m) In the *Packspec./Level/Elements* column, click on the *Main packaging material* line.
Select the *Text* tab. Set the flag for *Print Long Text* and enter the text:
Oil Material.
- n) Enter the *Target Qty* of **20**.
- o) Enter the *Pack. Material* **PKE-090** on the *Assigned Elements* tab.
- p) Select the *Warehouse* tab.
- q) Enter the *HU Type* **E1** and the *External Step* **VS02**.
- r) Choose *Activate* . Your packaging specification is saved and is now ready for use.
- s) Choose *Exit*  to leave the transaction.

Continued on next page

2. Create a new work center layout, **VAS1 – Value-Added Services (VAS)**, based on the existing work center layout, **KITR**.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Master Data → Work Center → Specify Work Center Layout*.
 - b) Position on your *Warehouse Number* **E1##** and the *Layout* **KITR**.
 - c) Choose *Copy as...* 
 - d) Enter *Work Center Layout* **VAS1** and the *Description* **Value-Added Services (VAS)**. Leave all other fields as they are.
 - e) Save  your new entry.
 - f) Choose *Exit*  to leave the transaction.
3. Create two new work centers as described the table:

<i>Ware-house No.</i>	<i>Work Cen-ter</i>	<i>De-scrip-tion</i>	<i>Ex-ternal Step</i>	<i>Stor-age Type</i>	<i>In-bound Sec-tion</i>	<i>Out-bound Sec-tion</i>	<i>Rerack WPT</i>	<i>Work Cen-ter Lay-out</i>
E1##	WOIL	Oil-ing Sta-tion	VOIL	WOIL	0001	0001	3040	VAS1
E1##	VAS2	Pack af-ter oil-ing	VS02	8050	0001	0001	3040	VAS1

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Master Data → Work Center → Define Work Center*.
- b) Choose *New Entries* and enter the details for the first work center as in the table.
- c) Choose *Next Entry*  and enter the details for the second work center.
- d) Save  your new entries.
- e) Choose *Exit*  to leave the transaction.
4. Create storage bins in the storage type for the VAS activities. The details for the storage bins are:

Continued on next page

Warehouse No.	Storage Bin	Storage Type	Storage Section	Stor. Bin Type	X Coordinate	Y Coordinate
E1##	WOIL	WOIL	0001	W001	40	40
E1##	VAS2	8050	0001	W001	40	50

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Storage Bin* → *Create Storage Bin*.
 - b) Enter the *Warehouse No.* **E1##** and the *Storage Bin* **WOIL**. Press *Enter*.
 - c) Enter the other details as in the table.
 - d) *Save*  your new bin.
 - e) Repeat the process for the second new bin.
 - f) Choose *Exit*  to leave the transaction.
5. Assign the new bins to the work centers.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Work Center* → *Define Master Data Attributes*.
 - b) Enter for the new *Work Cntr.* **WOIL** the *Storage Bin* **WOIL** and for the *Work Cntr.* **VAS2** the *Storage Bin* **VAS2**.
 - c) *Save*  your entries.
 - d) Choose *Exit*  to leave the transaction.
6. Set up the process-oriented storage control for the VAS process. The storage process details are:

<i>Warehouse No.</i>	E1##
<i>Storage Process</i>	VOIL
<i>Description</i>	Oiling Process
<i>Direction</i>	Putaway

Assigned storage process steps:

Continued on next page

Step	Auto. WT	Prod/HU WT
VOIL	X	
VS02	X	X
IB03		

The destination storage bins are:

Warehouse No.	External Step	Source storage type	Whse Proc. Type	Destination storage type	Destination storage section	Destination storage bin
E1##	VOIL		1013	WOIL	0001	WOIL
E1##	VS02	WOIL	3060	8050	0001	VAS2

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Cross-Process Settings → Warehouse Tasks → Define Process-Oriented Storage Control*.
- b) In the dialog structure, select the entry *Storage Process - Definition*.
- c) Choose *New Entries* and enter the details as in the table.

Warehouse No.	E1##
Storage Process	VOIL
Description	Oiling Process
Direction	Putaway

- d) Save  your entry.
- e) Mark the new entry and in the dialog structure, select the entry *Assign Storage Process Step*.
- f) Choose *New Entries* and enter the details as in the table.

Step	Auto. WT	Prod/HU WT
VOIL	X	
VS02	X	X
IB03		

- g) Save  your new process definition.

Continued on next page

- h) In the dialog structure, select the entry *Process-Oriented Storage Control*.

- i) Choose *New Entries* and enter the details as in the table.

Warehouse No.	External Step	Source storage type	Whse Proc. Type	Destination storage type	Destination storage section	Destination storage bin
E1##	VOIL		1013	WOIL	0001	VOIL
E1##	VS02	WOIL	3060	8050	0001	VAS2

- j) Save  your new entries.

- k) Choose *Exit*  to leave the transaction.

7. The determination of the process orientated storage control is done by the **warehouse process type**. We will use the process type **1013** for this. Enter the new storage control in this process type.

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Tasks* → *Define Warehouse Process Type*.

- b) Position on your *Warehouse Number* **E1##** and the *Warehouse Process type* **1013**.

- c) Select the entry and choose *Details* .

- d) Enter the *Storage Process* **VOIL**.

- e) Save  your new entry.

- f) Choose *Exit*  to leave the transaction.

8. Set up the determination of the packaging specification and the VAS relevance for your products. Enter the product group type **VA** for the *Product Group Type for Determining VAS Packaging Specification*. Set the VAS relevance as following:

<i>Warehouse Number</i>	E1##
<i>Doc. Cat.</i>	PDI Inbound Delivery
<i>Doc. Type</i>	INB
<i>Item Type</i>	IDLV
<i>Product Group</i>	VAS-GROUP
<i>Procedure</i>	0VSI

Continued on next page

<i>VAS Order</i>	1 Create When Creating Warehouse Request/Warehouse Req. Item
<i>PS Exist. Check</i>	Do not conduct existence check
<i>Partner Role</i>	SFPRT
<i>Date / Time Type</i>	TDELIVERY

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Value-Added Service* → *Warehouse Number-Dependent VAS Settings*.
 - b) Position on your *Warehouse Number* **E1##** and enter the *PS PrdGrTy VA*.
 - c) Save  your settings.
 - d) Choose *Exit*  to leave the transaction.
 - e) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Value-Added Service* → *Define Relevance for VAS*.
 - f) Choose *New Entries* and enter the details as in the table above.
 - g) Save  your settings.
 - h) Choose *Exit*  to leave the transaction.
9. Maintain the product master data for **T-EW55-##**. Enter the *product group type VA* and the *Product Group VAS-GROUP* in the product master. Additionally enter the *process type determination indicator 02* and the *putaway control indicator 0030* in warehouse product T-EW55-##.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Product* → *Maintain Product*.
 - b) Enter the *Product* **T-EW55-##** and set the flag for *Global Data*. Choose *Change* .
 - c) Select the *Properties 2* tab.
 - d) Enter the *Prod. Group Type VA* and the *Product Group VAS-GROUP*.
 - e) Save  your entries.
 - f) Choose *Exit*  to leave the transaction.

Continued on next page

- g) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Product* → *Maintain Warehouse Product*.
- h) Enter the *Product Number* **T-EW55-##**, *Warehouse No.* **E1##** and the *Party Entitled to Dispose* **SPCW**.
 Choose *Create*.
- i) Select the *Whse Data* tab.
- j) Enter the *Proc. Type Det. Ind.* **02** and the *Putaway Control Ind.* **0030**.
- k) Save  your entries.
- l) Choose *Exit*  to leave the transaction.

Task 2:

Test the value-added service process.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW55-##
<i>PO Quantity</i>	20
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Continued on next page

Purchase order:

-
- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) *Save* your purchase order. Note down the purchase order number.
 - d) Choose *Exit* to end the transaction.
2. Create the inbound delivery and **pack in this inbound delivery** into one **PKE-095**.

Inbound delivery (ERP):

HU:

-
- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Choose *Pack* .
 - d) Enter the *Packaging Materials* **PKE-095** and press **Enter**.
 - e) Select the new created *Handling Unit*, select the *Material*, and select (*Pack*).
- Write down the HU number.
- f) *Save* your inbound delivery. Note down the inbound delivery number.
 - g) Choose *Exit* to end the transaction.
3. Check if a VAS order has been created. Look up the inbound delivery number and create the warehouse task.

VAS order: _____

Continued on next page

Inbound delivery (EWM):

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Work Scheduling* → *Value-Added Services (VAS)* → *VAS in Goods Receipt Process*.
Alternatively: In the navigation area of the WH Monitor, choose *Inbound* → *Documents* → *VAS Order* → *VAS Order*. Choose *Execute* . Click once on the number of the VAS Order for the details.
 - b) Choose *Execute Search*  and confirm the pop-up with *Yes*. Note down the number of the VAS order. Confirm the assignment of the VAS work centers to the different steps in the VAS order.
 - c) Choose *Exit*  to end the transaction.
 - d) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - e) In the *Search criteria* drop-down, select *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the inbound delivery.
 - f) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
 - g) Select the *Handling Units* tab.
 - h) Choose *Create*. Confirm that the warehouse task has the destination storage type WOIL and the destination storage bin WOIL.
 - i) Choose *Save*  your warehouse task.
 - j) Choose *Exit*  twice to end the transaction.

Continued on next page

4. Confirm the warehouse tasks and the steps on the different work centers (do not forget to move the material in between). Finally, put away the product.



Hint: It is recommended to use the WH Monitor for most steps and to have two separate sessions (one for the WH Monitor and one for the other transactions).

- a) Confirm the warehouse order. In the WH Monitor, choose *Inbound → Documents → Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose *Warehouse Order*.
Select the warehouse order and use *Other Methods* to **Confirm**. **Backgr.**
- b) Confirm the first step of the VAS order in the work center WOIL. Select in the Easy Access Menu of your EWM System: *Extended Warehouse Management → Execution → Create Confirmation for VAS*. Enter the *Work Center WOIL* and select *Execute*.
- c) Select in the *VAS/Activity/Item* area the entry for *VAS Oiling* of your VAS Order. Enter the *Start* and *End, w/o Variances* (via the buttons).
- d) Select the HU in the *Section/Bin/HU/Item* area. Choose *Complete Process Step for HU* and *Save*.
- e) Confirm in the Warehouse Management Monitor that two new warehouse tasks have been created. One is to move the HU to the work center VAS2, the other, still inactive task, is to move the material to the final bin in 0030. Confirm the open warehouse task.
Mark the warehouse task and use *Other Methods* to **Confirm**. **Backgr.**
- f) Confirm the second step of the VAS order in the work center VAS2. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Execution → Create Confirmation for VAS*. Enter the *Work Center VAS2* and choose *Execute*.
- g) In the *VAS/Activity/Item* area, select the entry for *VAS Pack* of your VAS Order. Enter the *Start* and *End, w/o Variances* (via the buttons).
- h) Select the HU in the *Section/Bin/HU/Item* area. Choose *Complete Process Step for HU* and *Save* .
- i) Confirm in the WH Monitor that the last warehouse task is active. Complete the process by confirming this warehouse task.
Select the warehouse task and use *Other Methods* to **Confirm**. **Backgr.**



Lesson Summary

You should now be able to:

- Use value-added services
- Create packaging specifications for value-added services
- Create and determine a work center for value-added services

Lesson: Avoid Unnecessary Warehouse Movements

Lesson Overview

In this lesson you will learn about the different cross-docking possibilities in EWM.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the various cross-docking possibilities in EWM
- Set up EWM-triggered cross-docking

Business Example

Warehouse space is expensive and keeping too much material in stock is dead equity. Only materials that are difficult to get should be kept in stock and, whenever possible, material should be unloaded and sent directly to customers or into production.

Reasons for Cross-Docking

If you aim to process products and handling units (HUs) as efficiently as possible, and to minimize unnecessary load transfer activities in the warehouse, you can use a **cross-docking** process in a distribution center or warehouse. Cross-docking is the practice of unloading materials from an incoming vehicle and loading these materials directly into outbound vehicles, with little or no storage in between. Reducing the time in storage in the warehouse enables you to reduce stockholding costs. In the case of transportation cross-docking (TCD), you can also optimize transportation costs.

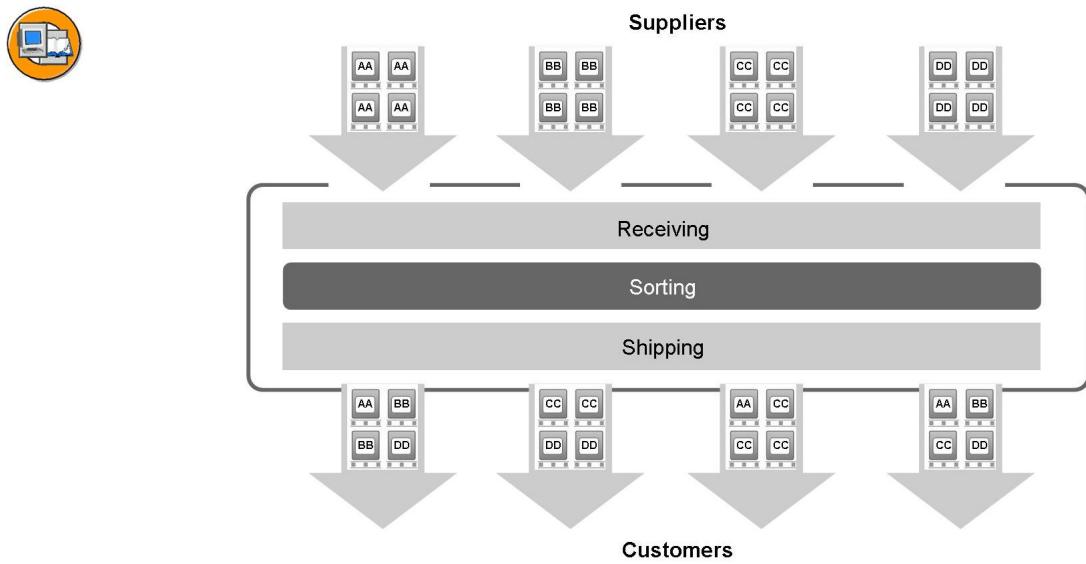


Figure 18: Cross-Docking

Using cross-docking enables you to fulfil urgent sales orders or reduce processing and storage costs.

Cross-Docking Possibilities in EWM

There are several possibilities in EWM for cross-docking. First you have to distinguish between **planned** cross-docking and **opportunistic** cross-docking.

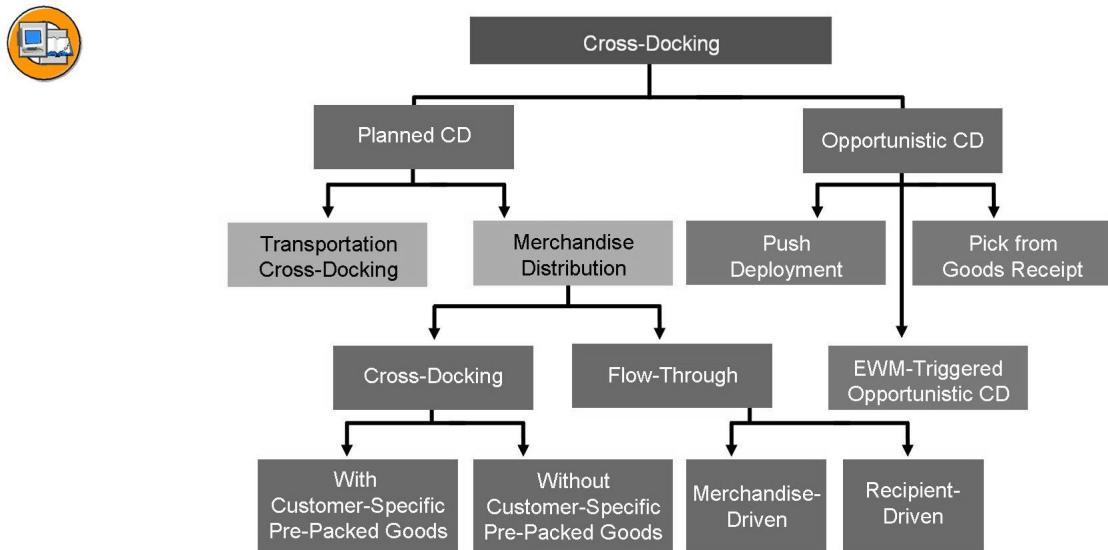


Figure 19: Cross-Docking Scenarios in EWM

Planned Cross-Docking

In planned cross-docking, you define in Customizing how the cross-docking process is to proceed. The cross-docking relevance is therefore already defined before stock arrives, and before you post goods receipt or release the outbound delivery.

- Transportation cross-docking (TCD)

Transportation cross-docking supports the transportation of handling units (HUs) across different distribution centers or warehouses, up to the final place of destination. Examples for this are to switch the means of transport, to consolidate multiple deliveries to new transports, or to process export activities centrally. If the final place of destination is a distribution center or warehouse at the customer site, a sales order in SAP Customer Relationship Management (SAP CRM) or SAP Enterprise Resource Planning (SAP ERP) forms the basis for TCD. However, you can also use TCD to transport HUs to your own final warehouse. In this case, a stock transfer order forms the basis for TCD.

When you pick a TCD-relevant HU, Extended Warehouse Management (EWM) uses a stock removal HU warehouse task (stock removal HU-WT) to update the corresponding inbound delivery and the corresponding outbound delivery order simultaneously. In EWM, you can use the warehouse management monitor (WH Monitor) to display the TCD-relevant inbound deliveries and outbound delivery orders for the warehouse in which you are currently working. The monitor only gives you information about the current process status. However, the transportation cross-docking monitor in SAP ERP gives you an overview of the complete process that has already run up to that point.

Restrictions:

Transportation cross-docking does not support returns.

If you use nested mixed pallets in transportation cross-docking, a subordinate HU can contain either TCD-relevant delivery items only, or non-TCD-relevant delivery items only.

In a supply chain in transportation cross-docking, the final destination must be located domestically (in the same company code as the plants of the warehouses involved in the transportation cross-docking process).

- Merchandise distribution

You can use merchandise distribution to plan and control your flow of goods flexibly, enabling you to move the goods through a warehouse in an optimal way. For the merchandise distribution, you use the warehouse-internal processing types merchandise distribution **cross-docking** or **flow-through**.

Prerequisite:

You are using SAP enhancement package 4 for SAP ERP 6.0 with business function Retail, CD/FT_EWM Integration, and your system is configured as SAP Retail.

- Merchandise distribution cross docking

Merchandise distribution cross-docking allows you to plan, control, and process the flow of goods from the vendor through a warehouse to the recipients, such as stores or customers. Merchandise distribution supports the push and pull method in SAP ERP, and enables cross-docking in the warehouse.

- Merchandise distribution flow-through.

When you receive goods, it can be the case that you are unable to send the goods to a final ship-to party completely. This can affect products that are delivered in an unpacked state, or whole handling units. In this case, you can move the goods after goods receipt to a cross-docking storage type that you are using as a repacking area.

If you repack the goods in the cross-docking storage type, the workflows are different for **recipient-driven flow-through** and **product-driven flow-through**.

In recipient-driven flow-through, you put together one pick handling unit for each customer. As a picker, you pick up the pick handling unit, and go to the storage bins from which you have to pick the products. You put the products into the pick handling unit, and take the entire packed pick handling unit to goods issue.

In product-driven flow-through, you distribute the contents of the incoming handling units to customer-specific pick handling units. As a picker, you pick up the delivered handling unit, and go to the pick handling units into which you have to distribute the products. You therefore perform deconsolidation and fill the pick handling units. You then perform picking and take the completely packed pick handling units to goods issue.

Opportunistic Cross-Docking

In opportunistic cross-docking, you first work with standard inbound and outbound deliveries and start the standard goods receipt process or goods issue process. You determine the cross-docking relevance after the goods have entered the warehouse or before they leave it.

- Push deployment (PD) and Pick from goods receipt (PFGR)

Push deployment (PD) and pick from goods receipt (PFGR) are opportunistic cross-docking processes. When you post goods receipt, Extended Warehouse Management (EWM) checks whether the warehouse process type and stock type are relevant for putaway delay. If they are relevant, EWM starts the putaway delay. As a result, EWM would delay the automatic generation of the warehouse tasks for the putaway initiated via PPF. **SAP Advanced Planning & Optimization** (SAP APO) defines whether an inbound delivery is PD-relevant or PFGR-relevant. This means that SAP APO defines the cross-docking relevance after posting goods receipt.

Prerequisite:

You have a system landscape in which you are using SAP EWM, SAP APO, and SAP Customer Relationship Management (SAP CRM).

- Push deployment (PD)

You use PD so that you can react to requirement changes and requirement bottlenecks in your warehouse quickly and flexibly. You can use PD to execute stock transfers for delivered products from one warehouse to another at short notice, without having to put away the goods.

- Pick from goods receipt (PFGR)

In PFGR, you can confirm a sales order that is not yet confirmed via the ATP check by posting goods receipt for an inbound delivery. You can perform this picking from directly within the goods receipt area; unlike the standard pick procedure, you do not have to put away the products.

- EWM-triggered opportunistic cross-docking

This process takes place entirely in Extended Warehouse Management (EWM). When EWM generates putaway or pick-warehouse tasks, it defines whether opportunistic cross-docking is to take place, that is, whether the inbound delivery or outbound delivery order item is relevant for cross-docking. You can activate this cross-docking procedure for the inbound and outbound delivery process separately at warehouse or product level.

Transportation Cross-Docking

The decision to use transportation cross-docking is made by EWM during the **route determination of the outbound delivery order**. For this, special routes called “cross-docking routes” are required. The EWM route determination determines all suitable routes between the starting point and the destination (which can be a customer or another warehouse). The result can either be a linear route, which is direct, or a cross-docking route. A cross-docking route may be faster than a linear route; for example, the linear route may depart very rarely, while the cross-docking route leaves every day.

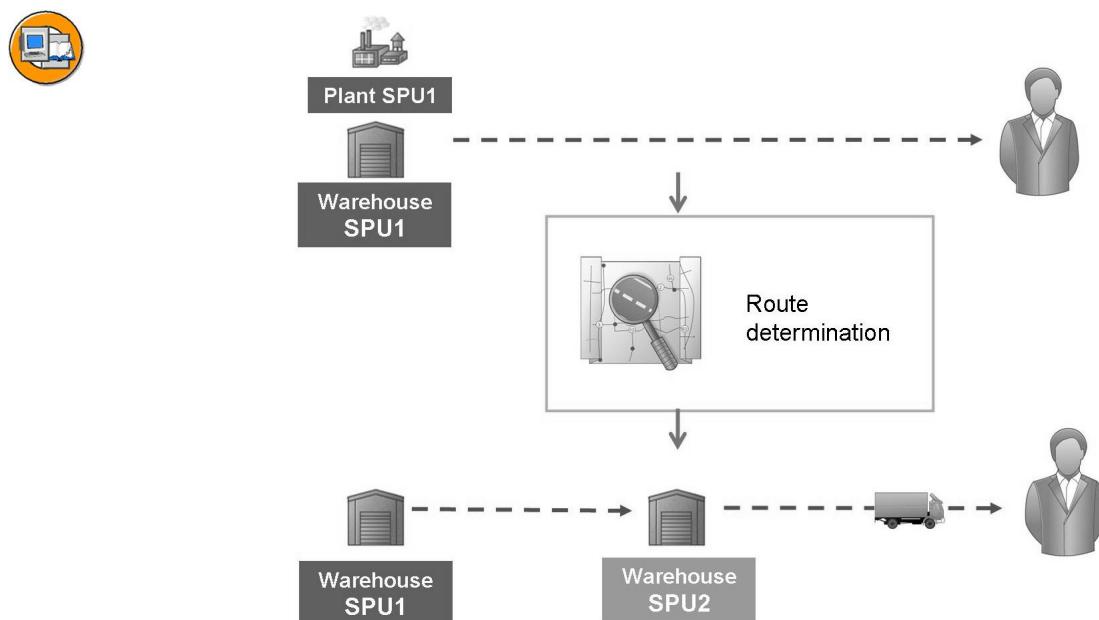


Figure 20: Transportation Cross-Docking Scenario

Once a cross-docking route is assigned, the ship-to-party in the outbound delivery request is replaced by a cross-dock warehouse and the original ship-to party is assigned to the partner role *final ship-to party*.

When the goods issue is posted by EWM for the outbound delivery order and transferred to ERP (with the cross-docking route and final ship-to party), ERP creates a pair of deliveries: an inbound delivery into the cross-dock warehouse and an outbound delivery from the cross-dock warehouse to the final location. When the goods arrive in the cross-docking warehouse, the handling units are unloaded from the truck and moved directly from the inbound area to the outbound area.

This “basic” scenario can be extended by using storage control if you are working with a nested handling unit. You receive an inbound delivery with a nested putaway HU that contains two further products. Extended Warehouse Management determines that TCD is necessary for an HU (TCD HU) and that the other HU is for putaway (putaway HU). EWM determines a goods receipt

(GR) storage process for the highest-level putaway HU. The highest-level putaway HU correspondingly runs through all steps of the GR process, including deconsolidation. During deconsolidation, you unpack the TCD HU and the lower putaway HU from the highest-level putaway HU and then pack both of them into a further HU. You move the TCD HU to the goods issue (GI) zone after deconsolidation. If EWM determines a storage process for process-oriented storage control in GI for this TCD HU after deconsolidation, EWM processes the individual steps according to the warehouse process. You perform the further steps of putaway for the putaway HU.



Hint: Only packed products are relevant for transportation cross-docking.

Organizational Structures and Additional Settings

Transportation cross-docking requires besides the above mentioned cross-docking routes some other specific settings and also special organizational structures.

During transportation cross-docking, the stock remains in the ownership of the sending warehouse. Only the final goods issue posting from the last cross-docking warehouse (there can be multiple cross-docking warehouses in the complete process) removes the stock from triggering plant. Therefore, transportation cross-docking requires special cross-docking storage locations for each plant that can trigger a transportation cross-docking process.

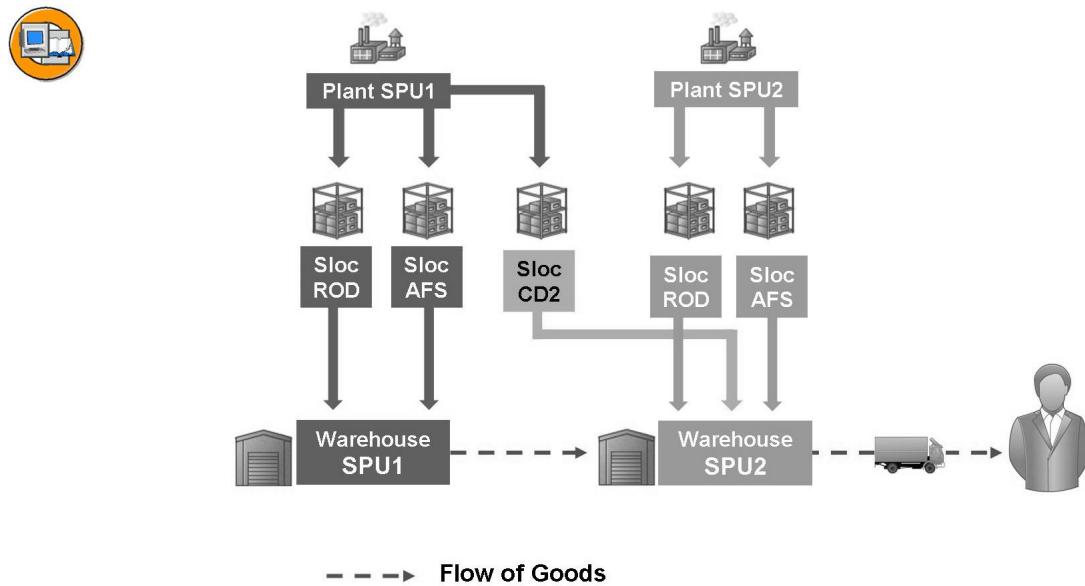


Figure 21: Organizational Structure for Transportation Cross-Docking



Hint: As standard procedure, EWM calls SAP BusinessObjects Global Trade Services in the TCD process for each outbound delivery order or each outbound delivery in the supply chain. You can deactivate this call for all outbound delivery orders or for outbound deliveries in Customizing for each document type. The check criterion is the existence of a final ship-to party, meaning EWM only calls SAP BusinessObjects Global Trade Services for a document type if no final ship-to party has been specified. For more information, see Customizing for EWM at *Cross-Process Settings → Cross-Docking (CD) → Planned Cross-Docking → Basic Settings for Transportation Cross-Docking (TCD)*.

Supplier Cross-Docking

As a special variation of transportation cross-docking, supplier cross-docking allows you to integrate a cross-docking warehouse into the inbound delivery process from the supplier to the destination warehouse. It is assumed that information about the cross-docking warehouse to which the goods from the supplier are to be shipped is provided by customer-specific enhancements in the ASN IDoc submitted by the supplier. Additionally you have to implement the Business Add-In PARSING_IDOC and GN_DELIVERY_CREATE of BAdI /SPE/INB_ID_HANDLING in order to retrieve the information about the receiving cross-docking warehouse from the IDoc and to transfer this information to delivery processing.

As an alternative, you can implement method PROPOSE_CD_PLANT of BAdI /SPE/BADI_DETERMINE_CD_PLANT to determine the receiving cross-docking information internally.

For both methods you also have to implement method FILL_OUTBOUND_DELIVERY of BAdI /SPE/CD_FILL_OUTBOUND_DELIVERY to determine essential data needed for creating the cross-docking outbound delivery.

EWM-Triggered Cross-Docking

EWM-triggered opportunistic cross-docking does not need any other application or system for the cross-docking decision. You activate this cross-docking variation with the usage of **product groups** and **product group types** – which means it is generally product controlled if a cross-docking is to be done or not.



Hint:

1. For cross-docking, EWM only considers inbound delivery items for which goods receipt has been confirmed. EWM does not consider inbound delivery items that are relevant for the quality inspection.
 2. If packed quantities in goods receipt are relevant for the cross-docking, the product quantity of a handling unit is not distributed across different outbound deliveries, meaning the handling unit is not split. The product quantity in the handling unit must be less than or identical to the requested quantity of an outbound delivery. In addition, this process only supports homogeneous handling units, in other words, a handling unit must contain one type of product only.
 3. EWM also determines putaway and outbound delivery order items for opportunistic cross-docking for which warehouse tasks have already been generated. EWM cancels these warehouse tasks according to the following prerequisites:
 - a) The stock removal strategy does not follow the FIFO principle.
 - b) The warehouse tasks are processed in the radio frequency environment (RF environment).
- Note:** If a warehouse task is assigned to the RF environment, is simply validated through the assignment of the warehouse task to a RF queue. Therefore, if you want to use the EWM-triggered cross-docking, you must set up the RF queue determination. If no RF queue is assigned, it is assumed that the warehouse task will be processed paper-based.
- c) EWM has not generated the warehouse tasks for the material flow system.

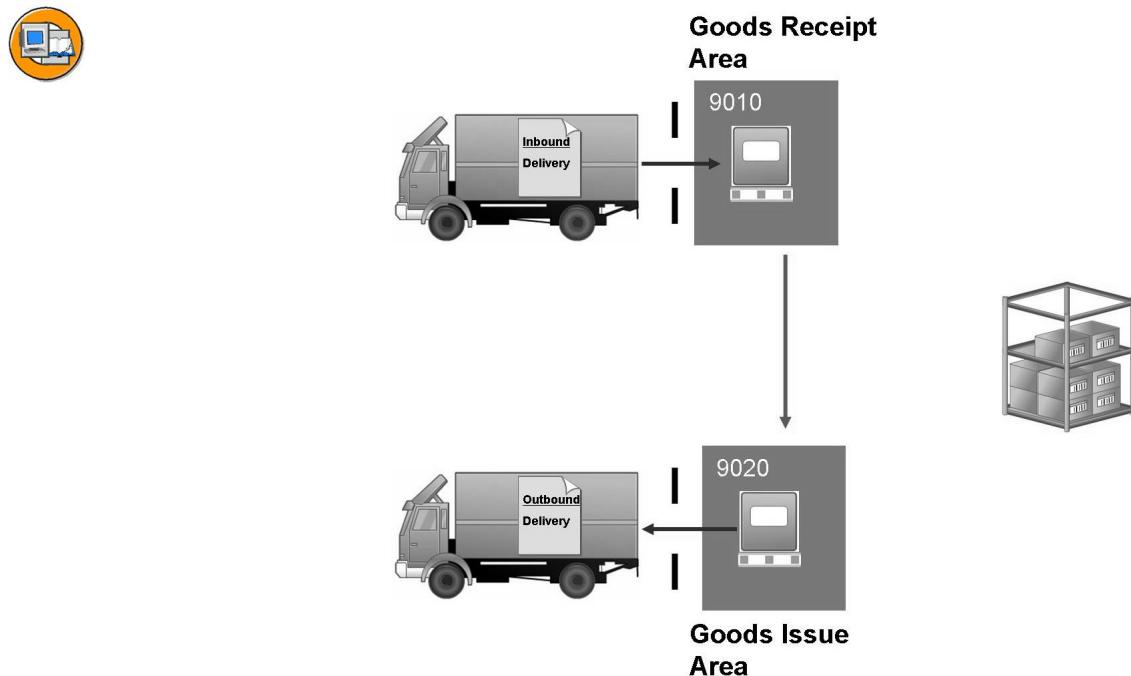


Figure 22: EWM-Triggered Cross-Docking

EWM-Triggered Cross-Docking in the Inbound Delivery Process

Extended Warehouse Management defines whether the inbound delivery is relevant for cross-docking. You can use this process when you generate warehouse tasks for the putaway. EWM then checks whether the inbound delivery suits an existing outbound delivery order item in terms of the following criteria:

- Product
- Batch
- Quantity including stock separation characteristics, such as party entitled to dispose or the sales order stock

In this case, you can take the stock directly from goods receipt to goods issue. The process can be performed **with** or **without** storage control.

The process in details:

1. EWM creates an inbound delivery.
2. You post the goods receipt.
3. You generate the warehouse tasks for putaway. At the same time, EWM looks for suitable delivery items in existing outbound delivery orders based on the active Business Add-In (BAdI) implementation. EWM checks whether delivery items of outbound delivery order exist whose outbound delivery stock is suitable in terms of products or batch and quantity.
 - If EWM is unable to determine any delivery items of this kind, it continues with the standard goods receipt process and generates the related warehouse tasks for putaway.
 - If EWM is able to determine delivery items of this kind, it checks whether it has already generated pick warehouse tasks for these delivery items, which are assigned to the RF environment.If open pick warehouse tasks of this kind exist, EWM cancels these without violating the FIFO principle. EWM generates relevant new pick warehouse tasks and assigns to these the stock that you want to put away. This enables you to pick the stock directly, without having to perform putaway. If the outbound delivery stock found by EWM is less than the delivered stock, EWM generates a warehouse task for putaway for the remaining delivery quantity.
4. You perform picking or putaway and confirm the pick warehouse tasks or warehouse tasks for putaway.
5. EWM updates the inbound delivery and the outbound delivery order.

EWM-Triggered Cross-Docking in the Outbound Delivery Process

Extended Warehouse Management defines whether the outbound delivery order is relevant for cross-docking. When you generate warehouse tasks for the outbound delivery order, you can use this process to have EWM check the stock in the goods receipt. In this process, EWM checks whether stock exists in the goods receipt, which is more suitable than the stock in the warehouse. In this case, you can take the stock directly from goods receipt to goods issue. You can only perform the process **without** using storage control.

The process steps in detail:

1. EWM creates an outbound delivery order.
2. You generate warehouse tasks for the stock removal. At the same time, EWM looks for suitable warehouse tasks with reference to an existing inbound delivery, based on the active Business Add-In implementation.

Here EWM checks whether the goods receipt contains stock that is more suitable for fulfilling the outbound delivery order item than the stock in the warehouse.

- If EWM is unable to determine any delivery items of this kind, it continues with the standard goods issue process and generates the related warehouse tasks for stock removal.
- If EWM is able to determine delivery items of this kind, it checks whether it has already generated putaway warehouse tasks for these delivery items, which are assigned to the RF environment.

If open putaway warehouse tasks of this kind exist, EWM cancels these without violating the FIFO principle. EWM generates relevant new pick warehouse tasks and assigns to these the stock that you want to put away. This enables you to pick the stock directly, without having to perform putaway. If the stock found in the goods receipt is less than the required stock, EWM generates additional pick warehouse tasks for the open quantity, which refer to stock in the warehouse.

- If EWM only determines open putaway warehouse tasks, which you process on paper only, EWM does not use these, thereby avoiding data inconsistencies. If you print out putaway warehouse tasks, and confirm the printout, you do not save this data in EWM. In this case, no current data for the status of the putaway warehouse task is available to EWM, based on which it can trigger a cross-docking process.

3. You confirm the pick warehouse tasks.
4. EWM updates the inbound delivery and the outbound delivery order.

Exercise 6: EWM-Triggered Opportunistic Cross-Docking

Exercise Objectives

After completing this exercise, you will be able to:

- Set up EWM-triggered opportunistic cross-docking

Business Example

When you receive products and need to ship them immediately, it is not practical to store the products first. You want to move the products directly from the goods receipt area into the goods issue area in the required quantity.

Task:

Activate EWM-triggered opportunistic cross-docking and set up the stock determination that cross-docking is possible even with different storage locations. Finally, test the process.

1. Activate EWM-triggered opportunistic cross-docking for your warehouse number **E1##**. You want to have cross-docking for inbound and outbound processes, and for products with the product group type **CD**.
2. Maintain the *Product Group Type CD* and the *Product Group Cross Docking* for the product **T-EW60-##**.
3. Create a *Stock Determination Group CD - OPPCD* and create the stock determination for this group. For the *Inbound Value F2* and the *Permitted Value F1* the *Valuation 10* shall be assigned.
4. Maintain the *Stock Determination Group CD* in the warehouse product master for **T-EW60-30**,
5. Add the storage type **9010** in the storage type search sequence **PICK** in your warehouse number.
6. Create a purchase order as per the table below and create the inbound delivery. Look for the inbound delivery in EWM and post the goods receipt, but do not create a warehouse task yet.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000

Continued on next page

Item 1	
Material	T-EW60-##
PO Quantity	100
Plnt	SPCW
Stor. Location	RD##
Conf. Control	ANLI Inbound Delivery ECC

Purchase order:

Inbound delivery (ERP):

Inbound delivery (EWM):

7. Create a sales order as described below and the outbound delivery.

The sales order details are:

Order Type	OR
Sold-To Party	T-E01A-##
PO Number	##
Req.deliv.date	next day
Material	T-EW60-##
Order Quantity	10

Sales order: _____

Delivery: _____

Outbound delivery order:

8. Create the warehouse task for the outbound delivery, but do NOT save it. Then create the warehouse tasks for the inbound delivery. Confirm these warehouse tasks.

9. Post the goods issue for the outbound delivery order. Confirm the storage location in the outbound delivery in ERP.

Solution 6: EWM-Triggered Opportunistic Cross-Docking

Task:

Activate EWM-triggered opportunistic cross-docking and set up the stock determination that cross-docking is possible even with different storage locations. Finally, test the process.

1. Activate EWM-triggered opportunistic cross-docking for your warehouse number **E1##**. You want to have cross-docking for inbound and outbound processes, and for products with the product group type **CD**.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Cross-Docking (CD)* → *Opportunistic Cross-Docking* → *EWM-triggered opportunistic Cross-Docking* → *Activate EWM-triggered opportunistic Cross-Docking*.
 - b) There are two columns for each warehouse number: one for **inbound**, one for **outbound** opportunistic cross-docking.
Enter the *Product Group Type CD* in both columns for your *Warehouse Number E1##*.
 - c) Save  your entries.
 - d) Choose *Exit*  to leave the transaction.
2. Maintain the *Product Group Type CD* and the *Product Group CROSS DOCKING* for the product **T-EW60-##**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Product* → *Maintain Product*.
 - b) Enter the *Product T-EW60-##* and set the flag for *Global Data*. Choose *Change* .
 - c) Select the *Properties 2* tab.
 - d) Enter the *Prod. Group Type CD* and the *Product Group CROSS DOCKING*.
 - e) Save  your entries.
 - f) Choose *Exit*  to leave the transaction.

Continued on next page

3. Create a *Stock Determination Group CD - OPPCD* and create the stock determination for this group. For the *Inbound Value F2* and the *Permitted Value F1* the *Valuation 10* shall be assigned.

- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Stock Determination* → *Maintain Stock Determination Groups* → *Maintain Stock Determination Groups*.
- Choose *New Entries*.
- Create a new entry as following:

<i>Warehouse Number</i>	E1##
<i>StkDetGrp</i>	CD
<i>Description</i>	OPPCD
<i>WM Handling</i>	1 WM has priority

- Save*  your entry.
- Choose *Exit*  to leave the transaction.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Stock Determination* → *Maintain Stock Determination Groups* → *Configure Stock Determination*.
- Choose *New Entries*.
- Create a new entry as following:

<i>Warehouse Number</i>	E1##
<i>Ent. toDisp</i>	SPCW
<i>Activity</i>	PICK
<i>Stk Det. Grp</i>	CD
<i>Stock Owner</i>	C Stock Type
<i>Inbound Value</i>	F2
<i>Permitted Val.</i>	F1
<i>Valuation</i>	10

- Save*  your entry.
- Choose *Exit*  to leave the transaction.

Continued on next page

4. Maintain the *Stock Determination Group CD* in the warehouse product master for **T-EW60-30**,
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Product* → *Maintain Warehouse Product*.
 - b) Enter the *Product Number* **T-EW60-##**, the *Warehouse No.* **E1##**, and the *Party Entitled to Dispose* **SPCW**. Choose *Create* .
 - c) Select the *Whse Data* tab.
 - d) Enter the *Stk Dtermin. Group CD*.
 - e) *Save*  your entry.
 - f) Choose *Exit*  to leave the transaction.
5. Add the storage type **9010** in the storage type search sequence **PICK** in your warehouse number.
 - a) In the *IMG* of your EWM system, choose *Extended Warehouse Management* → *Goods Issue Process* → *Specify Storage Type Search Sequence*.
 - b) *Position* on your *Warehouse No.* **E1##** and the *Sequence* **PICK**.
 - c) Mark the entry and select *Assign Storage Types to Storage Type Search Seq..*
 - d) Select *New Entries*.
 - e) Enter the *Storage Type* **9010**.
 - f) *Save*  your new entry.
 - g) Choose *Exit*  to leave the transaction.
6. Create a purchase order as per the table below and create the inbound delivery. Look for the inbound delivery in EWM and post the goods receipt, but do not create a warehouse task yet.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW60-##
<i>PO Quantity</i>	100

Continued on next page

<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

Inbound delivery (ERP):

Inbound delivery (EWM):

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) *Save* your purchase order. Note down the purchase order number.
 - d) Choose *Exit* to end the transaction.
 - e) In the *Easy Access* menu of your ERP System, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - f) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - g) *Save* your inbound delivery. Note down the inbound delivery number.
 - h) Choose *Exit* to end the transaction.
 - i) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - j) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the inbound delivery.
 - k) Select the inbound delivery and choose *Goods Receipt + Save* .
7. Create a sales order as described below and the outbound delivery.

The sales order details are:

Continued on next page

<i>Order Type</i>	OR
<i>Sold-To Party</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Material</i>	T-EW60-##
<i>Order Quantity</i>	10

Sales order: _____

Delivery: _____

Outbound delivery order:

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*
- b) Enter the *Order Type* OR and press **Enter**.
- c) Enter the sales order details as described in the table.
- d) Save your sales order. Write down the sales order number.
- e) Choose *Exit* to leave the transaction.
- f) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
- g) Enter the *Shipping point* Z0##. The *Order* should default. Press **Enter**.
- h) Save your delivery. Note down the delivery number.
- i) Choose *Exit* to return to the *Easy Access* enu.
- j) In the *Easy Access* menu of your ERP system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
- k) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.

Continued on next page

8. Create the warehouse task for the outbound delivery, but do NOT save it. Then create the warehouse tasks for the inbound delivery. Confirm these warehouse tasks.
- In the *Easy Access* menu of your ERP system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* .
 - Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
 - Choose *Create Warehouse Task*.
 - Confirm that the *Source Storage Type* is **9010**.
 - Choose *Exit*  to return to the previous transaction. Choose *No* in the pop-up.
Choose *Exit*  to leave the transaction.
 - In the *Easy Access* menu of your ERP system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* .
 - Select the inbound delivery order and choose *Inbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
 - Choose *Create Warehouse Task*.
- You should now receive two warehouse tasks: one from *Source Storage Type 9010* to *Destination Storage Type 0030*, and the other from *Source Storage Type 9010* to *Destination Storage Type 9020*.
- Save  the warehouse tasks.
 - Choose *Warehouse Task* → *Confirm*.
 - Select both warehouse orders and choose *Confirm + Save*.

Continued on next page

9. Post the goods issue for the outbound delivery order. Confirm the storage location in the outbound delivery in ERP.
 - a) In the *Easy Access* menu of your ERP system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* .
 - c) Select the outbound delivery order and choose *Goods Issue + Save* .
 - d) Choose *Exit*  to return to the *Easy Access* menu.
 - e) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Display*.
 - f) Enter (if necessary) the *Outbound Delivery*.
 - g) Select the *Picking* tab and confirm the *Storage Location*.
 - h) Choose *Exit*  to return to the *Easy Access* menu.



Lesson Summary

You should now be able to:

- Describe the various cross-docking possibilities in EWM
- Set up EWM-triggered cross-docking

Lesson: Direct Outbound Deliveries

Lesson Overview

In this lesson you will learn how to create direct outbound deliveries in EWM. You will also learn about the important customizing settings.



Lesson Objectives

After completing this lesson, you will be able to:

- Create direct outbound deliveries in EWM
- Set up the direct outbound delivery process in EWM and ERP

Business Example

Sometimes a delivery process does not start in ERP. For example you sell products to customers directly out of your warehouse, or products that are not required anymore are sent for scrapping.

Reasons for Direct Outbound Deliveries

Unlike EWM outbound delivery orders, for which SAP ERP generated a reference document previously, you or EWM can also generate direct outbound delivery orders directly and locally in EWM, which EWM then sends to SAP ERP.

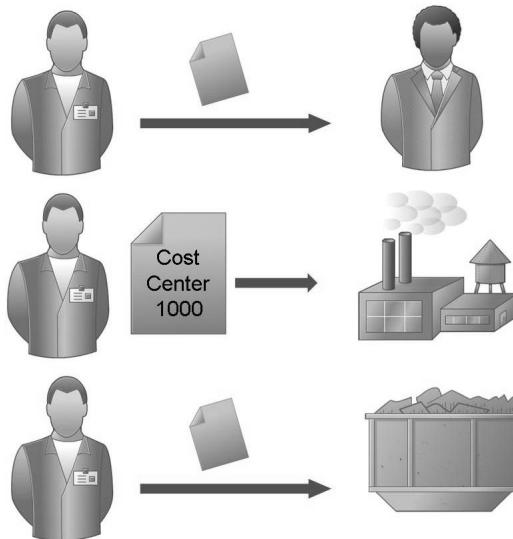


Figure 23: Direct Outbound Delivery Scenarios

You can use direct outbound delivery orders in the following scenarios:

- Pickup

- Direct sales

For direct sales, transportation activities do not apply, since the customer asks for the goods and picks them up on-site in 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 SAP ERP. The delivery in SAP ERP forms the outbound document for billing. You can also trigger direct sales in SAP 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 for 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 SAP 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 SAP ERP, you always trigger this last step locally in the warehouse.

- Immediate deliveries

You can fulfill immediate deliveries and choose between a push and pull procedure:

- In the push procedure, you make a decision for the outbound delivery without a sales order from the current requirements of the warehouse. For example, you want to use your available transportation capacities as optimally as possible by making use of unused space in a vehicle. Or you have to consider the special requirements of the consumer products industry. For example, you want to distribute a very recent delivery containing fresh goods (lettuce) to outbound deliveries going to different stores.
 - In the pull procedure, the store or customer triggers the process. For example, you only notice later that an article in the last purchase order was not included. You call the warehouse and trigger immediate delivery, so the goods are still delivered on time.
- 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.

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 SAP ERP:

- The availability check is necessary, as this check is usually triggered in SAP ERP.

As direct outbound delivery orders are created in EWM directly, no availability check is performed in SAP ERP for the required product. Instead, EWM triggers the availability check. Depending on the configuration, the check can be performed in SAP ERP or in SAP APO.

- A lot of organizational and logically relevant delivery data that is copied to outbound delivery orders from SAP ERP preceding documents must be specified for the direct outbound delivery orders locally in EWM. Either you enter the data 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.

As you start the goods issue process using direct outbound delivery orders in EWM, the underlying document type must display the process correspondingly. EWM uses the process profile to do this. When generating a direct outbound delivery order, you must select the correct document type to ensure the process flow is correct. For more information, see the IMG for EWM under *Cross-Process Settings → Delivery Processing → Process Management and Control*.

- As no outbound delivery request from SAP 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.

- Direct outbound delivery orders support processing of non-pick-relevant items, for example, or generation of items from handling units.

Additional aspect are:

- EWM can send direct outbound delivery orders for scrapping to SAP ERP, but this depends on the SAP ERP release. For more information, see the Implementation Guide (IMG) for EWM under *Interfaces → ERP Integration → General Settings → Set Control Parameters for ERP Version Control*. If you are not using a corresponding enhancement package, only the goods movement posting takes place. There is no delivery replication.
- When you generate a direct outbound delivery order, EWM automatically performs a compliance check through SAP BusinessObjects Global Trade Services to check whether an outbound delivery can be delivered to a certain goods recipient.

Constraints

- You cannot use credit management for direct outbound delivery orders.
- The price determination in SAP ERP does not provide you with the same functions as the price determination in the sales order.
- You cannot use any configurable products in direct outbound delivery orders.
- You cannot perform billing in SAP CRM for direct outbound delivery orders.
- You cannot extend bills of materials in direct outbound delivery orders.
- SAP ERP does not send messages for a direct outbound delivery order to EWM.
- 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.

Direct Outbound Deliveries Settings

For the direct outbound delivery you of course need delivery documents in EWM. As you directly create the **outbound delivery order** (which, technically, is a warehouse request), you do not need an **outbound delivery request**, so for these cases the document chain consists of only **two** documents (the outbound delivery order and the outbound delivery).

Sales Organization

If you manually create an outbound delivery order, Extended Warehouse Management cannot copy any data from a predecessor document, such as the sales organization, since direct outbound deliveries do not have predecessor documents. EWM requires a sales organization to carry out a **GTS check**. In Customizing you can assign a **party entitled to dispose** with its sales organization to a warehouse

number. When you or EWM create an outbound delivery order, you do not have to enter a sales organization since EWM automatically copies the specified sales organization into the outbound delivery order.

For the assignment, please choose in the IMG: *Extended Warehouse Management → Interfaces → GTS Integration → Assign Sales Organization to Warehouse Number.*

Availability Check

If you generate an item manually and want to perform an availability check, you must specify the product, quantity, and stock type for the item. If you fail to specify a batch for a product that is subject to batch management, or if EWM is unable to determine one, EWM performs a batch-independent availability check. If you enter the batch at a later time, EWM performs the availability check again, but batch-independently.

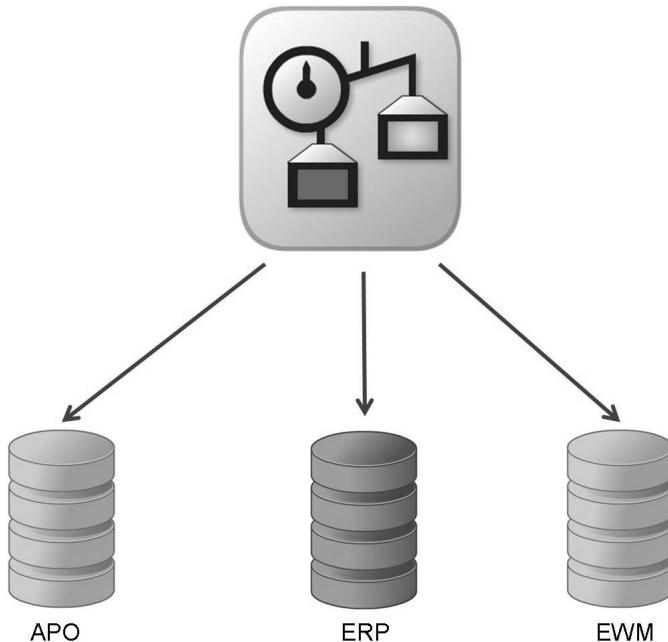


Figure 24: Availability Check in Direct Outbound Deliveries

If you have defined an availability check in Customizing, Extended Warehouse Management automatically performs an availability check in one of the following ways, corresponding to your Customizing settings:

- Call availability check in SAP Advanced Planning and Optimization (SAP APO).

When SAP APO executes an availability check, SAP APO generates pre-persistent **temporary quantity assignments** (TQAs), which first reserve the quantities temporarily. As soon as EWM saves the associated outbound delivery order, SAP APO changes these pre-persistent TQAs to persistent TQAs. SAP ERP then later converts these persistent TQAs into reservations for the delivery quantities.

If SAP APO is not available and is therefore not able to perform the availability check, EWM continues with the outbound delivery process. Here, EWM confirms the requested delivery quantity and sends the data to SAP ERP. SAP ERP sends this data to SAP APO as soon as SAP APO is available again. If backorder processing is required due to this current data, SAP APO triggers this.

- Call availability information in SAP ERP.
- Call availability check in EWM.

If you are using neither the availability check in SAP ERP nor the availability check in SAP APO, you can perform an availability check in EWM. However, this only works on the basis of the availability known in EWM, and only considers stocks that do not refer to a delivery.

If SAP APO, SAP ERP, or EWM are able to confirm all quantities and do not change the inspection type automatically, you can check this confirmation by using the status or the additional quantities. In the detailed view of the item, choose the *Status* tab page. For the status type *DAV Availability check*, the status value is *Confirmed*. In the detailed view of the item, choose the *Additional Quantities* tab page. EWM shows you the quantities in the role for the quantity. For example, you have requested 10 pieces of product A for a delivery item. The *reduced quantity* is 10 pieces, the *open quantity* is zero, and the *requested quantity* is 10 pieces.

If SAP APO, SAP ERP, or EWM can only partially confirm the requested quantities or change the inspection type automatically, EWM displays a dialog box. Here you can find information such as:

- Check status, for example *Partially Checked*
- Inspection type, for example *Availability Check in EWM*
- Requested quantity
- Available quantity
- Confirmation date/time

For a partial confirmation, EWM also shows you the following:

- Reduced delivery quantity in the relevant item
For example, you requested 10 pieces for an item but only 8 pieces are confirmed. EWM reduces the delivery quantity to 8 pieces.
- Status value of the checked items as *Confirmed*
In the detailed view of the item, choose the *Status* tab page.
- Quantities in the role for quantities *Availability Check*
In the detailed view for the item, choose the *Additional Quantities* tab page. For example, you have requested 10 pieces of product A for a delivery item. However, only 8 pieces were confirmed. The *reduced quantity* is 8 pieces, the *open quantity* is zero, and the *requested quantity* is 8 pieces.

EWM does not perform an availability check in EWM for the following delivery items:

- Delivery items that belong to a scrapping process
- Packing items

 **Note:** For more information, see the Implementation Guide (IMG) for EWM under *Interfaces → Availability Check*.

Scheduling

EWM can set the following dates/times based on the results of the availability check:

- Dates / times at delivery header level:
 - Delivery date / time
- Dates / times at delivery item level:
 - Picking start and finish
 - Loading start and finish
 - Goods issue start and finish

EWM only sets the picking or loading dates/times if you have specified them in the corresponding date profile in Customizing for the item type used.

EWM performs scheduling based on the type of availability check it finds:

- If EWM finds *Availability Check in SAP APO* as the type of availability check, and you have defined scheduling in Customizing for SAP APO, EWM copies the results of the scheduling into the direct outbound delivery order.
- If EWM finds a different type of availability check, the system sets the dates/times of the direct outbound delivery order – such as the delivery date and goods issue start and finish – to the confirmation date of the availability check.

Control Message Processing Dependent on Recipient

In the interface connections you have to define parameters for sending messages from EWM to the ERP system. You can execute the mapping optionally depending on the business system.

-  **Note:** Not all parameters listed here are relevant for direct outbound deliveries; they are listed for completeness.

Definition of parameters for **inbound deliveries**: The following two parameters are optional. If you do not make any entries here, the system uses the initial values.

- Control parameter for goods movement confirmation.
If you do not want to confirm the goods receipt for each partial goods receipt, and instead want to collect them together for joint reporting to the ERP system for one warehouse request, choose *Delayed Goods Receipt Confirmation* for this parameter. If you want to report confirmation of the goods receipt for each partial goods receipt to the ERP system, do not enter a value for this parameter. This means that the availability of a product in the ERP system is announced in good time, and also enables increased system communication.
- Control parameter for returning handling unit data.
If you want to avoid returning current handling unit data to the ERP system during the goods receipt process, set the *Do Not Report HU Data in Goods Receipt Process* indicator.

Definition of parameters for **inbound deliveries**:

- If the delivery split results in outbound deliveries in EWM, you can enter a split profile. You must have already defined the split profile in the ERP system.

Definition of parameters for **inbound** and **outbound deliveries**:

- If you create ERP documents as originals in EWM, enter the following parameters:
 - Manual inbound delivery documents
 - Inbound/outbound delivery documents resulting from the delivery split
- Enter the number range interval for the ERP documents. If you have connected to an ERP system, the interval you enter here must not overlap with the interval that you defined in the ERP system.



Hint: The number range is also to be defined in Customizing in EWM under *Extended Warehouse Management → Interfaces → ERP Integration → Delivery Processing → Define Number Ranges for ERP Documents*.

- Enter the increment for assigning the item numbers. If you have connected an ERP system, the increment you enter here must match the increment that you defined in the ERP system for this document type.

Determination of the Delivery Type in ERP for Direct Outbound Deliveries

In Customizing in the ERP system, you define which delivery types are used for direct outbound deliveries. The delivery type is mandatory for creating the direct outbound delivery in ERP if the delivery is directed to an external customer. For stock transfer deliveries, this activity is optional. Before you can assign delivery types to direct outbound deliveries, you must first define suitable delivery types.

You can determine delivery types based on the following parameters:

- EWM delivery type

This is the delivery type used for the direct outbound delivery in SAP EWM. Since the ERP system has no knowledge about valid values, no search help is available for this parameter. If you want to define the ERP delivery type independently from the EWM delivery type, enter * as a placeholder.

- Code for the initiator of a communication chain

This code describes the business process in which direct outbound deliveries are submitted from SAP EWM to the ERP system. If you want to define the delivery type independent of this code, choose the * value as a placeholder. Examples for business processes for direct outbound deliveries are:

- Kit-to-stock

Direct outbound deliveries are used for posting goods issue for the kit components.

- Reverse kitting

In this process, the disassembled kit headers are goods issue posted by means of direct outbound deliveries.

- Cash sales

Goods are sold directly to customers within the warehouse. The related direct outbound delivery might be relevant for billing.

- Direct shipment

Goods are shipped to customers or other warehouses without prior planning.

- Warehouse number

You can define the delivery-type settings for a specific warehouse number only. If you want to define the delivery type for all warehouses, use * as a placeholder.

If you make multiple entries with placeholders (*), the system first looks for the most specific matching entry, that is, the one with the smallest number of placeholders. If you have defined multiple entries with the same number of placeholders, the system uses the matching entry with the most specific data fields on the left.

Determination of Item Categories in ERP

There is also a table where you define the item categories that must be used for the items of the direct outbound delivery.

Usually, the ERP item category is determined based on the delivery type, the item category group from the material, and the item usage (see standard item category determination). This additional Customizing activity provides the possibility to overrule the standard item category determination and to determine the item category dependent on the business processes for which direct outbound deliveries are used. Using the separate item category determination is optional. If you do not make any entries here, the standard item category determination is used.

Direct Outbound Deliveries Process

To create a direct outbound delivery, in the *SCM Easy Access* menu, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order* and then choose *Create* . Then you can select in the pop-up the document type you wish to use.



Caution: The first time, you will probably receive an error log prompting you to maintain a *Shipping office* and a *Party entitled to dispose* as default values.

Enter the required data, like the ship-to party, and the items, quantities, and stock type so that the availability check can be done.

When you save your direct outbound delivery, a message is sent to the ERP system and the same outbound delivery is created here.

You continue performing the goods issue process steps, such as picking and packing, and finally you post the goods issue.

For direct outbound deliveries in the **pickup** scenario, there is a separate transaction, which can be found under *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Pickup*. The follow-on functions are the same as for any other direct outbound delivery.

Invoice Before Goods Issue

Sometimes it is required to include the actual invoice in the shipment when it leaves the warehouse. For a direct outbound delivery, especially for a pickup process where you want the buyer to pay immediately, you might want to issue the invoice before you post the goods issue (which would normally trigger the invoice print). For these cases, you can use the “invoice before goods issue” process to create and print the invoice before the goods issue is posted. You do this by sending an invoice request from Extended Warehouse Management to CRM billing or ERP billing.

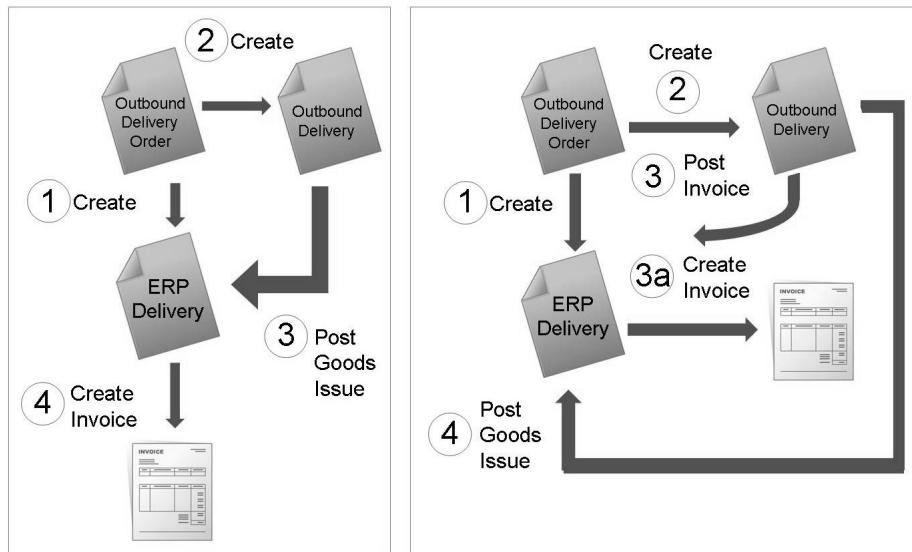


Figure 25: Invoice Before Goods Issue

You can request an invoice for each delivery, or one or more invoices for the contents of a vehicle or transportation unit.

- If you want to print invoices for the contents of a vehicle or transportation unit, EWM triggers the invoice printout in CRM billing or ERP billing by sending the message *Print Billing Document*.
- If you want to create one invoice for each delivery, EWM triggers the creation and invoice printing automatically when it generates an outbound delivery.

For single requests from EWM, CRM billing or ERP billing directly creates single invoices that you cannot change. To make changes, you have to delete the outbound delivery. This automatically cancels the invoice. If you then generate a new outbound delivery, the invoice is automatically created and printed again.

For group requests from EWM, CRM billing or ERP billing creates one or more invoices for each vehicle or transportation unit. CRM billing creates corresponding billing due list items. ERP billing does not create any billing due list items. You can make changes to these deliveries in EWM. If these occur before invoice creation, ERP or SAP CRM updates its deliveries or the invoice-relevant data in accordance with the input from EWM.

After you have posted the goods issue, you can only trigger the invoice printout from CRM billing or ERP billing.

If more than one vehicle forwards the material for a sales order, you can create related outbound deliveries for each vehicle and request invoices for them.

You can determine a **print profile** after CRM billing or ERP billing has selected the printer. EWM finds the print profile and informs CRM billing or ERP billing accordingly. For printing single requests, the billing system uses the print profile found. For the printing of group requests, the billing system uses the profile of the first delivery that was found.

Exercise 7: Create a Pickup Outbound Delivery

Exercise Objectives

After completing this exercise, you will be able to:

- Set up the direct outbound delivery scenario
- Post the invoice before goods issue

Business Example

You sell materials directly to end customers from your warehouse. The customers come to the warehouse office, where the order is entered directly in EWM. The customer receives an invoice and pays when the materials are picked.

Task:

First, specify some customizing settings and default values. Then enter an example for a direct outbound delivery and create the outbound delivery order and the invoice for the customer. Finally, post the goods issue.

1. Set up the delivery type determination for the direct outbound deliveries in the ECC system. Enter the following combination in customizing:

EWM Del. Type	Initiator ComCh	WhN	Dlv Ty	CC ReplDlv Type	IC ReplDlv Type
*	* All Possible Values for the Initiator of a Comm. Chain	E##	ODSH	NLCC	NL

2. Maintain default values for the shipping office and the entitled to dispose for entering direct outbound deliveries. Maintain the following values:

Shipping Office	E1##
Ent. to Dispose	SPCW

Continued on next page

3. Create a direct outbound delivery in EWM. For the Outbound Delivery Order, select the *Document Type OPIG Outbound Delivery Order for Pickup*. Enter the customer **T-E01A-##** as ship-to party.

The customer wants the following materials:

Product	Quantity
T-EW01-##	10

The product is taken from the stock type F2.

Check the outbound delivery in the EPR system and note down the EWM outbound delivery order number and the ERP delivery number.

EWM outbound delivery order:

ERP delivery: _____

4. Pick the materials for the outbound delivery order. Create the outbound delivery and the invoice. Finally, post the goods issue.

Warehouse task: _____

Warehouse order: _____

EWM outbound delivery:

Invoice document: _____

Goods issue document:

Solution 7: Create a Pickup Outbound Delivery

Task:

First, specify some customizing settings and default values. Then enter an example for a direct outbound delivery and create the outbound delivery order and the invoice for the customer. Finally, post the goods issue.

1. Set up the delivery type determination for the direct outbound deliveries in the ECC system. Enter the following combination in customizing:

EWM Del. Type	Initiator ComCh	WhN	Dlv Ty	CC ReplDlv Type	IC ReplDlv Type
*	* All Pos- sible Values for the Initia- tor of a Comm. Chain	E##	ODSH	NLCC	NL

- a) In the IMG of the ERP system, choose *Logistics Execution → Extended Warehouse Management Integration → Outbound Process → Direct Outbound Deliveries → Determine Delivery Types for Direct Outbound Deliveries*.
 - b) Choose the *New Entries* button and create the new entry as described in the table.
2. Maintain default values for the shipping office and the entitled to dispose for entering direct outbound deliveries. Maintain the following values:

Shipping Office	E1##
Ent. to Dispose	SPCW

- a) In the *Easy Access* menu of the EWM system, choose *Extended Warehouse Management → Delivery Processing → Outbound Delivery → Maintain Outbound Delivery Order*.
- b) Select *Default Values* and maintain the values as described in the table.

Continued on next page

3. Create a direct outbound delivery in EWM. For the Outbound Delivery Order, select the *Document Type OPIG Outbound Delivery Order for Pickup*. Enter the customer **T-EW01A-##** as ship-to party.

The customer wants the following materials:

Product	Quantity
T-EW01-##	10

The product is taken from the stock type F2.

Check the outbound delivery in the EPR system and note down the EWM outbound delivery order number and the ERP delivery number.

EWM outbound delivery order:

Continued on next page

ERP delivery: _____

- a) In the *Easy Access* menu of the EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
- b) Choose *Create* and in the dialog box, select *Document Type OPIG Outbound Delivery Order for Pickup*.
- c) Select the *Partner* tab. Enter in the line for the *Ptnr Role STPRT* the *Partner T-E01A-##*.
- d) Select the *Items* tab. Choose *Create* . In the dialog box, choose *Item Type ODPG Standard Item Outbound Deliv. for Pickup*.
- e) Switch to *Form View* and enter the details for the item.

<i>Product</i>	T-EW01-##
<i>Quantity</i>	10
<i>Stock Type</i>	F2

Press **Enter** and select the *Availability Information* icon. Close the pop-up with the *Information About Current Availability* again.

- f) Choose *Save* and note down the document number.
 - Select the *Reference Documents* tab. Here you can find the *ERP Document*. Note down the document number.
 - g) Change to the ERP system and in the *Easy Access* menu of the EWM system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Display*. Enter the outbound delivery number from above and check the *Status Overview*.
4. Pick the materials for the outbound delivery order. Create the outbound delivery and the invoice. Finally, post the goods issue.

Warehouse task: _____

Warehouse order: _____

EWM outbound delivery:

Invoice document: _____

Goods issue document:

Continued on next page

- a) Create the warehouse task for picking. In the *Easy Access* menu of the EWM system, choose *Extended Warehouse Management* → *Work Scheduling* → *Create Warehouse Task for Warehouse Request* → *Stock Removal for Outbound Delivery Order*. In the search field, enter the outbound delivery order (which is also a Warehouse Request) and choose *Perform Search* .
- Alternatively, if you are still in the *Maintain Outb. Deliv. Order* transaction, choose *Outbound Delivery Order* → *Follow-On Functions* → *Warehouse Tasks*.
- Select both items and choose *Create + Save*.
- b) Change to the warehouse management monitor. In the EWM *Easy Access* menu, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*. Follow the path *Outbound* → *Document* → *Outbound Delivery Order*. Double-click to open the search window. Enter your *Outb. Delivery Order* and choose *Execute*  Select your outbound delivery order and use the buttons *Warehouse Order* and *Warehouse Task* to check the document numbers.
- c) Confirm the picking of the product. Possibilities are:
- Mark the warehouse order or the warehouse tasks in the WH Monitor and select, on the *More methods* dropdown icon, the entry **Confirm Backgr.**
 - Click the number of the warehouse order in the WH Monitor once. A new session will open. Choose the *Confirm + Save* button. Close the session again by choosing *Back* .
 - In the EWM *Easy Access* menu, choose *Extended Warehouse Management* → *Execution* → *Confirm Warehouse Task*. Enter in the search field the warehouse order number and select  *Perform Search*. Select the button *Confirm + Save*.
- d) Create the outbound delivery. Click in the WH Monitor one time on the outbound delivery order number, so that a new session will open. Alternatively, in the EWM *Easy Access* menu, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*. Enter the outbound delivery order in the search field and choose *Perform Search* .

On the *Items* tab, select both item lines and choose *Create Outbound Delivery*. Choose *Save*  and note down the document number of the **outbound delivery**.

- e) Create the invoice. Either directly change the transaction from the *Maintain Outb. Deliv. Order* transaction by using the *Outbound Delivery* button or choose, in the EWM *Easy Access* menu, *Extended*

Continued on next page

Warehouse Management → Delivery Processing → Outbound Delivery → Maintain Outbound Delivery. Then enter the outbound delivery number in the search field and choose *Perform Search* .

Select the drop-down icon *Invoice Bef. GI* and select the entry *Request Invoice + Save*.

- f) Check the status in the outbound delivery in the ERP system. The *Billing Status* should be changed to *C*. Select *Document Flow*  and note down the number of the invoice document.
- g) Change to the EWM system and use the *Goods Issue* button to post the GI.
- h) Check the status in the outbound delivery in the ERP system again. You probably will have to leave the delivery document and display it again. The *Total gds mvt status* should be changed to *C*. Select *Document Flow*  and note down the number of the goods issue document.

Exercise 8: Create a Direct Outbound Delivery for Internal Consumption

Exercise Objectives

After completing this exercise, you will be able to:

- Set up a direct outbound delivery for internal consumption

Business Example

Sometimes a product is required for internal use, for example, for additional testing or as a sales example. You can create a consumption posting from ERP for this case, or start with a direct outbound delivery from EWM.

Task:

A material needs to be picked for internal consumption. Create a direct outbound delivery, run the picking process, and finally post the goods issue. First, you need to specify some customizing settings and default values.

1. Set up so that the *Account Assignment Category 10 - Cost Center* is allowed for your *Warehouse Number E1##*.
2. Set up the delivery type determination for the direct outbound deliveries in the ECC system. Enter the following combination in customizing:

<i>EWM Del. Type</i>	<i>Initiator ComCh</i>	<i>WhN</i>	<i>Dlv Ty</i>	<i>CC ReplDlv Type</i>	<i>IC ReplDlv Type</i>
OPIN	PIG Cash sales process (pick-up of goods)	E##	ODKT		

3. Maintain default values for entering direct outbound deliveries for the pickup process. Maintain the following values (if still required):

Continued on next page

<i>Shipping Office</i>	E1##
<i>Ent. to Dispose</i>	SPCW
<i>Document Type</i>	OPIN
<i>Item Type</i>	ODPG
<i>Numbers of Items</i>	1

4. Create a direct outbound delivery for pickup in EWM with the maintained default values. **1185** is the internal customer number. The account assignment is cost center **1000**. You require 1 piece of **T-EW01##** from stock type F2.

Check the outbound delivery in the EPR system and note down the EWM outbound delivery order number and the ERP delivery number.

EWM outbound delivery prder (for pickup): _____

ERP delivery: _____

5. Pick the materials for the outbound delivery order for picking. Create the outbound delivery and post the goods issue.

Warehouse task: _____

Warehouse order: _____

EWM outbound delivery: _____

Goods issue document: _____

Solution 8: Create a Direct Outbound Delivery for Internal Consumption

Task:

A material needs to be picked for internal consumption. Create a direct outbound delivery, run the picking process, and finally post the goods issue. First, you need to specify some customizing settings and default values.

1. Set up so that the *Account Assignment Category 10 - Cost Center* is allowed for your *Warehouse Number E1##*.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Interfaces → ERP Integration → Delivery Processing → Define Account Assignment Category and Allow in Warehouse Number*.
 - b) Select the entry for the *AC 10* and select the entry *Warehouse Number* in the dialog structure.
 - c) Choose *New Entries*.
 - d) Create a new entry with the following details:

<i>Warehouse Number</i>	E130
<i>AC</i>	10

- e) Save your new entry.
- f) Choose Exit to leave the transaction.

2. Set up the delivery type determination for the direct outbound deliveries in the ECC system. Enter the following combination in customizing:

<i>EWM Del. Type</i>	<i>Initiator ComCh</i>	<i>WhN</i>	<i>Dlv Ty</i>	<i>CC ReplDlv Type</i>	<i>IC ReplDlv Type</i>
OPIN	PIG Cash sales process (pick-up of goods)	E##	ODKT		

Continued on next page

- a) In the IMG of the ERP system, choose *Logistics Execution → Extended Warehouse Management Integration → Outbound Process → Direct Outbound Deliveries → Determine Delivery Types for Direct Outbound Deliveries*.
 - b) Choose the *New Entries* button and create the new entry as described in the table.
 - c) Save  your new entry.
 - d) Choose *Exit*  to leave the transaction.
3. Maintain default values for entering direct outbound deliveries for the pickup process. Maintain the following values (if still required):

<i>Shipping Office</i>	E1##
<i>Ent. to Dispose</i>	SPCW
<i>Document Type</i>	OPIN
<i>Item Type</i>	ODPG
<i>Numbers of Items</i>	1

- a) In the *Easy Access* menu of the EWM system, choose *Extended Warehouse Management → Delivery Processing → Outbound Delivery → Pickup*.
 - b) Select *Default Values*  and maintain the values as described in the table.
 - c) Leave the transaction again with *Back* .
4. Create a direct outbound delivery for pickup in EWM with the maintained default values. **1185** is the internal customer number. The account assignment is cost center **1000**. You require 1 piece of **T-EW01##** from stock type F2.

Check the outbound delivery in the EPR system and note down the EWM outbound delivery order number and the ERP delivery number.

EWM outbound delivery prder (for pickup):

Continued on next page

ERP delivery: _____

- In the *Easy Access* menu of the EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Pickup*.
- Select the drop-down icon *Create with Default Values* .
- Select the *Switch to Form View* button.

Enter

- **1185** as *Ship-to party*
- **10 Cost Center** as *Item AAC*
- **1000** as *ItmAcctAsstObj*.

- Select the icon *Switch to Form View* on the *Items* tab.

Enter the details for the item.

<i>Product</i>	T-EW01-##
<i>Quantity</i>	1
<i>Stock Type</i>	F2

Press **Enter** and select the *Availability Information* icon. Close the pop-up with the *Information About Current Availability* again.

- Choose *Save*  and note down the document number.
- Select the *Reference Documents* tab. Here you can find the *ERP Document*. Note down the document number.
- Change to the ERP system and, in the *Easy Access* menu, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Display*. Enter the outbound delivery number from above and check the *Status Overview*.

- Pick the materials for the outbound delivery order for picking. Create the outbound delivery and post the goods issue.

Warehouse task: _____

Warehouse order: _____

EWM outbound delivery:

Goods issue document:

Continued on next page

- a) Create the warehouse task for picking. In the *EWM Easy Access* menu, choose *Extended Warehouse Management* → *Work Scheduling* → *Create Warehouse Task for Warehouse Request* → *Stock Removal for Outbound Delivery Order*. In the search field, enter the outbound delivery order (which is also a warehouse request) and choose *Perform Search* .

Alternatively, if you are still in the *Pickup* transaction, choose *Pickup* → *Follow-On Functions* → *Warehouse Tasks*.

Choose *Create + Save* .

- b) Change to the WH Monitor. In the *EWM Easy Access* menu, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*. Next, choose *Outbound* → *Document* → *Outbound Delivery Order*. Double-click to open the search window. Enter your outbound delivery order and chose *Execute* . Select your outbound delivery order and use the buttons *Warehouse Order* and *Warehouse Task* to check the document numbers.
- c) Confirm the picking of the product. Possibilities are:
- Select the warehouse order or the warehouse tasks in the WH Monitor and, on the *More methods* drop-down icon, select the entry **Confirm Backgr**.
 - Click the number of the warehouse order in the WH Monitor once. A new session will open. Choose the *Confirm + Save* button. Close the session again by choosing *Back* .
 - In the *EWM Easy Access* menu, choose *Extended Warehouse Management* → *Execution* → *Confirm Warehouse Task*. In the search field, enter the warehouse order number and choose *Perform Search* . Choose the *Confirm + Save* button.
- d) Create the outbound delivery. Click in the WH Monitor one time on the outbound delivery order number, so that a new session will open. Alternatively, in the *EWM Easy Access* menu, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Picking*, enter the outbound delivery order in the search field and choose *Perform Search* .
- Choose *Goods Issue*  and note down the document number of the **outbound delivery** that is shown in the status line.
- e) Check the status in the outbound delivery in the ERP system again. You probably will have to leave the delivery document and display it again. The *Total gds mvt status* should be changed to *C*. Choose *Document Flow*  and note down the number of the goods issue document.



Lesson Summary

You should now be able to:

- Create direct outbound deliveries in EWM
- Set up the direct outbound delivery process in EWM and ERP



Unit Summary

You should now be able to:

- Create waves in EWM
- Set up the wave determination
- Set up and use two-step picking
- Use value-added services
- Create packaging specifications for value-added services
- Create and determine a work center for value-added services
- Describe the various cross-docking possibilities in EWM
- Set up EWM-triggered cross-docking
- Create direct outbound deliveries in EWM
- Set up the direct outbound delivery process in EWM and ERP

Unit 3

Expand Your Warehouse

Unit Overview

Warehouse management does not have to stop at the warehouse walls. Connecting the warehouse to the outside world via yard management and shipments is important to optimize the warehouse space and movements.



Unit Objectives

After completing this unit, you will be able to:

- Set up yard management
- Control movements in the yard
- Set up the determination of staging areas and doors in EWM
- Explain the use of doors in EWM
- Describe and set up the route determination
- Explain the possibilities of transportation planning within SAP Extended Warehouse Management
- Plan transports for inbound and outbound deliveries

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Lesson: Use the Yard

Lesson Overview

In this lesson you will learn how to set up a yard in SAP Extended Warehouse Management.



Lesson Objectives

After completing this lesson, you will be able to:

- Set up yard management
- Control movements in the yard

Business Example

You receive and ship deliveries via trucks, which arrive at various times at your warehouse. As your space and number of doors are limited, you need to control and coordinate the movements of these trucks.

Yard Management

The yard is an enclosed area outside a warehouse where vehicles and transportation units are dealt with, waiting to be dealt with, or waiting to be collected by an external carrier. Using yard management extends your control of inbound and outbound deliveries beyond the physical walls of your warehouse.

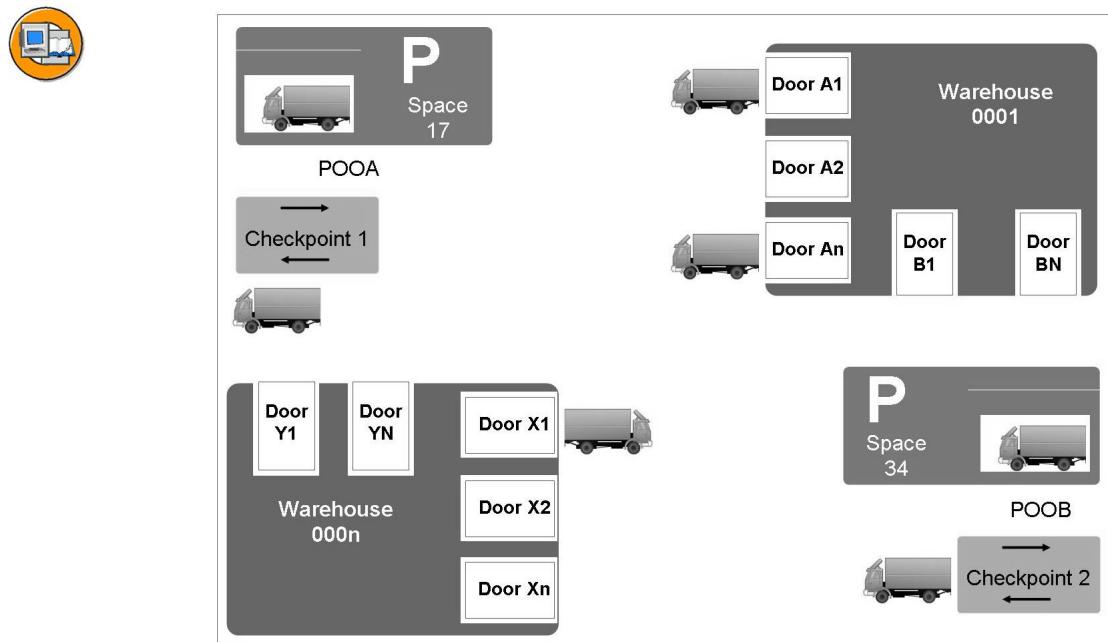


Figure 26: Yard Management

Yard Management Setup

A yard is based on the warehouse structure of Extended Warehouse Management. A yard represents a **separate storage type** in a warehouse. However, you can also configure it 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.

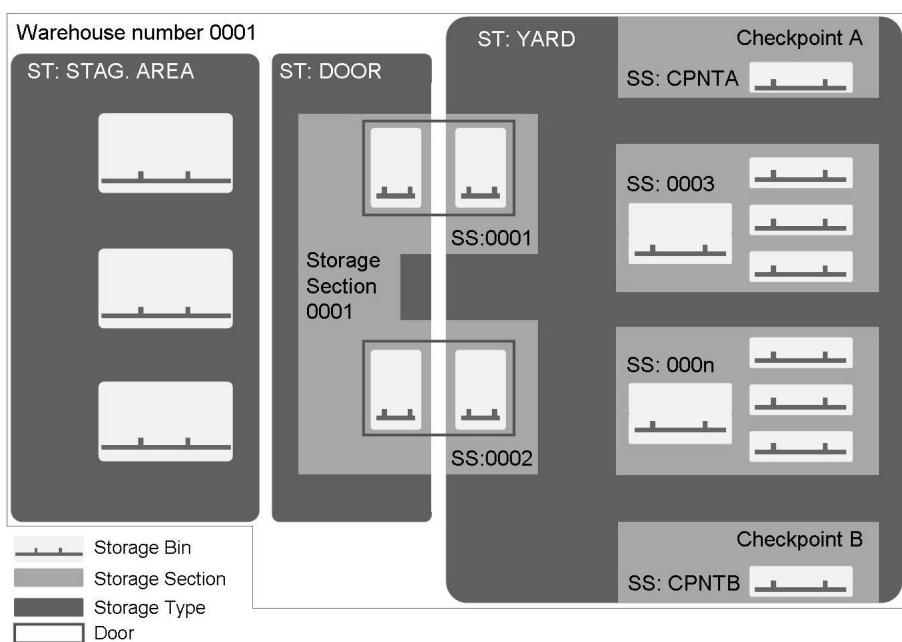


Figure 27: Yard Setup

You map the corresponding storage bins as yard bins, which you can group into yard sections, the same as for the warehouse. The following structures are possible in a yard:

- **Parking spaces**

A position in the yard where a vehicle or a transportation unit is parked. Multiple parking spaces can be combined to form a parking section.

You define parking spaces as **standard storage bins** with standard storage sections and standard storage bin types in the storage type with the role *Yard*.

- **Checkpoints**

A location where vehicles and transportation units (TUs) arrive at or leave the yard. This can represent a physical gate at the yard entrance, or a virtual gate from which data is transmitted electronically.

You define checkpoints in Customizing. You must then 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 (SC unit), such as the SC unit of the warehouse.

- **Doors**

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. It connects the yard to the warehouse. 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 staging areas - you make an assignment between staging areas and doors.

You then assign each door to a storage bin that you can use to post goods receipts or goods issues. You create these storage bin in a storage type with the storage type role *F*.

You can also assign doors to supply chain units to control authorization checks. You can also assign doors to yard bins – this is then the connection to the yard.

Vehicles and Transportation Units

In the yard you move vehicles or transportation units.

A **vehicle** is a specialization of a particular **means of transport**. A vehicle can comprise one or more transportation units and represents the physical entity of the transport vehicle, like a truck that pulls the trailer, the engine that pulls the rail cars, or the ship that transports the container.

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 following figure shows different transportation units.

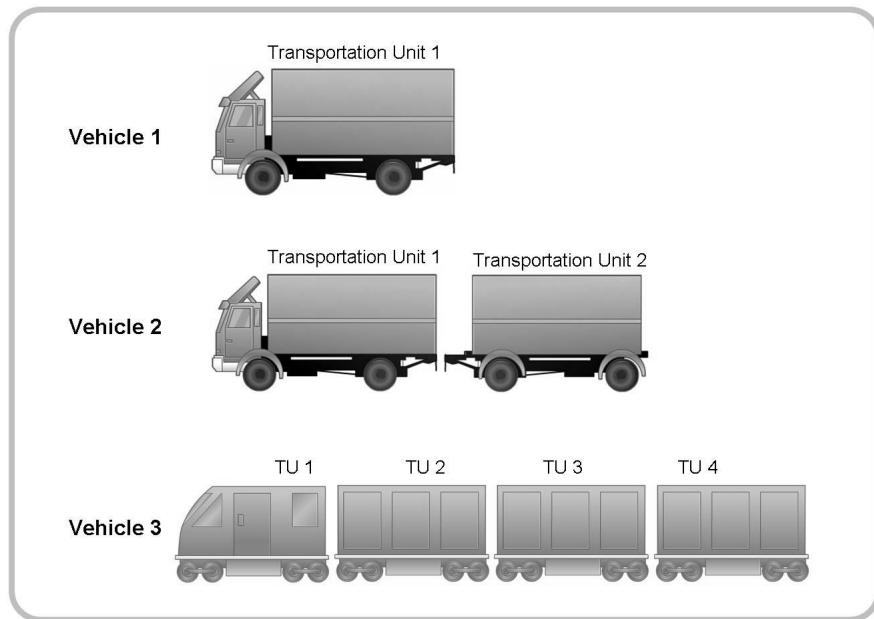


Figure 28: Vehicles and Transportation Units

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

You map transportation units as handling units (HUs) and assign packaging materials to them. By linking these packaging materials to means of transport, you define construction rules for your vehicles. In this way, you define, for example, how many transportation units a vehicle is supposed to have and the order in which they are to be arranged. You also specify whether a transportation unit is to be optional or obligatory:

- Obligatory transportation units are a fixed part of a vehicle (fixed assignment). You cannot assign them to another vehicle. Example: Truck cargo area.
- You can assign optional transportation units to other vehicles. Example: Trailer for a truck.

If transport information was provided with the Advanced Shipping Notification of your supplier, then the TU can be automatically created when the inbound delivery is transferred from ERP to EWM.

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:

- The TU arrives at the checkpoint and is moved to a parking space or to the door.
- You move a TU from a parking space to the door, or from the door to a parking space.
- You move a TU within the yard, from one parking space to another, or from one door to another.

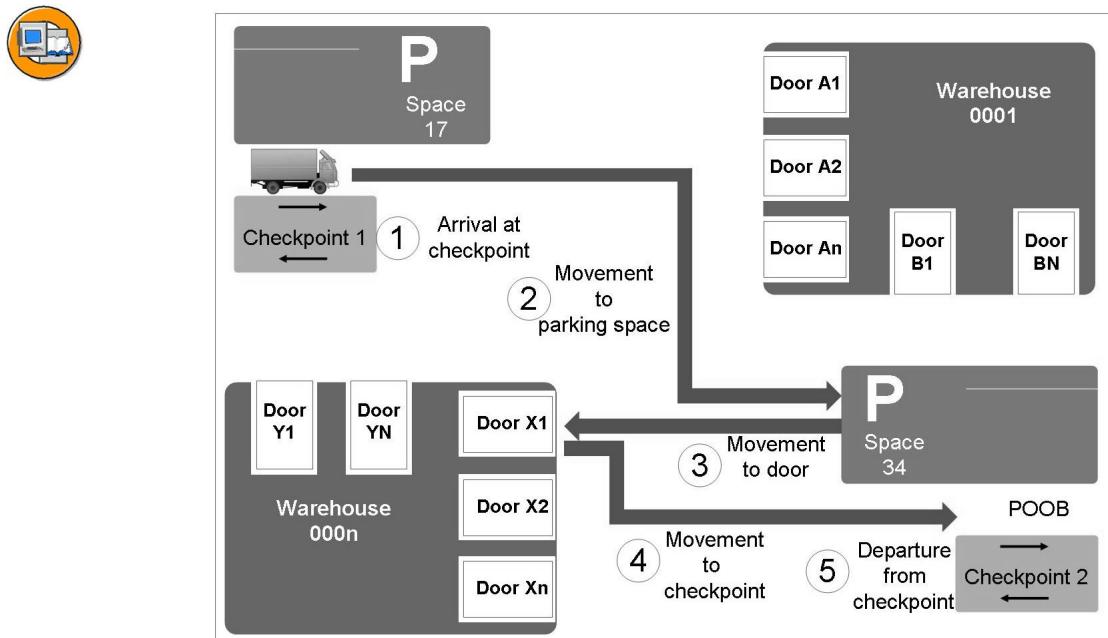


Figure 29: Movements in the Yard

You map each TU using an empty handling unit (HU) that is described as an HU for the TU and is moved during the yard movement.

Arrival at or Departure from Checkpoint

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 or departure from the checkpoint. Registering vehicles and TUs that arrive in the yard is a prerequisite for yard movements.

The exact steps you execute at the checkpoint depend on whether you have obtained the vehicle data and transportation unit data in advance through advanced shipping notification, for example, or whether you first have to record this when the vehicle has arrived.

- Data is already available.

In the function *Arrival at/Departure from Checkpoint*, you set the status *Arrival at Checkpoint* for the vehicle. To do this, on the *SAP Easy Access* screen, choose *Extended Warehouse Management → Goods Receipt and Shipping → Yard Management → Arrival at/Departure from Checkpoint* (transaction /SCWM/CICO).

- Data has to be recorded.

1. You create the vehicle in the system (transaction /SCWM/CICO or /SCWM/VEH).
2. You create a TU if required and assign it to the vehicle. To do this, on the *SAP Easy Access* screen, choose *Extended Warehouse Management→ Goods Receipt and Shipping → Maintain Transportation Unit* (/SCWM/TU).
3. You register the arrival of the vehicle by setting the status *Arrival at Checkpoint* (transaction /SCWM/CICO or /SCWM/VEH).
4. You register the TUs (transaction /SCWM/TU).

In the following cases, you can also post the arrival at checkpoint in this transaction right away:

- TU is not assigned to a vehicle.
 - TU is assigned to a vehicle that contains just one TU.
5. You assign deliveries and handling units to the TUs (transaction /SCWM/TU).

Moving Transportation Units in the Yard

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. This relationship is 1:1.

For yard movements, the HU for the TU always remains empty, meaning you can never pack the contents of the TU (deliveries with HUs and unpacked products) into an HU for the TU. If you move the HU for the TU in the yard, the system considers only the packaging material, that is, the HU, from a stock point of view, whereas the related stock does not follow every movement. WTs for yard movements are always HU WTs. The system does not use product WTs because quantities are not considered in yard movements.

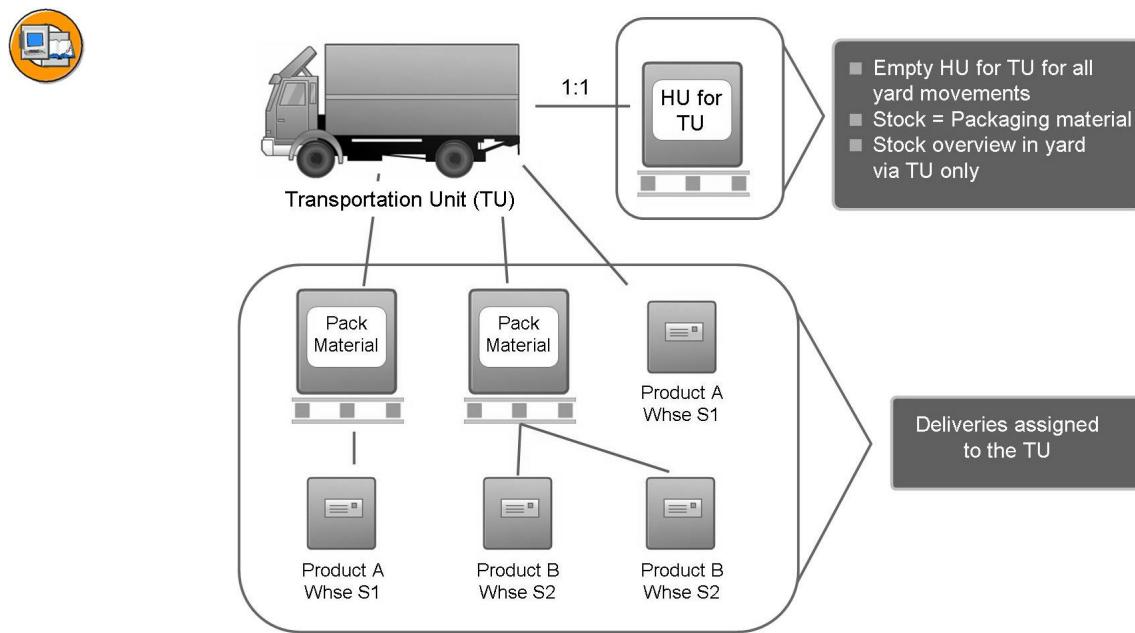


Figure 30: Transportation Units and Deliveries

You can also create and execute yard movements in a **radio frequency (RF)** environment.

Exercise 9: Yard Management

Exercise Objectives

After completing this exercise, you will be able to:

- Set up a yard in SAP Extended Warehouse Management
- Control movements in a yard

Business Example

Several vehicles move around your warehouse every day. You need to control these movements so you know where the vehicles are so they can be at doors for loading or unloading at the required time.

Task 1:

Set up doors, checkpoints, and parking places in your yard.

1. Confirm the storage type used for yard management in your warehouse number E1## and the structuring through storage sections.

Storage type:

Storage sections:

2. Confirm the checkpoints used for yard management in your warehouse number E1##.

Checkpoints:

3. Create the following storage bins for your yard.

Warehouse No.	Storage Bin	Storage Type	Storage Section
E1##	PARKING NORTH	YARD	PSL1
E1##	PARKING SOUTH	YARD	PSL2
E1##	YARD DOOR NORTH	YARD	DOR1

Continued on next page

E1##	YARD DOOR SOUTH	YARD	DOR2
E1##	CHECKPOINT NORTH	YARD	CHK1
E1##	CHECKPOINT SOUTH	YARD	CHK2

4. Connect the checkpoints with the corresponding storage bins and assign the warehouse process type 9999 for movements.
5. Control the doors in your warehouse. You want to use **DOR1** and **DOR2**. Dor1 shall be used for “Inbound”, and Dor2 shall be used for “Outbound”. The corresponding staging area groups are 9010 for goods receipt and 9020 for goods issue. Make the necessary corrections.
6. Create the following bin for one of your doors (the other bin already exists):

<i>Warehouse No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>	<i>Storage Section</i>
E1##	DOOR2	9040	0001

7. Connect the doors with the corresponding storage bins. The storage bin **Door1** shall be assigned to the door **Dor1** and the storage bin **Door2** to the door **Dor2**.
8. Connect the warehouse to the yard by assigning warehouse doors to yard bins.

<i>Warehouse Door:</i>	<i>YrdWhseNo.</i>	<i>Yard Bin</i>
DOR1	E1##	YARD DOOR NORTH
DOR2	E1##	YARD DOOR SOUTH

Task 2:

Test the yard management with an inbound delivery that includes transportation information.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000

Continued on next page

Item 1	
Material	T-EW01-##
PO Quantity	100
Plnt	SPCW
Stor. Location	RD##
Conf. Control	ANLI Inbound Delivery ECC

Purchase order:

-
2. Create the inbound delivery and **pack in this inbound delivery** into one **PKE-095**. Additionally enter the transportation information: The material comes with a *Means of transport type V100*, the *Means of transport* is **TM-100**, and the *Means of transport ID* is **EWM-120-##**.

Inbound delivery (ERP):

HU:

3. When the truck arrives at the warehouse, first check it in at the **Checkpoint North**, then move it to the **PARKING NORTH** and finally to the **YARD DOOR NORTH**, where you start the unloading process. Put away the material, finally move the truck back to the **Checkpoint North** and check it out.

TU:

TU internal number:

Inbound delivery (EWM):

Solution 9: Yard Management

Task 1:

Set up doors, checkpoints, and parking places in your yard.

1. Confirm the storage type used for yard management in your warehouse number E1## and the structuring through storage sections.

Storage type:

Storage sections:

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Shipping and Receiving* → *Yard Management* → *Define Yard Using Storage Type*.
 - b) Look for the storage type for your warehouse number **E1##** and note down the storage type number / name.
 - c) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Shipping and Receiving* → *Yard Management* → *Structure Yard Using Storage Areas*.
 - d) Position on your warehouse number **E1##** and note down the storage sections in your yard storage type.
 - e) Choose *Exit*  to leave the transaction.
2. Confirm the checkpoints used for yard management in your warehouse number E1##.
- Checkpoints:
-
- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Shipping and Receiving* → *Yard Management* → *Define Checkpoints*.
 - b) Look for the checkpoints for your warehouse number **E1##** and note down the checkpoint names.
 - c) Choose *Exit*  to leave the transaction.
3. Create the following storage bins for your yard.

Continued on next page

<i>Warehouse No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>	<i>Storage Section</i>
E1##	PARKING NORTH	YARD	PSL1
E1##	PARKING SOUTH	YARD	PSL2
E1##	YARD DOOR NORTH	YARD	DOR1
E1##	YARD DOOR SOUTH	YARD	DOR2
E1##	CHECKPOINT NORTH	YARD	CHK1
E1##	CHECKPOINT SOUTH	YARD	CHK2

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Shipping and Receiving* → *Yard Management* → *Create Storage Bin*.
- b) Enter the *Warehouse No.* **E1##** and the *Storage Bin* **PARKING NORTH**. Press **Enter**.
- c) Enter the *Storage Type* and the *Storage Section*.
- d) Save  your new storage bin.
- e) Repeat the process for all listed bins.
- f) Choose *Exit*  to leave the transaction.

Continued on next page

4. Connect the checkpoints with the corresponding storage bins and assign the warehouse process type 9999 for movements.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Shipping and Receiving* → *Yard Management* → *Assign Checkpoint to Yard Bin and SCU*.
 - Enter the storage bins and the warehouse process types for the existing checkpoints.

<i>Checkpoint</i>	<i>Description</i>	<i>Storage Bin</i>	<i>Whse Proc. Type</i>
CHKN	Checkpoint North	CHECKPOINT NORTH	9999
CHKS	Checkpoint South	CHECKPOINT SOUTH	9999

- Save  your entries.
 - Choose *Exit*  to leave the transaction.
5. Control the doors in your warehouse. You want to use **DOR1** and **DOR2**. Dor1 shall be used for “Inbound”, and Dor2 shall be used for “Outbound”. The corresponding staging area groups are 9010 for goods receipt and 9020 for goods issue. Make the necessary corrections.
- In the *IMG* of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Warehouse Door* → *Define Warehouse Door*.
 - Position on your warehouse number **E1##**.
 - Change the *Load. Dir.* of the *Whse Door DOR1* to **I Inbound**.
 - Change the *Load. Dir.* (Loading Direction) of the *Whse Door DOR2* to **O Outbound** and change the *DfStgArGrp* (Default Staging Area Group) to **9020**.
 - Save  your changes.
 - Choose *Exit*  to leave the transaction.
6. Create the following bin for one of your doors (the other bin already exists):

Continued on next page

<i>Warehouse No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>	<i>Storage Section</i>
E1##	DOOR2	9040	0001

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Shipping and Receiving* → *Yard Management* → *Create Storage Bin*.
 - b) Enter the *Warehouse No.* **E1##** and the *Storage Bin* **DOOR2**. Press **Enter**.
 - c) Enter the *Storage Type* and the *Storage Section*.
 - d) *Save*  your new storage bin.
 - e) Choose *Exit*  to leave the transaction.
7. Connect the doors with the corresponding storage bins. The storage bin **Door1** shall be assigned to the door **Dor1** and the storage bin **Door2** to the door **Dor2**.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Shipping and Receiving* → *Assign Door Storage Bin and Supply Chain Unit*.
 - b) Assign the *Whse Door* **DOR1** to the *Storage Bin* **DOOR 1** and the *Whse Door* **DOR2** to the *Storage Bin* **DOOR 2**.
 - c) *Save*  your entries.
 - d) Choose *Exit*  to leave the transaction.
8. Connect the warehouse to the yard by assigning warehouse doors to yard bins.

<i>Warehouse Door:</i>	<i>YrdWhseNo.</i>	<i>Yard Bin</i>
DOR1	E1##	YARD DOOR NORTH
DOR2	E1##	YARD DOOR SOUTH

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Shipping and Receiving* → *Yard Management* → *Assign Warehouse Door to Yard Bin*.
- b) Enter the warehouse number of the yard and the yard bins as in the table.
- c) *Save*  your entries.
- d) Choose *Exit*  to leave the transaction.

Continued on next page

Task 2:

Test the yard management with an inbound delivery that includes transportation information.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW01-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) *Save* your purchase order. Note down the purchase order number.
 - d) Choose *Exit* to end the transaction.
2. Create the inbound delivery and **pack in this inbound delivery** into one **PKE-095**. Additionally enter the transportation information: The material comes with a *Means of transport type* **V100**, the *Means of transport* is **TM-100**, and the *Means of transport ID* is **EWM-120-##**.

Inbound delivery (ERP):

Continued on next page

HU: _____

- In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
- The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
- Select *Pack* .
- Enter the *Packaging Materials* **PKE-095** and press **Enter**.
- Select the newly created *Handling Unit*, select the *Material*, and choose *(Pack)* .

Note down the HU number.

- Choose *Back*  to return to the overview screen.
- Choose *Goto* → *Header* → *Shipment*.

Enter the details:

<i>MnsTransTy</i>	v100
<i>TrnsIDCode</i>	EWM-120-##
<i>MeansOfTrn</i>	TM-100

- Save  your inbound delivery. Note down the inbound delivery number.
 - Choose *Exit*  to end the transaction.
3. When the truck arrives at the warehouse, first check it in at the **Checkpoint North**, then move it to the **PARKING NORTH** and finally to the **YARD DOOR NORTH**, where you start the unloading process. Put away the material, finally move the truck back to the **Checkpoint North** and check it out.

TU: _____

TU internal number: _____

Inbound delivery (EWM): _____

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.

Continued on next page

- b) In the *Search criteria* drop-down, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search*  . Note down the number of the inbound delivery.
 - c) Confirm on the *HU* tab that an HU was created for the PKE-095.
 - d) Confirm on the *PPF Actions* tab if the action */SCWM/PRD_CREATE_VEH* was successfully processed.
 - e) Choose *Exit*  to end the transaction.
 - f) Confirm the existence of the TU. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Shipping and Receiving → Process Transportation Unit*.
- In the *Search criteria* drop-down, select the entry *TU_NUM_EXT Transportation Unit*. Enter your number **EWM-120-##** and choose *Search*  . Note down the internal number of the TU.
- g) Check the TU in at the Checkpoint North. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Shipping and Receiving → Yard Management → Arrival at/Departure from Checkpoint*.
- In pop up, maintain the *Default Values*: *Yard Warehouse No.* **E1##** and *Checkpoint* **CHKN**.
- In the *Search criteria* drop-down, select the entry *TU_NUM_EXT Transportation Unit*. Enter your number **EWM-120-##** and choose *Search*  .
- Choose *Arrival at Checkpoint + Save* .
- h) Confirm the status of the inbound delivery. The transit status should now be “Registered in Yard.”
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Delivery Processing → Inbound Delivery → Maintain Inbound Delivery*.
- In the *Search criteria* drop-down, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search*  . Confirm the *Transit Status*.
- i) Move the TU to the bin **PARKING NORTH**.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Shipping and Receiving → Yard Management → Create Warehouse Task in Yard*.
- In pop up for the *Default Values*, maintain *Yard Warehouse No.* **E1##**.

Continued on next page

In the *Search criteria* drop-down, select the entry **TU_NUM_EXT TU**. Enter your number **EWM-120-##** and choose *Search* .

Switch to *Form View* and enter the *Whse Proc.* Type **9999** and the *Dest. Yard Bin* **PARKING NORTH**.

Select *Create + Save TU Yard Movement*.

On the *Open WTs in Yard* tab, select the TU, choose *Confirm Yard Movement Background*, and *Save*  the confirmation.

The *Source Yard Bin* of the TU should now be changed to **PARKING NORTH**

- j) Move the TU further to **DOR1**.

Enter the *Whse Proc.* Type **9999** and the *Dest. Door* **DOR1**. Press **Enter**; the *Dest. Yard Bin* should now be **YARD DOOR NORTH**.

Select *Create + Save TU Yard Movement*.

On the *Open WTs in Yard* tab, select the TU, choose *Confirm Yard Movement Background*, and *Save*  the confirmation.

The *Source Yard Bin* of the TU should now be changed to **YARD DOOR NORTH**.

- k) Create the unloading task for you TU.

In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.

In the *Search criteria* dropdown, select the entry **ERP Document**. Enter your delivery number and choose *Perform Search*  . Note down the number of the inbound delivery.

Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.

Select the *Handling Units* tab.

Choose *Create*. Confirm that the warehouse task has the *Source TU* **EWM-120-##** and the *Destination Storage Type* **9010**.

Save  your warehouse task.

Choose *Exit*  twice to end the transaction.

- l) Confirm the warehouse task. In the warehouse management monitor, choose *Inbound* → *Documents* → *Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and select *Warehouse Task*.

Continued on next page

Select the active warehouse task and use *Other Methods to Confirm. Backgr.*

The second warehouse task should become active as well. Mark the second warehouse task, use *Other Methods to Confirm. Backgr.*

Choose *Exit*  to end the transaction.

m) Move the truck back to **Checkpoint North**

In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Shipping and Receiving → Yard Management → Create Warehouse Task in Yard*.

In the *Search criteria* dropdown, select the entry *TU_NUM_EXT TU*. Enter your number **EWM-120-##** and choose *Search* .

Switch to *Form View* and enter the *Whse Proc.* Type **9999** and the *Dest.-Checkpoint* **CHKN**.

Select *Create + Save TU Yard Movement*.

On the *Open WTs in Yard* tab, select the TU, choose *Confirm Yard Movement Background*, and *Save* .

The *Source Yard Bin* of the TU should now be changed to **Checkpoint North**

Select  *Exit* to end the transaction.

n) Confirm the departure of the TU at the Checkpoint North. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Shipping and Receiving → Yard Management → Arrival at/Departure from Checkpoint*.

In the *Search criteria* dropdown, select the entry *TU_NUM_EXT Transportation Unit*. Enter your number **EWM-120-##** and choose *Search* .

Choose *Dep. from Checkpoint + Save* .

Choose *Exit*  to end the transaction.



Lesson Summary

You should now be able to:

- Set up yard management
- Control movements in the yard

Lesson: Determine Staging Areas, Doors, and Routes

Lesson Overview

In this lesson you will learn how to set up the determination of staging areas and doors and what possibilities SAP Extended Warehouse Management offers for working with routes.



Lesson Objectives

After completing this lesson, you will be able to:

- Set up the determination of staging areas and doors in EWM
- Explain the use of doors in EWM
- Describe and set up the route determination

Business Example

You need to control and organize the flow of goods in the warehouse. One way to do that is the determination of staging areas and doors.

Staging Areas and Doors

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

You can group multiple staging areas into staging area groups. The staging area group corresponds to a storage type (storage type role “D”), while the staging area corresponds to a storage section. You can divide each staging area into one or more storage bins. You need multiple storage bins, for example, if you want to define a loading sequence.

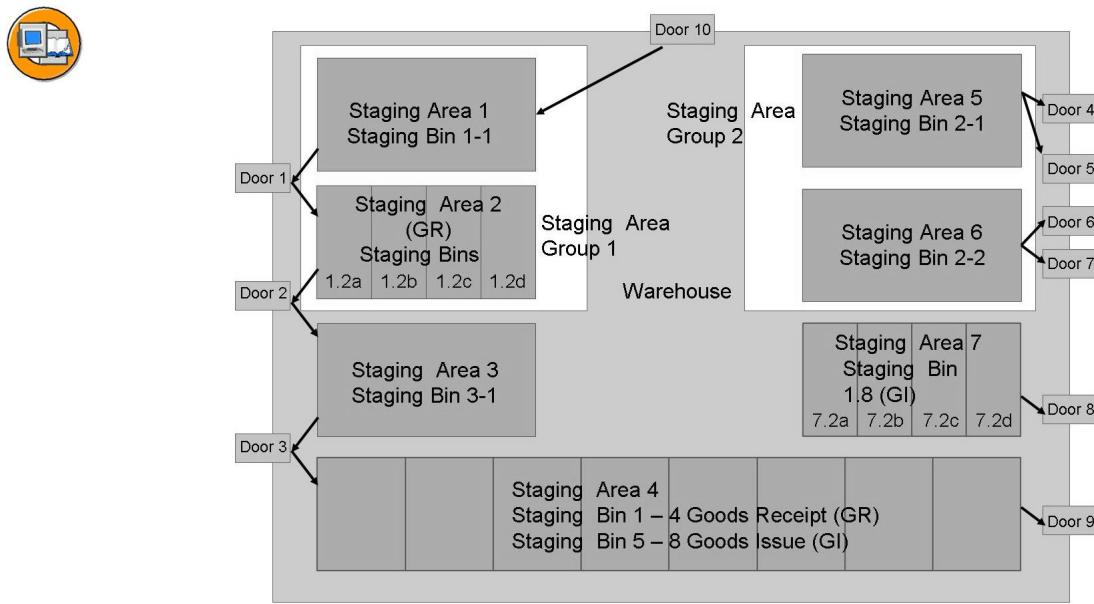


Figure 31: Staging Areas and Doors

Doors are locations 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 staging areas.

You can assign directions to a door:

- Inbound
- Outbound
- Inbound and outbound

You assign each door to a storage bin that you can use to post goods receipts or goods issues. You assign this storage bin to a storage type with the storage type role “F”. You can also assign doors to supply chain units to control authorization checks. You can also assign doors to yard bins, which are used in yard management.

Staging Area and Door Determination

In the staging area and door determination, the system can determine the following values by using determination rules:

- Staging area groups
 - A staging area group is a storage type with the role “D”.
- Staging area
 - A staging area is a section in a storage type which has the role staging area group.
- Staging bays
 - A staging bay is a bin in a staging area.
- Doors

Staging area and door determination runs automatically in the background when you create or change a delivery (outbound delivery order or inbound delivery) in Extended Warehouse Management. In the outbound delivery process, it runs after route determination since the route influences the determination of staging areas and doors.

So that the system can perform staging area and door determination in the background, you must define determination rules. When doing this, you first specify which values the system is to compare with the values in the delivery. The values which can be used for the determination are depending on the direction of the process:

- Inbound delivery process:
 - Warehouse process type
 - Staging area / door determination group
- Outbound delivery process:
 - Routes
 - Departure calendar
 - Staging area / door determination group
 - Destination sequence numbers



Note: Please note that although the staging area / door determination group from the product master can be used for inbound and outbound delivery processes, there is only **one** assignment in the warehouse product master in the stock removal section.

When you use the integration with the transportation (LE-TRA) component of SAP ERP, you can use additional information from the shipment to determine staging areas and doors:

- For inbound processing:
 - Carrier
 - Means of transport
 - Handling unit (HU) type of packaging material
- For outbound processing:
 - Carrier
 - Ship-to party
 - Means of transport
 - Handling unit (HU) type of packaging material

Route Determination

Extended Warehouse Management can work with different routes in delivery processing:

- Route (SD)

This is the route that can be entered in the SD sales order in ERP, for example, or determined by ERP route determination. It influences transportation scheduling. For example, the system can determine from the route that goods are to be sent by rail to Boston. Therefore, during transportation scheduling, the system takes into account how far in advance loading space in the freight car must be reserved. As well as this route, the ERP route determination can also determine a route schedule. This route is sometimes called an ERP route.
- Route (SCM)

This is the route used in SCM/EWM route determination, for example, which is also transferred from a CRM system. This route is sometimes called the **Geo route**. It is a sequence of legs that are connected by transshipment locations. This route represents a framework or corridor that comprises multiple trips, in other words, possible concrete itineraries.

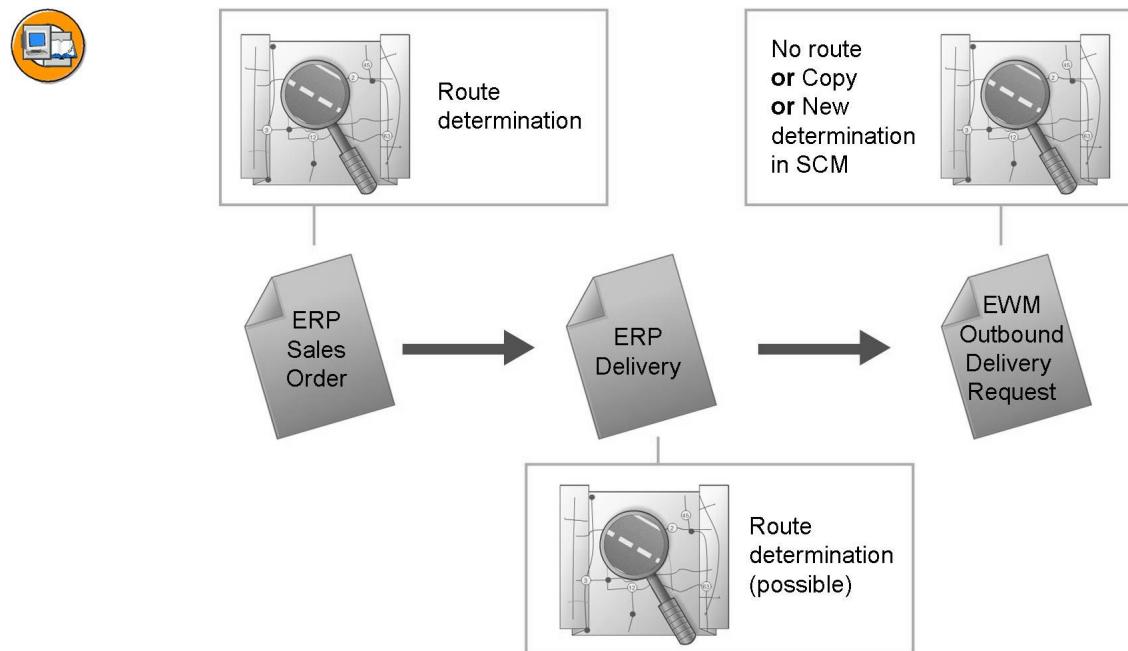


Figure 32: Route Determination

In Customizing you can set up how and which route data or route schedule is to be copied from the ERP system into the EWM system. The following settings are possible:

- Route (SCM) is used

This setting is active in the standard system. The route may come from an SCM system, for example. This route is usually filled if you are working with a CRM system in which routes from an SCM system are used (for example, by the availability check).
- Use Route (SD) if Route (SCM) is initial

An SD route that may exist in the document is only used if the route (SCM-EWM) is not filled at the same time.
- Use Route (SD) if Route (SD) and Route Schedule are Filled

An SD route that may exist in the document is only used if the SD route and route schedule are transferred from the ERP system.

Depending on the above settings, the *Origin of Route Master Data* indicator is also set in the delivery. Note that if neither a route (SCM) or a route (SD) exist in the document, the indicator is left blank, which means *Route and Departure Calendar from SCM*.

Route determination in EWM is based on the SCM routing guide. If activated, it runs automatically in the background.

Route Determination Settings

To be able to perform route determination, you have to enter first of all some basic Customizing settings under *Extended Warehouse Management → Goods Issue Process → Outbound Delivery → Route determination → Activate or Deactivate Route Determination*. Here you can also deactivate route determination for certain combinations of warehouse number, document type, and document category. You can also specify if a route determination in EWM shall not happen in case of a route originating from ERP.

Master data that needs to be defined for the route determination:

- General transportation cost profile
- Location
- Transportation lane
- Route
- Zone
- Carrier profile



Hint: If you integrate with the transportation (LE-TRA) component of SAP ERP, you have to **deactivate** route determination in SCM Basis, as transportation integration uses routes from SAP ERP.

Delivery Splits

You can perform a delivery split in various business processes. For example, you have completely picked an outbound delivery order in Extended Warehouse Management. You find that you cannot load the complete quantity. You can create an outbound delivery for individual delivery items and therefore perform an outbound delivery split. Either you or the system can split an outbound delivery order or an outbound delivery.

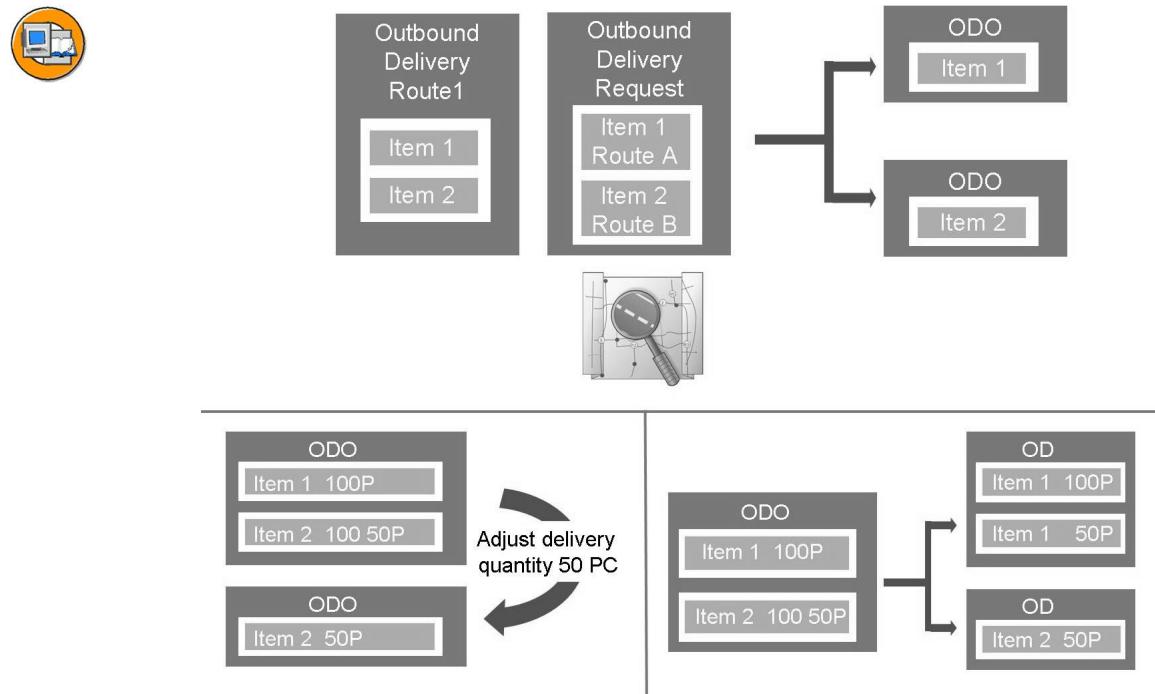


Figure 33: Delivery Splits

Outbound Delivery Order Split Based on the Outbound Delivery Request

If EWM finds various routes for different delivery items, it performs an outbound delivery order split. For example, an outbound delivery request consists of delivery items 10, 20, and 30. Delivery items 10 and 20 have route R1 and delivery item 30 has route R2. EWM creates an outbound delivery order for delivery items 10 and 20 and a second outbound delivery order for delivery item 30. You can program a separate logic for route determination in the Business Add-In (BAdI) *BAdI Route Determination and Route Check* that causes EWM to perform an outbound delivery order split.

Outbound Delivery Order Split

You have defined process codes that adjust **both** the delivery quantity and the transferred delivery quantity; that is, you have chosen the value *2 Adjustment of Delivery Quantity and Del. Quant.* You can then totally delete a delivery item or reduce the delivery quantity of a delivery item. EWM determines a the process code according to your Customizing settings for delivery quantity changes. If you want to work without a default process code, choose *Adjust Delivery Quantity* for the selected delivery item and specify a process code. When you select the corresponding process code, EWM adjusts the delivery quantity and the transferred delivery quantity. EWM performs a delivery split automatically and creates a new outbound delivery order that contains delivery items for the partial quantities that are still missing or for the totally deleted delivery item.

The prerequisite for this is that you have not performed a warehouse activity for this delivery item or partial quantity. For example, you have not created a warehouse task for picking yet.

Outbound Delivery Split

If you want to perform an outbound delivery split, you split an outbound delivery order item. EWM creates corresponding subitems. You create outbound deliveries for the individual subitems. You can split delivery items for both packed and unpacked products. EWM displays the subitems that have been created on the Items or HU tab page using + symbols in the Level column. You can also delete an outbound delivery split. To do so, you must first delete the corresponding outbound delivery and then the subitem. You delete the whole subitem when deleting unpacked products. For packed products, you can delete the parts of a subitem that are packed in an HU.

When you save a newly created subitem, EWM posts the stock of the delivery item to the subitem, meaning that the stock is item based. You can post goods issue for every subitem. The document flow always displays the quantity of delivery items that have not been split and does not display the corresponding subitems.

Exercise 10: Transfer Routes from ERP to EWM

Exercise Objectives

After completing this exercise, you will be able to:

- Transfer routes with deliveries to EWM

Business Example

You might want to use the route determined in ERP for planning shipping in EWM or for automatic wave assignment. For that you need to transfer the route with the delivery data.

Task 1:

Set up the usage of the route from the delivery in EWM.

- Create an entry for your ERP warehouse number that SD routes shall be used if SCM routes are not determined.

Task 2:

Create a sales order and a delivery.

- Create a sales order as detailed below and the outbound delivery. Note down the route in the delivery.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW01-##
<i>Quantity</i>	10

Sales order: _____

Delivery: _____

Route: _____

Continued on next page

Task 3:

Confirm that the outbound delivery order indeed includes the route from the delivery.

1. Look for the outbound delivery order and confirm the route.

Outbound delivery order:

Route: _____

Task 4:

Remove the settings for the usage of the route from the delivery in EWM.

1. Delete the previously created entry for your ERP Warehouse Number that SD routes shall be used if SCM routes are not determined.

Solution 10: Transfer Routes from ERP to EWM

Task 1:

Set up the usage of the route from the delivery in EWM.

1. Create an entry for your ERP warehouse number that SD routes shall be used if SCM routes are not determined.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Interfaces → ERP Integration → Delivery Processing → Map Routes and Route Schedules from ERP System to EWM*.
 - b) Choose *New Entries*.
 - c) Create a new entry:

<i>Whse No. ERP</i>	E## Attention: This is the ERP warehouse number!
<i>Mapping Route</i>	1 Use Route (SD) If Route (SCM) is Initial

- d) Save  the new entry.
- e) Choose *Exit*  to leave the transaction.

Task 2:

Create a sales order and a delivery.

1. Create a sales order as detailed below and the outbound delivery. Note down the route in the delivery.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW01-##
<i>Quantity</i>	10

Sales order: _____

Delivery: _____

Continued on next page

Route: _____

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
- b) Enter *Order Type*: OR and press **Enter**.
- c) Enter the details as described in the table.
- d) Save your sales order. Note down the sales order number.
- e) Choose *Exit* to end the transaction.
- f) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
- g) Enter the *Shipping point* **Z0##**. The *Order* should default. Press **Enter**.
- h) Select the *Transport* tab. Here you can find the *Route*. Note down the route.
- i) Save your delivery. Note down the delivery number.
- j) Choose *Exit* to return to the *Easy Access* menu.

Task 3:

Confirm that the outbound delivery order indeed includes the route from the delivery.

1. Look for the outbound delivery order and confirm the route.

Outbound delivery order: _____

Route: _____

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
- b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
- c) Select *Switch to Form View*. Note down the route.
- d) Choose *Exit* to return to the *Easy Access* menu.

Continued on next page

Task 4:

Remove the settings for the usage of the route from the delivery in EWM.

1. Delete the previously created entry for your ERP Warehouse Number that SD routes shall be used if SCM routes are not determined.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Interfaces → ERP Integration → Delivery Processing → Map Routes and Route Schedules from ERP System to EWM*
 - b) Select the entry for your *WNoERP E##* and choose *Delete* .
 - c) *Save*  your changes.
 - d) Choose *Exit*  to leave the transaction.



Lesson Summary

You should now be able to:

- Set up the determination of staging areas and doors in EWM
- Explain the use of doors in EWM
- Describe and set up the route determination

Lesson: Plan Transportation, Shipping, and Receiving

Lesson Overview

In this lesson you will learn about the possibilities to plan transportation with SAP EWM.



Lesson Objectives

After completing this lesson, you will be able to:

- Explain the possibilities of transportation planning within SAP Extended Warehouse Management
- Plan transports for inbound and outbound deliveries

Business Example

Your deliveries need to be transported from your warehouse to other warehouses or to your customers. Depending on the available transportation resources or other constraints, it might be necessary to make the deliveries fit.

Planning Transportation in Extended Warehouse Management

EWM has some possibilities to support customers in transportation planning. First of all it has its own Transportation Management (TM) (sometimes called Freight Order Management), which mainly provides some transportation planning functionalities and the interface to external transportation planning system. It is a lean component whose main objective is the shipment consolidation and load consolidation.

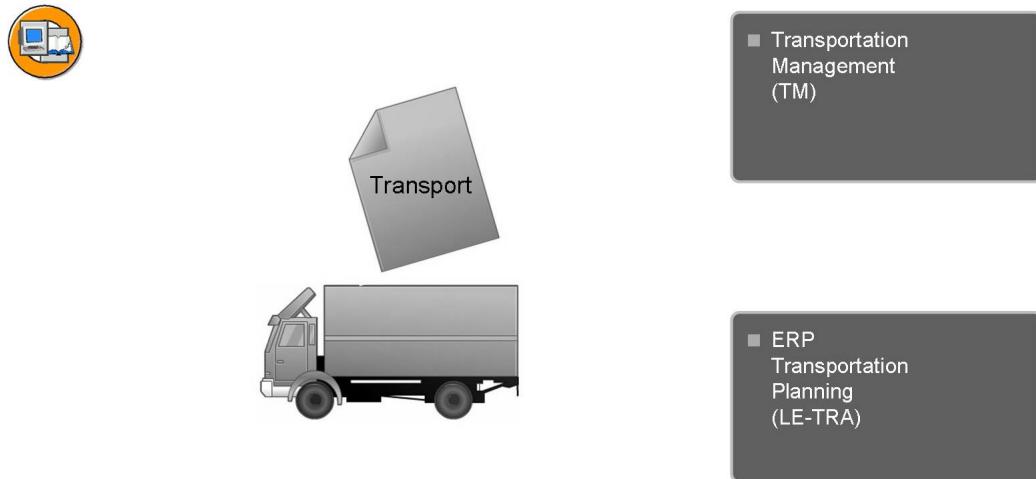


Figure 34: Planning Transportation

Since SCM 7.0 enhancement package 1, EWM also offers an ERP Transportation Management integration based on the IDoc interface already existing in SAP ERP. Apart from the new interface, this functionality is mainly integrated in existing EWM functionalities. According to this, shipping and receiving objects like transportation units and vehicles, as well as delivery processing objects and functions, are reused.

Transportation Management in EWM

Transportation Management (TM) in EWM offers **basic** transportation planning features, but also works as an **interface** to external transportation planning system. With TM you can create shipments and freight documents.

The **shipment** consolidates all the goods from one issuing location (for example, a warehouse) to a destination location (a customer).

The **freight document** consolidates shipments and therefore contains what is shipped together in a TU or a vehicle.

Shipment

Shipments can be created manually or automatically. A shipment can have different characteristics that are determined by the shipment type as well as its relationship to other shipments. You define the shipment type in Customizing for Transportation Management (TM). It contains all the important control parameters for the shipment document.

There are two classifications of shipments:

- Planned shipments

They can still change with regard to type and size, for example, due to a subsequent delivery split in Extended Warehouse Management.

- Final shipments

They are fixed with regard to type and size, in other words, they are confirmed. Most of these shipments are already packed or loaded.

Freight Document

The freight document is relevant to transferring planning results and to printing, and maps trips as well as multiple pickups and stops. You can create freight documents both manually and automatically. You define the freight document type in Customizing for *Transportation Management* (TM). It contains all the important control parameters for the freight document.

You can manually set statuses in the freight document, for example, *Transportation Completed*. In this case, this status is set automatically for all the bills of lading contained in the freight document. These are then printed automatically. You can also print master bills of lading and freight lists from the freight document.

Freight Order Management Processes

There are different possibilities for the Transportation Management process, first of all depending of if the planning is really done in EWM or if you use an external transportation planning system.

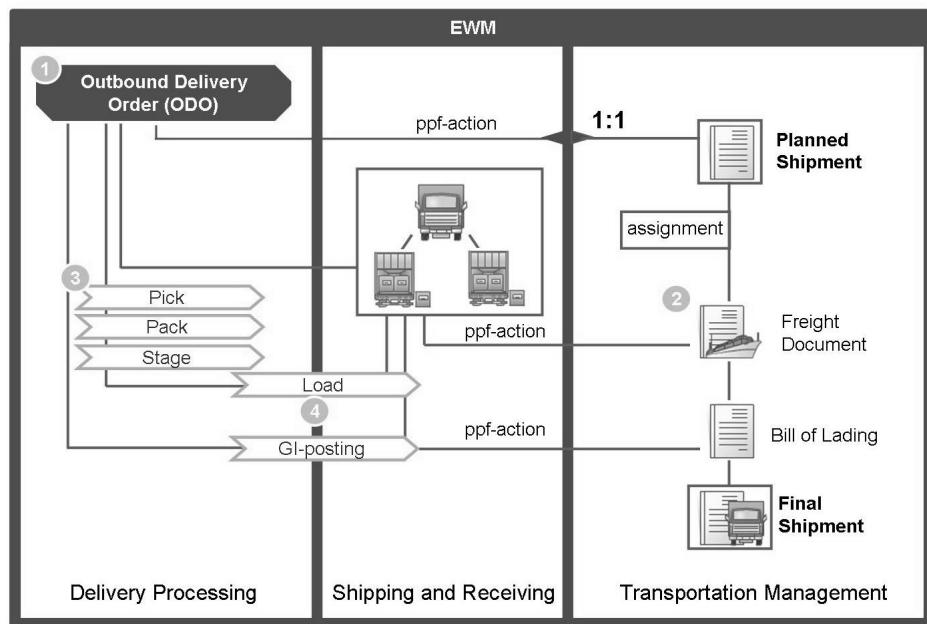


Figure 35: Planning Before Execution

Planning before execution

- For each relevant outbound delivery order, you create manually or automatically via a PPF action a **planned shipment**. Then you create a **freight document** and assign the planned shipments. In the freight document there should be a **means of transport** and a **vehicle number** entered. Via a PPF action, a TU and/or a vehicle with one or multiple TUs is created from this data. Also, the outbound delivery orders assigned to the freight document are assigned to the TUs.

After finishing the relevant warehouse process steps, you load the TU with the outbound delivery orders. Triggered by the goods issue posting in the TU and when the *Loading Completed* status is set, a **bill of lading** is being created, and the **planned shipment** is replaced by a **final shipment**.

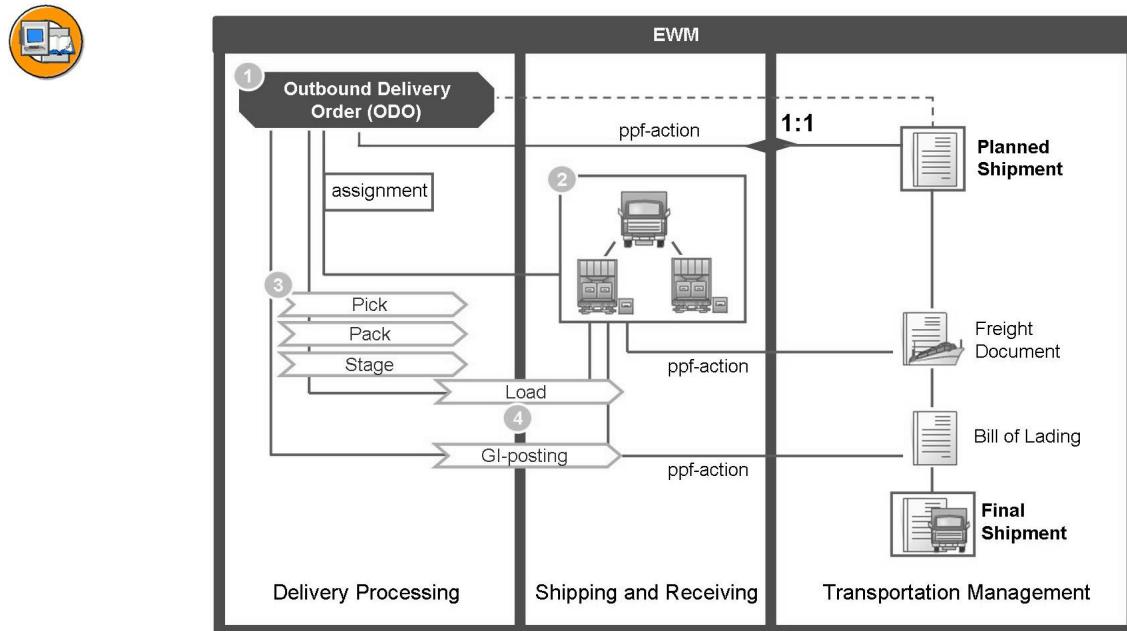


Figure 36: Execution Fixes Planning

Execution fixes planning

- For each relevant outbound delivery order you create manually or automatically via a PPF action a **planned shipment**. Then you create a TU or a Vehicle and assign the outbound delivery order to this TU or Vehicle. Via a PPF action a **freight document** is created and the **planned shipment** is automatically assigned to it.

After finishing the relevant warehouse process steps, you load the TU with the outbound delivery orders. Triggered by the goods issue posting in the TU and when the *Loading Completed* status is set, a **bill of lading** is being created, and the **planned shipment** is replaced by a **final shipment**.

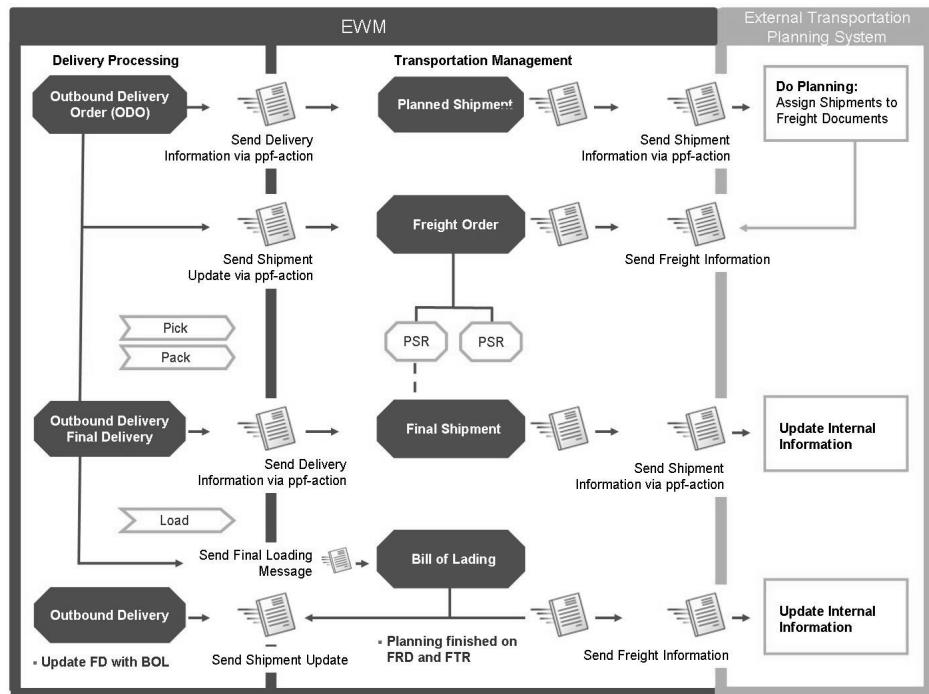


Figure 37: External Planning System

External transportation planning system

- For each relevant outbound delivery order you create manually or automatically via a PPF action a **planned shipment**. This planned shipment again sends a shipment information to the external transportation planning system. In this system the shipments gets planned, meaning the are consolidated into a transport or shipment. For this transport the external system then sends a message back and creates in EWM a **freight document**, which groups the planned shipments and automatically creates a TU and/or a vehicle.

When the warehouse processes for the outbound delivery order are finished, the **planned shipment** is replaced by a **final shipment** and when the outbound delivery order is loaded, a **bill of lading** is being created and the **freight order** is updated with this information.

Updates for the shipment and the bill of lading are sent to the external transportation planning system.

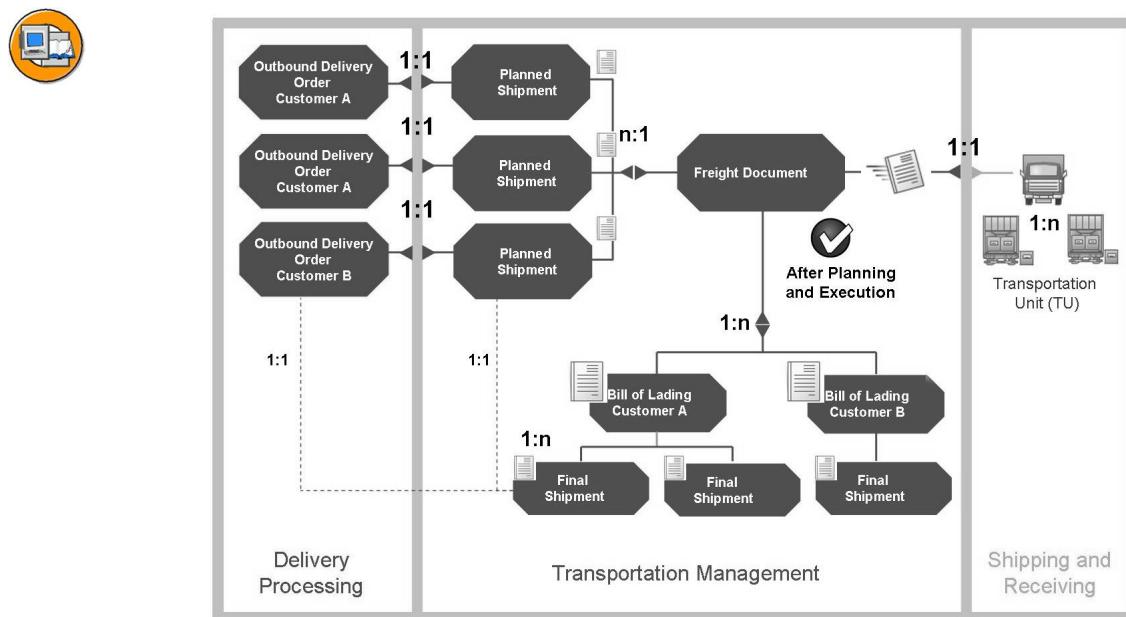


Figure 38: Relationship Between S&R Objects and Transportation Management

Transportation Management Integration with ERP

Besides EWM's own Transportation Management, EWM also offers integration with the transportation (LA-TRA) component of SAP ERP. With this integration, you can control and monitor the entire transportation process from the planning stage to the goods receipt at the customer location or your own plant.

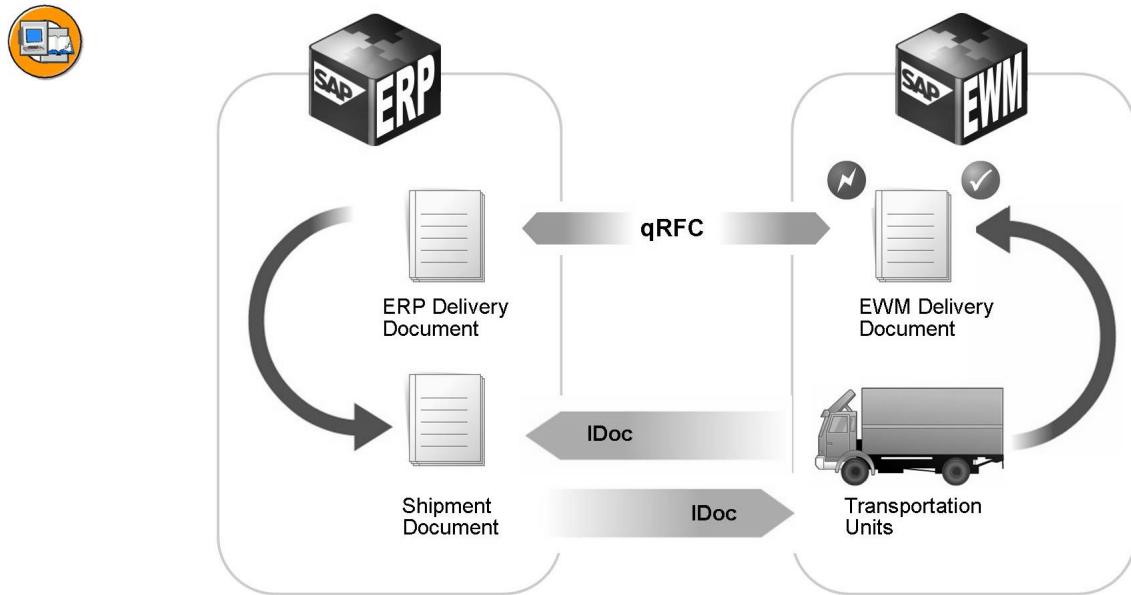


Figure 39: Integration with ERP Transportation Management

Requirements

The integration of the EWM delivery processing with the SAP ERP Transportation is available with EWM 7.0 enhancement package

1. You must activate the business function *EWM, Integration with Transportation* (SCM_EWM_TRANS_INT_1). Additionally there are two BC Sets to be activated: /SCWM/DLV_OUTBOUND_TRANSP_INT and /SCWM/DLV_INBOUND_TRANSP_INT.

Outbound deliveries and outbound delivery orders that are relevant for transportation planning in SAP ERP are **not** relevant for transportation cross-docking in EWM. If you integrate with the transportation (LE-TRA) component of SAP ERP, you have to **deactivate** route determination in SCM Basis, as transportation integration uses routes from SAP ERP.

Transportation Planning Scenarios

Transportation integration enables you to plan **inbound** and **outbound** transports.

Inbound processing with transportation integration

- When you create a delivery in SAP ERP, the system replicates it to EWM. You can then create a shipment in SAP ERP and assign inbound deliveries to it. When the planning for the shipment is completed, the system replicates the shipment with the assigned inbound deliveries to EWM through the SHPMNT05 IDoc. After receiving the IDoc in EWM, the system automatically creates transportation unit (TU) activities (and, optionally, a vehicle activity) for the shipment with the assigned inbound deliveries. You can then process the unloading, the goods receipt, and the putaway by using the desktop or radio frequency transactions.

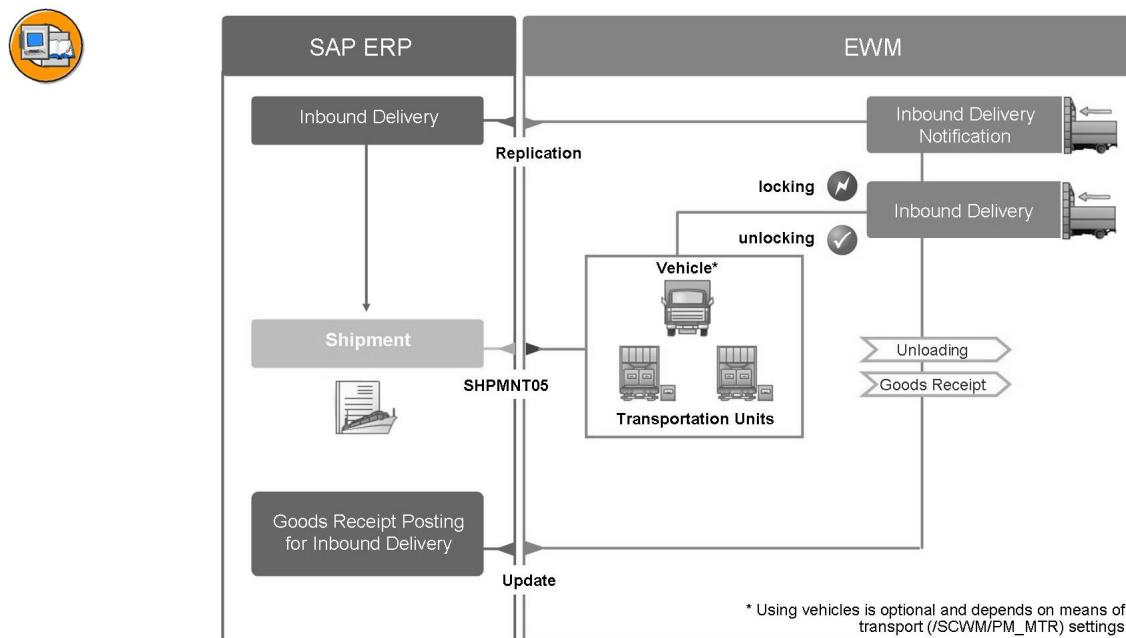


Figure 40: Inbound Transportation Planning

Outbound processing with transportation integration

Two process variations are possible for outbound processing:

- Outbound processing with **transportation planning in SAP ERP**

When you create a delivery in SAP ERP, the system replicates it to EWM. You can then create a shipment in SAP ERP and assign outbound deliveries to it. When you save the shipment with the assigned outbound deliveries, the system replicates it to EWM through the *SHPMNT05* IDoc. After receiving the IDoc in EWM, the system automatically creates corresponding TU activities (and optionally a vehicle activity). You can then process the picking (and optionally the packing and the loading) by using the desktop or radio frequency transactions. After loading is completed in the system, you can post the goods issue. When the system has set the Goods Issue Posted status of the TU, the system replicates the TU to SAP ERP through the *SHPMNT05* IDoc as an update of the existing shipment in SAP ERP.

Based on the assigned HU data from SAP ERP, the system creates TU activities and vehicle activities in the following way:

- If you have one HU assigned to the shipment and you have selected the *Optional* checkbox in *Link Between Packaging Material (TU) and Means of Transport* (transaction /SCWM/PM_MTR), the system creates only a TU activity.
- If you have one HU assigned to the shipment and you have not selected the *Optional* checkbox in *Link Between Packaging Material (TU) and Means of Transport* (transaction /SCWM/PM_MTR), the system creates a TU activity and a vehicle activity.
- If you have more than one HU on the same level, the system uses the first HU to create a vehicle activity and it uses the remaining HUs to create TU activities.
- If you have nested HUs, the system uses the highest-level HU to create a vehicle activity, and it uses the lower-level HUs to create TU activities.

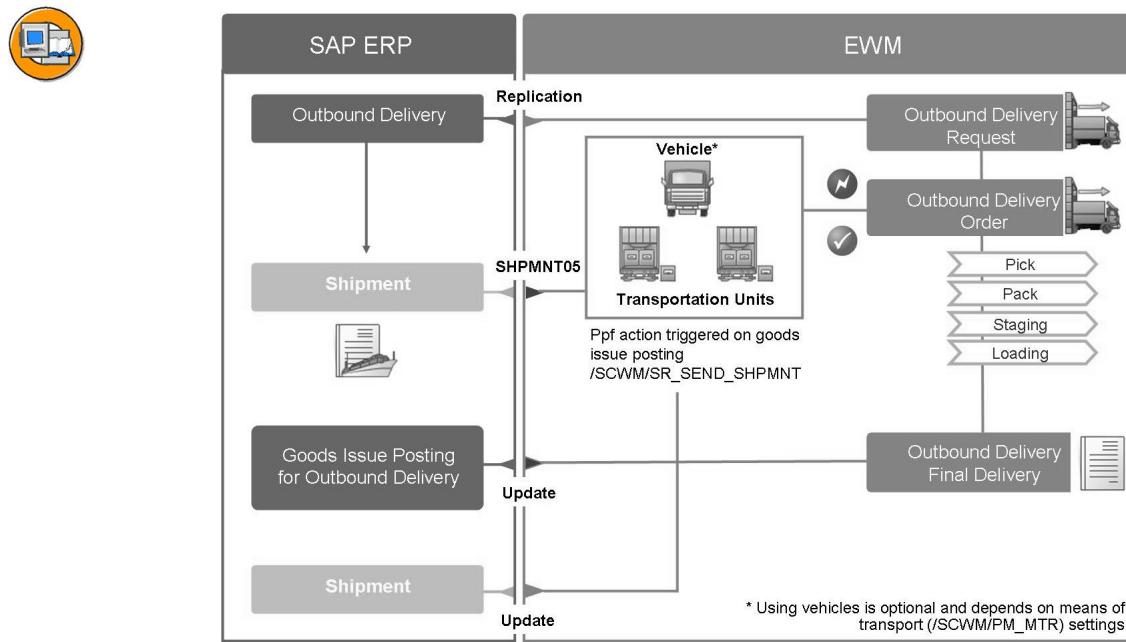


Figure 41: Outbound – ERP Planning

- Outbound processing with **transportation planning in EWM**

When you create a delivery in SAP ERP, the system replicates it to EWM. In EWM, you assign the delivery to a TU (and optionally a vehicle). You can then process the picking (and optionally the packing and the loading) by using the desktop or radio frequency transactions. After loading is completed in the system, you can post the goods issue. When the system has set the *Goods Issue Posted* status of the TU, the system replicates the TU to SAP ERP through the SHPMNT05 IDoc and creates a new shipment in SAP ERP.

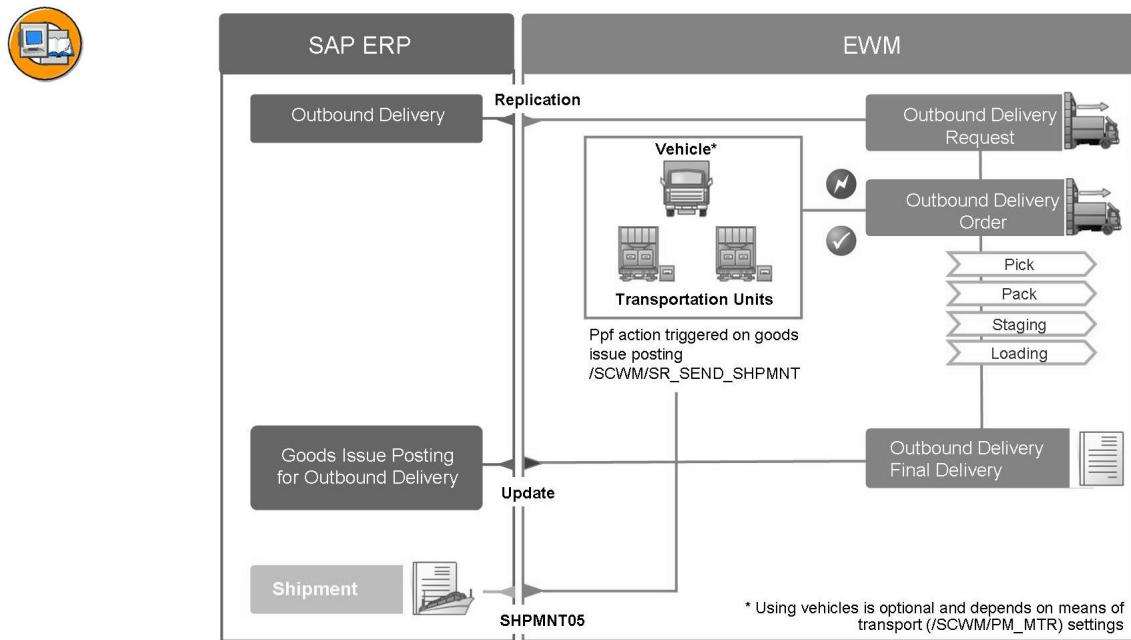


Figure 42: Outbound – EWM Planning

IDoc Processing

Since the status update for outbound shipments is triggered through the *Good Issue Posted* status of the transportation unit, this might lead to a conflict and a non-processing of the IDoc. As at the same time the goods issue posting and a status update of the delivery is triggered, a lock on the delivery will eventually not allow the update on the shipment through the IDoc.

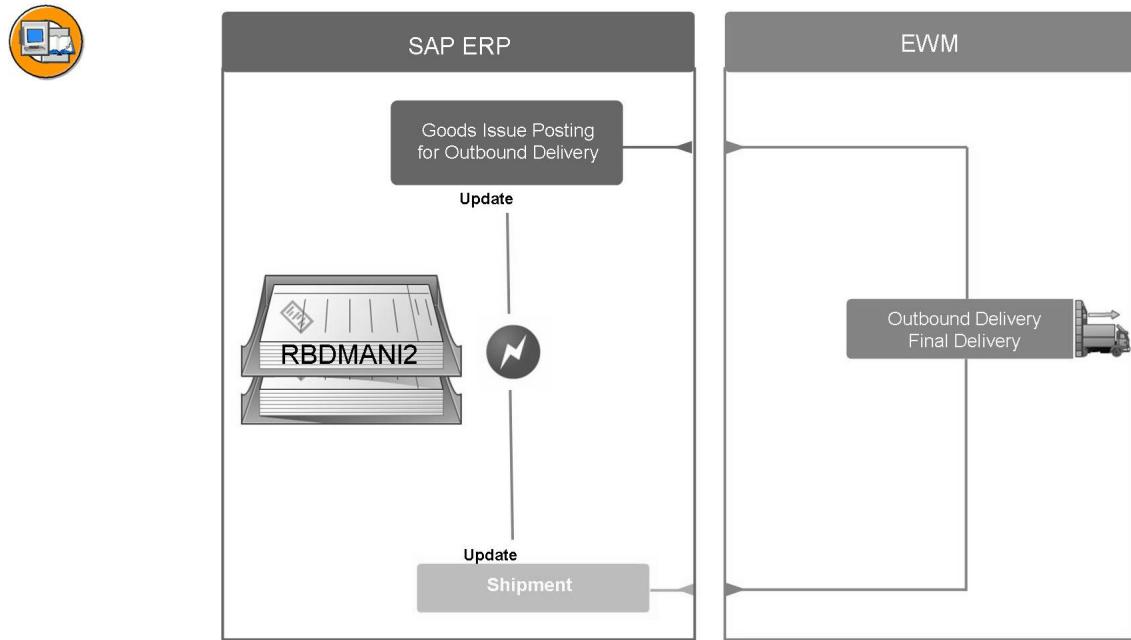


Figure 43: IDoc Processing for Proper Status Update

For that reason it is recommended to schedule a regular job for the program **RBDMANI2** (Manual Processing of IDocs: Post IDocs Not Yet Posted) with a variant for the message type SHMPNT.

Exercise 11: Transportation Management – Planning Before Execution

Exercise Objectives

After completing this exercise, you will be able to:

- Create shipments and freight document in SAP Extended Warehouse Management

Business Example

For basic shipment planning, you create shipments and freight documents in SAP Extended Warehouse Management. With these documents you can create the required documents for your forwarder and combine individual deliveries for your customer for shipping.

Task:

Create a outbound delivery order, which is relevant for Transportation Management. Then create the freight document and the transportation unit for the shipment.

1. Create a sales order as detailed below and create the outbound delivery. Check the PPF actions of the EWM outbound delivery order.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW01-##
<i>Quantity</i>	2

Sales order: _____

Delivery: _____

Outbound delivery order:

Continued on next page

2. Look for the **shipment** and note down the shipment number.



Hint: The number of the outbound delivery order is at the same time the external document number for the shipment.

Shipment: _____

3. Create a **freight document** with transportation planning point **1000 - Trsp. Hamburg Truck**. Assign the shipment and enter the *Vehicle Number ##-001*.

Freight document: _____

4. Confirm the creation of the transportation unit and the assignment of the outbound delivery order. The *Vehicle Number* you have entered in the freight document corresponds to the *External TU Number*.

Internal TU number: _____

5. Check the TU in at the Checkpoint North.

6. Create and confirm the warehouse task for picking the material.

7. Use the simple load process to load the transportation unit. Then post the goods issue of the outbound delivery order also via the transportation unit.

8. Confirm the creation of the final transportation request and the bill of lading. Use the vehicle number to search for the documents.

Shipment number for the final transportation request (FTRQ): _____

Shipment number for the bill of lading (BOLD): _____

9. Confirm the assignment of the bill of lading to the freight document. Use again the vehicle number to search for the document.

Solution 11: Transportation Management – Planning Before Execution

Task:

Create a outbound delivery order, which is relevant for Transportation Management. Then create the freight document and the transportation unit for the shipment.

1. Create a sales order as detailed below and create the outbound delivery. Check the PPF actions of the EWM outbound delivery order.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW01-##
<i>Quantity</i>	2

Sales order: _____

Delivery: _____

Continued on next page

Outbound delivery order:

-
- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - b) Enter *Order Type*: **OR** and press **Enter**.
 - c) Enter the details as described in the table.
 - d) *Save* your sales order. Note down the sales order number.
 - e) Choose *Exit* to end the transaction.
 - f) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
 - g) Enter the *Shipping point* **Z0##**. The *Order* should default. Press **Enter**
 - h) *Save* your delivery. Note down the delivery number.
 - i) Choose *Exit* to return to the *Easy Access* menu.
 - j) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - k) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
 - l) Select the *PPF Actions* tab. Confirm that the **Action Send Transportation Information** was successfully processed.
2. Look for the **shipment** and note down the shipment number.



Hint: The number of the outbound delivery order is at the same time the external document number for the shipment.

Shipment: _____

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Transportation* → *Maintain Shipment*.
- b) In the *Search criteria* dropdown, select the entry *EXTNO External Document Number*. Enter your outbound delivery order number and choose *Search* . Note down the number of the shipment.

Continued on next page

3. Create a **freight document** with transportation planning point **1000 - Trsp. Hamburg Truck**. Assign the shipment and enter the *Vehicle Number ##-001*.

Freight document:

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Transportation* → *Maintain Freight Document*.
 - b) Choose *Generate Freight Document* . The *Frgt Doc. Type* in the popup should be already filled with **FRD Collective Shipment - Outbound**. Enter the *TransportPlantPt* **1000 - Trsp. Hamburg Truck**.
- Choose *Continue* .
- c) Select the *Unassigned Shipments* tab.
 - d) Select the *Select Shipments* icon.
 - e) Enter the shipment number as *Document Number* and choose *Execute* .
 - f) Select the icon *Add to Freight Document* .
 - g) Switch to form view and enter the *Vehicle Number ##-001*.
 - h) Save your freight document. Note down the freight document number.
 - i) Choose *Exit* to return to the *Easy Access* menu.

4. Confirm the creation of the transportation unit and the assignment of the outbound delivery order. The *Vehicle Number* you have entered in the freight document corresponds to the *External TU Number*.

Internal TU number:

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Process Transportation Unit*.
- b) In the *Search criteria* dropdown, select the entry *TU_NUM_EXT Transportation Unit*. Enter your vehicle number and choose *Search* . Note down the internal number of the TU.
- c) On the *Assigned Del.* tab, confirm that the outbound delivery order is assigned.
- d) Choose *Exit* to return to the *Easy Access* menu.

Continued on next page

5. Check the TU in at the Checkpoint North.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Yard Management* → *Arrival at/Departure from Checkpoint*.
 - b) In the *Search criteria* dropdown, select the entry *TU_NUM_EXT Transportation Unit*. Enter your vehicle number and choose *Search* .
 - c) Choose *Arrival at Checkpoint + Save* .
 - d) Choose *Exit*  to return to the *Easy Access* menu.
6. Create and confirm the warehouse task for picking the material.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* .
 - c) Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
 - d) Choose *Create + Save Warehouse Task*.
 - e) Choose *Warehouse Task* → *Confirm*.
 - f) Make sure that the warehouse order is marked and choose the *Confirm + Save* button.
 - g) Choose *Exit*  three times to return to the *Easy Access* menu.
7. Use the simple load process to load the transportation unit. Then post the goods issue of the outbound delivery order also via the transportation unit.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Process Transportation Unit*.
 - b) In the *Search criteria* dropdown, select the entry *TU_NUM_EXT Transportation Unit*. Enter your HU number and choose *Search* .
 - c) Make sure that the TU is selected, then choose *Action* → *Load* → *Finish Loading* or choose the *Load* icon.
 - d) Choose *Save*  to save the status.
 - e) Choose *Action* → *Goods Movement* → *Goods Issue + Save* or choose the *Goods Issue* icon.
 - f) Choose *Exit*  to return to the *Easy Access* menu.

Continued on next page

8. Confirm the creation of the final transportation request and the bill of lading. Use the vehicle number to search for the documents.

Shipment number for the final transportation request (FTRQ):

Shipment number for the bill of lading (BOLD):

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Transportation* → *Maintain Shipment*.
 - b) In the *Search criteria* dropdown, select the entry *VEHICLE Vehicle Number*. Enter your vehicle number **##-001** and choose *Search* . Note down the number of the two new shipments.
 - c) Choose *Exit*  to return to the *Easy Access* menu.
9. Confirm the assignment of the bill of lading to the freight document. Use again the vehicle number to search for the document.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Transportation* → *Maintain Freight Document*.
 - b) In the *Search criteria* dropdown, select the entry *VEHICLE Vehicle Number*. Enter your vehicle number **##-001** and choose *Search* .
 - c) Select the *Assigned Shipments* tab. Confirm that the *Shipment Type* is “**BOLD**” and the *Document Number* corresponds to the number you noted down in the last step.
 - d) Choose *Exit*  to return to the *Easy Access* menu.

Exercise 12: Integration of EWM and ERP Transportation Planning

Exercise Objectives

After completing this exercise, you will be able to:

- Set up the integration of EWM with the ERP transportation planning for transportation planning in ERP

Business Example

To plan transportation of your goods to your customers, you can use the Logistics Execution System (LES) in SAP ERP, which offers a simple transportation planning function with freight cost calculation.

Task 1:

Activate the integration with transportation planning.

1. Activate the transportation integration for your warehouse number **E1##**, the document category **PDO**, and the document type **OUTB**. The transportation planning shall be obligatory in the ERP system.

Task 2:

Test the transportation planning process.

1. Create a sales order as detailed below and create the outbound delivery. Check the status of the EWM outbound delivery order.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW01-##
<i>Quantity</i>	2

Sales order: _____

Delivery: _____

Outbound delivery order:

Continued on next page

Status: _____

2. Create a shipment in the ECC system. The transportation planning point is **1000 - Trsp. Hamburg Truck**, and the shipment type is **9001 - EWM Out ERP plan**. Add the outbound delivery and create an HU with the packaging material **TM-100**.

HU: _____

Shipment: _____

3. Reconfirm the status of your outbound delivery order. If you are still in the display of the outbound delivery order you can just refresh the display.

Status: _____

4. Confirm the transportation unit and the assignment of the outbound delivery order to the TU. You can use the HU number as external number of the transportation unit for searching.

5. Check the TU in at the Checkpoint North.

6. Create and confirm the warehouse task for picking the material.

7. Use the simple load process to load the transportation unit. Then post the goods issue of the outbound delivery order also via the transportation unit.

8. Confirm the final status in the shipment. All the statuses should be set now.

9. **Deactivate** the transportation integration for your warehouse number **E1##** again.

Solution 12: Integration of EWM and ERP Transportation Planning

Task 1:

Activate the integration with transportation planning.

1. Activate the transportation integration for your warehouse number **E1##**, the document category **PDO**, and the document type **OUTB**. The transportation planning shall be obligatory in the ERP system.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Goods Issue Process → Outbound Delivery → Integration with Transportation → Define Transportation Planning Type (Outbound)*.
 - b) Choose *New Entries*.
 - c) Create a new entry with the following details:

<i>Warehouse No.</i>	E130
<i>Document Type</i>	OUTB
<i>TransPlanType</i>	A Obligatory External Planning in ERP

- d) Save  your entry.
- e) Choose *Exit* .

Task 2:

Test the transportation planning process.

1. Create a sales order as detailed below and create the outbound delivery. Check the status of the EWM outbound delivery order.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW01-##
<i>Quantity</i>	2

Continued on next page

Sales order: _____

Delivery: _____

Outbound delivery order:

Status: _____

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - b) Enter *Order Type* **OR** and press **Enter**.
 - c) Enter the details as described in the table.
 - d) *Save* your sales order. Note down the sales order number.
 - e) Choose *Exit* to end the transaction.
 - f) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*
 - g) Enter the *Shipping point* **Z0##**, The *Order* should default. Press **Enter**
 - h) *Save* your delivery. Note down the delivery number.
 - i) Choose *Exit* to return to the *Easy Access* menu.
 - j) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - k) In the *Search criteria* drop-down, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
 - l) Confirm the status of the outbound delivery order. It should be *Locked*.
2. Create a shipment in the ECC system. The transportation planning point is **1000 - Trsp. Hamburg Truck**, and the shipment type is **9001 - EWM Out ERP plan**. Add the outbound delivery and create an HU with the packaging material **TM-100**.

HU: _____

Continued on next page

Shipment: _____

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Logistics Execution* → *Transportation* → *Transportation Planning* → *Create* → *Single Document*.
- b) Enter the *TransportPlanningPt 1000* and the *Shipment type 9001 - EWM Out ERP plan*. Select *Select Deliveries*. Enter your outbound delivery in the pop-up for the selection.
- c) Select *Select Deliveries*. In the popup for the selection, enter the delivery number in the *Outbound Delivery* field.
- d) Choose *Execute* .
- e) Create an HU. Select *Means of Transport and Packaging Matl for current shipment* . Enter the *Packaging Material TM-100* and press **Enter**.

Note down the HU number.

- f) *Save*  your shipment. Note down the shipment number.
3. Reconfirm the status of your outbound delivery order. If you are still in the display of the outbound delivery order you can just refresh the display.

Status: _____

- a) In the display of your outbound delivery orders, choose *Refresh Display* .

OR:

In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.

In the *Search criteria* drop-down, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.

- b) Confirm the status of the outbound delivery order. It should be *Green*.

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- For internal use by CSC only
4. Confirm the transportation unit and the assignment of the outbound delivery order to the TU. You can use the HU number as external number of the transportation unit for searching.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Process Transportation Unit*.
 - b) In the *Search criteria* drop-down, select the entry *TU_NUM_EXT Transportation Unit*. Enter your HU number and choose *Search* .
 - c) Confirm the TU and the assignment of the outbound delivery order.
 - d) Choose *Exit*  to return to the *Easy Access* menu.
 5. Check the TU in at the Checkpoint North.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Yard Management* → *Arrival at/Departure from Checkpoint*.
 - b) In the *Search criteria* drop-down, select the entry *TU_NUM_EXT Transportation Unit*. Enter your HU number and choose *Search* .
 - c) Choose *Arrival at Checkpoint + Save* .
 - d) Choose *Exit*  to return to the *Easy Access* menu.
 6. Create and confirm the warehouse task for picking the material.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - b) In the *Search criteria* drop-down, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search*  . Note down the number of the outbound delivery order.
 - c) Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
 - d) Choose *Create + Save Warehouse Task*.
 - e) Choose *Warehouse Task* → *Confirm*.
 - f) Make sure that the warehouse order is selected and choose the *Confirm + Save* button.
 - g) Choose *Exit*  three times to return to the *Easy Access* menu.

Continued on next page

7. Use the simple load process to load the transportation unit. Then post the goods issue of the outbound delivery order also via the transportation unit.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Shipping and Receiving* → *Process Transportation Unit*.
 - In the *Search criteria* drop-down, select the entry *TU_NUM_EXT Transportation Unit*. Enter your HU number and choose *Search* .
 - Make sure that the TU is selected, then choose *Action* → *Load* → *Finish Loading* or choose the *Load* icon.
 - Choose *Save*  to save the status.
 - Choose *Action* → *Goods Movement* → *Goods Issue + Save* or choose the *Goods Issue* icon.
 - Choose *Exit*  to return to the *Easy Access* menu.
8. Confirm the final status in the shipment. All the statuses should be set now.
- In the *Easy Access* menu of your ECC system, choose *Logistics* → *Logistics Execution* → *Transportation* → *Transportation Planning* → *Display*.
 - Enter your *Shipment Number* and press **Enter**.
 - Confirm all statuses are set.
 - Choose *Exit*  to return to the *Easy Access* menu.
9. **Deactivate** the transportation integration for your warehouse number **E1##** again.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Goods Issue Process* → *Outbound Delivery* → *Integration with Transportation* → *Define Transportation Planning Type (Outbound)*.
 - Select the entry for your *Warehouse Number* **E1##**.
 - Choose *Delete* .
 - Save*  your changes.
 - Choose *Exit*  to exit the transaction.



Lesson Summary

You should now be able to:

- Explain the possibilities of transportation planning within SAP Extended Warehouse Management
- Plan transports for inbound and outbound deliveries



Unit Summary

You should now be able to:

- Set up yard management
- Control movements in the yard
- Set up the determination of staging areas and doors in EWM
- Explain the use of doors in EWM
- Describe and set up the route determination
- Explain the possibilities of transportation planning within SAP Extended Warehouse Management
- Plan transports for inbound and outbound deliveries

Unit 4

Optimize Resources and Processes

Unit Overview

Resources in a warehouse are always tight and should be used in the best possible way. By calculating the distances to be covered, using RF devices and special processes like pick, pack, and pass, you can avoid bottlenecks and get the most out of your workforce.



Unit Objectives

After completing this unit, you will be able to:

- Explain the different possibilities for travel distance calculation
- Set up networks
- Describe the supported processes supported by mobile data entry
- Set up menu management for mobile data entry in EWM
- Set up resources
- Assign tasks to resources
- Describe the advantages of the pick, pack, and pass process
- Create the required settings for pick, pack, and pass

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Lesson: Travel Distance Calculation

Lesson Overview

In this lesson you will learn how to set up the travel distance calculation inside a warehouse.



Lesson Objectives

After completing this lesson, you will be able to:

- Explain the different possibilities for travel distance calculation
- Set up networks

Business Example

For the calculation of the required time for warehouse movements, it is necessary to know the distance that needs to be covered.

Travel Distance Calculation

The travel distance calculation calculates the travel distance that a warehouse worker must travel to execute a warehouse order. 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 result of the travel distance calculation is used for:

- Planning the workers, if you have activated Labor Management (LM)
- Calculating engineered labor standards (ELS), if you have activated LM
- Calculating the latest start time for a warehouse order

Extended Warehouse Management has two different ways for the distance calculation:

- Direct distance

The system calculates the travel distance using the direct distance, based either on the Euclidean metric or Manhattan metric. The upper part of the figure below shows the direct distance between two storage bins of a storage type. The solid line corresponds to the Euclidean metric; the dotted line represents the Manhattan metric.

- Distance based on networks

The travel distance calculation can also be based on an existing valid network. The valid routes represent the edges. The lower part of the figure below shows the distance between two storage bins of a storage type. The resource moves across the valid routes.

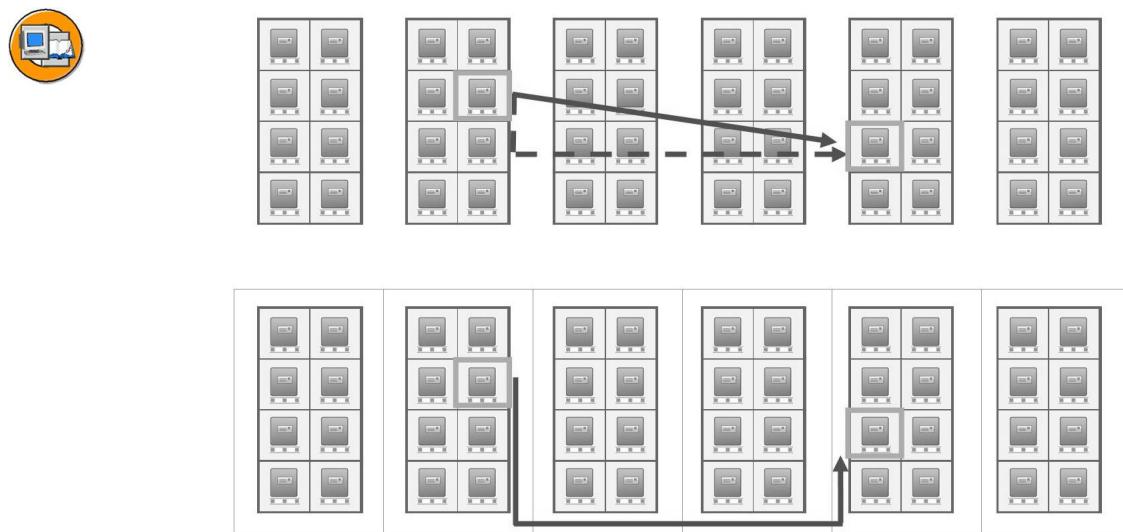


Figure 44: Travel Distance Calculation

The system calculates the travel distance needed to execute a warehouse order more than once, namely when:

- Creating a warehouse order for planning purposes
- Confirming a warehouse order for evaluation purposes

Only when confirming is the system able to access more detailed information, as only then is the executing resource known. The following information is then available:

- Speed of the resource
- Last position of the resource prior to executing the warehouse order
- The route network allowed for the resource, if available

When calculating the distance while creating the warehouse order, the system estimates the following values:

- For the speed, the system uses the speed of the slowest resource (pessimistic approach).
- Instead of the known position of the resource, a default distance to be covered to reach the first position in a storage type is specified.
- The route network used (if available) contains all defined routes without resource type restrictions.

If Labor Management (LM) is activated, the system saves the result of the travel distance calculation in the planned and executed workload.

Networks

Networks define the valid routes (streets) in the warehouse on which the resources move. A network consists of edges and nodes. Edges are connected to each other by way of nodes. Edges represent the valid routes in the warehouse, and nodes represent crossings.

There are two different kinds of networks:

- Storage-type-specific networks

These networks consist of edges that map the individual aisles, and edges that represent a connection of different aisles. You assign storage bins of a storage type to:

- An edge, if the storage bins are located in an aisle, and an edge exists for the aisle
- A node that matches your X and Y coordinates, if you have not assigned an edge

- Global networks

The global network connects the defined, storage-type-specific networks to each other. If no storage-type-specific networks are defined, the network connects the storage bins to each other directly.



Figure 45: Travel Distance Calculation with Storage-Type-Specific and Global Networks

Edges have the following properties:

- Each edge has a start node and end node.
- An edge is usually passable in both directions, however it can also be defined as a one-way street. The direction is defined through the start and end nodes.
- For each edge, you can define which resource types are allowed to pass.
- You can assign an edge to an aisle.
- An edge has a length that is used by the system to calculate the travel distance, if the edge is passed by a resource.

You can use the program **Generating Storage-Type-Specific Networks** to generate storage-type-specific networks for the travel distance calculation in Extended Warehouse Management automatically. On the *SAP Easy Access* screen, choose *Extended Warehouse Management* → *Settings* → *Travel Distance Calculation* → *Generate Network*. The edges for the aisles generated in this way have the following properties:

- Edges are only created for aisles that have more than one storage bin.
- Edges can be passed in both directions.
- The length of the edges corresponds to the Euclidean distance between the start and end nodes.
- If storage bins are located on both sides of the aisle, the edges are located in the center of the aisle.
- If there are only storage bins on one side of the aisle, the edges lie half a bin depth away from the aisle.
- The edges start and end outside the aisle (half a bin depth).

The system generates connecting edges between neighboring aisles by connecting both the start and end nodes of two neighboring aisles with an edge.

If you do not use the program to generate the storage-type specific networks, you can make the following settings:

- Define average distance for warehouse number and storage type.
- Define edges in storage-type-specific networks:
 - X and Y coordinates for the start of the network
 - X and Y coordinates for the end of the network
 - Define edge direction (unidirectional, bidirectional)
 - Define aisle (optional)
 - Define edge length in the unit of length of the warehouse number
 - Define excluded resource types

For **global networks** you can make the following settings for the edges:

- X and Y coordinates for the start of the edge
- X and Y coordinates for the end of the edge
- Define edge direction (unidirectional, bidirectional)
- Define edge length in the unit of length of the warehouse number
- Define excluded resource types

Calculating the Travel Distance

The travel distance is calculated for the storage bin list. A storage bin list is a list of storage bins that are to be approached sequentially for a warehouse order. The system differentiates between horizontal (X and Y coordinates) and vertical movements (Z coordinates). The total travel distance is the sum of travel distances that lie between the storage bins that lie next to each other on the list. The system generates the list of storage bins from the warehouse order creation rules. The order is fixed, meaning the **travel distance calculation does not sort the storage bin list**.

For the movements, we assume that:

- The resource executes the horizontal movement first, meaning the resource first moves itself to the storage bin in a horizontal direction.
- The resource then executes the vertical movement, namely the movement to the storage bin and back to the outbound item.
- The resource then moves itself to the next storage bin in a horizontal direction.
- The total travel distance in a vertical direction therefore corresponds to twice the Z distance of the storage bins to the floor (point of origin Z = 0).

For the horizontal movements, a difference is made between:

- Direct movements

The system uses the direct distance:

- For movements between storage bins within a storage type, if **no** valid storage-type-specific network is available
- For movements between storage bins from different storage types, if no global valid network exists
- For movements within an aisle. Here, the direct distance between storage bins is used to calculate the travel distance.

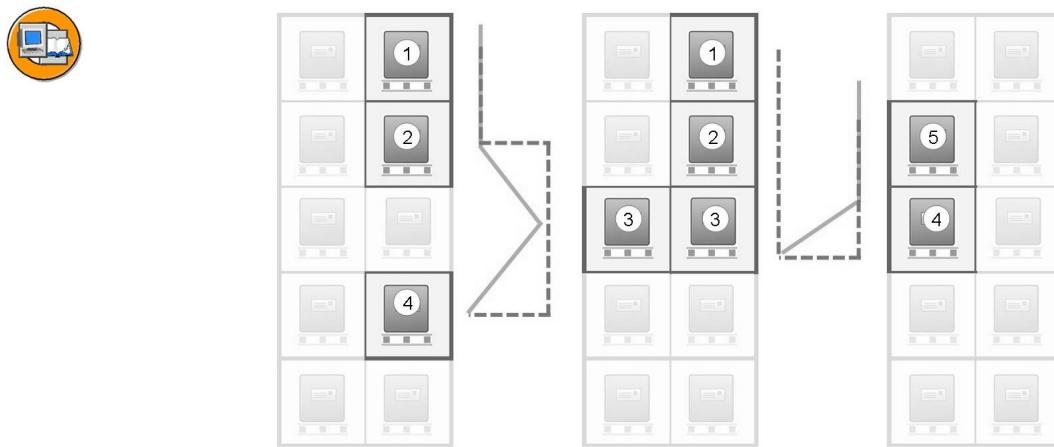


Figure 46: Direct Movements Within an Aisle

- For the connection of a storage bin with the network:
 - With the nodes of an edge, if the storage bin is in an aisle, and an edge exists for these. Fundamentally, four options exist. For a one-way route, only one option is allowed: entering the edge at the start node and leaving it at the end node.
 - With the next node, if no edge has been assigned (the node comes from the storage-type-specific network, or if the storage-type-specific network does not exist, the global network)

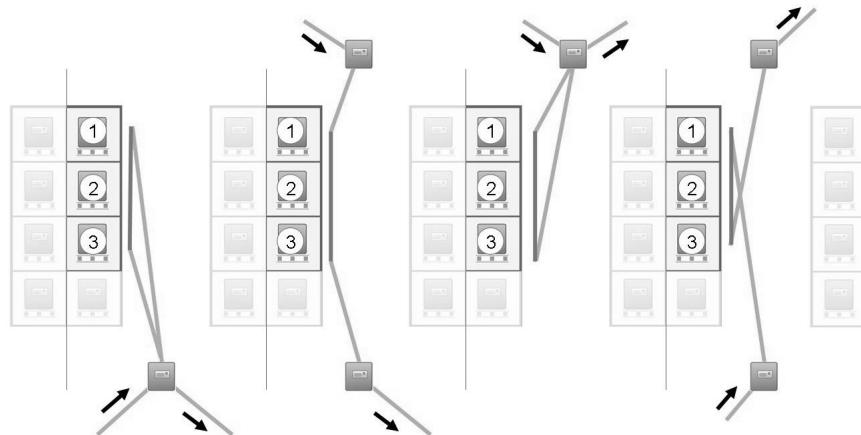


Figure 47: Connections of Storage Bins with the Network

- For movements within a network

These take place if the storage bins:

- Lie in the same storage type but not in the same aisle, and a valid storage-type-specific network exists
- Are in different storage types and a valid global network exists

For the calculation within the network (valid global network and any existing valid storage-type-specific networks), the system connects the storage bins with the nodes of the respective edge or with the next node. Then the travel distance within the network between the storage bins is added to the assigned nodes. For this, a maximum of four options are available (if both bins can be assigned to one edge respectively [no one-way routes]): from the start node of the first edge to the start node of the second edge, from start node to end node, from end node to start node, and from end node to end node.

Examples for the Travel Distance Calculation

Here are some examples for the calculation of the travel distance.

Travel Distance Calculation Within a Storage Type

The warehouse manager wants to calculate the travel distance from storage bin 1 to storage bin 3 within a storage type with a valid network. 1, 2, and 3 are storage bins from which warehouse worker X withdraws goods.

The travel distance comprises the following:

- Direct distances A (within an aisle), B, and D (connection between storage bin and network)
- Distance C (connecting edge) within the network

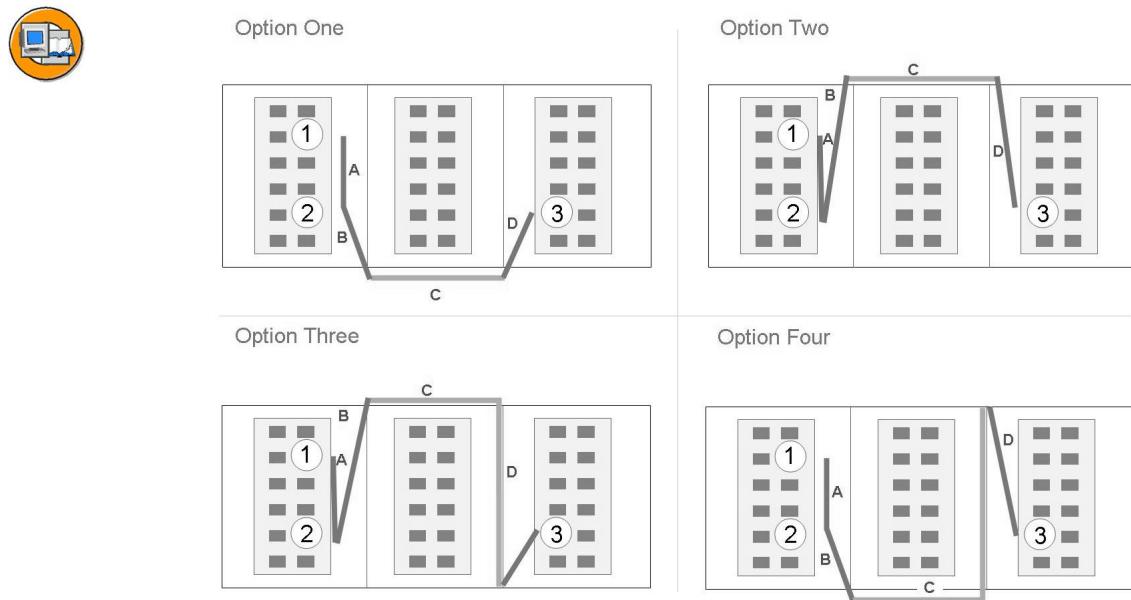


Figure 48: Travel Distance Calculation Within a Storage Type

Of the four possible calculations, the system uses the first option, as that represents the shortest travel distance.

Travel Distance Calculation Between Two Storage Types with Valid Networks

This example shows a travel distance calculation between two storage types that each have a valid, storage-type-specific network and a valid, global network.

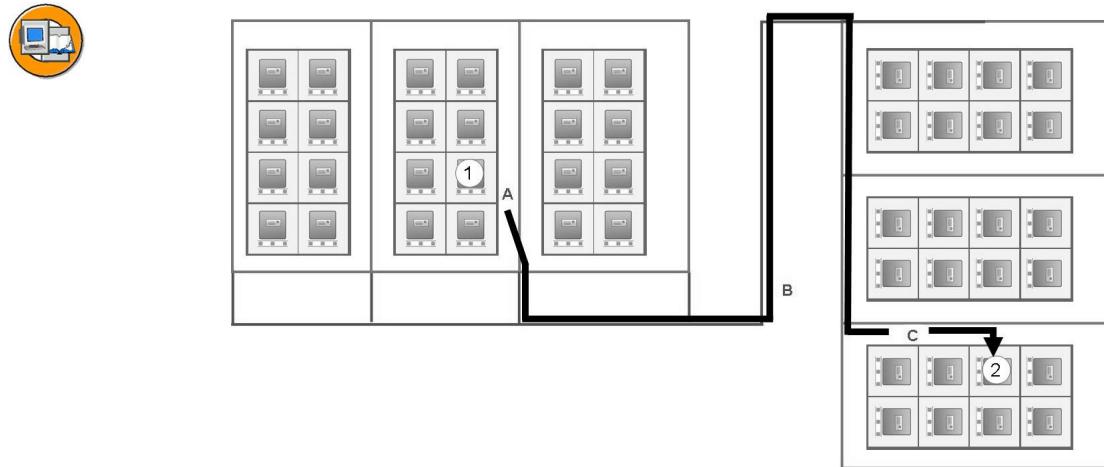


Figure 49: Two Storage Types with Storage-Specific Networks

The travel distance comprises the direct distances A and C (connection between storage bin and network) and distance B within the entire network (local and global).

Travel Distance Calculation Between Two Storage Types with a Global Valid Network

This example shows the travel distance calculation between two storage types with a valid global network. Only one storage type has a valid network.

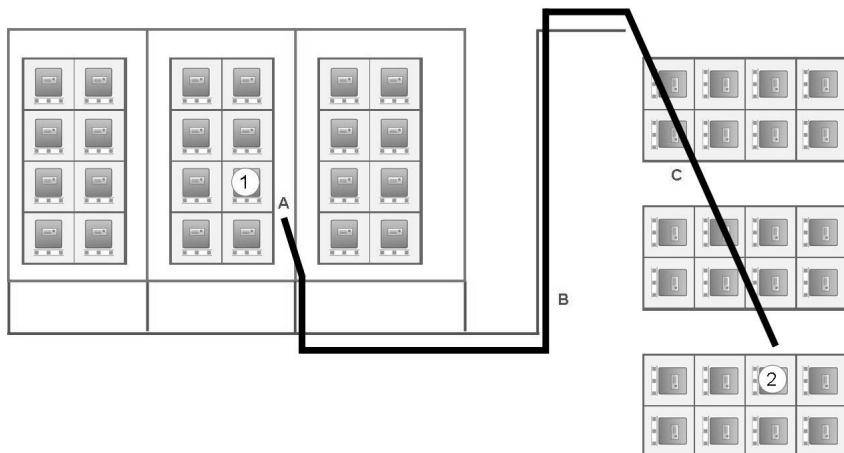


Figure 50: Two Storage Types but Only One Storage-Specific Network

The travel distance comprises the direct distances A and C (connection between storage bin and network) and distance within network B.

Heuristics for the Travel Distance Calculation

Two heuristics exist for the travel distance calculation within a network. The system calls both by default.

- Depth-first search

The system attempts to find a route between the specified nodes of a network in the shortest time possible. Here, the search runs in the direction of start node to end node. The search finishes when the first complete route is found.

- Breadth-first search

The system looks for all possible routes in the network, and selects the one that has the shortest distance. This heuristic is more performance intensive at runtime, and is only appropriate for small networks.

You can control the heuristics using BAdIs for the travel distance calculation. It can make sense to use different heuristics. For example, a rough estimation of the travel distances is sufficient for the warehouse manager for planning the

workers. When creating warehouse orders, the performance of the calculation is more important to the warehouse manager, as many warehouse orders are created simultaneously. So you use the quick depth-first search in the specified network, or a direct distance for this rough estimation. For this, you can implement a BAdI method that considers the used resource. If this is not available, for example because it is not known at the time of creating the warehouse orders, only the depth-first search is called, or the direct distance calculated.

When evaluating the performance of the employees, the warehouse manager wants to consider the shortest travel distance in order to have a fair basis for the valuation. The performance is not so crucial here, since this call of the calculation occurs separately. For this reason, the BAdI method performs a breadth-first search as well as a depth-first search, if a resource is known.

The following BAdIs are available:

- Change storage bin list for travel distance calculation
`/SCWM/EX_TDC_BIN_LIST`

You can do the following:

- Sort the list.
- Delete storage bins from the list.
- Add new storage bins to the list.

You can also influence the default distance to the first storage bin in the storage bin list.

- Travel distance calculation using the storage bin list
`/SCWM/EX_TDC_START`

The system calls this BAdI to calculate the travel distance of a warehouse order. If you implement this BAdI, you can define your own logic for calculating the travel distance along the sorted storage bin list transmitted to the BAdI.

Exercise 13: Travel Distance Calculation

Exercise Objectives

After completing this exercise, you will be able to:

- Set up the travel distance calculation in SAP Extended Warehouse Management
- Create local and global networks

Business Example

You create warehouse orders with complex warehouse order creation rules to have an equal workload for your employees in the warehouse. To calculate the required time exactly, it is necessary to know what distance each employee has to cover for his tasks.

Task:

You activate the travel distance calculation in your warehouse. In order to calculate the distance properly, you create local networks for storage types and global networks to connect the storage types.

1. Activate the travel distance calculation for your warehouse **E1##**.
2. Generate local networks for your storage types **0010** and **0030**.
3. Create a global network to connect your storage types 0010 and 0030 with the following coordinates:

<i>Warehouse No.</i>	E1##
<i>X Coordinate</i>	26.2
<i>Y Coordinate</i>	72
<i>X Coordinate</i>	35
<i>Y Coordinate</i>	72
<i>Edge Length</i>	8.8

4. Control your networks in the graphical warehouse layout.
5. Test the distance calculation for some storage bins in your warehouse number **E1##** with the report **/SCWM/TDC_EVALUATE**. Test the following bins and note the result:

Continued on next page

Source bin	Destination bin	Distance (only xy)
0010–01–01–01	0010–01–03–01	
0010–01–02–01	0010–03–02–01	
0010–01–01–01	0030–03–03–01	

Solution 13: Travel Distance Calculation

Task:

You activate the travel distance calculation in your warehouse. In order to calculate the distance properly, you create local networks for storage types and global networks to connect the storage types.

1. Activate the travel distance calculation for your warehouse **E1##**.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Define Warehouse Number Control*.
 - b) Select your warehouse and choose *Details* . Set the flag for *Activate Travel Distance Calculation*.
 - c) *Save* your changes.
 - d) Choose *Exit* to exit the transaction.
2. Generate local networks for your storage types **0010** and **0030**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Settings* → *Travel Distance Calculation* → *Generate Network*.
 - b) Enter your *Warehouse Number* **E1##**. Click on the *Multiple Selection* icon. Enter your values **0010** and **0030** and choose *Copy* .
 - c) Choose *Execute* to generate the networks.
 - d) Choose *Continue* to close the log pop-up.
 - e) Choose *Exit* to exit the transaction.
3. Create a global network to connect your storage types 0010 and 0030 with the following coordinates:

<i>Warehouse No.</i>	E1##
<i>X Coordinate</i>	26.2
<i>Y Coordinate</i>	72

Continued on next page

<i>X Coordinate</i>	35
<i>Y Coordinate</i>	72
<i>Edge Length</i>	8.8

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Settings* → *Travel Distance Calculation* → *Settings for the Travel Distance Calculation*.
- In the left dialog structure, select the entry *Define Edges in Global Networks*.
- Choose *New Entries*.
- Enter the following details:

<i>Warehouse No.</i>	E1##
<i>X Coordinate</i>	26.2
<i>Y Coordinate</i>	72
<i>X Coordinate</i>	35
<i>Y Coordinate</i>	72
<i>Edge Length</i>	8.8

- Save  your new entry.
 - Choose *Exit*  to exit the transaction.
- Control your networks in the graphical warehouse layout.
 - In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Graphical Warehouse Layout* → *Display Graphical Warehouse Layout*.
 - Set the *Edges* flag to display the created edges.
 - Choose *Exit*  to exit the transaction.
 - Test the distance calculation for some storage bins in your warehouse number **E1##** with the report **/SCWM/TDC_EVALUATE**. Test the following bins and note the result:

Continued on next page

Source bin	Destination bin	Distance (only xy)
0010-01-01-01	0010-01-03-01	
0010-01-02-01	0010-03-02-01	
0010-01-01-01	0030-03-03-01	

- a) In the *Easy Access* menu of your EWM system, choose *Tools* → *ABAP Workbench* → *Development* → *ABAP Editor*.
- b) Enter the program **/SCWM/TDC_EVALUATE**.
- c) Choose *Execute* .
- d) Enter your *Warehouse No.* **E1##**, the *Source Bin* and the *Dest. Bin* as listed in the table. Note down the *Total travel distance: xy:* as shown in the status bar.



Lesson Summary

You should now be able to:

- Explain the different possibilities for travel distance calculation
- Set up networks

Lesson: Use Mobile Data Entry

Lesson Overview

Although all processes in SAP Extended Warehouse Management can be done with desktop transactions or in the warehouse management monitor, resources in the warehouse will use mobile devices for their work. In this lesson you will learn about the basic settings for the RF framework and the supported processes.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the supported processes supported by mobile data entry
- Set up menu management for mobile data entry in EWM

Business Example

In a complex warehouse, the usage of mobile devices is a requirement for fast and accurate data entry.

Radio Frequency Framework

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

- Decouples business logic from the physical presentation of application data on a selected presentation device and enables personalized menus and screens
- Supports a large variety of device sizes, device types, and data entry types



Figure 51: Using Mobile Devices

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.

Support for GUI and Character-Based Devices and Browser-Based Devices

GUI 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 WebSAPConsole. WebSAPConsole operates on a Windows NT/Windows 2000 platform and interacts with the RF terminals connected to it. This concept is currently supported by the leading providers of RF terminals.

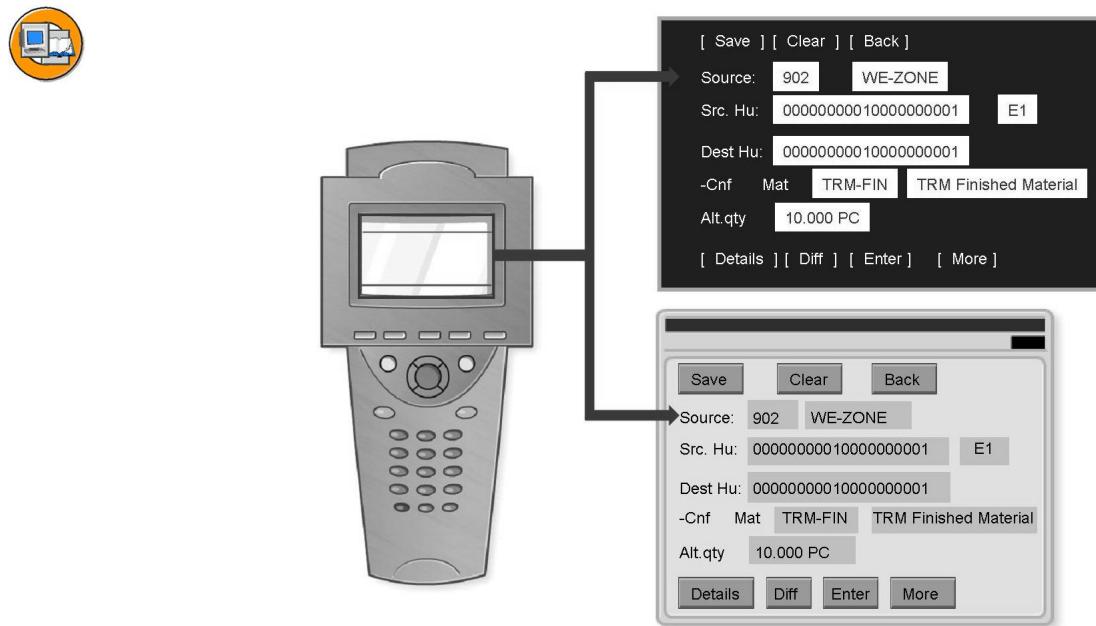


Figure 52: Character-Based or Browser-Based Devices

The system uses ITSmobile for connecting **browser-based devices**. ITSmobile uses the tried-and-tested ITS template technique to do this. This technique is based on the concept that an HTML template for visualization in the browser is provided for every screen (dynpro) of the application. Dynamic content/data can be included in the templates at runtime using HTMLBusiness (HTMLB). ITSmobile is delivered with a new template generator that allows you to generate the templates of simple screens directly. If necessary, you can then change these further to meet your requirements. You can also create a completely new template generator or create a new template generator based on the one delivered.

Bar Code Support

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.

Screen Layout Personalization

Using the RF screen manager, you can customize the appearance of RF presentation screens to ensure that they are consistent with the attributes of the presentation devices being used.



Hint: SAP provides screens based on a screen size of 8x40.

Menu Personalization

Using the RF menu manager, you can define your own menus and menu hierarchy for the RF device transactions.

Standard RF Functionalities

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

- Logon

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.

- Logoff
- Recovery

During logon, the system checks with the content provider whether the user is logged on as a resource, and if so, whether he or she was interrupted during WO execution. The system checks whether a specific WO that was assigned to the resource, and already started, was stopped before completion. If yes and if the WO can be locked, it finds the WO's data and displays the screen of the relevant step to continue the process.

- Work execution transactions for the following warehouse processes:

- Picking
- Putaway
- Loading
- Unloading
- Deconsolidation
- Packing
- Inventory
- Replenishment

RF Navigation

- Menu navigation

The RF framework supports the following options for menu navigation to RF transactions:

1. Standard navigation

You choose the required menu item.

2. Direct navigation to transaction

You enter the number of the required menu item displayed in the *Menu* field.

3. Virtual navigation

Unlike the first options where navigation is accomplished from the displayed menus, this option enables “virtual” navigation between menus. You enter the numbers of all required menu items, including those not displayed on the current screen, but rather displayed on subsequent screens.

- Transaction navigation

When in the screen for a particular logical transaction, you may be required to enter data, validate existing data, or a combination of both.

When data entry is required, the input field is open. You enter the data by scanning bar codes or typing. If you enter data manually, you choose *Enter* after entering the value.

After all input fields on the screen are filled, one of the following occurs:

- If the *Skip Shortcut* indicator is set, the posting (for example, WT confirmation) is automatically triggered.
- If the *Skip Shortcut* indicator is **not** set, you automatically navigate to the *Shortcut* field.

You can invoke functions by choosing the corresponding function key pushbutton, or entering the function key in the *Shortcut* field. Where necessary, you enter exception codes in the *Shortcut* field (for example, for differences).

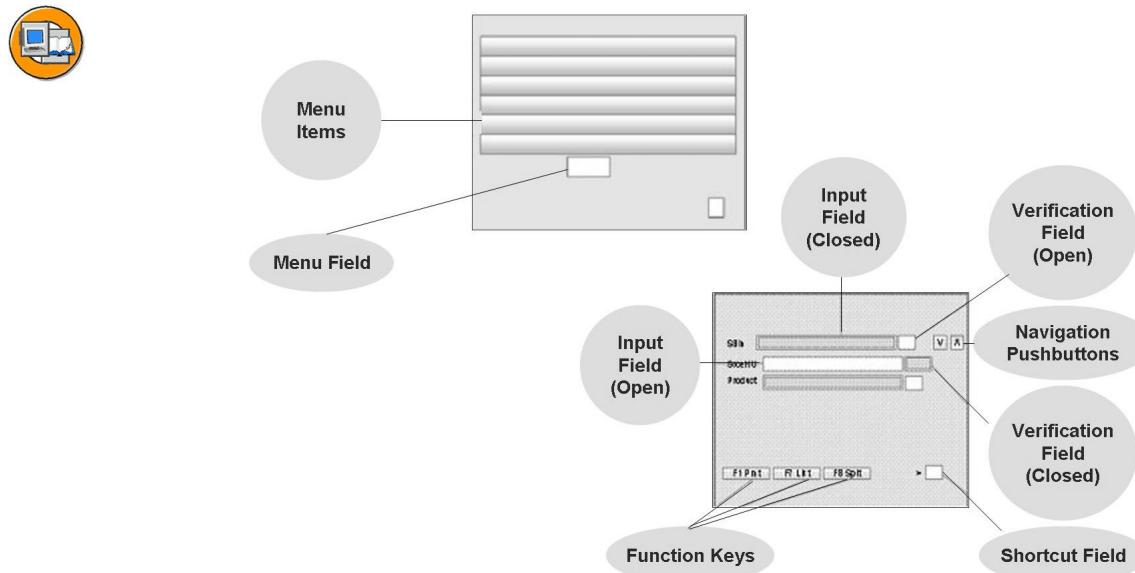


Figure 53: RF Screens

RF Function Keys

Function keys are provided with the RF framework.

Standard function keys are not displayed in the function key line of an RF screen. Rather, they are accessed directly via the function key or shortcut.

Function	Function Key	Shortcut	Description
More	F5	05	Displays the next pushbuttons in the sequence (in case of more than four pushbuttons for a screen)
Clear	F6	06	Clears a selected input field, or all input fields
Back	F7	07	Returns to previous screen/step
List	F8	08	Displays the list screen (showing the possible input values) for a selected field
Full Message	F9	09	Displays the full message on a separate screen

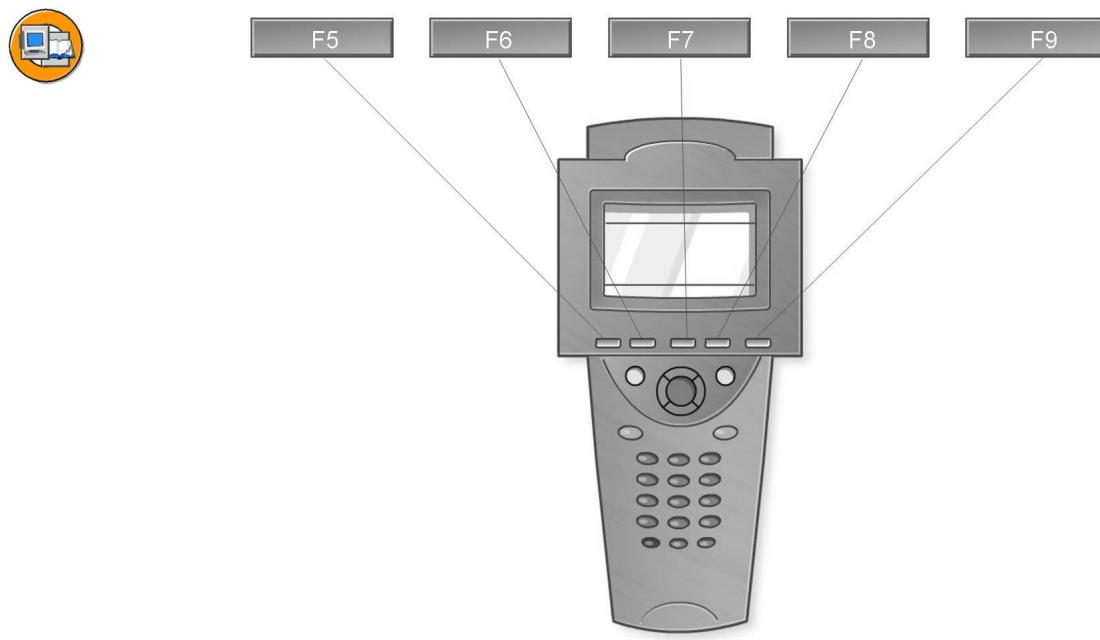


Figure 54: Standard RF Function Keys

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 **F5** to display the other pushbuttons.

RF Framework Settings

The following sections present the most important objects and settings in the RF framework.

RF Screen Manager

The RF screen manager is a tool that enables you to customize the appearance of RF presentation screens, so as to ensure that they are consistent with the attributes of the presentation devices being used.

The RF screen manager enables you to do create, copy, and delete display profiles and to edit screens of a display profile. The display profile is a group of settings that determine the appearance of RF presentation screens, including screen templates and the formats of screen elements.

By defining your own display profiles, you can determine the following screen display characteristics:

- Screen size
- Screen element attributes, including:
 - Number of pushbuttons available for the screen
 - Text length for pushbuttons, logical transactions and menu items
 - How messages are displayed
- Screen template function groups and screen numbers

The display profile for standard transaction is “**”.

If you define your own display profile, you define height and width of your total screen (standard is 8x40) and the template program and screens (0001 and 0002 for messages). The length of the pushbuttons, the number of pushbuttons, the length of the menu items, the display of error messages (0 = display on a separate screen), and where the error messages are displayed is also defined at profile level. You can use the three parameters BEEP_INFO, BEEP_WARN, and BEEP_ERR to maintain the number of beeps processed by the device when a message is displayed. Of course, this only works if the device supports this beep function.

Presentation Device

Presentation devices classify the different kind of devices you use in your warehouse. When defining a presentation device, you enter its characteristics, such as display profile, presentation device type, data entry type, function keys quantity, various indicators, and signal assignments

The presentation devices can be assigned to a **resource** (which is part of resource management).

Presentation Profile

The presentation profile (together with the personalization profile) is used to support different menu structures for different users. The presentation profile is assigned to the application (the standard application for EWM is 01).

The **personalization profile** is used to enable the customer to make changes to the SAP standard. With the personalization profile you can support different user groups working in different menus and, therefore, different processes. The personalization profile for standard transaction is “**”.

RF Menu Manager

With the RF menu manager you can define your own menus.

First you create your menu items for the main menu and the submenus. In the hierarchy, you define whether a logical transaction is triggered (field LTRANS) or if the user jumps to a submenu (field LMENU).

SAP delivers the default menu with application ‘01’, presentation profile ‘****’, and personalization profile ‘**’. These entries can only be maintained in an SAP system. In a customer system, these entries are locked for changes.

Wizards

There are two wizards available, which are started directly from a running RF transaction with **Ctrl+Shift+F1**.

- Split screen

This wizard guides you through the steps necessary to split the RF transaction screen into several screens. These screens are then displayed in your preferred sequence. You can also configure the function codes that are displayed in each resulting screen.

The wizard contains the following steps:

- Assign Fields to Split Screens
 - Assign Function Codes to Split Screens / Assignment
 - Assign Function Codes to Split Screens / Pushbuttons
 - Define Target Function Group and Screen Numbers
 - Define Personalization Profile
 - Complete (Creating the new screens and customizing in database)
- Modify screen

This wizard guides you through the steps necessary for modifying an RF transaction screen. Each time you add or remove fields from the screen, the wizard generates an updated screen. To display the new screen to a specific group of users, enter the user's personalization profile, and the wizard automatically adjusts the Customizing. Once you run the wizard, the new screen is displayed in Screen Painter, so that you can verify the contents or make manual adjustments.

The wizard contains the following steps:

- Select Target Screen Fields
- Assign Verification Fields
- Define Target Function Group and Screen Number
- Define Personalization Profile
- Complete (Creating the new screens and customizing in database)

Exercise 14: Mobile Data Entry

Exercise Objectives

After completing this exercise, you will be able to:

- Set up users for the RF environment
- Create user-specific menus for RF

Business Example

In your warehouse, most processes are done using mobile devices. You need to set up these devices.

Task 1:

Create specific menus for your warehouse: one for standard entries, and one that is only for queue-controlled movements. Assign these menus to your user and test them.

1. Create a new presentation profile **Z##**, with two personalization profiles. One personalization profile shall be named ****** and is a copy of the existing profile in the presentation profile ********, and the other personalization profile shall be named **##**
2. Assign the new presentation profile to your warehouse.
3. Copy the standard menu into the personalization profile ******* of your new presentation profile and create new, short menu for the personalization profile **##**, which contains **only** the buttons for the system guided processes.
4. Create an entry for your user to connect it to the personalization profile ****** and the resource **GR##** in your warehouse **E##**.
5. Test the settings for your user. Log on to the RF environment and check if the standard menu appears.
6. Check the settings for the shortened menu. Temporarily assign it to your user and check if the new menu is there.

Task 2:

Test the settings for your user.

1. Create a sales order as described below.

Continued on next page

<i>Order Type</i>	OR
<i>Sold-To Party</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Material</i>	T-EW04-##
<i>Order Quantity</i>	2

Sales order: _____

2. Create the outbound delivery.

Delivery: _____

3. Create the warehouse task and the warehouse order, and confirm the queue of the warehouse order.

Outbound delivery order: _____

Warehouse order: _____

Queue: _____

4. Before you can confirm the picking process, you have to assign the correct queue to your resource group.
5. In the final step, confirm the warehouse order using RF.

Solution 14: Mobile Data Entry

Task 1:

Create specific menus for your warehouse: one for standard entries, and one that is only for queue-controlled movements. Assign these menus to your user and test them.

1. Create a new presentation profile **Z##**, with two personalization profiles. One personalization profile shall be named ****** and is a copy of the existing profile in the presentation profile ********, and the other personalization profile shall be named **##**
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Mobile Data Entry → Radio Frequency (RF) Framework → Define Steps in Logical Transactions*.
 - b) In the *Dialog Structure*, double-click on *Define Presentation Profile*.
 - c) Select the *Pres.Prof. ***** and choose *Copy As...* . Enter the new name **Z##** for the *Pres.Prof.* field and the *Description Presentation profile ##*. Press **Enter**. In the *Specify object to be copied* pop-up, select the *copy all* button.
 - d) Select the new presentation profile and in the *Dialog Structure*, select the entry *Define Personalization Profile*. Create a *New Entry* for the *PrsnProf. ##* and the *Description Short menu ##*.
 - e) *Save*
 - f) Choose *Exit*
2. Assign the new presentation profile to your warehouse.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Mobile Data Entry → Assign Presentation Profile to Warehouse*.
 - b) Select the entry for your warehouse **E1##** and overwrite the existing *Pres.Prof.* with the new entry **Z##**.
 - c) *Save*
 - d) Choose *Exit*

Continued on next page

3. Copy the standard menu into the personalization profile *** of your new presentation profile and create new, short menu for the personalization profile ##, which contains **only** the buttons for the system guided processes.
- In the IMG of your EWM system, choose *Extended Warehouse Management → Mobile Data Entry → Radio Frequency (RF) Framework → RF Menu Manager*.
 - Make sure that the following entries are in the entry screen:

<i>Application</i>	01
<i>Presentation Profile</i>	****
<i>Personal.Profile</i>	**
<i>Object Size</i>	40

- Choose *Copy menu hierarchy* .
- Enter the *Dest. presentation* **Z##** and the *Dest. personalization* ****** and press **Enter**.
- Save*  your new entry.
- Choose *Back*  to leave the transaction.
- Choose *Copy menu hierarchy*  again.



Hint: It is okay that the *Presentation Profile* is now changed to **Z##**.

- Enter the *Dest. presentation* **Z##** and the *Dest. personalization* **##** and press **Enter**.
- In the right part of the screen (*Menu Hierarchy -Descriptions*), select the entry *Internal Processes*. Choose *Delete Row*  to delete this entry.
 - Delete all the entries one by one **except the entry System Guided**.
 - Save*  your new entry.
 - Choose *Back*  to leave the transaction.

Continued on next page

4. Create an entry for your user to connect it to the personalization profile ** and the resource **GR##** in your warehouse **E##**.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Users*.
 - Switch to change mode with the *Display* -> *Change* icon.
 - Choose *New Entries* and create a new entry with the following details:

User	Your user ID
Prsn.Prof.	**
Warehouse No.	E1##
Resource	GR##

- Save your new entry.
 - Choose *Exit* to leave the transaction.
5. Test the settings for your user. Log on to the RF environment and check if the standard menu appears.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Log On to RF Environment*
 - The entries *Whse No.:* **E1##**, *Resource:* **GR##**, and *DefPresDvc:* **PRES** should default.
- Press **Enter**
- Confirm the standard menu:
- 01 System-Guided
 - 02 Manual Selection
 - 03 Inbound Processes
 - 04 Outbound Processes
 - 05 Internal Processes
- Select *FI* twice to log off from the RF environment again.

Continued on next page

6. Check the settings for the shortened menu. Temporarily assign it to your user and check if the new menu is there.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Users*.
 - Switch to change mode with the *Display* → *Change* icon.
 - Replace the entry ** for the *Prsn.Prof.* with ##.
 - Save*  your changed entry.
 - Choose *Exit*  to leave the transaction.
 - In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Log On to RF Environment*
 - The entries *Whse No.: E1##*, *Resource: GR##* and *DefPresDvc: PRES* should default.
- Press **Enter**
- Confirm the short menu:
01 System-Guided
 - Choose *F1* twice to log off from the RF environment again.
 - In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Users*.
 - Switch to change mode with the *Display* -> *Change*  icon.
 - Replace the entry ## for the *Prsn.Prof.* with ** again.
 - Save*  your changed entry.
 - Choose *Exit*  to leave the transaction.

Task 2:

Test the settings for your user.

- Create a sales order as described below.

<i>Order Type</i>	OR
<i>Sold-To Party</i>	T-E01A-##
<i>PO Number</i>	##

Continued on next page

<i>Req.deliv.date</i>	next day
<i>Material</i>	T-EW04-##
<i>Order Quantity</i>	2

Sales order: _____

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - b) Enter the *Order Type* OR and press **Enter**.
 - c) Enter the sales order details as described in the table.
 - d) *Save* your sales order. Note down the sales order number.
 - e) Choose *Exit* to leave the transaction.
2. Create the outbound delivery.

Delivery: _____

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
- b) Enter the *Shipping point* **Z0##**; the *Order* should default. Press **Enter**.
- c) *Save* your delivery. Note down the delivery number.
- d) Choose *Exit* to return to the *Easy Access* menu.

3. Create the warehouse task and the warehouse order, and confirm the queue of the warehouse order.

Outbound delivery order: _____

Warehouse order: _____

Continued on next page

Queue: _____

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
- b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
- c) Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
- d) Choose *Create + Save Warehouse Task*  and note down the number of the warehouse order.
- e) Confirm the queue of the warehouse order in the warehouse management monitor. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
- f) Choose *Outbound* → *Documents* → *Outbound Delivery Order*. Enter the outbound delivery order number in the search pop-up and start the search.
- g) Select the outbound delivery order and choose *Warehouse Order*. Confirm the queue in the lower part of the screen (it should be “Outbound”).
- h) Choose *Exit*  to leave the transaction.



Hint: You can start the next steps in a parallel session and leave the warehouse management monitor open.

Continued on next page

4. Before you can confirm the picking process, you have to assign the correct queue to your resource group.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Queue Sequence for Resource Group*.
 - Switch to change mode by choosing *Display* → *Change* .
 - Choose *New Entries* and create a new entry with the following details:

Rsrce Grp	RGAL
Queue	OUTBOUND

- Save  your new entry.
 - Choose *Exit*  to leave the transaction.
5. In the final step, confirm the warehouse order using RF.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Log On to RF Environment*.
 - The entries *Whse No.:* **E1##**, *Resource:* **GR##**, and *DefPresDvc:* **PRES** should default.
 - Press **Enter**.
 - Choose *02 Manual Selection* → *01 Selection by WO*. Enter the warehouse order number and press **Enter** twice.
 - Select *F4 Next* for the entry of a *PickHU*.
 - Confirm the source and the destination information for the warehouse order.
 - Log off from the RF environment.



Lesson Summary

You should now be able to:

- Describe the supported processes supported by mobile data entry
- Set up menu management for mobile data entry in EWM

Lesson: Work with Resources

Lesson Overview

In this lesson you will learn how resources can be used to distribute the tasks in the warehouse.



Lesson Objectives

After completing this lesson, you will be able to:

- Set up resources
- Assign tasks to resources

Business Example

You have a certain number of resources – namely employees, forklifts, and other vehicles in the warehouse – for daily work. The warehouse tasks need to be distributed to these resources in a meaningful way to avoid backlogs, and also to avoid overloading individual resources.

Resources in EWM

A resource is an entity representing a user or equipment, which can execute work in the warehouse. It 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 it can be tracked and displayed in the warehouse management monitor.



Figure 55: Resources in EWM

A resource belongs to a resource type (a grouping of resources with similar technical or physical qualifications) and resource group (a grouping of resources for queue assignment purposes).

Resource management maximizes the efficiency of warehouse processes by:

- Facilitating the management and distribution of work via queues
- Enabling the execution of work by resources in a radio frequency (RF) and non-RF environment
- Optimizing the selection of warehouse orders for resources requesting work
- Enabling effective monitoring and controlling of resources

Assignment of Warehouse Orders to a Resource

Warehouse orders (WOs) can be assigned to resources in radio frequency (RF) and non-RF environments. In an RF environment, WOs can be assigned manually or automatically, while in a non-RF environment, WOs are only manually assigned.

In the case of automatic WO assignment to a resource, the WOs must belong to a queue to which the resource is assigned, and in which the resource is authorized to work.

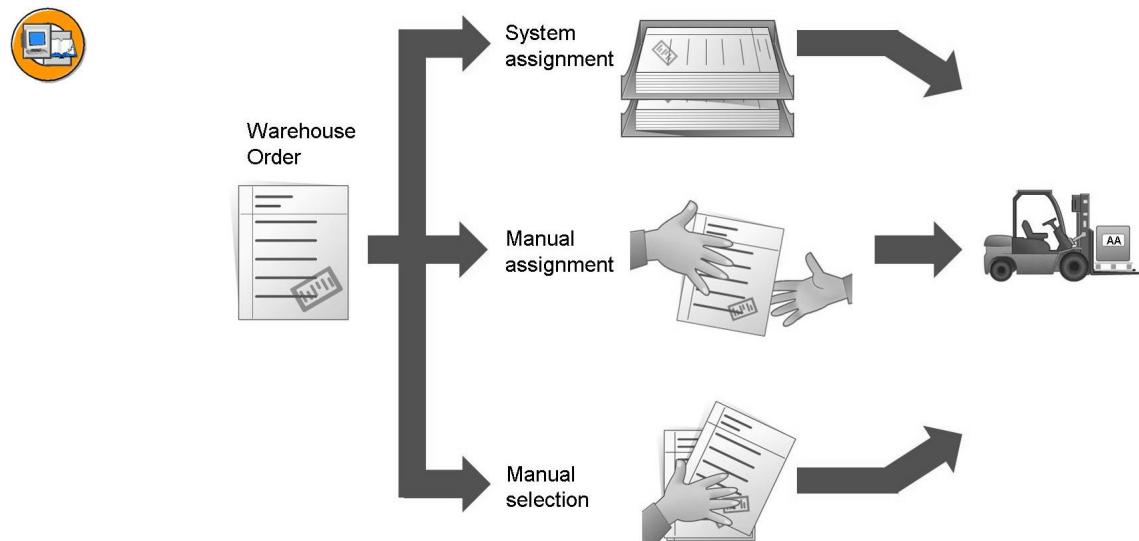


Figure 56: Assignment of Warehouse Orders to a Resource

Warehouse Order Assignment to a Resource

	Non-RF Environment	RF Environment
1	A resource logs on to the desktop environment.	A resource log on to the RF environment
2	The warehouse manager assigns the WO to the resource via the <i>Assign Rsrce</i> monitor method.	One of the following occurs: <ul style="list-style-type: none"> • The warehouse manager assigns a WO to the resource

3	<p>The warehouse manager prints out the WO and gives it to the resource.</p>	<p>via the <i>Assign Rsrce</i> warehouse management monitor method.</p> <p> Hint: Any available WOs can be manually assigned to a resource, including those from queues to which the resource is not assigned.</p> <ul style="list-style-type: none">• The resource requests work by choosing a system-guided option from the RF menu. In such a case, the system assigns to the resource the most appropriate WO.• The resource requests work by choosing a manual option from the RF menu (for example, Pick by HU). In such a case, the system assigns to the resource the specific WO.
---	--	---

Queues

A queue is a logical file to which warehouse tasks for processing are assigned. Queues define movements by which work in the warehouse is managed and assigned.

The management and distribution of work in the warehouse is accomplished by the assignment of resources and WOs to queues. A resource may execute **only** those WOs that belong to one of its allowed queues (unless the WOs are manually assigned). This means a queue to which the resource or resource group is assigned, and in which the resource is authorized to work. In addition, a resource working within a particular operating environment may execute only those WOs that belong to a queue in the same operating environment.

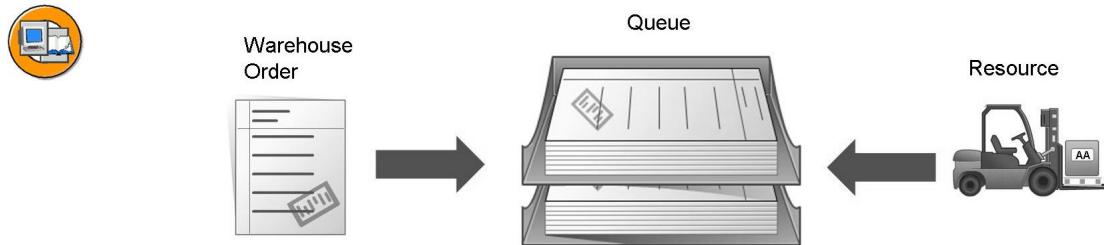


Figure 57: Queues

Resource Assignment to Queue

You can assign a resource to a specific queue, or assign its resource group to a sequence of allowed queues. WO selection will be performed first according to the resource's assigned queue, and, in the absence of an assigned queue, according to the resource group's queue sequence.

Warehouse Order Assignment to Queue

When the system creates a warehouse task (WT), it searches for an appropriate queue to assign to it, based on the following WT parameters:

- Source activity area
- Destination activity area
- Bin access type
- Warehouse process type

Resource Setup

You define a resource in the transaction for resource maintenance. To do so, on the *SAP Easy Access* screen, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Resource*. Alternatively, you can define a resource by using the warehouse management monitor (you can start the same transaction with the **method Maint. Resource**).

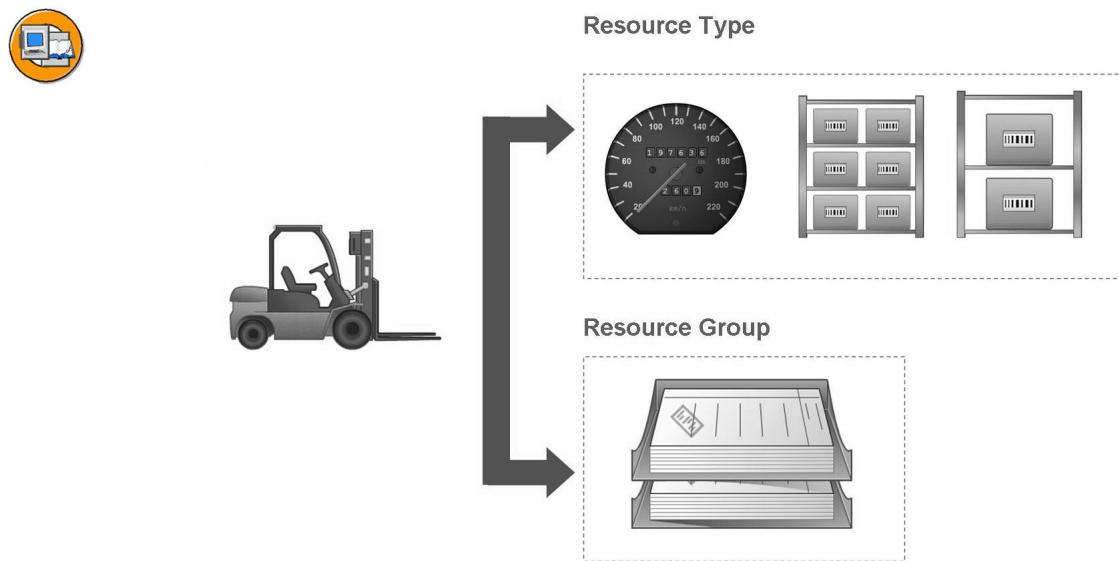


Figure 58: Resource Setup

Resource Type

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

- Horizontal and vertical velocity
The velocity of a resource can influence the latest starting date (LSD) of a warehouse order.
- Applicability of position management
Position management enables an RF device user to validate handling units (HUs) by their position number, rather than by their HU number. This is particularly useful when the HU number tags are not readily accessible, such as when the HUs are stacked on top of each other.
- Qualifications and preferences (reflected by priority values) regarding **bin access types** and **HU type groups**

Resource Group

The resource group determines the sequence of allowed queues for its corresponding resources, which can influence which warehouse orders are selected for a resource.

To use system-guided processing, the queues must be assigned to the resource groups in the desired sequence. As the warehouse orders are selected from the queues according to the queue sequences, this represents a sort of prioritization of the warehouse orders for this resource type.

Resource Execution Constraints

You use resource execution constraints to control the number of working resources in defined areas of the warehouse. You define these areas by assigned an resource execution constraint (REC) storage group to your storage bins.

The individual REC storage groups can correspond to an aisle, storage section, storage type, or another area in your warehouse. Define the maximum number of permitted work resources for these REC storage groups in such a way that the resources can perform your work without disruption.

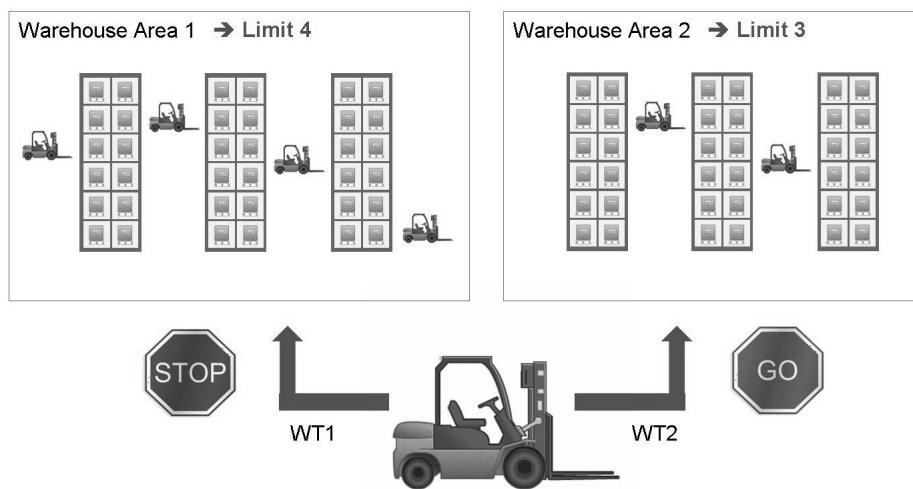


Figure 59: Resource Execution Constraints

The resource execution constraint consists of a group of different resource types, each having a maximum number of work resources. You identify the group uniquely using an ID. You can assign the same ID to different REC storage groups, and define whether:

- Only one resource type is allowed to be kept in the REC storage group at a time (parameter OR).
- Multiple different resource types are allowed to be kept in the REC storage group at a time, for example, forklift and warehouse worker. For each resource type, the maximum defined number of work resources in the REC storage group is allowed (parameter AND).

Example:

Resource types RT01 and RT02 are assigned to resource execution constraint A1, with a maximum number of two and three respectively. REC storage group GAN is assigned to constraint A1 with the parameter "AND". This means that a maximum of three resources of type RT02 and two resources of type RT01 can work in A1 at the same time.

The REC control is based on calculated times. Each time a resource enters the REC storage group, the system calculates the estimated exit time when it leaves the area. This time includes the following:

- Move time for moving the resource from the current position to the entry point of the REC storage group
- Working time in the REC storage group
- Exit time of the resource from when it leaves the location of the last completed warehouse task to the exit point of the REC storage group

When a resource wants to enter the REC storage group, the system compares the estimated exit times of the resources working in this area with the entry time of the resource. The system calculates the times, compares the calculated values with the number of permitted resources, and allows or denies the resource access to the REC storage group. If a warning is issued, the warehouse worker can enter the area, but he or she does so at his or her own risk.

The system calculates optimal routes for the resources based on the **travel distance calculation**. The actual times may deviate from the optimal times.

The function works using the average confirmation time for warehouse tasks. If you have activated Labor Management in your EWM system, the system uses the engineered labor standard values. If you are not using Labor Management, you must define the bin access type for the REC storage group, in the master data and you must also define the **extract time determination** for storage bins.

System-Guided / Semi-System-Guided Work

You can use semi-system-guided processing within system-guided processing. This is useful for source storage bins that have more than one handling unit (HU). In system-guided processing, the system proposes one particular HU to the user for processing. Finding this particular HU can take up a lot of time. If the source storage bin contains multiple HUs, it is more efficient if the system instructs the warehouse worker to go to a particular source storage bin and remove any HU. This is what happens in semi-system-guided processing.

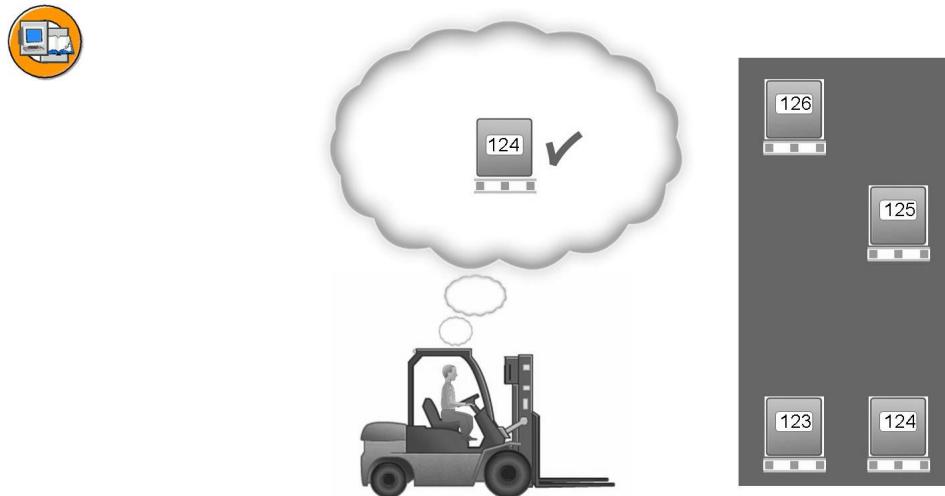


Figure 60: System-Guided / Semi-System-Guided Work

To use this function, you set the queue to semi-system-guided processing, not the source storage bin. When selecting a warehouse task, the system checks whether a queue has been set to semi-system-guided processing. If this is the case, the system sets the session to semi-system-guided. This affects processing in the following way:

- The user verifies the source storage bin only.
- The HU field is empty. The user can scan it.

After scanning, the system checks whether:

- The scanned HU is available in the specified storage bin.
- An open warehouse task exists for this HU.
- The reported resource is allowed to process the HU.

System-guided processing	Semi-system-guided processing
The screen shows you various data, such as HU, product, quantity, batch, and so on.	You only see the source storage bin and the input field for the HU.
Warehouse task is locked.	Warehouse task is not locked, as it is still not clear which HU is being selected.

The semi-system-guided processing screen contains a pushbutton that allows you to activate the display of available HUs. You can also trigger other queries for the HU, such as queue or storage bin.

Task Interleaving

The aim of task interleaving is to minimize unutilized resources through an optimized distribution of the warehouse tasks and to reduce the travel times in the warehouse. For example, after putaway, a forklift does not return empty to the goods receipt area; instead, it is given a new task before returning to that area, such as a stock removal order.

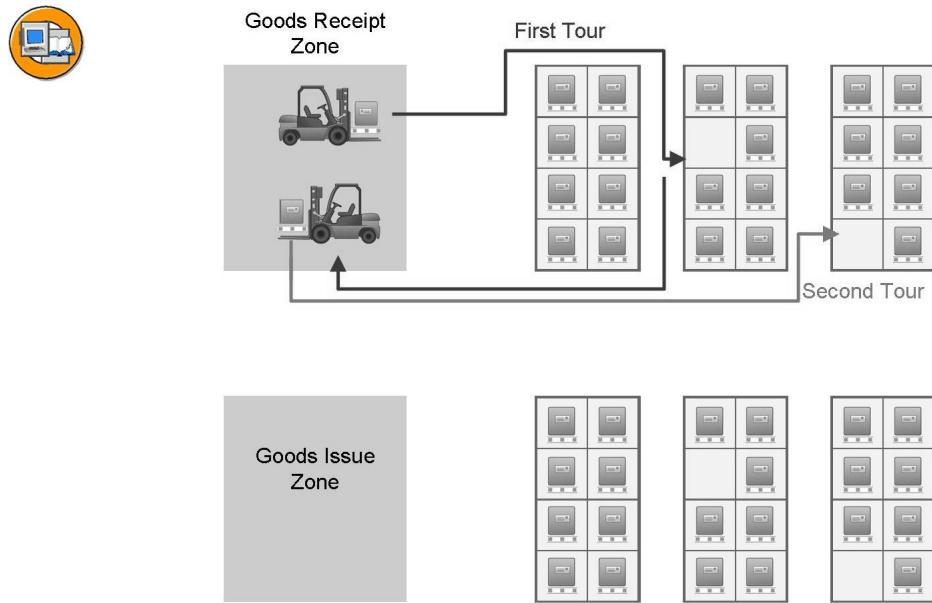


Figure 61: Without Task Interleaving

After completing a warehouse task, the system immediately assigns a new task to the warehouse worker, which is located near the worker. Before making each allocation, the system determines the distance to find the task that is geographically closest for the resource.

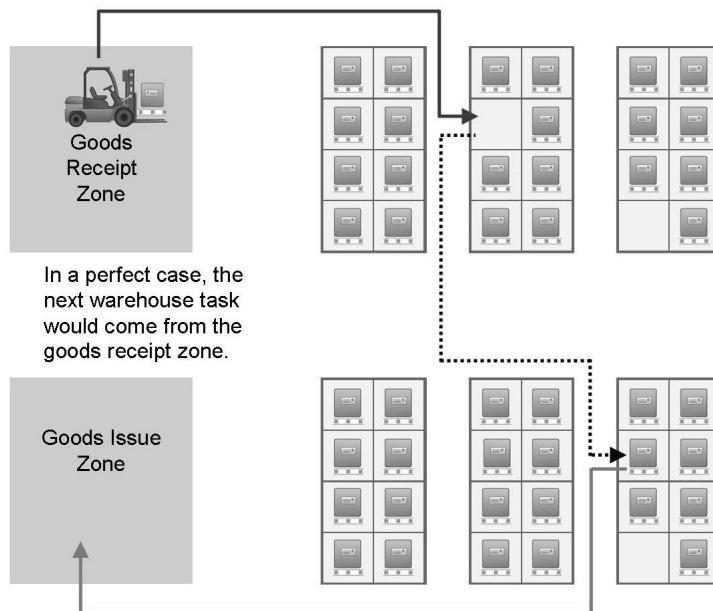


Figure 62: With Task Interleaving

You set RF interleaving for resource types. You assign each interleaving-relevant queue to a queue type and to a queue sequence.

RF interleaving	Standard RF function
1. Resource processes a warehouse task of a queue.	1. Same queue is processed until it is empty.
2. The subsequent warehouse task comes from another queue, based on the defined queue type sequence.	2. The next queue is processed according to the defined queue sequence.



Caution: This function is only available within system-guided processing.

Exercise 15: Work with Resources

Exercise Objectives

After completing this exercise, you will be able to:

- Set up resource types and resources
- Describe the use of bin access types

Business Example

In your warehouse, different resources are available, but not all resources can access all areas of your warehouse. You can use resource types and bin access types to model these limitations.

Task 1:

Create a new resource type that can access only certain bins in your warehouse.

1. Create a new bin access type: **BAT2 - No fast forklift**.
2. Set up a new resource type, **RT02 - Fast forklift**, which has a horizontal velocity of 20 km/h and a vertical velocity of 5 km/h. This new resource type can only go to bins with the bin access type BAT1. The resource type RT01 can go to bins with access types BAT1 and BAT2. Make these assignments.
3. Create a new resource **GR##_2** with *resource type RT02, resource group RGAL*, and the *default presentation device PRES*.
4. Add the **INBOUND** queue to your resource group **RGAL**.
5. Assign the **Bin Access Type** “BAT2” to all bins in storage type 0010.

Task 2:

Test your resource management settings.

1. Create a sales order as detailed below:

<i>Order Type</i>	OR
<i>Sold-To Party</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Material</i>	T-EW05-##
<i>Order Quantity</i>	2

Sales order: _____

Continued on next page

2. Create the outbound delivery

Delivery: _____

3. Create the warehouse task and warehouse order.

Outbound delivery order: _____

Warehouse order: _____

4. Try to pick via RF with the resource GR##_2.

Solution 15: Work with Resources

Task 1:

Create a new resource type that can access only certain bins in your warehouse.

1. Create a new bin access type: **BAT2 - No fast forklift**.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Resource Management* → *Define Bin Access Types*.
 - b) Choose the *New Entries* button.
 - c) Enter the following details:

<i>Warehouse Number</i>	E1##
<i>Acc. Type</i>	BAT2
<i>Description</i>	No fast forklift

- d) Choose *Save*  to save your new entry.
- e) Choose *Exit*  to end the transaction.

Continued on next page

2. Set up a new resource type, **RT02 - Fast forklift**, which has a horizontal velocity of 20 km/h and a vertical velocity of 5 km/h. This new resource type can only go to bins with the bin access type BAT1. The resource type RT01 can go to bins with access types BAT1 and BAT2. Make these assignments.
- In the IMG of your EWM system, choose *Extended Warehouse Management → Cross-Process Settings → Resource Management → Define Resource Types*.
 - Choose *New Entries*.
 - Enter the following details:

<i>Warehouse Number</i>	E1##
<i>Rsrce Type</i>	RT02
<i>Description</i>	Fast forklift
<i>Res Type Vel</i>	20
<i>Velocity Z</i>	5
<i>UoM</i>	KMH

- Choose *Save*  to save your new entry.
- Choose *Back*  to return to the list of all resource types.
- Position on your warehouse number.
- Select the entry for the *Rsrce Type RT01* in your warehouse and in the left-hand dialog structure, choose *Assign Bin Access Types*.
- Choose *New Entries*.
- Enter the *Acc. Types* **BAT1** and **BAT2**.
- Choose *Back*  to return to the list of all resource types.
- Select the entry for the *Rsrce Type RT02* in your warehouse and in the left-hand dialog structure, choose *Assign Bin Access Types*.
- Choose *New Entries*.
- Enter the *Acc. Types* **BAT1**.
- Choose *Save*  to save your new entries.
- Choose *Exit*  to end the transaction.

Continued on next page

3. Create a new resource **GR##_2** with *resource type RT02*, *resource group RGAL*, and the *default presentation device PRES*.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Resource*.
 - Switch to change mode by choosing *Display* → *Change*.
 - Choose the *New Entries* button.
 - Enter the following details:

<i>Resource</i>	GR##_2
<i>Rsrce Type</i>	RT02
<i>RsrceGrp</i>	RGAL
<i>DefPresDvc</i>	PRES

- Choose *Save* to save your new entry.
 - Choose *Exit* to end the transaction.
4. Add the **INBOUND** queue to your resource group **RGAL**.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Queue Sequence for Resource Group*.
 - Switch to change mode by choosing *Display* → *Change*.
 - Choose the *New Entries* button.
 - Enter the following details:

<i>RsrceGrp</i>	RGAL
<i>Queue</i>	INBOUND

- Choose *Save* to save your new entry.
- Choose *Exit* to end the transaction.

Continued on next page

5. Assign the **Bin Access Type** “BAT2” to all bins in storage type 0010.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Storage Bin* → *Mass Change to Storage Bins*.
 - Enter the *Warehouse Number* **E1##** and the *Storage Type* **0010**.
 - Choose *Execute* .
 - Choose *Select all* .
 - Choose *Change Storage Bins* .
 - In the pop-up, enter the *Bin Access Type* **BAT2** and press **Enter**.
 - Choose *Save*  to save your changes.
 - Choose *Exit*  to end the transaction.

Task 2:

Test your resource management settings.

- Create a sales order as detailed below:

<i>Order Type</i>	OR
<i>Sold-To Party</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Material</i>	T-EW05-##
<i>Order Quantity</i>	2

Sales order: _____

- In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - Enter *Order Type*: **OR** and press **Enter**.
 - Enter the details as described in the table.
 - Save  your sales order. Note down the sales order number.
 - Choose *Exit*  to end the transaction.
- Create the outbound delivery

Continued on next page

Delivery: _____

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*
 - b) Enter the *Shipping point* **z0##**, the *Order* should default. Press **Enter**
 - c) Save your delivery. Note down the delivery number.
 - d) Choose *Exit* to return to the *Easy Access* menu.
3. Create the warehouse task and warehouse order.

Outbound delivery order: _____

Warehouse order: _____

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
- b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
- c) Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
- d) Choose *Create + Save Warehouse Task* and note down the number of the warehouse order.
- e) Confirm the queue of the warehouse order in the warehouse management monitor. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
- f) Choose *Outbound* → *Documents* → *Outbound Delivery Order*. Enter the outbound delivery order number in the search pop-up and start the search.
- g) Select the outbound delivery order and choose *Warehouse Order*. Confirm the queue in the lower part of the screen (it should be “Outbound”).
- h) Choose *Exit* to leave the transaction.

Continued on next page

4. Try to pick via RF with the resource **GR##_2**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Log On to RF Environment*.
 - b) The entries *Whse No.: E1##*, *Resource: GR##*, and *DefPresDvc: PRES* should default.
Overwrite the default entry for the resource with the new resource **GR##_2**. Choose *02 Manual Selection* → *Selection by WO*. Enter your warehouse order. The system should give you an error: **E: Suitable warehouse orders were not found.**
 - c) Log off and on again, but this time with the resource **GR##**. Try the process again.

Exercise 16: Semi-System-Guided Work

Exercise Objectives

After completing this exercise, you will be able to:

- Set up semi-system-guided queues for RF

Business Example

Sometimes there are several HUs in a bin and the warehouse worker should choose which HU he will move instead of receiving the next warehouse task for a pallet, which he might not be able to access.

Task 1:

Create a new queue for semi-system-guided processing.

1. Create a queue, **Semi-Sys**, for semi-system-guided processing.
2. Set up the determination of the new queue **Semi-Sys**. It should be found for the warehouse process type 1010 (instead of the standard queue Inbound).
3. Add the new queue **Semi-Sys** to your resource group **RGAL**.

Task 2:

Test the settings for the semi-system-guided work.

1. Create a purchase order as detailed below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Material</i>	T-EW04-##
<i>PO Quantity</i>	200
<i>Deliv. Date</i>	Today + 2 days
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##

Purchase order:

Continued on next page

2. In the inbound delivery you create some handling units by packing always 50 pieces into one handling unit.

Inbound delivery (ERP):

HUs:

3. Post the goods receipt and create the warehouse tasks and warehouse orders.

Inbound delivery (EWM):

Warehouse orders:

Queue:

4. Confirm the putaway of the handling units via RF.

Task 3:

Reverse the settings to use the INBOUND queue again.

1. Change the determination of the queue so that inbound deliveries will be part of the INBOUND queue again.

Solution 16: Semi-System-Guided Work

Task 1:

Create a new queue for semi-system-guided processing.

1. Create a queue, **Semi-Sys**, for semi-system-guided processing.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Resource Management* → *Define Queues*. Select *Define Queues* in the *Choose Activity* pop-up.
 - b) Choose *New Entries*. Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>Queue</i>	SEMI-SYS
<i>Description</i>	Semi-system-guided
<i>Oper.Environ.</i>	3 RF; Resource Management Active
<i>Semi-Sys.</i>	Set flag

- c) Save  your new entry.
- d) Choose *Exit*  to leave the transaction.
2. Set up the determination of the new queue **Semi-Sys**. It should be found for the warehouse process type 1010 (instead of the standard queue Inbound).
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Resource Management* → *Define Queues*. Select *Define Queue Determination Criteria* in the *Choose Activity* pop-up.
 - b) Position on the entry for your *Warehouse No.*: **E1##** and *Whse Proc. Type*: **1010**.
 - c) Overwrite the *Queue* entry with the new queue **SEMI-SYS**.
 - d) Save  your changed entry.
 - e) Choose *Exit*  to leave the transaction.

Continued on next page

3. Add the new queue **Semi-Sys** to your resource group **RGAL**.

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Queue Sequence for Resource Group*.
- Switch to change mode by choosing *Display* → *Change* .
- Choose the *New Entries* button.
- Enter the following details:

<i>RsrceGrp</i>	RGAL
<i>Queue</i>	SEMI-SYS

- Choose *Save*  to save your new entry.
- Choose *Exit*  to end the transaction.

Task 2:

Test the settings for the semi-system-guided work.

- Create a purchase order as detailed below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Material</i>	T-EW04-##
<i>PO Quantity</i>	200
<i>Deliv. Date</i>	Today + 2 days
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##

Continued on next page

Purchase order:

-
- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) *Save* your purchase order. Note down the purchase order number.
 - d) Choose *Exit* to end the transaction.
2. In the inbound delivery you create some handling units by packing always 50 pieces into one handling unit.

Inbound delivery (ERP):

HUs:

-
- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Select *Pack*.
 - d) Enter the *Packaging Materials*: **PKE-095** and press **Enter**.
 - e) Select the newly created *Handling Unit*. Select the *Material*. In *Partial qty*, enter **50** and select *per part. qty* .
- Four (4) handling units should be created and packed. Note down the HU numbers.
- f) *Save* your inbound delivery. Note down the inbound delivery number.
 - g) Choose *Exit* to end the transaction.
3. Post the goods receipt and create the warehouse tasks and warehouse orders.

Inbound delivery (EWM):

Warehouse orders:

Continued on next page

Queue: _____

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search*  . Note down the number of the inbound delivery.
 - c) Select the inbound delivery and choose *Goods Receipt*  .
 - d) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
 - e) Choose *Create + Save Warehouse Task*  .
 - f) Confirm the queue of the warehouse orders in the warehouse management monitor. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - g) Choose *Inbound* → *Documents* → *Inbound Delivery* . Enter the inbound delivery number in the search pop-up and start the search.
 - h) Select the inbound delivery and choose *Warehouse Order*. Confirm the queue in the lower part of the screen (it should be “SEMI-SYS”).
 - i) Choose *Exit*  to leave the transaction.
4. Confirm the putaway of the handling units via RF.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Log On to RF Environment*.
 - b) The entries *Whse No.: E1##*, *Resource: GR##* and *DefPresDvc: PRES* should default.
- Press **Enter**.
- c) Choose *01 System-Guided* → *02 System-guided by Queue*. Enter the *Queue SEMI-SYS* and continue.
 - d) The system will present you a confirmation field for the *SrcBin* and an entry field for the *HU*. Use *F1 Queries* for an *HU list on bin GR-Zone*.
- Put away the handling units one by one.

Continued on next page

Task 3:

Reverse the settings to use the INBOUND queue again.

1. Change the determination of the queue so that inbound deliveries will be part of the INBOUND queue again.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Resource Management* → *Define Queues*. Select *Define Queue Determination Criteria* in the *Choose Activity* pop-up.
 - b) Position on the entry for your *Warehouse No.*: **E1##** and *Whse Proc. Type*: **1010**.
 - c) Overwrite the *Queue* entry with the queue **INBOUND**.
 - d) Save  your changed entry.
 - e) Choose *Exit*  to leave the transaction.

Exercise 17: Task Interleaving

Exercise Objectives

After completing this exercise, you will be able to:

- Set up task interleaving

Business Example

After a putaway process, a resource should possibly not move empty, but receive the best-fitting next task. For this the system can use task interleaving.

Task:

Set up new queue types and queue types sequences. Queue types control the task interleaving process. A queue type includes queues in one direction. Finally check your settings.

1. Create two new queue types: **INB - Inbound Queues** and **OUTB - Outbound Queues**.
2. Assign the new **queue types** to the **queues**: the queue type INB to the queue INBOUND and the queue type OUTB to the queue OUTBOUND.
3. Maintain a **queue type sequence** in your *warehouse number E1##* and for the *resource group RGAL*. First there shall be in the OUTB queue type, then the INB queue type.
4. Create a sales order and a purchase order, as detailed below, and the according the outbound and the inbound deliveries.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW04-##
<i>Quantity</i>	5
<i>Item 2</i>	T-EW05-##
<i>Quantity</i>	5

Sales order: _____

Delivery: _____

Continued on next page

Details for the purchase order:

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW04-##
<i>PO Quantity</i>	200
<i>Deliv. Date</i>	Today + 2 days
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
Item 2	
<i>Material</i>	T-EW05-##
<i>PO Quantity</i>	100
<i>Deliv. Date</i>	Today + 2 days
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##

Purchase order:

Inbound delivery (ERP):

5. Create the warehouse tasks in a way that you get separate warehouse orders for **each** task. Go through the picking and the putaway process system-guided and check if the system uses task interleaving when assigning you the tasks.

Outbound delivery order:

Warehouse order 1:

Warehouse order 2:

Inbound delivery (EWM):

Warehouse order 1:

Continued on next page

Warehouse order 2:

Solution 17: Task Interleaving

Task:

Set up new queue types and queue types sequences. Queue types control the task interleaving process. A queue type includes queues in one direction. Finally check your settings.

1. Create two new queue types: **INB - Inbound Queues** and **OUTB - Outbound Queues**.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Cross-Process Settings → Resource Management → Define Queues Types*.
 - b) Choose *New Entries*. Create two new entries with the following details:

<i>Warehouse Number</i>	<i>Q.Typ</i>	<i>Definition</i>
E1##	INB	Inbound Queues
E1##	OUTB	Outbound Queues

- c) Save  your new entries.
- d) Choose *Exit*  to leave the transaction.

2. Assign the new **queue types** to the **queues**: the queue type INB to the queue INBOUND and the queue type OUTB to the queue OUTBOUND.

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Cross-Process Settings → Resource Management → Define Queues*. Select *Define Queues* in the *Choose Activity* pop-up.
- Enter the queue types for the queues INBOUND and OUTBOUND in your warehouse number **E1##**. Assign the queue type INB to the queue INBOUND and the queue type OUTB to the queue OUTBOUND.

- b) Save  your changes.
- c) Choose *Exit*  to leave the transaction.

Continued on next page

3. Maintain a **queue type sequence** in your *warehouse number E1##* and for the *resource group RGAL*. First there shall be in the OUTB queue type, then the INB queue type.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Resource Management → Maintain Queues Type Sequence*.
 - Choose the *New Entries* button.
 - Create two new entries with the following details:

<i>Warehouse Number</i>	<i>Rsrce Grp</i>	<i>Sequence No.</i>	<i>Q. Type</i>
E1##	RGAL	1	OUTB
E1##	RGAL	2	INB

- Save  your new entries.
 - Choose *Exit*  to leave the transaction.
4. Create a sales order and a purchase order, as detailed below, and then according the outbound and the inbound deliveries.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW04-##
<i>Quantity</i>	5
<i>Item 2</i>	T-EW05-##
<i>Quantity</i>	5

Sales order: _____

Delivery: _____

Details for the purchase order:

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000

Continued on next page

<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW04-##
<i>PO Quantity</i>	200
<i>Deliv. Date</i>	Today + 2 days
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
Item 2	
<i>Material</i>	T-EW05-##
<i>PO Quantity</i>	100
<i>Deliv. Date</i>	Today + 2 days
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##

Purchase order:

Continued on next page

Inbound delivery (ERP):

-
- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - b) Enter *Order Type*: **OR** and press **Enter**.
 - c) Enter the details as described in the table.
 - d) *Save* your sales order. Note down the sales order number.
 - e) Choose *Exit* to end the transaction.
 - f) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
 - g) Enter the *Shipping point* **Z0##**. The *Order* should default. Press **Enter**.
 - h) *Save* your delivery. Note down the delivery number.
 - i) Choose *Exit* to return to the *Easy Access* menu.
 - j) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - k) Enter the details as described in the table.
 - l) *Save* your purchase order. Note down the purchase order number.
 - m) Choose *Exit* to end the transaction.
 - n) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - o) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - p) *Save* your inbound delivery. Note down the inbound delivery number.
 - q) Choose *Exit* to end the transaction.
5. Create the warehouse tasks in a way that you get separate warehouse orders for **each** task. Go through the picking and the putaway process system-guided and check if the system uses task interleaving when assigning you the tasks.

Outbound delivery order:

Continued on next page

Warehouse order 1:

Warehouse order 2:

Inbound delivery (EWM):

Warehouse order 1:

Warehouse order 2:

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
- b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
- c) Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
- d) Select one item and choose *Create + Save Warehouse Task*. Then select the item that is left and choose *Create + Save Warehouse Task*.
- e) Confirm the queues of the warehouse order in the Warehouse Management Monitor. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
- f) Choose *Outbound* → *Documents* → *Outbound Delivery Order*. Enter the outbound delivery order number in the search pop-up and start the search.
- g) Select the outbound delivery order and choose *Warehouse Order*. Confirm the queues in the lower part of the screen (it should be “**Outbound**”). Note down the warehouse order numbers.
- h) Choose *Exit* to leave the transaction.
- i) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.

Continued on next page

- j) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search*  . Note down the number of the inbound delivery.
- k) Select the inbound delivery and choose *Goods Receipt* .
- l) Select the inbound delivery and choose *Inbound Delivery → Follow-on Functions → Warehouse Task*.
- m) Select one item and choose *Create + Save Warehouse Task*.
Then select the item that is left and choose *Create + Save Warehouse Task*.
- n) Confirm the queues of the warehouse orders in the Warehouse Management Monitor. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.
- o) Choose *Inbound → Documents → Inbound Delivery* . Enter the inbound delivery number in the search pop-up and start the search.
- p) Select the inbound delivery and choose *Warehouse Order*. Confirm the queues in the lower part of the screen (it should be “INBOUND”). Note down the numbers of the warehouse orders.
- q) Choose *Exit*  to leave the transaction.
- r) Log on to the RF environment. In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Execution → Log on to RF Environment*.

Press **Enter** on the entry screen.

Choose *01 System-Guided → 01 System-guided Selection*. The system should assign you alternately warehouse orders from the INBOUND and the OUTBOUND queue.



Lesson Summary

You should now be able to:

- Set up resources
- Assign tasks to resources

Lesson: Pick, Pack, and Pass

Lesson Overview

In this lesson you will learn about pick, pack, and pass during picking.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the advantages of the pick, pack, and pass process
- Create the required settings for pick, pack, and pass

Business Example

Several pickers in your warehouse pick products that belong to the same deliveries. You require a mechanism to consolidate these individual picks into one pick HU.

Pick, Pack, and Pass During Picking

With pick, pack, and pass, you coordinate picking, packing, and transportation of products in different activity areas in your warehouse. For example, you transport products from one activity area to another using a conveyor belt. From an organizational point of view, an activity area can correspond to an aisle for which a warehouse worker is responsible. As soon as the warehouse worker has picked a warehouse order in his area, he passes on the goods to the next area.

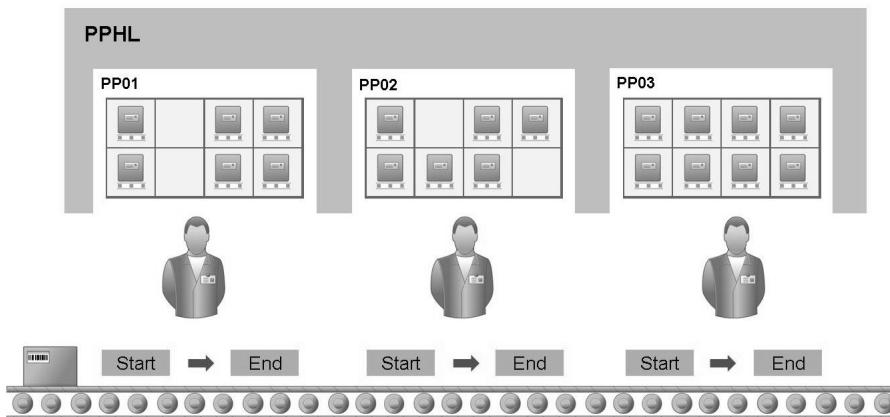


Figure 63: Pick, Pack, and Pass Process

The movement from one activity area to the other can be done by an automatic conveyor system. There may also be pick-to-light systems in the various zones to support the picking process within the zone.

Features

You can use pick, pack, and pass most efficiently in an RF environment. The process flow is the same as for standard RF picking.

The destination storage bins are different for RF picking using pick, pack, and pass and standard RF picking. In pick, pack, and pass, warehouse workers pass the product from activity area to activity area until it arrives at the actual destination storage bin.

Picking	Destination Storage Bin
RF picking	Destination storage bin, such as goods issue area
RF picking using pick, pack, and pass	Storage bin of activity area from where the product moves to the next activity area

You can use pick, pack, and pass in either a system-controlled or user-controlled way.

- System-controlled pick, pack, and pass function

With this setting, the system specifies the sequence for processing the warehouse orders and corresponding pick HUs.

It creates a higher-level warehouse order that contains all other warehouse orders that have been created. Only the first warehouse order in the sequence is active; all other warehouse orders are inactive. The sequence in which the system orders the warehouse orders corresponds to the sequence that you have defined in Customizing for the activity areas in the warehouse order creation rules.

1. During warehouse order creation, the pick HU determination determines the suitable pick HUs for all warehouse tasks of the warehouse order.
 2. The system checks the warehouse order type. If you activated the pick, pack, and pass function, the system creates a higher-level warehouse order that contains multiple warehouse orders sorted by activity area. The system only passes on the standard warehouse orders to resource management in Extended Warehouse Management.
- User-controlled pick, pack, and pass function

With this setting, the system creates the warehouse orders and the corresponding pick HUs the same as for the system-controlled pick, pack, and pass function. However, **all** created warehouse orders are active, and no sequence for processing them exists. The user takes a warehouse order that is valid for his or her activity area.

Requirements

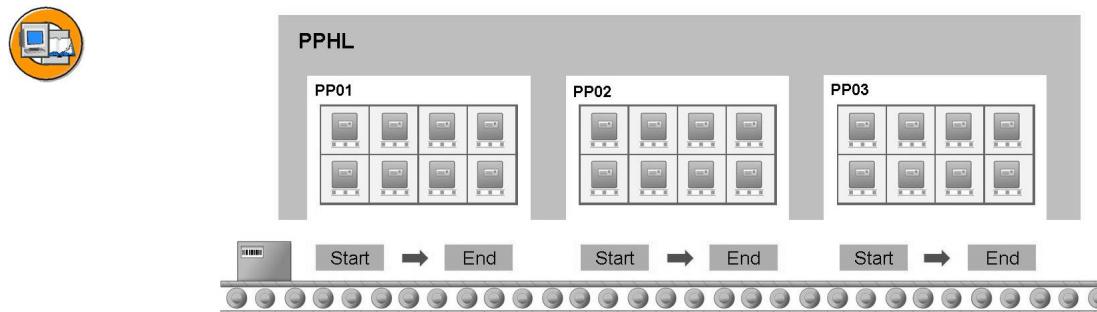


Figure 64: Activity Areas, Start and End Points for Pick, Pack, and Pass

- Each picking zone must be mapped as an individual activity area. Additionally, the activity areas must be joined and for the system-driven option in the required sort sequence.
- If you work with the system-driven method, you have to define which bins represent the start point and end point for each picking zone.
- You need a warehouse order creation rule that supports the top warehouse order creation for the pick, pack, and pass process. The creation categories for this are:
 - System-driven: For the system-driven option, the sequence of the warehouse orders in the top warehouse order is determined according to the sort sequence of the assigned in the configuration settings for joining the activity areas.
 - User-driven: For the user-driven option, the sequence is manually determined during the execution, which means it can also be done by the material flow system (MFS).

Warehouse Orders

If you use pick, pack, and pass, the system creates a higher-level warehouse order that contains the pick HUs for all warehouse tasks that are to be created, which you pick one after each other. The warehouse worker also receives the warehouse order created for his or her activity area, together with its warehouse tasks.

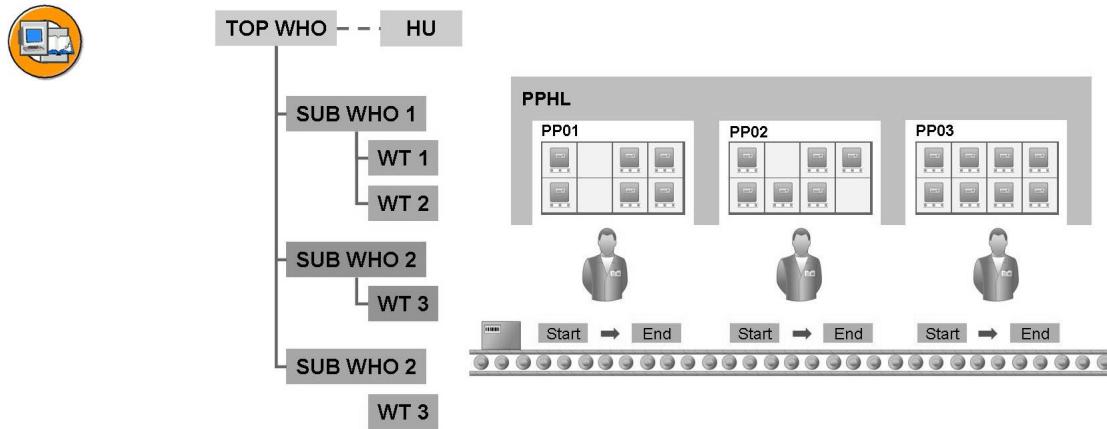


Figure 65: Warehouse Orders for Pick, Pack, and Pass

Example:

The warehouse workers pick in the three activity areas PP01, PP02, and PP03 in a system-controlled way using pick, pack, and pass.

1. The system creates a higher-level warehouse order containing seven warehouse tasks for the three activity areas PP01, PP02, and PP03, and determines the pick HUs for all warehouse tasks.
2. It then distributes the warehouse tasks across the three activity areas.
3. Each of the three warehouse workers receives their own warehouse order.
4. The first warehouse worker takes the pick HU from the source storage bin of his or her activity area.
5. The worker performs picking and puts the pick HU in the destination storage bin of his or her activity area.
6. The pick HU is moved from the destination storage bin of the activity area to the source storage bin of the next activity area.
7. The process is repeated from step 4. When it comes to the final activity area (PP03), the worker puts the pick HU in the original destination bin, such as the goods issue area, instead of in the destination storage bin of the activity area.

Exercise 18: Pick, Pack, and Pass

Exercise Objectives

After completing this exercise, you will be able to:

- Create activity areas for pick, pack, and pass
- Create warehouse order creation rules for pick, pack, and pass

Business Example

You want to use the pick, pack, and pass process to move pick HUs for deliveries from one warehouse worker to the other so that different picking areas can be used effectively.

Task 1:

Set up the pick, pack, and pass process.

1. Create separate activity areas for each of the first three aisles in storage type 0010. Name them **PPxx** (where xx is for the aisle number, so 01-03) and give them the description **Pick, Pack, and Pass xx**.



Hint: In reality you would probably have individual activity areas for each of the aisles in that storage type; we just limit it here to three for time reasons.

Also create a **joined** higher level activity area named **PPHL– pick, pack, and pass higher level AA**.

2. Assign the storage bins of the first three aisles to their respective new activity areas.
3. Define the sort sequence for the new activity areas for the activity **PICK**. As the activity area is always one aisle, the sort sequence can stay blank.
4. Create one start and end bin with the name **Start_End xx** for each of the three aisle. Do not forget to assign it to the aisle.
5. Sort the storage bins for the activity **PICK**.
6. Assign the new created storage bins as start / end storage bin for each of the respective aisles.
7. Join the new activity areas PP01, PP02, and PP03 under the higher-level activity area PPHL.
8. Create a new warehouse order creation rule for the system-driven pick, pack, and pass process with the following details:

Continued on next page

<i>Warehouse No.</i>	E1##
<i>WO Creatn Rule</i>	PPHL
<i>Description</i>	Pick, Pack, and Pass Rule
<i>Creation Cat.</i>	C Pick, Pack, and Pass: System-Driven
<i>Inbound Sorting</i>	CONS
<i>WO Sorting</i>	PIPA
<i>Packing Profile</i>	095

9. Define a search sequence for the new warehouse order creation rule in the activity area **PPHL** and the activity **PICK**.
10. Create a condition record for the packaging 2000000000000 (the description says “Use to Create HU's in Pack Station”) so that it can be found in your warehouse number **E1##** (which is represented by the *SC Unit* here).
11. Assign the warehouse process type **3050** for the movements of the pick HU to the resource.

Task 2:

Create an RF user.

→ **Note:** This task is only necessary if you do this exercise outside of the regular EWM120 or if you have not done the RF exercises.

1. Create a RF user with the following details:

<i>User</i>	Your user ID
<i>Prsn. Prof.</i>	**
<i>Warehouse No.</i>	E1##
<i>Resource</i>	GR##

Assign the queue **OUTBOUND** to the Resource Group **RGAL**.

Task 3:

Test the pick, pack, and pass process.

1. Create a sales order as detailed below. Create the outbound delivery and the warehouse tasks.

Details for the sales order:

Continued on next page

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW04-##
<i>Quantity</i>	2
<i>Item 2</i>	T-EW05-##
<i>Quantity</i>	1
<i>Item 2</i>	T-EW06-##
<i>Quantity</i>	2

Sales order: _____

Delivery: _____

Outbound delivery order:

2. Use the warehouse management monitor to control the status of the warehouse tasks and warehouse orders.

Warehouse order 1:

Status: _____

Warehouse order 2:

Status: _____

Warehouse order 3:

Status: _____

Warehouse task 1:

Status: _____

Warehouse task 2:

Status: _____

Warehouse task 3:

Status: _____

Continued on next page

Warehouse order 4:

-
3. Use the warehouse management monitor to look for the higher-level warehouse order.

Warehouse order 4:

Status: _____

4. Return to the previous lists of warehouse orders to control their status when you fulfill the process in a parallel session with RF.
5. Use a second session to log in to the RF environment. Use the *OUTBOUND* queue for the selection of the warehouse task. **Create one HU** and pick the different materials. Control in parallel in the warehouse management monitor the status of the warehouse orders after confirming the different steps.

Solution 18: Pick, Pack, and Pass

Task 1:

Set up the pick, pack, and pass process.

1. Create separate activity areas for each of the first three aisles in storage type 0010. Name them **PPxx** (where xx is for the aisle number, so 01-03) and give them the description **Pick, Pack, and Pass xx**.



Hint: In reality you would probably have individual activity areas for each of the aisles in that storage type; we just limit it here to three for time reasons.

Also create a **joined** higher level activity area named **PPHL – pick, pack, and pass higher level AA**.

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Master Data → Activity Areas → Define Activity Area*.
- b) Choose the *New Entries* button and create four new entries as listed below:

Warehouse No.	Activity Area	Description	Areas Joined
E1##	PP01	Pick, Pack, and Pass 01	
E1##	PP02	Pick, Pack, and Pass 02	
E1##	PP03	Pick, Pack, and Pass 03	
E1##	PPHL	Pick, pack, and pass higher level AA	Flag

- c) Save your entries.
- d) Choose *Exit* .

Continued on next page

2. Assign the storage bins of the first three aisles to their respective new activity areas.

- In the IMG of your EWM system, choose *Extended Warehouse Management → Master Data → Activity Areas → Assign Storage Bins to Activity Area*.
- Choose the *New Entries* button and create three new entries as listed below:

<i>Warehouse No.</i>	<i>Activity Area</i>	<i>Storage Type</i>	<i>Aisle Start</i>	<i>Aisle End</i>
E1##	PP01	0010	01	01
E1##	PP02	0010	02	02
E1##	PP03	0010	03	03

- Save  your entries.
 - Choose *Exit* .
3. Define the sort sequence for the new activity areas for the activity **PICK**. As the activity area is always one aisle, the sort sequence can stay blank.
- In the IMG of your EWM system, choose *Extended Warehouse Management → Master Data → Activity Areas → Define Sort Sequence for Activity Area*.
 - Choose the *New Entries* button and create three new entries as listed below:

<i>Warehouse No.</i>	<i>Activity Area</i>	<i>Activity</i>	<i>Sequence No.</i>	<i>Storage Type</i>
E1##	PP01	PICK	1	0010
E1##	PP02	PICK	1	0010
E1##	PP03	PICK	1	0010

- Save  your entries.
- Choose *Exit* .

Continued on next page

4. Create one start and end bin with the name **Start_End xx** for each of the three aisle. Do not forget to assign it to the aisle.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Storage Bin* → *Create Storage Bin*.
 - b) Enter the *Storage Bin* **Start_End 01** and press **Enter**.
Enter the *Storage Type* **0010** and the *Aisle* **01**.
Save  your entry.
 - c) Enter the *Storage Bin* **Start_End 02** and press **Enter**.
Enter the *Storage Type* **0010** and the *Aisle* **02**.
Save  your entry.
 - d) Enter the *Storage Bin* **Start_End 03** and press **Enter**.
Enter the *Storage Type* **0010** and the *Aisle* **03**.
Save  your entry.
 - e) Choose *Exit* .
5. Sort the storage bins for the activity **PICK**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Storage Bin* → *Sort Storage Bins*.
 - b) Enter the *Warehouse Number* **E1##** and the *Activity* **PICK**.
Choose *Execute* .
 - c) Choose *Create Bin Sorting* .
 - d) Choose *Exit* .

Continued on next page

6. Assign the new created storage bins as start / end storage bin for each of the respective aisles.

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Storage Bin* → *Assign Start/End Storage Bin for Activity Area*.
- Position on your new activity areas and enter for each of them:

<i>Warehouse No.</i>	<i>AA</i>	<i>Activity</i>	<i>Starting Point</i>	<i>End Point</i>
E1##	PP01	PICK	Start_End 01	Start_End 01
E1##	PP02	PICK	Start_End 02	Start_End 02
E1##	PP03	PICK	Start_End 03	Start_End 03

- Save*  your entries.
 - Choose Exit* .
7. Join the new activity areas PP01, PP02, and PP03 under the higher-level activity area PPHL.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Join Activity Areas Together*.
 - Choose the *New Entries* button and create three new entries as listed below:

<i>Warehouse No.</i>	<i>H.Act.Area</i>	<i>AA</i>	<i>Sort Sequence</i>
E1##	PPHL	PP01	1
E1##	PPHL	PP02	2
E1##	PPHL	PP03	3

- Save*  your entries.
 - Choose Exit* .
8. Create a new warehouse order creation rule for the system-driven pick, pack, and pass process with the following details:

Continued on next page

<i>Warehouse No.</i>	E1##
<i>WO Creatn Rule</i>	PPHL
<i>Description</i>	Pick, Pack, and Pass Rule
<i>Creation Cat.</i>	C Pick, Pack, and Pass: System-Driven
<i>Inbound Sorting</i>	CONS
<i>WO Sorting</i>	PIPA
<i>Packing Profile</i>	095

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Define Creation Rule for Warehouse Orders*.
- b) Choose the *New Entries* button and create one new entry as described in the table above.
- c) *Save*  your entry.
- d) Choose *Exit* .
9. Define a search sequence for the new warehouse order creation rule in the activity area **PPHL** and the activity **PICK**.
- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Define Search Sequence of Creation Rules for Activity Areas*.
- b) Choose the *New Entries* button and create one new entry with the following details:

<i>Warehouse No.</i>	E1##
<i>AA</i>	PPHL
<i>Activity</i>	PICK
<i>WOCR</i>	PPHL

- c) *Save*  your entry.
- d) Choose *Exit* .

Continued on next page

10. Create a condition record for the packaging 2000000000000 (the description says “Use to Create HU's in Pack Station”) so that it can be found in your warehouse number **E1##** (which is represented by the *SC Unit* here).
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Packaging Specification → Maintain Packaging Specification*.
 - Enter the *PACKSPEC Packaging Specification* **2000000000000** in the search field and choose *Perform Search* .
 - Select the packaging specification and choose *Create 2nd Version*.
 - Select the non-active version of the packaging specification and choose *Change* .
 - Enter a new condition record for the *Condition Type* **0BDL** for the combination of *SC Unit* **E1##** and the *Pack.Prof.* **095**.
 - Activate*  the changed packaging specification.
 - Choose *Exit*  twice to leave the transaction.
11. Assign the warehouse process type **3050** for the movements of the pick HU to the resource.
- In the *IMG* of your EWM system, choose *Extended Warehouse Management → Master Data → Define Warehouse Number Control*.
 - Position on your *Warehouse Number* **E1##**.
 - Choose *Details* .
 - Enter the warehouse process type **3050** for *WPT HU for Res..*

Task 2:

Create an RF user.

 **Note:** This task is only necessary if you do this exercise outside of the regular EWM120 or if you have not done the RF exercises.

- Create a RF user with the following details:

User	Your user ID
Prsn. Prof.	**
Warehouse No.	E1##
Resource	GR##

Continued on next page

Assign the queue **OUTBOUND** to the Resource Group **RGAL**.

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Users*.
- b) Choose *Display* -> *Change* .
- c) Choose *New Entries*.
- d) Create a new entry with the details in the table.
- e) *Save*  your entry.
- f) Choose *Exit* .
- g) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Resource Management* → *Maintain Queue Sequence for Resource Group*.
- h) Choose *Display* -> *Change* .
- i) Choose *New Entries*.
- j) Create a new entry for the *Rsrce Grp RGAL* and the *Queue OUTBOUND*.
- k) *Save*  your entry.
- l) Choose *Exit* .

Task 3:

Test the pick, pack, and pass process.

1. Create a sales order as detailed below. Create the outbound delivery and the warehouse tasks.

Details for the sales order:

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW04-##
<i>Quantity</i>	2
<i>Item 2</i>	T-EW05-##

Continued on next page

<i>Quantity</i>	1
<i>Item 2</i>	T-EW06-##
<i>Quantity</i>	2

Sales order: _____

Delivery: _____

Outbound delivery order: _____

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - b) Enter *Order Type*: OR and press **Enter**.
 - c) Enter the details as described in the table.
 - d) *Save* your sales order. Note down the sales order number.
 - e) Choose *Exit* to end the transaction.
 - f) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
 - g) Enter the *Shipping point* Z0##. The *Order* should default. Press **Enter**.
 - h) *Save* your delivery. Note down the delivery number.
 - i) Choose *Exit* to return to the *Easy Access* menu.
 - j) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - k) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
 - l) Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
 - m) Select all three items and choose *Create + Save Warehouse Task* .
2. Use the warehouse management monitor to control the status of the warehouse tasks and warehouse orders.

Warehouse order 1:

Status: _____

Continued on next page

Warehouse order 2:

Status: _____

Warehouse order 3:

Status: _____

Warehouse task 1:

Status: _____

Warehouse task 2:

Status: _____

Warehouse task 3:

Status: _____

Warehouse order 4:

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) Choose *Outbound* → *Documents* → *Outbound Delivery Order*. Enter the outbound delivery order number in the search pop-up and start the search.
 - c) Select the outbound delivery order and choose *Warehouse Order*. Note down the warehouse order numbers and their status.
 - d) Select the outbound delivery order and choose *Warehouse Task*. Note down the warehouse tasks numbers and their status.
3. Use the warehouse management monitor to look for the higher-level warehouse order.

Continued on next page

Warehouse order 4:

Status: _____

- a) Choose *Documents → Warehouse Order*
 - b) In the pop-up, deselect the entries for *Canceled WOs*, *Locked WOs*, *Confirmed WOs*, and *WOS in Process*.
 - c) Choose *Execute* .
 - d) You should have at least two warehouse orders (depending on the previous exercises and what is still open there might be more). Look for the first one of the warehouse orders you noted in the last step. The one number before should be your higher-level warehouse order, it can be recognized by the *WO ActArea PPHL*. When you scroll to the right, this warehouse order should also have an entry for *WO - Contains Whse Order*.
4. Return to the previous lists of warehouse orders to control their status when you fulfill the process in a parallel session with RF.
 - a) Choose *Outbound → Documents → Outbound Delivery Order*. Enter the outbound delivery order number in the search pop-up and start the search.
 - b) Select the outbound delivery order and choose *Warehouse Order*.
 5. Use a second session to log in to the RF environment. Use the *OUTBOUND* queue for the selection of the warehouse task. **Create one HU** and pick the different materials. Control in parallel in the warehouse management monitor the status of the warehouse orders after confirming the different steps.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.
 - b) Press **Enter** on the entry screen.
 - c) Choose *01 System-Guided → 02 System-guided by Queue*.
 - d) Enter the *Queue OUTBOUND*.
 - e) Create one HU (with **F2 HUCr**). Confirm the different steps, but do not create additional HUs. Use the warehouse management monitor in the other session to control the status of the warehouse orders.



Lesson Summary

You should now be able to:

- Describe the advantages of the pick, pack, and pass process
- Create the required settings for pick, pack, and pass



Unit Summary

You should now be able to:

- Explain the different possibilities for travel distance calculation
- Set up networks
- Describe the supported processes supported by mobile data entry
- Set up menu management for mobile data entry in EWM
- Set up resources
- Assign tasks to resources
- Describe the advantages of the pick, pack, and pass process
- Create the required settings for pick, pack, and pass

Unit 5

Control Physical Movements in Your Warehouse

Unit Overview

Modern, high-volume warehouses often require integration with automated storage and retrieval systems. SAP Extended Warehouse Management offers direct communication with, and control of, such systems. One tool to describe special physical requirements in movements in a warehouse is layout-oriented storage control, which also covers identification and pick-point scenarios.



Unit Objectives

After completing this unit, you will be able to:

- Set up layout-orientated storage control
- Put away using an ID point
- Pick using a pick point
- Set up a basic material flow system scenario

Unit Contents

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Lesson: Layout-Oriented Storage Control

Lesson Overview

In this lesson you will learn about the settings for layout-orientated storage control and the ID point and pick point features.



Lesson Objectives

After completing this lesson, you will be able to:

- Set up layout-orientated storage control
- Put away using an ID point
- Pick using a pick point

Business Example

Certain storage types in your warehouse might require that handling units get moved via interim points, for example, for dimension checks.

Layout-Oriented Storage Control

Goods in your warehouse might not travel directly from a source storage bin to a destination storage bin, but rather travel via intermediate storage bins. Reasons for that include the physical layout of your warehouse, for example, because you have a multilevel warehouse and an elevator to move products up and down. Or you have certain resources that only move in specific parts of your warehouse; then you have to describe where the products are handed from one resource to the other. In case of automated storage and retrieval systems, you need **identification points** and **pick points** to “connect” these systems to the rest of your warehouse. In Extended Warehouse Management you use the layout-oriented storage control to describe these intermediate storage bins.

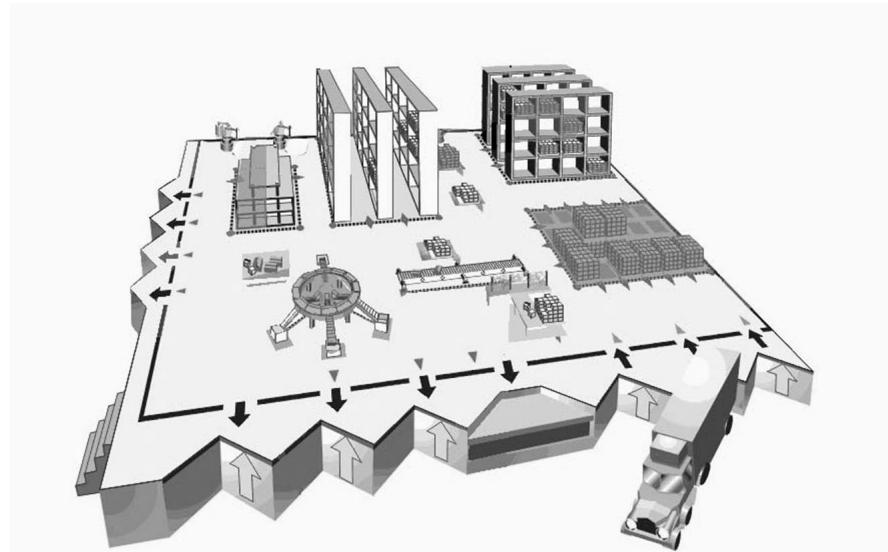


Figure 66: Complex Warehouses – Layout-Oriented Storage Control

Layout-oriented storage control can only be used with handling units except when intermediate pick and/or identification points are used.

Set Up Layout-Oriented Storage Control

First you can define **storage groups**. The storage group for the layout-oriented storage control is a logical or physical breakdown of a storage type. Within a storage type, you can combine a series of storage bins for an area. The criteria for doing this should depend on the physics of the storage bin. For example all storage bins in an aisle are grouped to a storage group, since the goods have to be brought during picking from this aisle to an intermediate storage bin at the end of the aisle.

In the settings for the layout-oriented storage control you describe for each required source or destination storage type or storage group via which intermediate type the products shall move. You can also choose an intermediate storage section or enter an intermediate storage bin. You can use this to specify in more detail to where the product should be moved. If you do not enter an intermediate storage section or bin, Extended Warehouse Management uses the defined putaway strategies to find the necessary data. Additionally, you can choose a **handling unit type group**, to specify that certain handling unit type, for example wire baskets, should always be moved via a specific intermediate storage type.

You also choose the warehouse process type that should be used to create the warehouse task to the intermediate storage type. You use this to specify which activities should be performed during warehouse task processing (for example, whether replenishment should be triggered automatically, or whether the quantities should be rounded). If the intermediate storage type is an identification point, the system does not use the warehouse process type.

Access Strategy Storage Control Table

Below is the matrix for the access strategy of determining the interim storage types.

Access	Source Storage Type	Source Storage Group	Destination Storage Type	Destination Storage Group	HU Type Group	Whole HU
01	X	X	X	X	X	X
02	X	X	X	X	X	
03	X	X	X	X		X
04	X	X	X	X		
05	X	X	X		X	X
06	X	X	X		X	
07	X	X	X			X
08	X	X	X			
09	X		X	X	X	X
10	X		X	X	X	
11	X		X	X		X
12	X		X	X		
13	X		X		X	X
14	X		X		X	
15	X		X			X
16	X		X			
17	X	X			X	X
18	X	X			X	
19	X	X				X
20	X	X				
21	X				X	X
22	X				X	
23	X					X
24	X					
25			X	X	X	X
26			X	X	X	
27			X	X		X
28			X	X		

Access	Source Storage Type	Source Storage Group	Destination Storage Type	Destination Storage Group	HU Type Group	Whole HU
29			X		X	X
30			X		X	
31			X			X
32			X			
33					X	X
34					X	
35						X

Using Layout-Oriented Storage Control

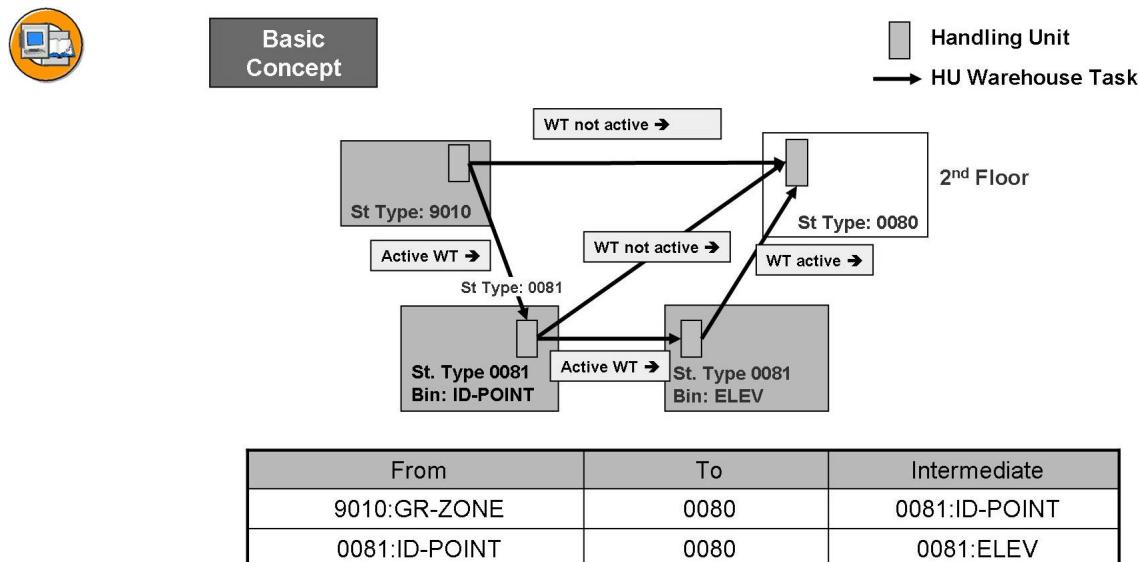


Figure 67: Layout-Oriented Storage Control Example

In the graphic above, a product pallet is to be moved from storage bin 9010-GR-ZONE (goods receiving area) to a storage bin in 0080 (high-rack storage area). The high-rack storage area is on the second level of the warehouse. The system should execute a contour and weight check at the ID point, 0081: ID-POINT, to ensure that the product pallet can be put away in the high-rack storage area safely. For this activity, using layout-oriented storage control, the system determines that an interim move is relevant for a warehouse task.

In this case, the task to move from the HU from the 9010:GR-ZONE to 0080 cannot be made, so EWM, based on layout-orient storage control, creates a task to move the HU to the ID-point 0081:ID-POINT. After the contour and weight check, the HU cannot be moved directly to Storage Type 0080 because it is on the second floor and requires special handling via the warehouse elevator. Now, based on layout-oriented storage control, an additional warehouse task is created to move from identification point 0081:ID-POINT to the warehouse elevator area 0081:ELEV. When this task is confirmed, finally the original warehouse task is activated and the source is correctly updated according to the current source of the product, which is point 0081:ELEV. so the last movement task can be confirmed. The product is moved to the storage bin in storage type 0080.

Exercise 19: Layout-Oriented Storage Control

Exercise Objectives

After completing this exercise, you will be able to:

- Set up layout-oriented storage control

Business Example

For specific storage types in your warehouse it might be necessary to move the goods via an interim storage type, for example an elevator to move from one floor to the other.

Task 1:

Set up layout-oriented storage control for putaway into an existing storage type. The interim storage type is a new storage type. Test the putaway process. Afterward, delete the storage control setting for this storage type again.

1. Use the *Storage Type 0300* as template to create a new *Storage Type 0071 - Pre-storage area for 0070*. Remove in the new storage type the flag for *Process-Oriented Storage Control/Putaway Completed* and set a *requirement for HUs*.
2. Create the following bin for your new storage type:

<i>Warehouse No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>
E1##	0071-01	0071

3. Create an entry for the layout-oriented storage control that movements going into the *Destination Storage Type 0070* will move via the *Interim Storage Type 0071* with the *Warehouse Process Type 3030*.

Task 2:

Test the process using the layout-oriented storage control.

1. Create a purchase order as detailed below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000

Continued on next page

Item 1	
Material	T-EW03-##
PO Quantity	100
Plnt	SPCW
Stor. Location	RD##
Conf. Control	ANLI Inbound Delivery ECC

Purchase order:

2. Create the inbound delivery and **pack in this inbound delivery** into one **PKE-090**.

Inbound delivery (ERP):

HU:

3. Create the warehouse task(s) to move the material into storage type **0070** (you have to enter the *Destination Storage Type* as *Default Value*)

Inbound delivery (EWM):

4. Confirm the warehouse tasks with the warehouse management monitor. Check the status change and the source bin change of the inactive warehouse task before and after confirming the active warehouse task.

Task 3:

Remove the settings for the layout-oriented storage control for storage type 0070 again.

1. Delete the entry for the layout-oriented storage control that movements going into the *Destination Storage Type 0070* will move via the *Interim Storage Type 0071*.

Solution 19: Layout-Oriented Storage Control

Task 1:

Set up layout-oriented storage control for putaway into an existing storage type. The interim storage type is a new storage type. Test the putaway process. Afterward, delete the storage control setting for this storage type again.

1. Use the *Storage Type 0300* as template to create a new *Storage Type 0071 - Pre-storage area for 0070*. Remove in the new storage type the flag for *Process-Oriented Storage Control/Putaway Completed* and set a *requirement for HUs*.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Define Storage Type*.
 - b) Position on your *Warehouse Number E1##* and the *Storage Type 0300*. Select this entry.
 - c) Choose *Copy As...* .
 - d) Enter the new *Storage Type 0071* and the description **Pre-storage area for 0070**.
In the *HU Requirement* field, set the entry **X HU Requirement**.
Remove the flag in the *Stor.Ctrl./Put.Compl* field.
 - e) *Save*  your new storage type.
 - f) Choose *Exit*  to leave the transaction.
2. Create the following bin for your new storage type:

<i>Warehouse No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>
E1##	0071-01	0071

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Storage Bin* → *Create Storage Bin*.
- b) Enter the *Warehouse No.* **E1##** and the *Storage Bin 0071-01*. Press **Enter**.
- c) Enter the *Storage Type*.
- d) *Save*  your new storage bin.
- e) Choose *Exit*  to leave the transaction.

Continued on next page

3. Create an entry for the layout-oriented storage control that movements going into the *Destination Storage Type 0070* will move via the *Interim Storage Type 0071* with the *Warehouse Process Type 3030*.
- In the IMG of your EWM system, choose *Extended Warehouse Management → Cross-Process Settings → Warehouse Task → Define Layout-Oriented Storage Process Control*.
 - Choose *New Entries*.
 - Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>DTyp</i>	0070
<i>Int. Storage Type</i>	0071
<i>Whse Proc. Type</i>	3030

- Save  your new entry.
- Choose *Exit*  to leave the transaction.

Task 2:

Test the process using the layout-oriented storage control.

- Create a purchase order as detailed below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW03-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Continued on next page

Purchase order:

-
- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) *Save* your purchase order. Note down the purchase order number.
 - d) Choose *Exit*
2. Create the inbound delivery and **pack in this inbound delivery** into one **PKE-090**.

Inbound delivery (ERP):

HU:

-
- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Choose *Pack* .
 - d) Enter the *Packaging Materials*: **PKE-090** and press **Enter**.
 - e) Select the newly created *Handling Unit*, select the *Material* and choose *(Pack)* .
- Note down the HU number.
- f) *Save* your inbound delivery. Note down the inbound delivery number.
 - g) Choose *Exit*
3. Create the warehouse task(s) to move the material into storage type **0070** (you have to enter the *Destination Storage Type* as *Default Value*)

Continued on next page

Inbound delivery (EWM):

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
- b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the inbound delivery.
- c) Confirm on the *HU* tab that a HU was created for the PKE-090.
- d) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
- e) On the lower part of the screen, select the *Default Values* tab.
Enter the storage type **0070** for the *Dest.Stor.Bin* (do not enter a storage bin, just a storage type in the first field).
- f) Choose *Create Warehouse Task* .
- g) Select the *Warehouse Task* tab and confirm that a warehouse task for *Destination Storage Type 0070* is to be created.
- h) Choose *Save* .
- The system should inform you that **2 warehouse tasks were created**.
- i) Choose *Exit* twice to end the transaction.

Continued on next page

4. Confirm the warehouse tasks with the warehouse management monitor.
Check the status change and the source bin change of the inactive warehouse task before and after confirming the active warehouse task.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) In the warehouse management monitor, choose *Inbound* → *Documents* → *Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose *Warehouse Task*.
Select the active warehouse task and use *Other Methods* to **Confirm**. **Backgr.**
The second warehouse task should become active as well. Select the second warehouse task and use *Other Methods* to **Confirm**. **Backgr.**
Choose *Exit*  to end the transaction.

Task 3:

Remove the settings for the layout-oriented storage control for storage type 0070 again.

1. Delete the entry for the layout-oriented storage control that movements going into the *Destination Storage Type 0070* will move via the *Interim Storage Type 0071*.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Layout-Oriented Storage Process Control*.
 - b) Select the entry for your *Warehouse Number E1##* and the *Destination Storage Type 0070*.
 - c) Choose *Delete* .
 - d) *Save*  your deletion.
 - e) Choose *Exit*  to leave the transaction.

Exercise 20: Work with ID Points and Pick Points

Exercise Objectives

After completing this exercise, you will be able to:

- Work with ID points and pick points

Business Example

For specific storage types you require an ID point. This is a special storage type where you identify the pallet, eventually run a dimension check, and so on. For picking from this storage type you move the pallets to another special storage type when you have to open the pallet for a partial picking. For a picking of the complete quantity of a pallet, you do not move the pallet to this pick point.

Task 1:

Put away material via an ID point.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW03-##
<i>PO Quantity</i>	300
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

-
2. Create the inbound delivery and **pack in this inbound delivery** into three **PKE-090** (always 100 pieces on one pallet). Use the *partial quantity* field and the *New HU per partial quantity* button for that.

Continued on next page

Inbound delivery (ERP):

HU: _____

HU: _____

HU: _____

3. Create the warehouse task(s) to move the material into storage type **0080** (you have to enter the *Destination Storage Type* as *Default Value*)

Inbound delivery (EWM):

4. Confirm the warehouse tasks with the warehouse management monitor.
 Confirm the destination bin.

Destination bin:

5. Move the pallets from the storage type 0081 to 0080. Create for that *warehouse tasks without reference* for a HU movement and confirm them.

Task 2:

Create a sales order and pick material, first always via a pick point, and later only if you require a partial pallet.

1. Create a sales order as detailed below.

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW03-##
<i>Quantity</i>	100

Sales order: _____

2. Create the outbound delivery.

Delivery: _____

3. Create the warehouse task for picking.

Outbound delivery order:

Continued on next page

4. Confirm the warehouse tasks via the warehouse management monitor. There should be two warehouse tasks for your outbound delivery order, one which is active. The second one is inactive and becomes active when you confirm the first one.

Task 3:

It might not be required to move full pallets via the pick point. Change the settings for that.

1. Change the settings for the layout-oriented storage control. When you pick a full pallet, it should not move via the picking point. When a partial pallet is required, this should move to the picking point from where you pick the required quantity. The pallets with the leftover quantity shall be moved back directly into 0080.
2. Create a sales order as detailed below.

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW03-##
<i>Quantity</i>	150

Sales order: _____

3. Create the outbound delivery.

Delivery: _____

4. Create the warehouse tasks for picking.

Outbound delivery order: _____

5. Confirm the warehouse tasks via the warehouse management monitor. There should be three warehouse tasks for your outbound delivery order, two which are active. The third one is inactive and becomes active when you confirm the correct other one.
6. Move the pallet with the leftover material from the storage bin P-Point back into the storage type 0080.

Solution 20: Work with ID Points and Pick Points

Task 1:

Put away material via an ID point.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW03-##
<i>PO Quantity</i>	300
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 b) Enter the details as described in the table.
 c) *Save* your purchase order. Note down the purchase order number.
 d) Choose *Exit* to end the transaction.
2. Create the inbound delivery and **pack in this inbound delivery** into three **PKE-090** (always 100 pieces on one pallet). Use the *partial quantity* field and the *New HU per partial quantity* button for that.

Inbound delivery (ERP):

HU: _____

HU: _____

Continued on next page

HU: _____

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Choose *Pack* .
 - d) Enter the *Packaging Materials*: **PKE-090** and press **Enter**.
 - e) In the *Materials to Be Packed* section, enter the quantity of **100** in the *Partial qty* field.
 - f) Select the new created *Handling Unit*, select the *Material*, and choose *per part. qty* .
- Note down the HU numbers.
- g) Choose *Save*  your inbound delivery. Note down the inbound delivery number.
 - h) Choose *Exit*  to end the transaction.
3. Create the warehouse task(s) to move the material into storage type **0080** (you have to enter the *Destination Storage Type* as *Default Value*)

Continued on next page

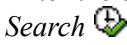
Inbound delivery (EWM):

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the inbound delivery.
 - c) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
 - d) On the lower part of the screen, select the *Default Values* tab.
Enter the storage type **0080** for the *Dest.Stor.Bin* (do not enter a **storage bin**, just a **storage type** in the first field).
 - e) Choose *Create Warehouse Task* .
 - f) Select the *Warehouse Task* tab and confirm that three warehouse tasks for *Destination Storage Type* **0081** are to be created.
 - g) Choose *Save* .
- The system should inform you that **3 warehouse tasks were created.**
4. Confirm the warehouse tasks with the warehouse management monitor.
Confirm the destination bin.

Destination bin:

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*
 - b) In the warehouse management monitor, choose *Inbound* → *Documents* → *Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose *Warehouse Task*.
 - c) Select one of the warehouse tasks, scroll to the right, and note down the destination bin of the warehouse tasks.
 - d) Select the warehouse task and use *Other Methods* to **Confirm**. **Backgr.**
 - e) Choose *Exit* to end the transaction.

Continued on next page

5. Move the pallets from the storage type 0081 to 0080. Create for that *warehouse tasks without reference* for a HU movement and confirm them.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Work Scheduling* → *Create Warehouse Task without Reference* → *Move Handling Unit*.
 - b) In the *Search criteria* dropdown, select the entry *LGPLA Storage Bin*. Enter the destination bin of the previous warehouse tasks and choose .
 - c) Use *Select all*  to mark all three HUs.
 - d) Choose *Mass Change* .
 - e) In the pop-up, enter the *Whse Proc. Type* **9999** and the *Dest.Stor.Type* **0080**.
Choose *Continue* .
 - f) Choose the *Create + Save Warehouse Task* button.
 - g) Choose *Warehouse Task* → *Confirm*.
 - h) Select the *HU WT* tab on the lower section. Confirm that three warehouse tasks are assigned to the warehouse order.
 - i) Choose the *Confirm + Save* button.
 - j) Choose *Exit*  twice to leave the transaction.

Task 2:

Create a sales order and pick material, first always via a pick point, and later only if you require a partial pallet.

1. Create a sales order as detailed below.

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW03-##
<i>Quantity</i>	100

Continued on next page

Sales order: _____

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - b) Enter *Order Type*: OR and press **Enter**.
 - c) Enter the details as described in the table.
 - d) Save your sales order. Note down the sales order number.
 - e) Choose *Exit* to end the transaction.
2. Create the outbound delivery.

Delivery: _____

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
- b) Enter the *Shipping point* Z0##. The *Order* should default. Press **Enter**.
- c) Save your delivery. Note down the delivery number.
- d) Choose *Exit* to return to the *Easy Access* menu.

3. Create the warehouse task for picking.

Outbound delivery order:

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
 - c) Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
 - d) Choose *Create + Save Warehouse Task* .
 - e) Choose *Exit* three times to return to the *Easy Access* menu.

Continued on next page

4. Confirm the warehouse tasks via the warehouse management monitor. There should be two warehouse tasks for your outbound delivery order, one which is active. The second one is inactive and becomes active when you confirm the first one.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) In the warehouse management monitor, choose *Inbound* → *Documents* → *Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose *Warehouse Task*.
 - c) Select the active warehouse task and use *Other Methods* to **Confirm Backgr.**
 - d) The second warehouse task should become active as well. Select the second warehouse task and use *Other Methods* to **Confirm Backgr..**

Task 3:

It might not be required to move full pallets via the pick point. Change the settings for that.

1. Change the settings for the layout-oriented storage control. When you pick a full pallet, it should not move via the picking point. When a partial pallet is required, this should move to the picking point from where you pick the required quantity. The pallets with the leftover quantity shall be moved back directly into 0080.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Layout-Oriented Storage Process Control*.
 - b) Choose *Position....*
Enter your *Warehouse No.* **E1##** and *Source Stor. Ty.* **0080** and choose *Continue* .
 - c) There should be only one entry for your warehouse with this combination.
 - d) Select the entry and choose *Delete* .
 - e) Choose *New Entries*.
 - f) Create two new entries with the following details.
First entry:

Continued on next page

<i>Warehouse Number</i>	E1##
<i>Source Storage Typ</i>	0080
<i>Whole HU</i>	A Partial Removal - Product Warehouse Task
<i>Int. Storage Type</i>	0082
<i>Int. Storage Bin</i>	P-Point
<i>Whse Proc. Type</i>	3030

Second entry:

<i>Warehouse Number</i>	E1##
<i>Source Storage Typ</i>	0080
<i>DTyp</i>	0080

- f) Save  your new entries.
 - g) Choose *Exit*  to end the transaction.
2. Create a sales order as detailed below.

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW03-##
<i>Quantity</i>	150

Sales order: _____

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - b) Enter *Order Type*: **OR** and press **Enter**.
 - c) Enter the details as described in the table.
 - d) Save  your sales order. Note down the sales order number.
 - e) Choose *Exit*  to end the transaction.
3. Create the outbound delivery.

Continued on next page

Delivery: _____

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
 - b) Enter the *Shipping point* **Z0##**. The *Order* should default. Press **Enter**.
 - c) *Save* your delivery. Note down the delivery number.
 - d) Choose *Exit* to return to the *Easy Access* menu.
4. Create the warehouse tasks for picking.

Outbound delivery order:

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
 - b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the outbound delivery order.
 - c) Select the outbound delivery order and choose *Outbound Delivery Order* → *Follow-on Functions* → *Warehouse Task*.
 - d) Choose *Create + Save Warehouse Task* .
 - e) Choose *Exit* three times to return to the *Easy Access* menu.

Continued on next page

5. Confirm the warehouse tasks via the warehouse management monitor. There should be three warehouse tasks for your outbound delivery order, two which are active. The third one is inactive and becomes active when you confirm the correct other one.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*
 - b) In the warehouse management monitor, choose *Inbound → Documents → Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose *Warehouse Task*.
 - c) Select the active warehouse task with the *WhsePrcTpe 2010* and use *Other Methods* to **Confirm. Backgr.**
 - d) Select the active warehouse task with the *WhsePrcTpe 3030* and use *Other Methods* to **Confirm. Backgr.**
 - e) The last warehouse task should become active as well. Select this warehouse task and use *Other Methods* to **Confirm. Backgr..**
6. Move the pallet with the leftover material from the storage bin P-Point back into the storage type 0080.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Work Scheduling → Create Warehouse Task without Reference → Move Handling Unit*.
 - b) In the *Search criteria* dropdown, select the entry *LGPLA Storage Bin*. Enter the bin **P-Point** and choose *Search* .
 - c) Switch to *Form View*.
 - d) Enter (if required) the *Whse Proc. Type 9999* and the destination storage type **0080** (the field says *Dest.Stor. Bin*; just enter the destination storage type and let the system decide on a bin).
 - e) Choose the *Create + Save Warehouse Task* button.
 - f) Choose *Warehouse Task → Confirm*.
 - g) Select the *HU WT* tab on the lower section. Confirm that the warehouse task has the *DTyp 0080*.
 - h) Choose the *Confirm + Save* button.
 - i) Choose *Exit*  twice to leave the transaction.



Lesson Summary

You should now be able to:

- Set up layout-orientated storage control
- Put away using an ID point
- Pick using a pick point

Lesson: Integrate a Material Flow System (MFS)

Lesson Overview

In this lesson you will learn how SAP Extended Warehouse Management allows direct control of automatic storage retrieval systems in the warehouse.



Lesson Objectives

After completing this lesson, you will be able to:

- Set up a basic material flow system scenario

Business Example

In many warehouses today, goods are moved without any human interaction on longer distances via conveyors or carousels. In high-rack storage, you often have a fully automated storage and retrieval system. You want to control these movements inside SAP Extended Warehouse Management.

Material Flow System

The material flow system (MFS) enables you to connect an automatic warehouse to SAP Extended Warehouse Management without the need for an additional warehouse control unit. SAP EWM communicates directly with the control level.

You can set up the MFS in such a way that warehouse tasks (from an identification point to a storage bin in an automatic high-rack storage area, for instance) are subdivided into smaller tasks. These are passed on, step by step, to the programmable logic controller (PLC) responsible in each case via telegram communication. The putaway and removal from storage of handling units (HUs) can thus take place without the use of another software system.

You can define capacity limits for communication points, conveyor segments, or resources. The EWM system then holds back tasks for the PLC as soon as these limits are exceeded. The same applies if the PLC reports that one of the individual elements of conveyance (vehicles, legs, or communication points) are subject to malfunction.

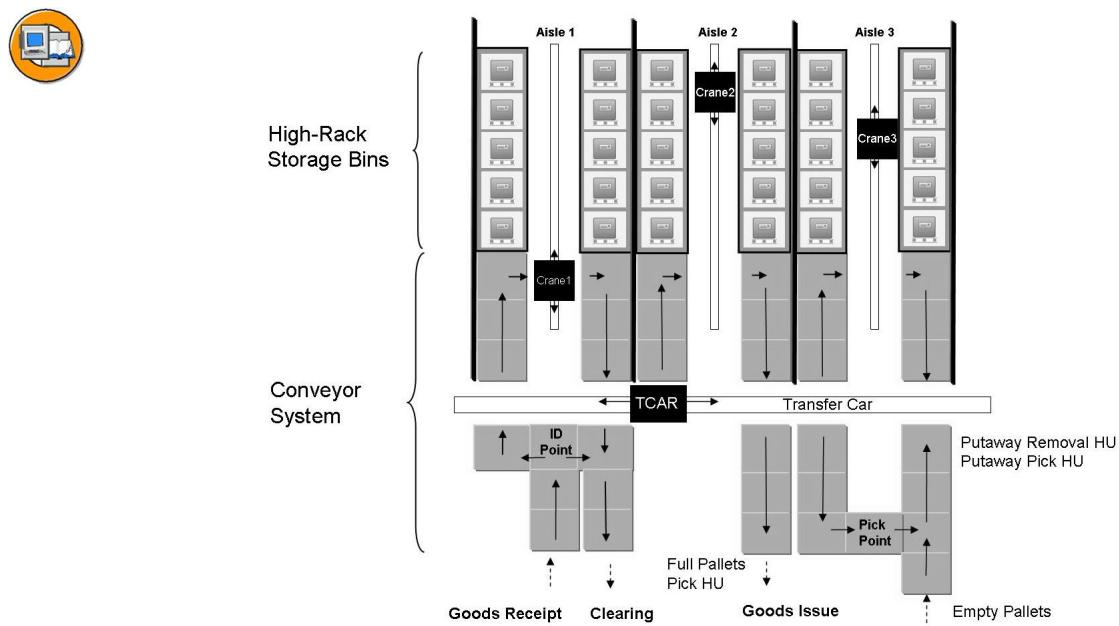


Figure 68: Scenario for a Material Flow System

Besides dispensing with an additional software system, this offers the benefit of a close connection between the material flow and warehouse management. Thus, Warehouse Management system strategies can be adjusted to the condition and utilization of automatic storage retrieval more easily. Additionally, the system provides the material flow system with functions and data, for example, for destination inquiries. In this way, system mapping represents physical movements in the warehouse more closely.

If you use EWM to manage an automatic warehouse, you can use the following functions:

- Configurable **paths** through storage control
- Automatic **identification** of HUs using scanners on the automatic storage retrieval facility
- Automatic **diversion** of HUs that cannot be stored (incorrect contours, excessive weight, unidentified)
- Fully automatic putaway of HUs in the storage bin via any number of interim steps; these interim steps are represented by **communication points**
- **Malfunctions** reported by the controls taken into account
- Configurable **capacity limits** for communication points, conveyor segments, and vehicles taken into account
- Reduction in empty traveling paths for stacker cranes through **interleaving**
- **Goods-to-man** picking principle
- **Stocks** are also available for deliveries during transportation within the system
- Stable **telegram communication** between EWM and PLC via parallel, bidirectional communication channels
- **Monitoring and troubleshooting** as part of the regular warehouse management monitor

Logical System Levels

In automatic warehouses, various types of technology are used, for example:

- Conveyor lines for containers, boxes, pallets, wire baskets (belts, chain conveyors, roller conveyors)
- Stacker cranes for accessing storage bins without a driver
- Transfer cars for moving storage units (handling units) horizontally to different leg stages or buffer spaces
- Scanners, sensors for contour control, scales, and so on

These devices are usually controlled by means of real-time systems that monitor and switch the sensors and actuators involved (light barriers, switches, motors, and so on). These real-time systems obtain their orders from the superordinate warehouse control level, which derives them from the warehouse requests.

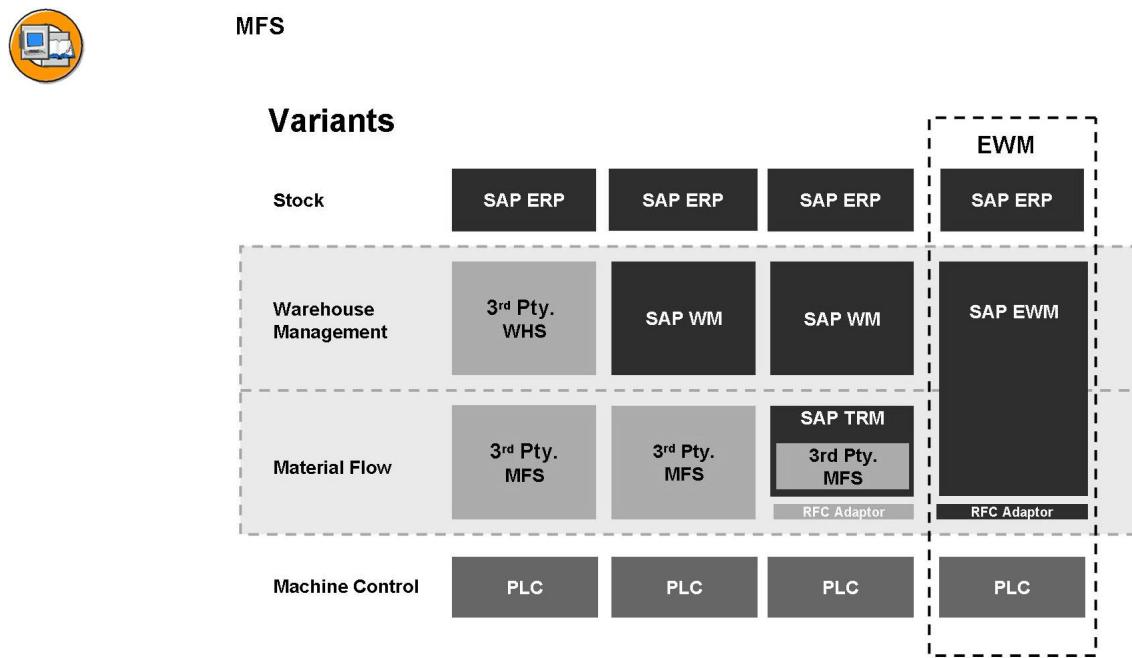


Figure 69: Communication to Programmable Logic Controller

Crucial differences between automated warehouses and warehouses operated manually or by radio frequency are:

- The resources are passive (as in the case of stacker cranes).
- Capacity bottlenecks must be watched and controlled much more closely.
- Technical malfunctions must be taken into consideration.
- Logistical malfunctions must not block the material flow (for example, bin occupied or unknown HU on automatic storage retrieval system).

Structure

This example warehouse consists of an automatic high-rack storage area with three aisles and automated putaway and removal. A distribution trolley links the putaway and picking area with the high-rack storage area.

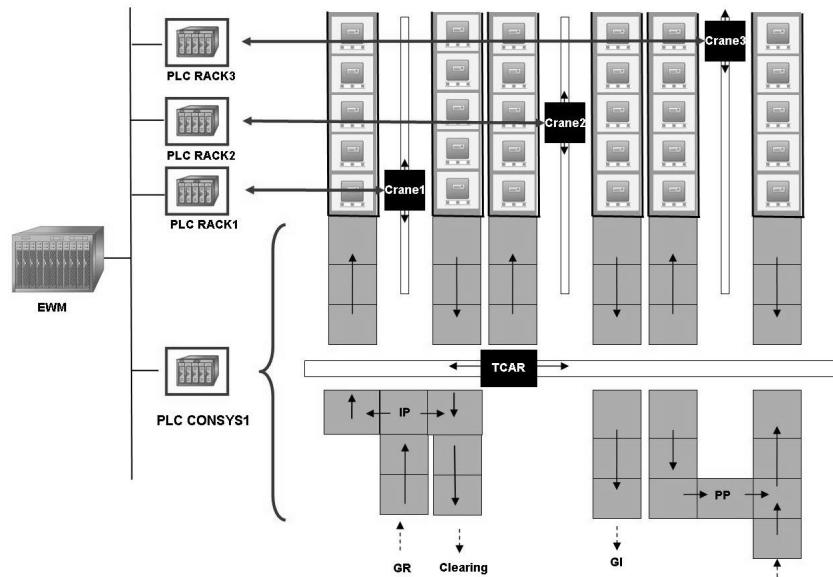


Figure 70: MFS Components

From the MFS standpoint, this warehouse is operated with four controls. Three are for the stacker cranes and one is for the distribution trolley and the conveyor lines of the preliminary (prestorage) zone. The warehouse has a single depth, and the distribution trolley and stacker cranes each have just one load handling attachment.

In the MFS, the warehouse to be controlled is mapped via the following components:

- Programmable logic controller (PLC)

The PLC is the underlying real-time system controlling the physical transportation of HUs on conveyor systems and their components. It evaluates signals from the connected automatic storage retrieval/conveyor system or other controls and activates or deactivates motors, appliances, sensors, readers, and so on. Each control that is to communicate with the EWM system must be defined as a PLC. In larger installations, **head controls** may be in use, which for their part regulate local controls. The EWM system communicates with the head controls only. In EWM, you therefore define just the head controls.

At least one communication channel must be defined for each PLC.

- Communication channel

The communication channel is the connection for transmission of messages between MFS and a control facility, defined by an IP address and a port. You also define certain properties, such as the length of the messages and whether telegram confirmations are to be used. Via the application menu, you also make the settings for the IP address and port via which the PLC can be reached. You can use several channels to communicate with the same PLC.

Each of these must use a separate port. You can specify that certain telegrams are to be sent via a particular port and other messages via a different one. Messages of a communication channel are communicated sequentially. This means that the system does not send message 2 until an acknowledgment of receipt has been received for message 1. One communication channel per control is sufficient.

- Communication point

SAP EWM maps the system to be controlled by means of communication points. Communication points are stations in the storage retrieval system at which it communicates with the PLC. Here, the PLC registers HUs (on the basis of scanner information or material flow tracking) and awaits new destination specifications.

The concept for these communication points is an important aspect of warehouse planning. More communication points lead to closer material flow tracking in EWM, but also to more intensive communication and consequently more load on the EWM system. For each stage between communication points, a warehouse task is created.

You can think of communication points as additional attributes of storage bins. Every communication point is also a storage bin, but only the storage bins on the automated storage retrieval system are also communication points, whereas the storage bins in the actual warehouse are not.

- Conveyor segments

Conveyor segments physically transport handling units (HUs) from one communication point to the next. You can define a capacity limit for conveyor segments. As in the case of communication points, the capacity relates to the number of HUs that can simultaneously be transported via the relevant conveyor segment. If the capacity of a conveyor segment is full, EWM holds back further orders for this segment.

You assign conveyor segments to your start and end points in layout-oriented storage control. You can combine different conveyor segments to form a conveyor segment group by conveyor segment group type (such as status). Thus, for example, you can assign an exception to the entire conveyor segment group instead of to individual conveyor segments in the case of a malfunction report; the system then holds back orders for these conveyor segments. You only need to define conveyor segments if you want to check their status (readiness, capacity) in EWM. In many cases, it is enough to record capacity and status at communication points.

- Resource

In the MFS, a resource is a vehicle that transports an HU from one communication point (or storage bin) to another.

A resource moves to the pickup point in an empty state, takes on the load, and then discharges the load at its destination. To reduce the number of empty travel paths, you must optimize the sequence of the orders.

EWM contains an interleaving strategy for stacker cranes with:

- Just one load handling attachment (means that only one HU can be loaded)
- Putaway and removal bin at the same end of the aisle

To optimize the movements of stacker cranes from within EWM, the stacker cranes must be mapped in EWM as resources. Conveyor lines are **not** mapped as resources.

To transport HUs, EWM generates **warehouse tasks** and **warehouse orders** and arranges them in **queues**. In the MFS, each warehouse order is assigned **one** warehouse task only.

To execute warehouse tasks, the EWM system generates **telegrams** and sends these to the appropriate PLC.

Exercise 21: Integrate a Material Flow System

Exercise Objectives

After completing this exercise, you will be able to:

- Set up a basic material flow system scenario

Business Example

In a warehouse it is often required to communicate with a programmable logic controller (PLC). SAP EWM can communicate directly with such a PLC.

Task 1:

Set up the communication with a programmable logic controller and define a storage type that is controlled through the material flow system.

1. Create a new **warehouse process type** for MFS movements with the following details:

<i>Warehouse No.</i>	E1##
<i>Whse Proc. Type</i>	3090
<i>Description</i>	MFS Movements
<i>Whse Proc. Cat.</i>	3
<i>Activity</i>	INTL

2. Create a new **PLC Interface Category** for your *Warehouse No.* **E1##**. The *PLC Interface Type* is F, the *Description Conveyor*.
3. Create a new **PLC** with the following details:

<i>Warehouse Number</i>	E1##
<i>PCL</i>	CONV1
<i>Description</i>	Conveyor System 1
<i>Interface Type</i>	F
<i>Header Data Str:</i>	/SCWM/S_MFS_TELECORE
<i>Process Type Faul</i>	3090
<i>Identification</i>	EWM

4. Define the following new **telegram structures**:

Continued on next page

<i>Ware-house No.</i>	<i>Intfc. Type</i>	<i>Tele-Typ</i>	<i>Tel. Category</i>	<i>Structure Name</i>
E1##	F	LIFE	K Life Telegram	ZSCWMS_MFS_TELETOTAL
E1##	F	SYBE	B Syn-chro-nization Start	ZSCWMS_MFS_TELETOTAL
E1##	F	SYEN	D Syn-chroniza-tion End	ZSCWMS_MFS_TELETOTAL
E1##	F	SYES	A Syn-chro-nization Setup	ZSCWMS_MFS_TELETOTAL
E1##	F	SYSR	L Status Request	ZSCWMS_MFS_TELETOTAL
E1##	F	WT	E Warehouse Task	ZSCWMS_MFS_TELETOTAL
E1##	F	WTCO	G Confirmation of the Warehouse Task	ZSCWMS_MFS_TELETOTAL
E1##	F	STAT	C Status Message	ZSCWMS_MFS_TELETOTAL

5. Create a new **communication channel** with the following details:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm.Chan.</i>	1
<i>Telegram Retries</i>	3
<i>Interval Tel. Retry</i>	5
<i>Highest Rec. Seq.No.</i>	999
<i>Highest Rec. Seq.No.</i>	999

Continued on next page

<i>HS Confirmation</i>	B
<i>HS Request</i>	A
<i>Handshake Mode</i>	A Send Complete Telegram
<i>S/R Switch</i>	Flag this field
<i>Life Tel. Interval</i>	30
<i>Life Tel. Type</i>	LIFE
<i>Get. Seq. No.</i>	Flag this field
<i>Telegram Length</i>	151

6. Create a new **communication point type** with the following details:

<i>Warehouse No.</i>	E1##
<i>RP Typ</i>	CP
<i>Description</i>	Communication Point

7. Define the **communication points**.

First you need to define the clearing point:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP05
<i>Description</i>	Clearing Point
<i>RP Typ</i>	CP
<i>Clarific. Bin</i>	Flag this field

The next point is for the decision of the further direction:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP02
<i>Description</i>	Branching Point
<i>RP Typ</i>	CP
<i>Clarific. SPS</i>	CONV1
<i>Clarif.</i>	CP05

Continued on next page

Then comes the transfer point:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP01
<i>Description</i>	Transfer Point
<i>RP Typ</i>	CP
<i>Clarific. SPS</i>	CONV1
<i>Clarif.</i>	CP02

And finally the two end points:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP03
<i>Description</i>	Putaway 1
<i>RP Typ</i>	CP
<i>End</i>	Flag this field

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP04
<i>Description</i>	Putaway 2
<i>RP Typ</i>	CP
<i>End</i>	Flag this field

8. Set up the determination of the **MFS actions**.

The determination shall be as following:

<i>Warehouse Number</i>	<i>RP Typ</i>	<i>TeleTyp</i>	<i>Action</i>
E1##	CP	WTCO	1
E1##	CP	STAT	2

9. Create a new **storage type** for the MFS:

Continued on next page

<i>Warehouse No.</i>	E1##
<i>Storage Type</i>	0075
<i>Description</i>	MFS Controlled pre-storage for 0070
<i>Storage Type Role</i>	H
<i>HU Requirement</i>	X
<i>Conf. Putaway</i>	Flag this field
<i>Putaway Rules</i>	4
<i>Capacity Check</i>	4
<i>Confirm Removal</i>	Flag this field
<i>Availability Group</i>	002
<i>Mandatory</i>	Flag this field

10. Create the following **storage groups** to group storage bins for the layout-oriented storage process:

<i>Warehouse Number</i>	<i>Storage Type</i>	<i>Storage Group</i>
E1##	0070	SEC1
E1##	0070	SEC2
E1##	0075	CP01
E1##	0075	CP02
E1##	0075	CP03
E1##	0075	CP04
E1##	0075	CP05

11. Create the following **storage bins** for the MFS:

<i>Ware-house No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>	<i>Stor. Bin Type</i>	<i>Stor. Group</i>	<i>X Coor-dinate</i>	<i>Y Coor-dinate</i>
E1##	0075-CP01	0075	P001	CP01	65	100
E1##	0075-CP02	0075	P001	CP02	65	135
E1##	0075-CP03	0075	P001	CP03	80	134
E1##	0075-CP04	0075	P001	CP04	100	134
E1##	0075-CP05	0075	P001	CP05	65	140

Continued on next page

12. Create a new **activity area**, **NFS**. Assign the new bins and sort them for the activity *Internal Movement* (the sort sequence is actually not important, but the sorting has to be done for the proper assignment).
13. Assign the **storage groups** to the storage bins in storage type **0070** via mass change. The first five aisles will belong to storage group **SEC1** and the second five aisles will belong to storage group **SEC2**.
14. **Block** the already sectioned bins in *storage type 0070* via the warehouse management monitor.
15. Create the following entries **layout-oriented storage process control**:

<i>Warehouse No.</i>	E1##
<i>Source Storage Type</i>	9010
<i>DTyp</i>	0070
<i>Int. Storage Type</i>	0075
<i>Int. Storage Bin</i>	0075-CP01
<i>Whse Proc. Type</i>	3060

<i>Warehouse No.</i>	E1##
<i>Source Storage Type</i>	0075
<i>Source Storage Group</i>	CP01
<i>DTyp</i>	0070
<i>Int. Storage Type</i>	0075
<i>Int. Storage Bin</i>	0075-CP02
<i>Whse Proc. Type</i>	3090

<i>Warehouse No.</i>	E1##
<i>Source Storage Type</i>	0075
<i>Source Storage Group</i>	CP02
<i>DTyp</i>	0070
<i>Destination Storage Group</i>	SEC1
<i>Int. Storage Type</i>	0075
<i>Int. Storage Bin</i>	0075-CP03
<i>Whse Proc. Type</i>	3090

Continued on next page

<i>Warehouse No.</i>	E1##
<i>Source Storage Type</i>	0075
<i>Source Storage Group</i>	CP02
<i>DTyp</i>	0070
<i>Destination Storage Group</i>	SEC2
<i>Int. Storage Type</i>	0075
<i>Int. Storage Bin</i>	0075-CP04
<i>Whse Proc. Type</i>	3090

16. Create a specific **queue** for MFS:

<i>Warehouse No.</i>	E1##
<i>Queue</i>	MFS
<i>Op. Envir</i>	4 MFS; No Resource Management
<i>PLC</i>	CONV1

17. Create a new **warehouse order creation rule**: MFS. This rule is very simple; it is just to make sure that each warehouse order has only one warehouse task.
18. **Assign** the new warehouse order creation rule to the warehouse process type **3090**.
19. Create the **connection** between the storage bins and the communication points.
20. Maintain the **programmable logic controller**.
21. Generate the **application data**.
This step is necessary to synchronize application data with customizing data of your warehouse.
22. Confirm with the warehouse management monitor that the communication with the PLC is working.

Task 2:

Test the process using the MFS connection.

1. Create a purchase order as detailed below.

Continued on next page

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW03-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

2. Create the inbound delivery and **pack this inbound delivery** into one **PKE-090**.

Inbound delivery (ERP):

HU:

3. Create the warehouse task(s) to move the material into storage type **0070** (you have to enter the *Destination Storage Type* as *Default Value*).

Inbound delivery (EWM):

4. Confirm the warehouse tasks with the warehouse management monitor.

Solution 21: Integrate a Material Flow System

Task 1:

Set up the communication with a programmable logic controller and define a storage type that is controlled through the material flow system.

1. Create a new **warehouse process type** for MFS movements with the following details:

<i>Warehouse No.</i>	E1##
<i>Whse Proc. Type</i>	3090
<i>Description</i>	MFS Movements
<i>Whse Proc. Cat.</i>	3
<i>Activity</i>	INTL

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Warehouse Process Type*.
 b) Choose *New Entries*.
 c) Create a new entry as per the table.
 d) *Save* your new entry.
 e) Choose *Exit* to leave the transaction.
2. Create a new **PLC Interface Category** for your *Warehouse No.* **E1##**. The *PLC Interface Type* is F, the *Description Conveyor*.
 - In the IMG of your EWM system, choose *Extended Warehouse Management* → *Material Flow System (MFS)* → *Master Data* → *Define PLC Interface Category*.
 - Choose *New Entries*.
 - Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>Intfc. Type</i>	F
<i>Description</i>	Conveyor

- d) *Save* your new entry.

Continued on next page

- e) Choose *Exit*  to leave the transaction.
3. Create a new **PLC** with the following details:

<i>Warehouse Number</i>	E1##
<i>PCL</i>	CONV1
<i>Description</i>	Conveyor System 1
<i>Interface Type</i>	F
<i>Header Data Str.</i>	/SCWMS/S_MFS_TELECORE
<i>Process Type Faul</i>	3090
<i>Identification</i>	EWM

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Material Flow System (MFS) → Master Data → Define Programmable Logic Controller (PLC)*.
- b) Choose *New Entries*.
- c) Create a new entry as per the table.
- d) *Save*  your new entry.
- e) Choose *Exit*  to leave the transaction.
4. Define the following new **telegram structures**:

<i>Ware-house No.</i>	<i>Intfc. Type</i>	<i>Tele-Typ</i>	<i>Tel. Category</i>	<i>Structure Name</i>
E1##	F	LIFE	K Life Telegram	ZSCWMS_MFS_TELETOTAL
E1##	F	SYBE	B Syn-chro-nization Start	ZSCWMS_MFS_TELETOTAL
E1##	F	SYEN	D Syn-chroniza-tion End	ZSCWMS_MFS_TELETOTAL
E1##	F	SYES	A Syn-chro-nization Setup	ZSCWMS_MFS_TELETOTAL

Continued on next page

E1##	F	SYSR	L Status Request	ZSCWMS_MFS_TELETOTAL
E1##	F	WT	E Warehouse Task	ZSCWMS_MFS_TELETOTAL
E1##	F	WTCO	G Confirmation of the Warehouse Task	ZSCWMS_MFS_TELETOTAL
E1##	F	STAT	C Status Message	ZSCWMS_MFS_TELETOTAL

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Material Flow System (MFS)* → *Telegram Processing* → *Define Telegram Structure*.
- b) Choose *Define Telegram Structure* for *PLC Interface Type*.
- c) Choose *New Entries*.
- d) Create the new entries as per the table.
- e) Save  your new entries.
- f) Choose *Exit*  to leave the transaction.
5. Create a new **communication channel** with the following details:

Warehouse No.	E1##
PLC	CONV1
Comm.Chan.	1
Telegram Retries	3
Interval Tel. Retry	5
Highest Rec. Seq.No.	999
Highest Rec. Seq.No.	999
HS Confirmation	B
HS Request	A
Handshake Mode	A Send Complete Telegram
S/R Switch	Flag this field
Life Tel. Interval	30

Continued on next page

<i>Life Tel. Type</i>	LIFE
<i>Get. Seq. No.</i>	Flag this field
<i>Telegram Length</i>	151

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Material Flow System (MFS)* → *Master Data* → *Communication Channel* → *Define Communication Channel*.
- b) Choose *New Entries*.
- c) Create a new entry as per the table.
- d) *Save* your new entry.
- e) Choose *Exit* to leave the transaction.
6. Create a new **communication point type** with the following details:
- | | |
|----------------------|----------------------------|
| <i>Warehouse No.</i> | E1## |
| <i>RP Typ</i> | CP |
| <i>Description</i> | Communication Point |
- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Material Flow System (MFS)* → *Master Data* → *Define Communication Point Types*.
- b) Choose *New Entries*.
- c) Create a new entry as per the table.
- d) *Save* your new entry.
- e) Choose *Exit* to leave the transaction.
7. Define the **communication points**.

First you need to define the clearing point:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP05
<i>Description</i>	Clearing Point
<i>RP Typ</i>	CP
<i>Clarific. Bin</i>	Flag this field

Continued on next page

The next point is for the decision of the further direction:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP02
<i>Description</i>	Branching Point
<i>RP Typ</i>	CP
<i>Clarific. SPS</i>	CONV1
<i>Clarif.</i>	CP05

Then comes the transfer point:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP01
<i>Description</i>	Transfer Point
<i>RP Typ</i>	CP
<i>Clarific. SPS</i>	CONV1
<i>Clarif.</i>	CP02

And finally the two end points:

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP03
<i>Description</i>	Putaway 1
<i>RP Typ</i>	CP
<i>End</i>	Flag this field

<i>Warehouse No.</i>	E1##
<i>PLC</i>	CONV1
<i>Comm. Pnt</i>	CP04

Continued on next page

Description	Putaway 2
RP Typ	CP
End	Flag this field

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Material Flow System (MFS)* → *Master Data* → *Define Communication Points*.

- b) Choose *New Entries*.

- c) Create the new entries as per the table.



Caution: It is important that you follow the above definition sequence.

- d) Save your new entries.

- e) Choose *Exit* to leave the transaction.

8. Set up the determination of the **MFS actions**.

The determination shall be as following:

Warehouse Number	RP Typ	TeleTyp	Action
E1##	CP	WTCO	1
E1##	CP	STAT	2

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Material Flow System (MFS)* → *Telegram Processing* → *Find MFS Actions*.

- b) Choose *New Entries*.

- c) Create two new entries as per the table.

- d) Save your new entries.

- e) Choose *Exit* to leave the transaction.

9. Create a new **storage type** for the MFS:

Warehouse No.	E1##
Storage Type	0075
Description	MFS Controlled pre-storage for 0070

Continued on next page

<i>Storage Type Role</i>	H
<i>HU Requirement</i>	X
<i>Conf. Putaway</i>	Flag this field
<i>Putaway Rules</i>	4
<i>Capacity Check</i>	4
<i>Confirm Removal</i>	Flag this field
<i>Availability Group</i>	002
<i>Mandatory</i>	Flag this field

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Define Storage Type*.
- b) Choose *New Entries*.
- c) Create a new entry as per the table.
- d) Save  your new storage type.
- e) Choose *Exit*  to leave the transaction.
10. Create the following **storage groups** to group storage bins for the layout-oriented storage process:

<i>Warehouse Number</i>	<i>Storage Type</i>	<i>Storage Group</i>
E1##	0070	SEC1
E1##	0070	SEC2
E1##	0075	CP01
E1##	0075	CP02
E1##	0075	CP03
E1##	0075	CP04
E1##	0075	CP05

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Material Flow System (MFS)* → *Storage Control* → *Define Storage Groups for Layout-Oriented Storage Control*.
- b) Choose *New Entries*.
- c) Create new entries as per the table.
- d) Save  your new entries.
- e) Choose *Exit*  to leave the transaction.

Continued on next page

11. Create the following **storage bins** for the MFS:

<i>Ware-house No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>	<i>Stor. Bin Type</i>	<i>Stor. Group</i>	<i>X Coor-dinate</i>	<i>Y Coor-dinate</i>
E1##	0075-CP01	0075	P001	CP01	65	100
E1##	0075-CP02	0075	P001	CP02	65	135
E1##	0075-CP03	0075	P001	CP03	80	134
E1##	0075-CP04	0075	P001	CP04	100	134
E1##	0075-CP05	0075	P001	CP05	65	140

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Storage Bin* → *Create Storage Bin*.
 - b) Enter the *Warehouse No.* E1## and the *Storage Bin* 0075-CP01. Press **Enter**.
 - c) Enter the *Storage Type*, the *Storage. Bin Type*, the *Stor. Group*, and the *Coordinates*.
 - d) Save  your new storage bin.
 - e) Repeat the process for all listed bins.
 - f) Choose *Exit*  to leave the transaction.
12. Create a new **activity area**, NFS. Assign the new bins and sort them for the activity *Internal Movement* (the sort sequence is actually not important, but the sorting has to be done for the proper assignment).
- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Activity Areas* → *Define Activity Area*.
 - b) Choose *New Entries*.
 - c) Create a new entry with the following details:

<i>Warehouse No.</i>	E1##
<i>Activity Area</i>	MFS
<i>Description</i>	MFS Activity

- d) Save  your new entry.
- e) Choose *Exit*  to leave the transaction.

Continued on next page

- f) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Activity Areas* → *Assign Storage Bins to Activity Area*.
- g) Choose *New Entries*.
- h) Create a new entry with the following details:

<i>Warehouse No.</i>	E1##
<i>Activity Area</i>	MFS
<i>Sequence No.</i>	1
<i>Storage Type</i>	0075

- i) Save  your new entry.
- j) Choose *Exit*  to leave the transaction.
- k) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Activity Areas* → *Define Sort Sequence for Activity Area*.
- l) Choose *New Entries*.
- m) Create a new entry with the following details:

<i>Warehouse No.</i>	E130
<i>Activity Area</i>	MFS
<i>Activity</i>	INTL
<i>Sequence No.</i>	1
<i>Storage Type</i>	0075

- n) Save  your new entry.
- o) Choose *Exit*  to leave the transaction.
- p) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Storage Bin* → *Sort Storage Bins*.
- q) Enter the *Warehouse Number* **E1##**, *Activity Area* **MFS**, and the *Activity* **INTL**.
- r) Choose *Execute* .
- s) Choose *Execute*  again.

Continued on next page

- t) Choose *Exit*  to leave the transaction.
13. Assign the **storage groups** to the storage bins in storage type **0070** via mass change. The first five aisles will belong to storage group **SEC1** and the second five aisles will belong to storage group **SEC2**.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Storage Bin → Mass Change to Storage Bins*.
 - b) Enter *Warehouse Number E1##, Storage Bin 0070*, and *To 0070-06*. This should select the bins from 0070-01-01-01 to 0070-05-05-04.
 - c) Choose *Execute* .
 - d) Choose *Select all* .
 - e) Choose *Storage Bins* .
 - f) Enter *Stor.Group SEC1* and press **Enter**.
 - g) *Save*  your changes and confirm the pop-up.
 - h) Choose *Back* .
 - i) Enter *Warehouse Number E1##, Storage Bin 0070-06*, and *To 0070-11*. This should select the bins from 0070-06-01-01 to 0070-10-05-04.
 - j) Choose *Execute* .
 - k) Choose *Select all* .
 - l) Choose *Storage Bins* .
 - m) Enter the *Stor.Group SEC2* and press **Enter**.
 - n) *Save*  your changes and confirm the pop-up.
 - o) Choose *Exit*  to leave the transaction.

Continued on next page

14. **Block** the already sectioned bins in *storage type 0070* via the warehouse management monitor.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - Choose *Stock and Bin* → *Storage Bin*.
 - Enter the *Storage Type 0070* and choose *Execute* .
 - Look for the bins that are sectioned. Select them and choose *More Methods* → *Block Putaway*.
- Make sure that the *PB* column is marked for the sectioned bins and their sections.
- Choose *Exit*  to leave the transaction.

15. Create the following entries **layout-oriented storage process control**:

<i>Warehouse No.</i>	E1##
<i>Source Storage Type</i>	9010
<i>DTyp</i>	0070
<i>Int. Storage Type</i>	0075
<i>Int. Storage Bin</i>	0075-CP01
<i>Whse Proc. Type</i>	3060

<i>Warehouse No.</i>	E1##
<i>Source Storage Type</i>	0075
<i>Source Storage Group</i>	CP01
<i>DTyp</i>	0070
<i>Int. Storage Type</i>	0075
<i>Int. Storage Bin</i>	0075-CP02
<i>Whse Proc. Type</i>	3090

<i>Warehouse No.</i>	E1##
<i>Source Storage Type</i>	0075
<i>Source Storage Group</i>	CP02
<i>DTyp</i>	0070
<i>Destination Storage Group</i>	SEC1

Continued on next page

<i>Int. Storage Type</i>	0075
<i>Int. Storage Bin</i>	0075-CP03
<i>Whse Proc. Type</i>	3090

<i>Warehouse No.</i>	E1##
<i>Source Storage Type</i>	0075
<i>Source Storage Group</i>	CP02
<i>DTyp</i>	0070
<i>Destination Storage Group</i>	SEC2
<i>Int. Storage Type</i>	0075
<i>Int. Storage Bin</i>	0075-CP04
<i>Whse Proc. Type</i>	3090

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Material Flow System (MFS) → Storage Control → Define Layout-Oriented Storage Control*.
- b) Choose *New Entries*.
- c) Create the new entries as per the table.
- d) *Save*  your new entries.
- e) Choose *Exit*  to leave the transaction.

16. Create a specific **queue** for MFS:

Continued on next page

<i>Warehouse No.</i>	E1##
<i>Queue</i>	MFS
<i>Op. Envir</i>	4 MFS; No Resource Management
<i>PLC</i>	CONV1

- a) In the IMG of the EWM system, choose *Extended Warehouse Management* → *Material Flow System (MFS)* → *Master Data* → *Define MFS Queue*.
- b) Choose *New Entries*.
- c) Create the new entry as per the table.
- d) Save  your new entry.
- e) Choose *Exit*  to leave the transaction.
17. Create a new **warehouse order creation rule: MFS**. This rule is very simple; it is just to make sure that each warehouse order has only one warehouse task.
- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Define Creation Rule for Warehouse Orders*.
- b) Choose *New Entries*.
- c) Create the following entry:

<i>Warehouse No.</i>	E1##
<i>WO Creatn Rule</i>	MFS
<i>Description</i>	MFS Warehouse Orders
<i>Creation Cat.</i>	B Pick Path
<i>Limit</i>	MX01

- d) Save  your new entry.
- e) Choose *Exit*  to leave the transaction.

Continued on next page

18. **Assign** the new warehouse order creation rule to the warehouse process type **3090**.
- In the EWM IMG, choose *Extended Warehouse Management → Cross-Process Settings → Warehouse Task → Define Warehouse Process Type*.
 - Position on the *Warehouse No.* **E1##** and the *Whse Proc. Type* **3090**.
 - Select the warehouse process type and choose *Details* .
 - Enter the *WO Rule* **MFS**.
 - Save*  your changes.
 - Choose *Exit*  to leave the transaction.
19. Create the **connection** between the storage bins and the communication points.
- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Material Flow System → Maintain Communication Points*.
 - Enter the bins to the corresponding communication points.

Comm. Pnt	Storage Bin
CP01	0075-CP01
CP02	0075-CP02
CP03	0075-CP03
CP04	0075-CP04
CP05	0075-CP05

- Save*  your entries.
- Choose *Exit*  to leave the transaction.

Continued on next page

20. Maintain the **programmable logic controller**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Material Flow System* → *Maintain Programmable Logic Controller*. The system will show immediately the details of the only defined PLC: **CONV1**
 - b) Select the **Communication Layer A Proprietary Communication Layer** and enter the *Sending FM / SCWM/MFS_SIM_RECEIVE*. Flag the *Logging*.
 - c) *Save*  your changes.
 - d) Choose *Exit* 
21. Generate the **application data**.

This step is necessary to synchronize application data with customizing data of your warehouse.

 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Material Flow System* → *Generate Application Data*. The system will show immediately your *Warehouse Number* **E1##**.
 - b) Choose *Execute* .
 - c) Confirm the pop-up and choose *Exit* 
22. Confirm with the warehouse management monitor that the communication with the PLC is working.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) Choose *Material Flow System* → *Communication Channel*.
 - c) Choose *Execute*  on the pop-up. The system should find the *PLC CONV1*.
 - d) Choose *More Methods* → *Stop Channel*. There should come an “X” in the *Stop* column.
 - e) Choose *More Methods* → *Start Channel*. The *Status* should show **A**. *Refresh*  until it changes to **B**.

Task 2:

Test the process using the MFS connection.

1. Create a purchase order as detailed below.

Continued on next page

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW03-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

-
- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) *Save* your purchase order. Note down the purchase order number.
 - d) Choose *Exit*
2. Create the inbound delivery and **pack this inbound delivery** into one **PKE-090**.

Inbound delivery (ERP):

Continued on next page

HU: _____

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Choose *Pack* .
 - d) Enter the *Packaging Materials*: **PKE-090** and press **Enter**.
 - e) Select the newly created *Handling Unit*, select the *Material*, and choose *(Pack)* .
- Note down the HU number.
- f) Choose *Save*  your inbound delivery. Note down the inbound delivery number.
 - g) Choose *Exit*  to end the transaction.
3. Create the warehouse task(s) to move the material into storage type **0070** (you have to enter the *Destination Storage Type* as *Default Value*).

Continued on next page

Inbound delivery (EWM):

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - b) In the *Search criteria* drop-down, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the inbound delivery.
 - c) Confirm on the *HU* tab that an HU was created for the PKE-090.
 - d) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
 - e) On the lower part of the screen, select the *Default Values* tab.
Enter the storage type **0070** for the *Dest.Stor.Bin* (do not enter a storage bin, just a storage type in the first field).
 - f) Choose *Create Warehouse Task* .
 - g) Select the *Warehouse Task* tab and confirm that a warehouse task for *Destination Storage Type 0070* is to be created.
 - h) Choose *Save* .
- The system should inform you that **2 warehouse tasks were created**.
- i) Choose *Exit* twice to end the transaction.

Continued on next page

4. Confirm the warehouse tasks with the warehouse management monitor.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*
 - b) In the warehouse management monitor, choose *Inbound* → *Documents* → *Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose the *Warehouse Task*.
Confirm the **active** warehouse task by choosing *Other Methods* → *Confirm*. Backgr. and a new warehouse task gets created. This goes to the *Destination Storage Bin 0075-CP02*. Use the  Refresh icon. After approximately three seconds, this warehouse task should be automatically confirmed and a new warehouse task should be created going to **0075-CP03** (if, of course the final bin is in the *Storage Group SEC1*). Also, this should be confirmed automatically after a short moment and the last, inactive warehouse task for **0070** should become active
 - c) Confirm the last warehouse task.



Lesson Summary

You should now be able to:

- Set up a basic material flow system scenario



Unit Summary

You should now be able to:

- Set up layout-orientated storage control
- Put away using an ID point
- Pick using a pick point
- Set up a basic material flow system scenario

Unit 6

Integrate Manufacturing

Unit Overview

Integration and communication with production is very important for a warehouse. Delivery of required products and receipt of final products from production should work hand-in-hand. For production, it is important to keep track of information like serial numbers or to be sure that materials received from suppliers satisfy the required standards and quality requirements. But processes, where no special tools or qualifications are required, might also be moved from production into the warehouse. This is called “kitting.”



Unit Objectives

After completing this unit, you will be able to:

- Explain the different organizational models for material staging
- Set up production supply areas and control cycles
- Describe the possibilities of goods receipt from production
- Set up serial number profiles
- Describe the different serial number requirements
- Create the settings for the Quality Inspection Engine
- Set up inspection rules
- Process the quality inspection
- Describe the different kitting scenarios
- Set up a kit-to-order process

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Lesson: Integrate Manufacturing Processes

Lesson Overview

In this lesson you will learn about the possibilities of staging material for the production and goods receipt of finished goods from production.



Lesson Objectives

After completing this lesson, you will be able to:

- Explain the different organizational models for material staging
- Set up production supply areas and control cycles
- Describe the possibilities of goods receipt from production

Business Example

The materials you have on stock might not be sold to customers, but used as components in production processes. To start the planned production in time, the material needs to be in special areas where the production can access them quickly. These are called “production supply areas,” and you require to post goods receipt for the product coming back from production so that they can be sold.

Integration of SAP Extended Warehouse Management with Manufacturing Processes

Inbound and outbound processes in a warehouse are often through inbound deliveries received from vendors or outbound deliveries sent to customers. But of course, products might also be received from the production plant connected to the warehouse. And this plant probably receives the raw material required for production from the very same warehouse.

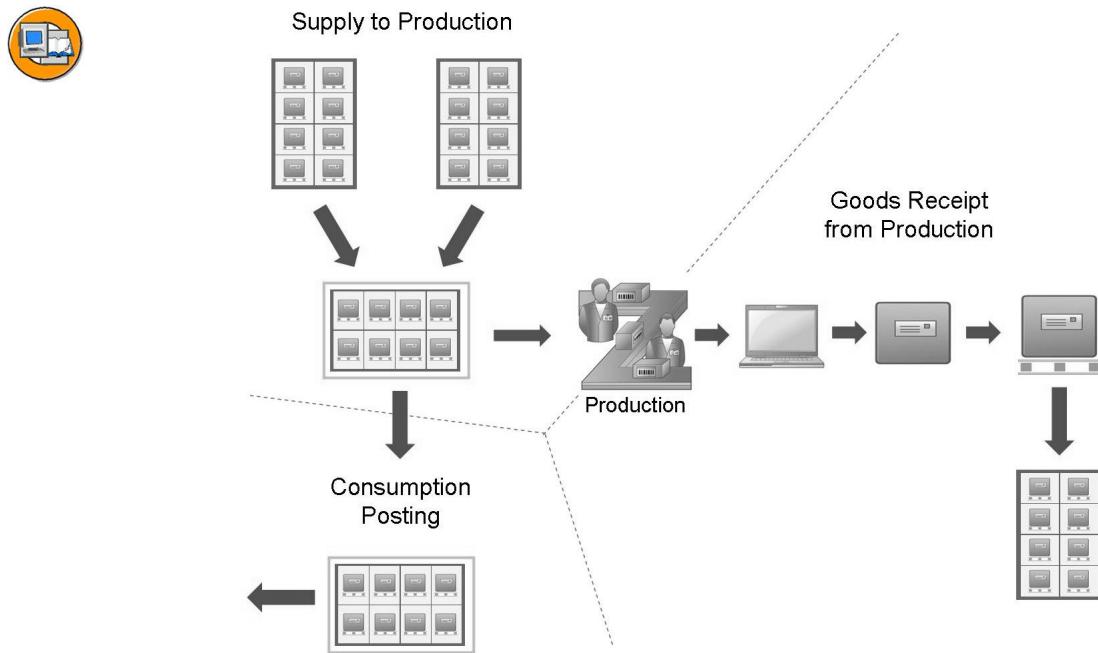


Figure 71: Integration with Production Processes

This means that processes between the production plant and the warehouse must be tightly integrated. The warehouse needs to know what material the plant requires at what time. And the materials produced in the plant shall be put away in the warehouse or used for outbound deliveries without extra efforts.

Extended Warehouse Management provides you with staging products for the production as well as different possibilities of posting the goods receipt from production.

Integration of Production Supply in Extended Warehouse Management

Together with an ERP system, EWM allows you to manage the storage and material staging of products in connection with production and process orders (manufacturing orders).

You can use the following production planning (PP) application components for production supply in EWM:

- Production order (PP-SFC)
- Process order (PP-PI_POR)
- Repetitive manufacturing (PP-REM)
- Kanban (PP-KAB)

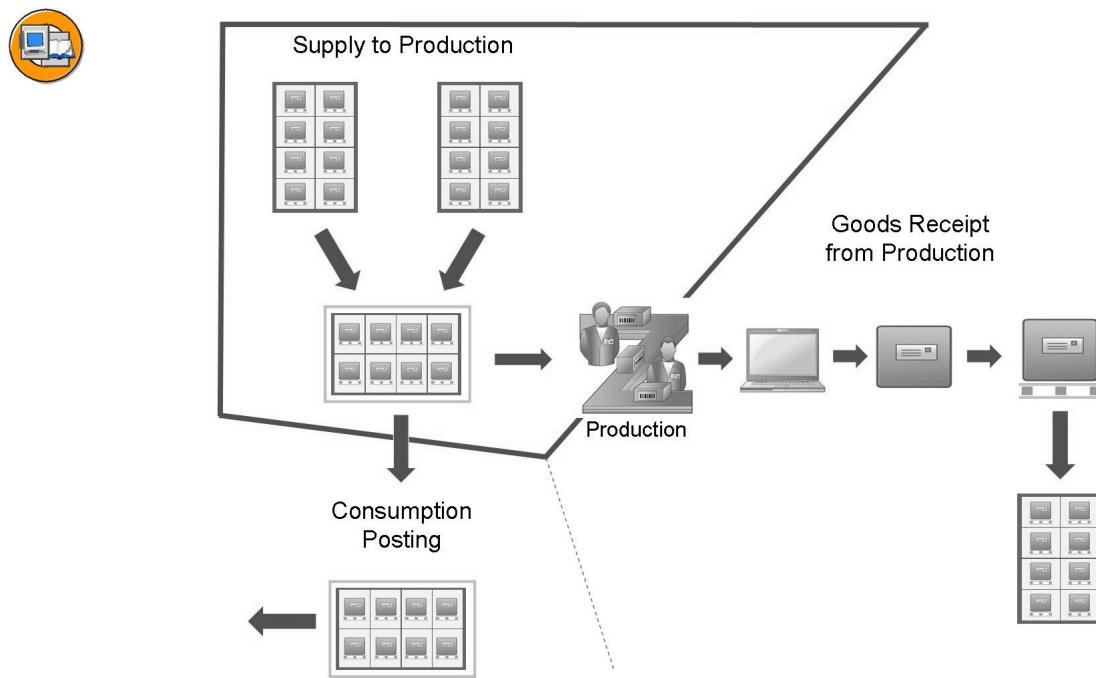


Figure 72: Production Supply

The information between the systems is exchanged using delivery documents. The ERP system creates the deliveries and sends them to the EWM system.

When **staging** products for a production order or process order, you pick the products in the warehouse and transport them to a production supply area (PSA). The second process step in the production supply is the **consumption** posting of the products from the PSA.

There are multiple ways to stage products required for a production or process order:

- The required products are **pick parts** in the case of individual orders, or **release order parts** in the case of multiple orders, which you stage in time and in the required quantity for production supply.
- You stage products that you use continually independently of existing orders. Containers, which are requested by production, are available in the warehouse. Kanban is a special method for managing **crate parts**. A crate part is a material that is stored in a crate or another standard container, and is staged independently of manufacturing orders in the quantity defined by **replenishment**.

If you no longer require the products for further manufacturing or production orders, you can return them to the warehouse. The system then posts goods issue of the products from the PSA. This is usually done by backflushing during the production confirmation.

Organizational Model for Production Supply

There are different models for organizing stocks in the production supply areas in SAP Extended Warehouse Management.

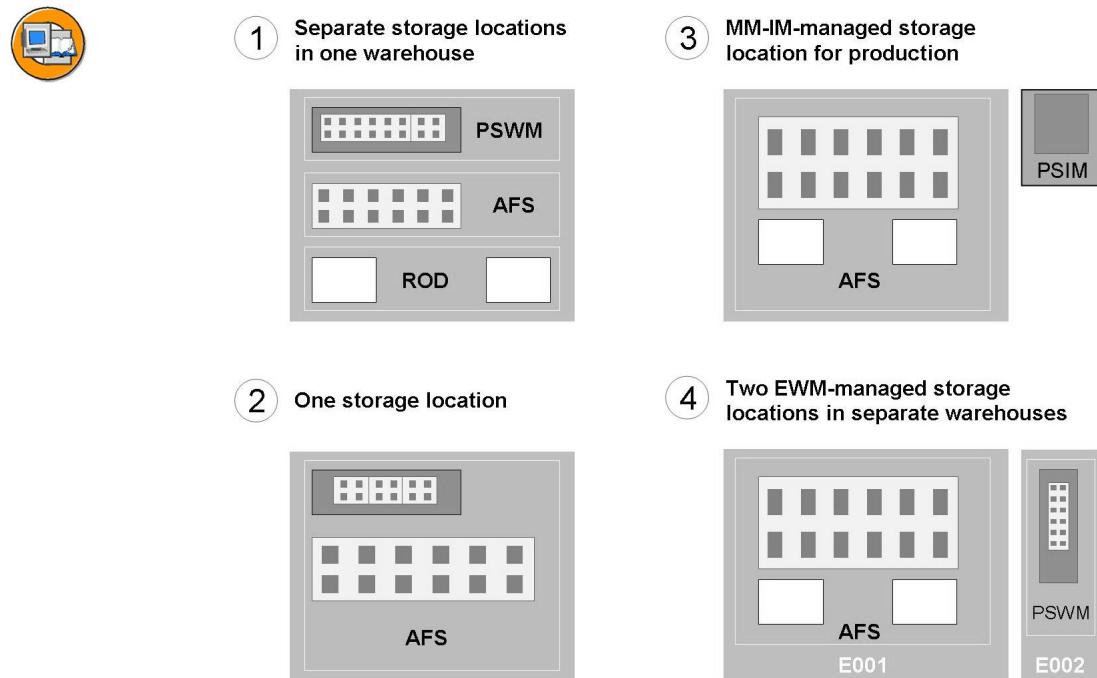


Figure 73: Organizational Models for Production Supply

Two EWM-managed storage locations in one warehouse

The system manages the stocks in the PSA separately from other stocks. This increases the transparency at the storage bin level in the EWM system, and at storage location level in the ERP system. When staging at the PSA, the EWM system executes a posting change by changing the stock type. In the ERP system this is a stock transfer between the storage locations.

One EWM-managed storage location

The PSA stocks are only managed in EWM, and are therefore transparent in the EWM system only. When staging at the PSA, the system does not execute a posting change

MM-IM-managed storage location

The products come from an EWM-managed storage location, but the storage location for production is only MM-IM-managed and therefore the PSA stocks are not managed in the EWM system. Staging at the PSA is an outbound delivery from an EWM perspective, and, from an ERP perspective, a posting change to a storage location outside of the EWM system.

Two EWM-managed storage locations in two warehouses

The PSA stocks are managed in the EWM system in another warehouse. The staging takes place in a two-step posting change:

1. Of the outbound delivery from the sending EWM warehouse
2. Of the inbound delivery of the receiving EWM warehouse

Master Data and Settings for Production Supply

The BC Set /SCWM/PROD_SUPPLY contains the standard settings that are required to use an SAP Extended Warehouse Management system in connection with an ERP system for storage and material staging of products and finished products. You might not require all these settings; they depend also on the organizational model you use. It contains:

- The **storage types** Production Supply (1000), Production Supply GI (1005), and Goods Receipt Production Supply (9015) for the production supply, and entries that are dependent on these, such as storage sections and activity areas.
- The **stock types** P2, P4, and P6 for stocks in production, and entries that are dependent on these, such as availability group 003. There are new stock types that refer to availability group *Stock in Production*.
- The **availability group** for *Stock in Production*, to separate the production supply stock from the stock in the warehouse. You can assign this availability group to a production storage location in the ERP system, which is different from the EWM production storage location, but managed in the EWM system.
- The **warehouse process types** 2100, 3100, 4100, and entries that are dependent on these.

Production Supply Area (PSA)

The production supply area is an area on the shop floor where products are staged or withdrawn. To stage products for a production order, a warehouse must know where it has to take the products. For production orders in the ERP system, the PSA contains this information.

The PSA is defined in the ERP system and then replicated to the EWM system as an organizational unit.

A PSA usually contains one or more storage bins where you can stage the products of a production order. But you do not assign a storage bin to a PSA directly; instead, you define the storage bin in which you want to stage a particular product or product group within a PSA. By making this assignment, you define the following:

- Determination of the storage bin for staging to the PSA
- Determination of the storage bin for the consumption of products from the PSA
- Determination of the storage bin for the physical inventory in the PSA
- Controlling staging of crate parts

You can manage the storage bin assignment at multiple levels for each PSA:

- Default storage bin for each party entitled to dispose
- Storage bin for each party entitled to dispose and product group
- Storage bin for each party entitled to dispose and product

For the organizational models *Production storage location in EWM / 2 EWM-managed storage locations in 1 warehouse* and *AFS-Production storage location / 1 EWM-managed storage location*, the product is stored in this bin from staging until consumption posting. For the organizational models *MM-IM-managed storage location* and *Production storage location in another warehouse number / 2 EWM-managed storage locations in 2 warehouses*, the product is stored in this bin after picking. However, the stock is posted to the staging outbound delivery during goods issue posting.

Control Cycle

With the control cycle you define the **type of material staging** for each material

- Pick parts

Using pick parts, you ensure material staging from the warehouse to production, based purely on the production order. You stage the quantity of the material requested in the production order with a direct reference to the production order.

- Release order parts

This is for material that you request from the warehouse to production for several orders. The quantity is not predefined, you request the quantity of a release order part manually.

The net requirement calculation considers EWM production supply!

Net requirement calculation:

Release order parts quantity = Stock in PSA for Product + open supply delivery quantities of Product - quantities of product in all open production orders.

- Crate parts

This is material stored in crates or other standard contains, which you request from the warehouse for production independent of existing production orders. Crate part staging for EWM-managed supply warehouse is **not** defined by a control cycle in ERP, but in the PSA in EWM.

There are two options fro the replenishment quantity in the bin assignment for crate parts replenishment:

- The replenishment quantity is determined from the packaging specification
- The replenishment quantity is define in the PSA-bin-product assignment directly.

Staging for Production Supply

Depending on your organizational model, you also have different documents for the staging process.

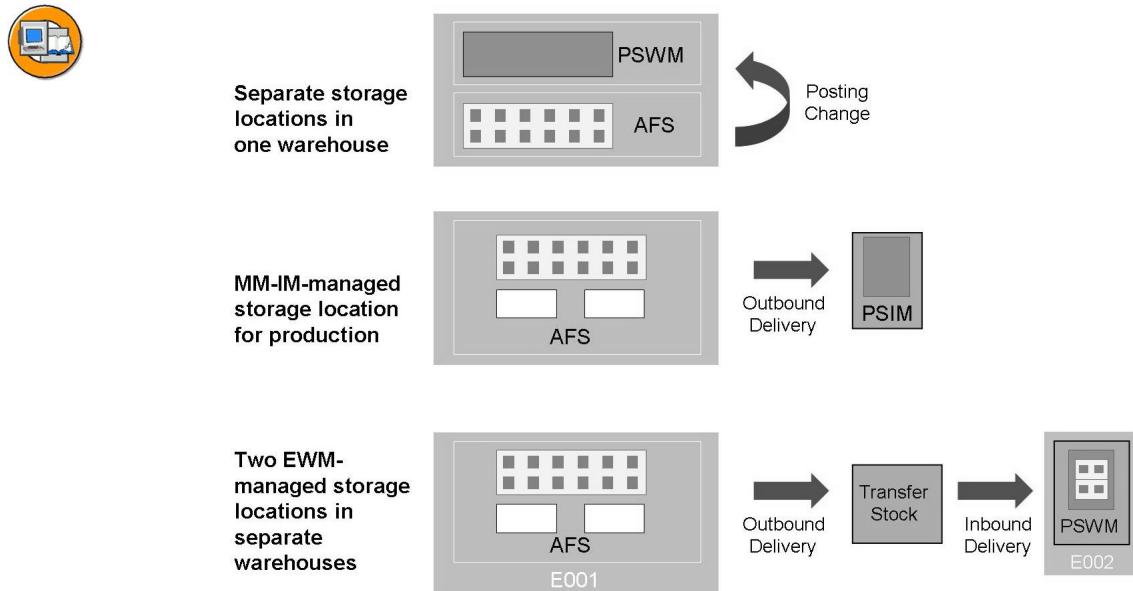


Figure 74: Process Scenarios for Production Supply

When the destination storage location is not an EWM-managed storage location, but an inventory-managed (MM-IM) storage location only, you have an outbound delivery from the supplying storage location / EWM warehouse. In processes with a two-step stock transfer using two EWM-managed storage locations **and** two warehouse numbers, there is an outbound delivery from the supplying storage location / warehouse for the first part and an inbound delivery for the second part.

The system uses a posting change delivery in case of using two separate EWM-managed storage locations in one warehouse or one single EWM-managed storage location. In the second case, the posting change does not trigger an update of the stock in the ERP system.

Consumption Posting Delivery for Production Supply

When confirming the production order in ERP you can use **backflushing** to generate a consumption posting delivery. This delivery is then replicated to EWM. The delivery is not relevant for picking in EWM and the system posts goods issue immediately upon creating this delivery.

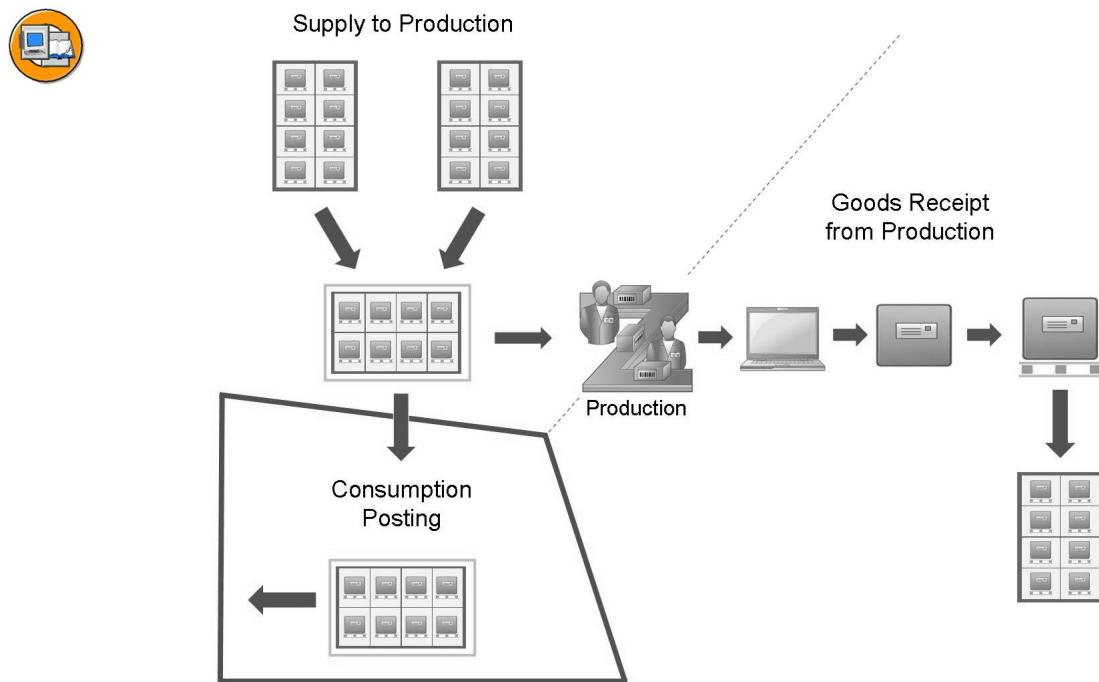


Figure 75: Consumption Posting

Goods Receipt from Production

The goods receipt for the materials produced through a production order can either be triggered by SAP ERP or by EWM.

You can also use the processes *Goods Receipt Posting Triggered by SAP ERP* and *Goods Receipt Posting Triggered by EWM at the same time*. For example, you can generate inbound deliveries for the same production order at the same time in both EWM and SAP ERP. If you want to avoid duplicate inbound deliveries being generated for a production order, you can set the indicator *GR From EWM Only* in SAP ERP. This allows only the generation of *Expected Goods Receipts* in SAP ERP, and you can only post the goods receipt in EWM.

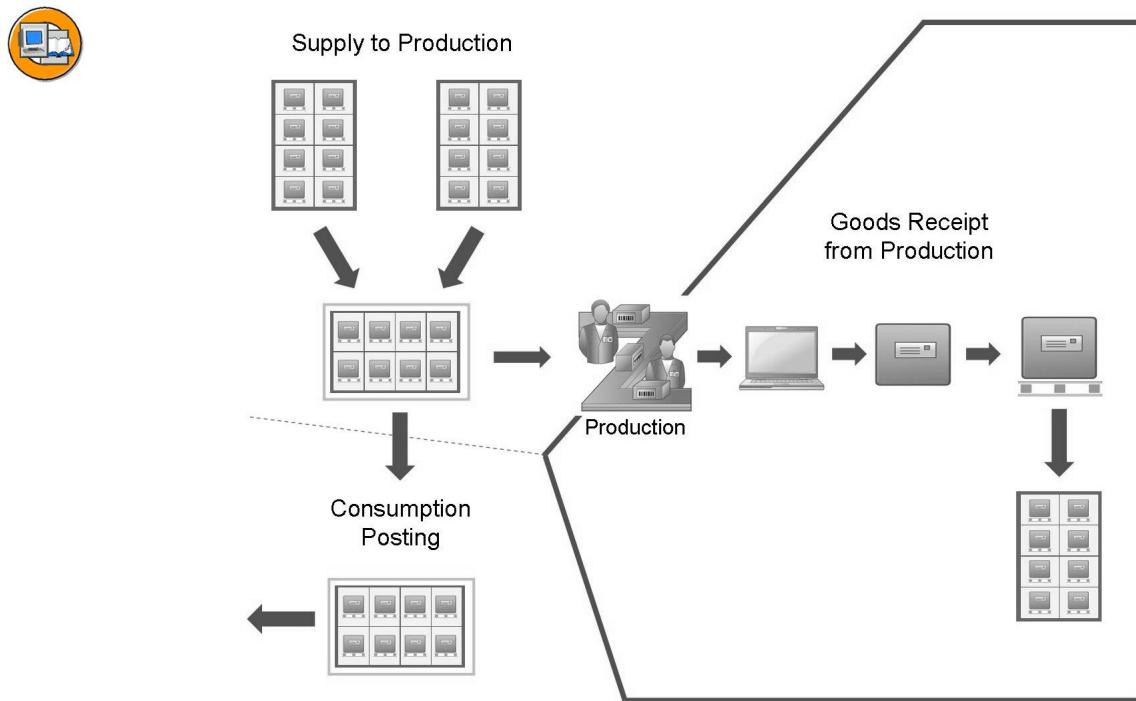


Figure 76: Goods receipt from production

Goods Receipt Posting Triggered by SAP ERP

For posting a goods receipt from production, you can generally use a separate inventory management posting transaction or trigger the posting at the same time as the goods issue posting of the components with the production order confirmation. For EWM, of course, in both cases this means that an inbound delivery has to be created, which is replicated to EWM and contains the information about the material and quantity being produced.

EWM uses document type *IDPD Inbound Delivery from Production* to differentiate that an EWM inbound delivery from production takes place.

Goods Receipt Posting Triggered by EWM

If you want to trigger the goods receipt posting of finished product by EWM, you have to work with the **expected goods receipt**. An expected goods receipt contains data of an open purchase order or a production order. It displays a copy template so that data from the production order or from the purchase order can be copied when manually creating a delivery. For each relevant production order, EWM receives a notification for the expected goods receipt from SAP ERP, and generates a corresponding expected goods receipt in EWM. The expected goods receipt contains a link to the production order in SAP ERP. You can use the expected goods receipt in EWM for planning purposes. It contains the planned times and quantities, for example.

When the products arrive in your warehouse, you can use the number of the production order to find the expected goods receipt, and generate a corresponding EWM inbound delivery. Here you use the expected goods receipt as a template for the EWM inbound delivery, and can adjust the quantities if required.

In exceptional circumstances, you generate an EWM inbound delivery manually without a template, meaning without an expected goods receipt. In this case you must make sure that the data in the inbound delivery is validated. You can use the standard implementation of Business Add-In (BAdI) /SCWM/EX_ERP_PROD.

Exercise 22: Staging from EWM for Production

Exercise Objectives

After completing this exercise, you will be able to:

- Set up the staging for production in EWM

Business Example

Your production requires material that is in storage in your warehouse. You need to maintain the system so that the different materials get staged when they are required. But you might stage materials differently, depending on the way they are packed and how often they are needed.

Task:

Set up the staging for a separate storage location in your warehouse. Materials need to be staged differently, so you need to create various control cycles. Finally, test your process.

1. The **Storage Location PW##** is not using your **Warehouse Number E##** yet. Activate the combination of **Plant and Storage Location SCPW / PW30** and **Warehouse Number E1##**. Then set up the **Availability Group 003** in EWM for the **Storage Location PW##** and the **Warehouse Number E1##**.
2. Create a new **production supply area PSA##**. The assigned **Storage Location** is **PW##**.
3. Create new **control cycles** for the **Production Supply Area PSA##**. The following materials will be staged in the following ways:
 - T-EW41-## is a *create part*.
 - T-EW42-## and T-EW43-## are *pick parts*.
 - T-EW46-## and T-EW47-## are *release order parts*.
 The source storage type for all materials is **AF##**
4. Create the **bill of material** for production for **T-EW40-##**. You require one of each of the following components: **T-EW41-##**, **T-EW42-##**, **T-EW43-##**, **T-EW46-##**, and **T-EW47-##**.
 For all the components, the *Prod. stor. location* is **PW##** and the *Prodn Supply Area* is **PSA##**.
5. **Replicate** the new PSA to EWM.
6. Create the following **PSA - Bin assignments**.

Continued on next page

For the material **T-EW40-##** (the crate part):

<i>Ent. to Dispose</i>	SPCW
PSA	PSA## /SPCW
<i>Product</i>	T-EW41-##
<i>Storage Bin</i>	PSA02-1-01
<i>Type of Qty Calculation</i>	2 Quantity-Based Crate Part Replenishment
<i>Replmt Qty</i>	100
<i>Min. Prod. Qty in PSA</i>	20
<i>Unit</i>	PC

The other materials:

<i>Ent. to Dispose</i>	<i>PSA</i>	<i>Product</i>	<i>Storage Bin</i>	<i>Type of Qty Calculation</i>
SPCW	PSA## /SPCW	T-EW42-##	PSA02-1-02	Not Relevant for Create Part Replenishment
SPCW	PSA## /SPCW	T-EW43-##	PSA02-1-03	Not Relevant for Create Part Replenishment
SPCW	PSA## /SPCW	T-EW46-##	PSA02-1-04	Not Relevant for Create Part Replenishment
SPCW	PSA## /SPCW	T-EW47-##	PSA02-1-05	Not Relevant for Create Part Replenishment

Continued on next page

7. Control the settings for the **crate part replenishment** for storage type 1000. You want to use the **warehouse process type 3100** and the *warehouse task* shall be created immediately.
8. **Schedule the replenishment** for the crate part and confirm the warehouse task in the warehouse management monitor.
9. Create a **production order** for 5 pieces of T-EW40-##.

Production order:

10. Confirm in the warehouse management monitor that a delivery (resp. a posting change) for the *pick parts* has been created. Note down the EWM document number and the ERP delivery number. Create the warehouse task and confirm the warehouse task.

Posting change:

ERP document:

11. Request the **staging** of the *release order parts*.
12. Confirm in the warehouse management monitor that a delivery (resp. a second posting change) for the *release order parts* has been created. Note down the EWM document number and the ERP delivery number. Create the warehouse task and confirm the warehouse task.

Posting change:

ERP document:

13. Confirm in the warehouse management monitor the stock in the **storage type 1000**.

<i>Product</i>	<i>Quantity</i>
T-EW41-##	
T-EW42-##	
T-EW42-##	
T-EW46-##	
T-EW47-##	

14. Enter the confirmation of the production order. Confirm that the goods issue for the components is supposed to be posted.

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15. Confirm in the warehouse management monitor that the stock on storage type **1000** has been reduced accordingly. There should only be stock of the *crate part T-EW41-##* left.
16. Look for the **outbound delivery order** in the warehouse management monitor. The document type is **OPC - Consumption for Order**.

Consumption for order:

ERP document:

Solution 22: Staging from EWM for Production

Task:

Set up the staging for a separate storage location in your warehouse. Materials need to be staged differently, so you need to create various control cycles. Finally, test your process.

1. The *Storage Location PW##* is not using your *Warehouse Number E##* yet. Activate the combination of *Plant* and *Storage Location SCPW / PW30* and *Warehouse Number E1##*. Then set up the *Availability Group 003* in EWM for the *Storage Location PW##* and the *Warehouse Number E1##*.
 - a) In the IMG of your ERP system, choose *Enterprise Structure → Assignment → Logistics Execution → Assign warehouse number to plant/storage location*.
 - b) Choose *New Entries*.
 - c) Create a new entry with the following details:

<i>Plnt</i>	SPCW
<i>SLoc</i>	PW##
<i>WhN</i>	E##

- d) *Save*  your new entry.
- e) Choose *Exit*  to leave the transaction.
- f) In the IMG of your ERP system, choose *Extended Warehouse Management → Interfaces → ERP Integration → Goods Movement → Map Storage Locations from ERP System to EWM*.
- g) Choose *New Entries*.
- h) Create a new entry with the following details:

<i>Plnt</i>	SPCW
<i>SLoc</i>	PW##
<i>Logical System</i>	T90CLNT090
<i>Warehouse Number</i>	E1##
<i>AGr</i>	003

- i) *Save*  your new entry.

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- j) Choose *Exit*  to leave the transaction.
2. Create a new **production supply area PSA##**. The assigned *Storage Location* is **PW##**.
- In the *Easy Access* menu of your ERP system, choose *Logistics → Logistics Execution → Master Data → Warehouse → Production Supply → Production Supply Area → Create / Change*.
 - Enter *Plant SPCW* if necessary and choose *Continue* .
 - Choose *New Entries*.
 - Create a new entry with the following details:

<i>Plant</i>	SPCW
<i>Supply Area</i>	PSA##
<i>Description</i>	Production Supply Area ##
<i>Stor. Location</i>	PW##

- Save  your new entry.
 - Choose *Exit*  to leave the transaction.
3. Create new **control cycles** for the *Production Supply Area PSA##*. The following materials will be staged in the following ways:
- T-EW41-## is a *create part*.
 - T-EW42-## and T-EW43-## are *pick parts*.
 - T-EW46-## and T-EW47-## are *release order parts*.

The source storage type for all materials is **AF##**

- In the *Easy Access* menu of your ERP system, choose *Logistics → Logistics Execution → Master Data → Warehouse → Production Supply → Control Cycle Production Supply → Create*.
- Enter the *Material T-EW41-##*, the *Plant SPCW*, and the *Supply Area PSA##*, then press **Enter**.
- Enter the following details:

<i>No. of Kanbans</i>	2
<i>Kanban Quantity</i>	20
<i>Staging Ind.</i>	2
<i>Stor. Location</i>	AF##

Continued on next page

- d) Save  your new control cycle.
- e) The control cycle for the *Pick Parts* has no *Material*. Delete the *Material*, if any, make sure that only *Plant* and *Supply Area* are filled, then press **Enter**.
- f) Enter the following details:

<i>Staging Ind.</i>	1
<i>Stor. Location</i>	AF##

- g) Save  your new control cycle.
- h) Create two more control cycles with the following details:

<i>Material</i>	T-EW46-##
<i>Plant</i>	SPCW
<i>Prodn Supply Area</i>	PSA##
<i>Staging Ind.</i>	3
<i>Stor. Location</i>	AF##

<i>Material</i>	T-EW47-##
<i>Plant</i>	SPCW
<i>Prodn Supply Area</i>	PSA##
<i>Staging Ind.</i>	3
<i>Stor. Location</i>	AF##

- i) Choose *Exit*  to leave the transaction.
4. Create the **bill of material** for production for **T-EW40-##**. You require one of each of the following components: **T-EW41-##**, **T-EW42-##**, **T-EW43-##**, **T-EW46-##**, and **T-EW47-##**.

Continued on next page

For all the components, the *Prod. stor. location* is **PW##** and the *Prodn Supply Area* is **PSA##**.

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Production* → *Master Data* → *Bills of Material* → *Material BOM* → *CS01 Create*.
 - b) Enter the *Material* **T-EW40-##**, *Plant* **SPCW**, and *BOM Usage* **1** (Production). Press **Enter**.
 - c) Enter the *components* (T-EW41-##, T-EW42-##, T-EW43-##, T-EW46-##, T-EW47-##), and 1 pce (resp. 1 m² for the last component) each.
 - d) Choose *Select All*  to select all components.
 - e) Select *Item* .
 - f) Select the *Status/Lng Text* tab.
 - g) Enter the *Prod. stor. location* **PW##** and the *Prodn Supply Area* **PSA##**.
 - h) Select *Next Item*  to move from one item to the next. Enter the *Prod. stor. location* **PW##** and the *Prodn Supply Area* **PSA##** for all items.
 - i) *Save*  your new BOM.
 - j) Choose *Exit*  to leave the transaction.
5. **Replicate** the new PSA to EWM.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Interfaces* → *ERP Integration* → *Replicate Production Supply Area (PSA)*.
 - b) Enter the *Warehouse number* **E1##**, *Party Entitled to Dispose* **SPCW**, and flag *Only EWM Stor. Loc.*. Choose *Execute* .
 - c) Select the found PSA and choose *Replicate* .
6. Create the following **PSA - Bin assignments**.

For the material **T-EW40-##** (the crate part):

<i>Ent. to Dispose</i>	SPCW
<i>PSA</i>	PSA## /SPCW
<i>Product</i>	T-EW41-##
<i>Storage Bin</i>	PSA02-1-01
<i>Type of Qty Calculation</i>	2 Quantity-Based Crate Part Replenishment

Continued on next page

<i>Replmt Qty</i>	100
<i>Min. Prod. Qty in PSA</i>	20
<i>Unit</i>	PC

The other materials:

<i>Ent. to Dispose</i>	<i>PSA</i>	<i>Product</i>	<i>Storage Bin</i>	<i>Type of Qty Calculation</i>
SPCW	PSA## /SPCW	T-EW42-##	PSA02-1-02	Not Relevant for Create Part Replenishment
SPCW	PSA## /SPCW	T-EW43-##	PSA02-1-03	Not Relevant for Create Part Replenishment
SPCW	PSA## /SPCW	T-EW46-##	PSA02-1-04	Not Relevant for Create Part Replenishment
SPCW	PSA## /SPCW	T-EW47-##	PSA02-1-05	Not Relevant for Create Part Replenishment

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Production Supply Area (PSA)* → *Assign Bin to PSA/Product/Entitled in Warehouse Number*.
- Choose *New Entries*.
- Create the new entries as in the tables.
- Save  your new entries.
- Choose *Exit*  to leave the transaction.

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7. Control the settings for the **crate part replenishment** for storage type 1000. You want to use the **warehouse process type 3100** and the *warehouse task* shall be created immediately.
 - a) In the IMG of your EWM system, choose *Extended Warehouse Management → Internal Warehouse Processes → Replenishment Control → Activate Replenishment Strategies in Storage Types*.
 - b) Position on your *Warehouse Number E1##* and the *Storage Type 1000*.
 - c) Select the line and choose *Details* .
 - d) Enter the *Whse Proc. Type 3100* and flag *WT Immed..*
 - e) *Save*  your changes.
 - f) Choose *Exit*  to leave the transaction.
8. **Schedule the replenishment** for the crate part and confirm the warehouse task in the warehouse management monitor.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Work Scheduling → Schedule Replenishment*.
 - b) Select the *Replenishment Strategy Crate Part Replenishment* and make sure that the *Warehouse Number E1##* is entered. Choose *Execute* .
 - c) There should only one planned replenishment item coming up, for the *product T-EW41-##*. Select the line and choose *Perform Replenishment* .
 - d) Choose *Exit*  to leave the transaction.
 - e) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.
 - f) Choose *Documents → Warehouse Order*. In the popup, enter the *Hdr Whse Process Tpe 3100* and choose *Execute* .

One warehouse order should be found.

 - g) Select the warehouse order and choose *More Methods → Confirm Backgr..*
9. Create a **production order** for 5 pieces of T-EW40-##.

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Production order:

-
- a) In the *Easy Access* menu of your ERP system, choose *Production* → *Shop Floor Control* → *Order* → *Create* → *With Material*.
 - b) Enter the *Material* **T-EW40-##** and the *Production Plant* **SPCW**. Press **Enter**.
 - c) Enter a *Total Qty* of **5** pieces and press **Enter**.
 - d) Choose *Release Order*  and then choose *Save*.
Note down the production order number.
 - e) Choose *Exit*  to leave the transaction.
10. Confirm in the warehouse management monitor that a delivery (resp. a posting change) for the *pick parts* has been created. Note down the EWM document number and the ERP delivery number. Create the warehouse task and confirm the warehouse task.

Posting change:

Continued on next page

ERP document:

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) Choose *Documents* → *Posting Changes*. Do not enter anything in the popup and choose *Execute* .
 - Note down the number of the *Document*.
 - c) Click **one time** on the document number. A new screen will open: *Maintain Posting Change....*
 - d) Select the *Reference Documents* tab.
 - Note down the *ERP Document* number.
 - e) Choose *Posting Change* → *Follow-On Functions* → *Warehouse Task*.
 - f) Use *Select All*  to select both items. Then choose the *Create + Save Warehouse Task* button .
 - g) Choose *Warehouse Task* → *Confirm*.
 - h) Make sure that the warehouse order is marked and choose the *Confirm + Save* button.
 - i) Choose *Exit*  three times to return to the warehouse management monitor.

Continued on next page

11. Request the **staging** of the *release order parts*.
 - a) In the *Easy Access* menu of your ERP system, choose *Production* → *Shop Floor Control* → *Goods Movements* → *Material Staging* → *Pull List*.
 - b) Deselect the flag for *SLoc Level* and set the flag for *EWM Rel. Parts*. Make sure that the *Plant SPCW* is entered. In the *Selection Horizon for Reqmts* field, enter the **actual date + 2 days**.
 - c) Select the *Production/Process Orders* tab and enter your *Prodn Supply Area PSA##*.
 - d) Choose *Execute* .
 - e) There should be two items coming up, the materials T-EW46-## and T-EW47-##. Select both lines and choose *Replenish. Proposals* .
 - Then choose *Replenishment Elements* .
 - The lower part of the screen should now show two *Replen. Elements*.
 - f) Select both lines in the lower part of the screen and choose *Stage* .
 - . Then choose *Save* .
 - g) Choose *Exit*  to leave the transaction.
12. Confirm in the warehouse management monitor that a delivery (resp. a second posting change) for the *release order parts* has been created. Note down the EWM document number and the ERP delivery number. Create the warehouse task and confirm the warehouse task.

Posting change:

Continued on next page

ERP document:

-
- a) (If you closed the warehouse management monitor after the last step): In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) Choose *Documents* → *Posting Changes*. Do not enter anything in the popup and choose *Execute*  .
There should be two documents now, one with the *Warehouse Activity Status Completed*, that is the one for the *pick parts*, and another one with the *Warehouse Activity Status Not Started*, this is for the *release order parts*.
Note down the number of the *Document*
 - c) Click **one time** on the document number. A new screen will open: *Maintain Posting Change....*
 - d) Select the *Reference Documents* tab.
Note down the *ERP Document* number.
 - e) Choose *Posting Change* → *Follow-On Functions* → *Warehouse Task*.
 - f) Use *Select All*  to select both items. Then choose the *Create + Save Warehouse Task*  button.
 - g) Choose *Warehouse Task* → *Confirm*.
 - h) Make sure that the warehouse order is marked and choose the *Confirm + Save* button.
 - i) Choose *Exit*  three times to return to the *Warehouse Management Monitor*.
13. Confirm in the warehouse management monitor the stock in the **storage type 1000**.

<i>Product</i>	<i>Quantity</i>
T-EW41-##	
T-EW42-##	

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T-EW42-##	
T-EW46-##	
T-EW47-##	

- a) Choose *Stock and Bin* → *Storage Bin* → *Physical Stock*.
- b) In the popup, enter *Storage Type 1000* and choose *Execute* .
14. Enter the confirmation of the production order. Confirm that the goods issue for the components is supposed to be posted.
- a) In the *Easy Access* menu of your ERP system, choose *Production* → *Shop Floor Control* → *Confirmation* → *Enter* → *For Order*.
- b) Enter your production order and press **Enter**.
- c) Choose the *Goods Movements* icon. Confirm that all 5 components are listed.
- d) Save  your confirmation.
- e) Choose *Exit*  to leave the transaction.
15. Confirm in the warehouse management monitor that the stock on storage type **1000** has been reduced accordingly. There should only be stock of the crate part **T-EW41-##** left.
- a) (If you closed the warehouse management monitor after the last step): In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
- Otherwise: just Refresh .
- b) Choose *Stock and Bin* → *Storage Bin* → *Physical Stock*.
- c) In the popup, enter the *Storage Type 1000* and choose *Execute* .
16. Look for the **outbound delivery order** in the warehouse management monitor. The document type is **OPC - Consumption for Order**.
- Consumption for order:
-

Continued on next page

ERP document:

-
- a) (If you closed the warehouse management monitor after the last step): In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) Choose *Outbound* → *Documents* → *Outbound Delivery Order*. Do not enter anything in the popup and choose *Execute* .
 - c) Look for the last created document. Note down the document number.
 - d) Click **one time** on the document number. A new screen will open: *Maintain Outb. Deliv. Order...*
 - e) Select the *Reference Documents* tab.

Note down the *ERP Document* number.

Exercise 23: Goods Receipt from Production into EWM

Exercise Objectives

After completing this exercise, you will be able to:

- Post goods receipt from production

Business Example

With the confirmation of the production order you want to post the goods issue of the components, but also post goods receipt for the materials coming out of production.

Task:

Create a production order. Stage the components and when confirming the production order, post the goods issue as well as the goods receipt for the materials.

- Create a **production order** for 5 pieces of T-EW40-##.

Production order:

-
- Confirm in the warehouse management monitor that a posting change for the *pick parts* has been created. Note down the EWM document number and the ERP delivery number. Create the warehouse task and confirm the warehouse task.

Posting change:

ERP document:

- Request the **staging** of the *release order parts*.
- Confirm in the warehouse management monitor that a delivery (resp. a second posting change) for the release order parts has been created. Note down the EWM document number and the ERP delivery number. Create the warehouse task and confirm the warehouse task.

Posting change:

ERP document:

Continued on next page

5. Enter the confirmation of the production order. Confirm that the goods issue for the components is supposed to be posted, as well as the good receipt for the produced material.
6. Confirm in the warehouse management monitor that the stock on storage type **1000** has been reduced accordingly. There should only be stock of the *crate part T-EW41-##* left.
7. Look for the **inbound delivery** in the warehouse management monitor. The document type is **INBI - Inbound Delivery GR Production**. Create and confirm the warehouse task for the inbound delivery.

Inbound delivery:

ERP document:

8. Confirm the goods receipt posting in the **ERP inbound delivery**.

Solution 23: Goods Receipt from Production into EWM

Task:

Create a production order. Stage the components and when confirming the production order, post the goods issue as well as the goods receipt for the materials.

1. Create a **production order** for 5 pieces of T-EW40-##.

Production order:

-
- a) In the *Easy Access* menu of your ERP system, choose *Production* → *Shop Floor Control* → *Order* → *Create* → *With Material*.
 - b) Enter the *Material* **T-EW40-##** and the *Production Plant* **SPCW**. Press **Enter**.
 - c) Enter a *Total Qty* of **5** pieces and press **Enter**.
 - d) Choose *Release Order*  and choose *Save*.

Note down the production order number.

- e) Choose *Exit*  to leave the transaction.

2. Confirm in the warehouse management monitor that a posting change for the *pick parts* has been created. Note down the EWM document number and the ERP delivery number. Create the warehouse task and confirm the warehouse task.

Posting change:

Continued on next page

ERP document:

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) Choose *Documents* → *Posting Changes*. Do not enter anything in the popup and choose *Execute* .
 - Note down the number of the *Document*.
 - c) Click **one time** on the document number. A new screen will open: *Maintain Posting Change....*
 - d) Select the *Reference Documents* tab.
 - Note down the *ERP Document* number.
 - e) Choose *Posting Change* → *Follow-On Functions* → *Warehouse Task*.
 - f) Use *Select All*  to select both items. Then choose the *Create + Save Warehouse Task* button.
 - g) Choose *Warehouse Task* → *Confirm*.
 - h) Make sure that the warehouse order is selected and choose the *Confirm + Save* button.
 - i) Choose *Exit*  three times to return to the warehouse management monitor.

Continued on next page

3. Request the **staging** of the *release order parts*.
 - a) In the *Easy Access* menu of your ERP system, choose *Production* → *Shop Floor Control* → *Goods Movements* → *Material Staging* → *Pull List*.
 - b) Deselect the flag for *SLoc Level* and set the flag for *EWM Rel. Parts*. Make sure that the *Plant SPCW* is entered. In the *Selection Horizon for Reqmts* field, enter the **actual date + 2 days**.
 - c) Select the *Production/Process Orders* tab and enter your *Prodn Supply Area PSA##*.
 - d) Choose *Execute* .
 - e) There should be two items coming up, the materials T-EW46-## and T-EW47-##. Select both lines and choose *Replenish. Proposals* .
 - Then choose *Replenishment Elements* . The lower part of the screen should now show two *Replen. Elements*.
 - f) Mark both lines in the lower part of the screen and choose *Stage* . Then choose *Save* .
 - g) Choose *Exit*  to leave the transaction.
4. Confirm in the warehouse management monitor that a delivery (resp. a second posting change) for the release order parts has been created. Note down the EWM document number and the ERP delivery number. Create the warehouse task and confirm the warehouse task.

Posting change:

Continued on next page

ERP document:

-
- a) If you closed the warehouse management monitor after the last step: In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) Choose *Documents* → *Posting Changes*. Do not enter anything in the popup and choose *Execute* . There should be two documents now, one with the *Warehouse Activity Status Completed*, which is the one for the pick parts, and another one with the *Warehouse Activity Status Not Started*, which is for the release order parts.
Note down the number of the document.
 - c) Click *one time* on the document number. A new screen will open: *Maintain Posting Change....*
 - d) Select the *Reference Documents* tab.
Note down the *ERP Document* number.
 - e) Choose *Posting Change* → *Follow-On Functions* → *Warehouse Task*.
 - f) Use *Select All*  to select both items. Then choose the *Create + Save Warehouse Task* button.
 - g) Choose *Warehouse Task* → *Confirm*.
 - h) Make sure that the warehouse order is selected and choose the *Confirm + Save* button.
 - i) Choose *Exit*  three times to return to the warehouse management monitor.
5. Enter the confirmation of the production order. Confirm that the goods issue for the components is supposed to be posted, as well as the good receipt for the produced material.
- a) In the *Easy Access* menu of your ERP system, choose *Production* → *Shop Floor Control* → *Confirmation* → *Enter* → *For Order*.
 - b) Enter your production order and press **Enter**.
 - c) Choose the *Goods Movements* icon. Confirm that material T-EW40-## and all five components are listed.
 - d) *Save*  your confirmation.
 - e) Choose *Exit*  to leave the transaction.

Continued on next page

6. Confirm in the warehouse management monitor that the stock on storage type **1000** has been reduced accordingly. There should only be stock of the *crate part T-EW41-##* left.
 - a) If you closed the warehouse management monitor after the last step: In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.
Otherwise: Just Refresh .
 - b) Choose *Stock and Bin → Storage Bin → Physical Stock*.
 - c) In the popup, enter the *Storage Type 1000* and choose *Execute* .
7. Look for the **inbound delivery** in the warehouse management monitor. The document type is **INBI - Inbound Delivery GR Production**. Create and confirm the warehouse task for the inbound delivery.

Inbound delivery:

ERP document:

- a) If you closed the warehouse management monitor after the last step: In the *Easy Access* menu of your ERP system, choose *Extended Warehouse Management → Monitoring → Warehouse Management Monitor*.
- b) Choose *Outbound → Documents → Inbound Delivery*. Do not enter anything in the popup and choose *Execute* .
- c) Look for the last created document. Note down the document number.
- d) Click *one time* on the document number. A new screen will open: *Maintain Outb. Deliv. Order...*
- e) Select the *Reference Documents* tab.
Note down the *ERP Document* number.
- f) Choose *Inbound Delivery → Follow-On Functions → Warehouse Task*.
- g) Choose the *Create + Save* button.
- h) Choose *Warehouse Task → Confirm*.
- i) Choose *Confirm + Save*.
- j) Choose *Exit*  three times to return to the warehouse management monitor.

Continued on next page

8. Confirm the goods receipt posting in the **ERP inbound delivery**.
 - a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Display* → *Single Document*.
 - b) Enter the *Inbound delivery* and press **Enter**.
 - c) Select the *Status Overview* tab. Confirm that the *GM - Goods Movement* status is **C**.
 - d) Choose *Exit*  to leave the transaction.



Lesson Summary

You should now be able to:

- Explain the different organizational models for material staging
- Set up production supply areas and control cycles
- Describe the possibilities of goods receipt from production

Lesson: Work with Serial Numbers

Lesson Overview

In this lesson you will learn about the different serial number profiles and serial number requirements supported by SAP Extended Warehouse Management.



Lesson Objectives

After completing this lesson, you will be able to:

- Set up serial number profiles
- Describe the different serial number requirements

Business Example

You can use serial numbers to individually identify single pieces of your products. You might just use it to confirm what has been sent to a customer, but in other cases you might want to follow a product from the production through the complete life cycle of the product. You can use different serial number requirements for these different purposes.

Serial Numbers

A serial number is a character string that is given to a product in addition to a product number to differentiate the individual piece from all the other pieces. The combination of product number and serial number is unique.

You use serial numbers if you want to identify or trace single units in the warehouse. SAP Extended Warehouse Management (EWM) only controls the serial numbers (as a movement date) until goods issue posting. This can help you to identify a product uniquely and to provide yourself with an overview of which products you have sold to which customers.

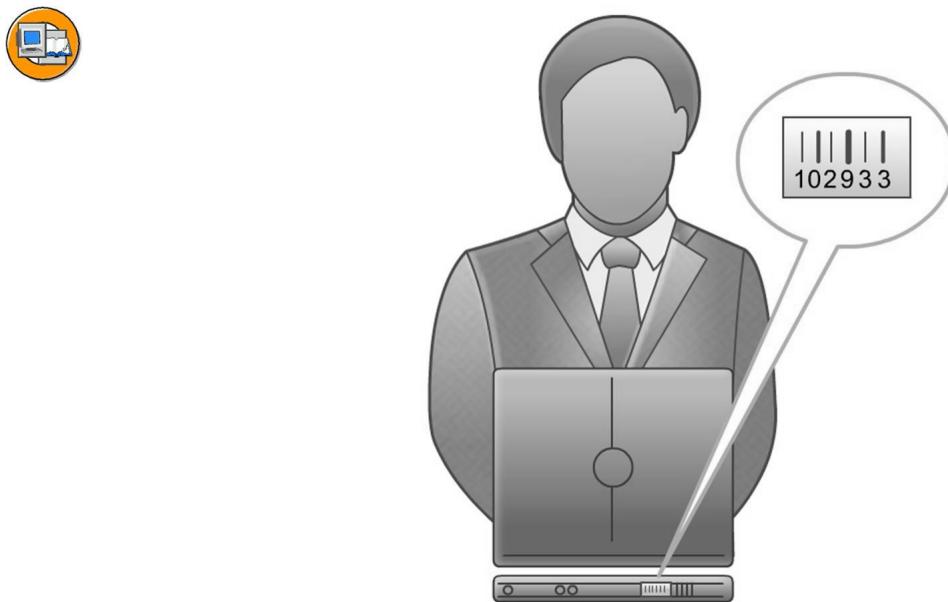


Figure 77: Serial Number Management

For example, you can use serial numbers in the following instances:

- If a freight forwarder damages a pallet during transportation, EWM can show you which engines were on the pallet and might potentially be damaged.
- You can tell if a partner reports a product as having been stolen, but later sends it to you for maintenance.
- If a customer returns a damaged engine, you can determine whether it is actually the engine that you supplied them with.
- If, during quality control, you determine that a production error has occurred, you can identify the affected product groups by using serial numbers. If necessary, you can also identify the customers to which you have already sold damaged products and inform them of this.

Serial Number Requirement Level

With EWM, there are three different types of serial number requirements:

- Serial numbers for document items
- Serial numbers at warehouse number level
- Serial numbers in inventory management

Each serial number requirement gives you different levels of detail information about the serial number, but affects also the processes in the warehouse.

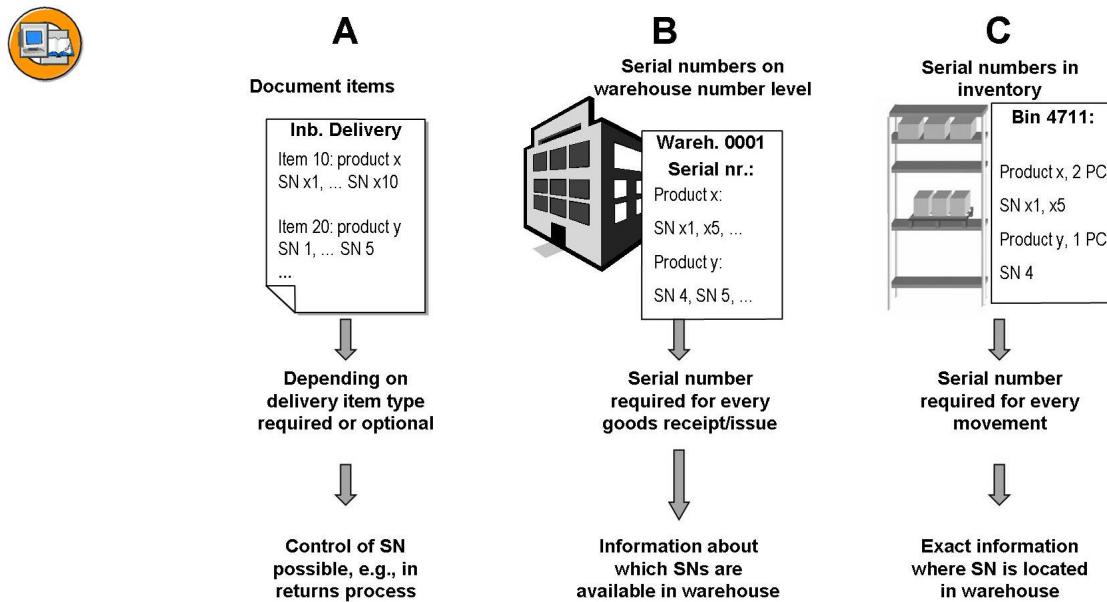


Figure 78: Serial Number Requirement

Serial numbers for document items

You record serial numbers in inbound deliveries or outbound deliveries, but you have no visibility about the actual location of a product. Depending on the item type of the delivery, you can make the entering of the serial number mandatory.

As a simple example, you can use this in a returns process to control if the serial number corresponds to the number you sent with an outbound delivery to the customer.

Serial numbers at warehouse number level

This serial number requirement provides you with an overview of which serial numbers are available in your warehouse. In every inbound and outbound delivery you enter the serial numbers for the products for which it is required.

Serial numbers in inventory management

You use this serial number requirement to store exact storage bin information for a serial number. Every movement in the warehouse— inbound, outbound, or internally— requires the entering of the serial numbers for the products.

To enter a serial number for a product, you create **serial number profiles** and assign them to the materials.

Serial Number Profiles

For working with serial numbers you may actually use up to **4** different serial number profiles for a material.

ERP serial number profile

First you have a serial number profile in ERP, which actually has nothing to do with the serial number profile in EWM. But this profile is required so that you can work with serial numbers in any document in ERP (like deliveries).

The serial number profile in ERP controls the following:

- The serialization procedure for the profile defines the transactions for which serialization is possible.
Examples are:
 - MMSL Maintain goods receipt and issue doc.
 - POSL Serial numbers in purchase orders
 - SDLS Maintain delivery
- **Serial number usage** defines whether serialization is mandatory or optional.
- The **equipment required** function specifies whether a piece of equipment is required.

The serial number profile can be allocated to different transactions with different parameterization.

You assign the ERP serial number profiles to the materials for which you want to maintain serial numbers. This is done in the material master either on the *Sales: General/Plant* view or on the *Plant data / stor. 2* view.



Hint: Do not set up an ERP serial number profile with **stock check** in Customizing. Goods movement postings originating from EWM do not register serial numbers at the central ERP system. Therefore it is not possible to update serial number data in the ERP system. EWM does not register serial numbers in internal goods movement postings at the ERP system. Therefore, serial numbers in the ERP system do not receive qualified stock information.

EWM serial number profile

You also assign an **EWM** serial number profile to the material master in **ERP**. This profile is entered on the *WM Execution* view. When you transfer the material master via CIF, this profile is also transferred and can be found on the *Storage* tab.

You have to maintain this EWM serial number profile in ERP and in EWM with the same name and the same settings. In this profile you define the **serial number requirement type**.

The EWM serial number profile entered in ERP is **warehouse-number independent**. You can then have additionally in EWM a **warehouse-number-dependent** serial number profile, with the same name, that overrides the warehouse number independent profile. In this way you can, for example, control that a certain product generally has no mandatory serial numbers, just in a specific warehouse – or the other way around, that in certain warehouses no serial numbers are required.

- **Note:** Once you have received material in a warehouse with or without a serial number profile, it is not possible simply to add a serial number profile or to change the serial number profile. Even if you change the definition of the serial number profile in customizing, this does not change the serial number behavior of the material.

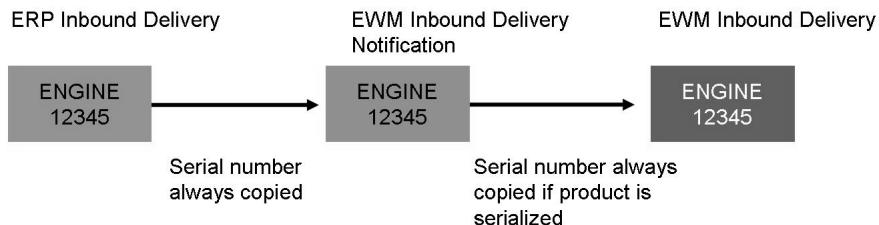
The serial number profile of the material is written in the table /SCWM/SERH on the first receipt and is not updated anymore. SAP does not recommend to change the settings for a material later. See SAP Note 1498521 for details.

Using Serial Numbers in the Delivery

If you enter a serial number for a product in an inbound or an outbound delivery in ERP, EWM copies the serial number into the inbound delivery notification or the outbound delivery request and further on into the inbound delivery or the outbound delivery order. A prerequisite for this is that you have determined the serialization for the product in the serial number profile. Otherwise, EWM does not copy any serial numbers to the inbound delivery or the outbound delivery order.



Goods Receipt Process



Goods Issue Process

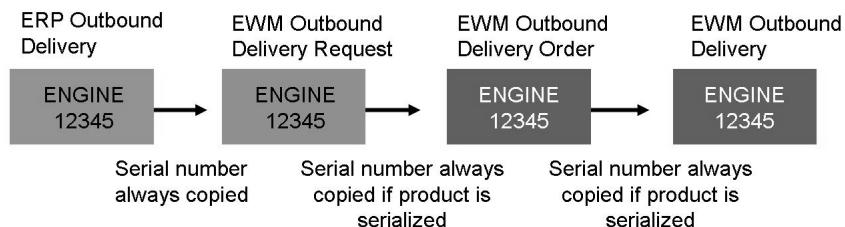


Figure 79: Serial Numbers in Deliveries

Serial numbers in inbound deliveries

You either receive the serial number in the advanced shipping notification of your supplier, you enter them in the inbound delivery in ERP (manually scan them or create them), or you enter them in the inbound delivery in EWM.

In the EWM serial number profile you can define the object name and the number range for serial numbers created in EWM, as well as a prefix (optional).



Hint: Differences between ERP and EWM:

In EWM, you can specify a serial number with a maximum length of **30** characters. However, if you want to use data records for master data in the ERP system, the serial number in EWM can only have **18** characters (as the serial number in ERP has this maximum length). If necessary, you can use the Business Add-In (BAdI) **Converting Serial Numbers ERP – EWM (/SCWM/EX_ERP_SN)** for mapping the serial number between the ERP system and EWM. This also allows you to work with 30-digit serial numbers in EWM.

Provisional serial number

If you set the serial number requirement at warehouse number level or in inventory management, Extended Warehouse Management always requires the serial numbers **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.



Note: If you want to track information about serial numbers in the ERP system, do **not** use provisional serial numbers. As soon as you use provisional serial numbers and replace them with your own serial numbers at a later point in time, EWM no longer reports these serial numbers to the ERP system, meaning that the ERP system does not have up-to-date information regarding the status of the serial numbers in EWM.

Serial numbers in outbound deliveries

You either enter the requested serial numbers in the outbound delivery (or even already in the sales order) and this information is taken to pick the requested serial number. Or you assign the picked serial numbers when confirming the warehouse task. If you confirm a warehouse task in the foreground, you can assign serial numbers manually. If you confirm a warehouse task in the background, EWM automatically assigns the serial numbers known to the system if a complete quant removal occurs.

Entering serial number ranges

In the RF environment, you can specify whole serial number ranges instead of individual serial numbers. Select *Range* on the entry screen for serial numbers. EWM displays a new screen where you can enter the start and end values for your serial number range. On this screen, EWM also displays the data for the product, the number of serial numbers necessary, and the number of serial numbers that already exist. When you have specified the serial number area, EWM updates the number of existing serial numbers accordingly. EWM displays the serial number range in a step loop and you can then specify the next serial number range.

Exercise 24: Work with Serial Numbers in EWM

Exercise Objectives

After completing this exercise, you will be able to:

- Set up serial number profiles in EWM and maintain them in the material master

Business Example

You might have different serial number requirements for your products or warehouses. These can be set by warehouse-independent and warehouse-dependent serial number profiles.

Task:

Maintain different serial number profiles in your materials and create a warehouse-dependent serial number profile. Create an inbound process for differently serialized materials.

1. Assign the *User screen reference WM* to your user to maintain the EWM-specific master data in the material master in ERP.
2. Maintain the **serial number profiles** in your material masters.

The following materials shall get these serial number profiles:

Material	Serial. no. profile General Plant Data / Storage 2	Serial. No. Profile WM Execution
T-EW80-##	M003	0001
T-EW81-##	M003	0002
T-EW82-##	M003	0003

For that you need the views *General Plant Data / Storage 2* and *WM Execution*.

3. Confirm the **serial number profiles** of the product **T-EW80-##** in EWM.
4. Create a new **warehouse-number-dependent serial number profile**. This serial number profile, **0002**, shall, differently than the **warehouse-independent** serial number profile, be on **warehouse number level** only.
5. Create a purchase order as per the table below.

Continued on next page

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW80-30
<i>PO Quantity</i>	5
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD30
<i>Conf. Control</i>	ANLI Inbound Delivery ECC
Item 2	
<i>Material</i>	T-EW81-30
<i>PO Quantity</i>	5
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD30
<i>Conf. Control</i>	ANLI Inbound Delivery ECC
Item 3	
<i>Material</i>	T-EW82-30
<i>PO Quantity</i>	5
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD30
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

6. Create the inbound delivery. Enter the serial numbers for the products as following:

Continued on next page

Material	Serial Numbers
T-EW80-##	80-##-01, 80-##-02, 80-##-03, 80-##-04, 80-##-05
T-EW81-##	81-##-01, 81-##-02, 81-##-03, 81-##-04, 81-##-05
T-EW82-##	82-##-01, 82-##-02, 82-##-03, 82-##-04, 82-##-05

Inbound delivery:

-
7. Confirm if the serial numbers have been transmitted to EWM. Create and confirm your warehouse tasks.
 8. Use the warehouse management monitor to confirm the serial number statuses of your products.

Solution 24: Work with Serial Numbers in EWM

Task:

Maintain different serial number profiles in your materials and create a warehouse-dependent serial number profile. Create an inbound process for differently serialized materials.

1. Assign the *User screen reference WM* to your user to maintain the EWM-specific master data in the material master in ERP.
 - a) In the ERP IMG, choose *Logistics - General* → *Material Master* → *Configuring the Material Master* → *Assign Screen Sequences to User/Material Type/Transaction/Industry Sector*.
 - b) In the dialog structure, select **User screen reference**.
 - c) Choose *New Entries*.
 - d) Create a new entry with the following details:

Name	Your user
SRef: user	WM

- e) Save  your new entry.
- f) Choose *Exit*  to leave the transaction.

2. Maintain the **serial number profiles** in your material masters.

The following materials shall get these serial number profiles:

Material	Serial. no. profile General Plant Data / Storage 2	Serial. No. Profile WM Execution
T-EW80-##	M003	0001
T-EW81-##	M003	0002
T-EW82-##	M003	0003

Continued on next page

For that you need the views *General Plant Data / Storage 2* and *WM Execution*.

- a) In the *Easy Access* menu of your ERP system, choose *Logistics → Materials Management → Material Master → Material → Change → Immediately*.
- b) Enter the *Material T-EW80-##* and press **Enter**.
- c) In the pop-up, select the views *General Plant Data / Storage 2* and *WM Execution*, then choose *Continue* .
- d) In the pop-up for the *Organizational Levels*, enter the *Plant SPWC* and the *Stor. Location AF##*. Choose *Continue* .
- e) Enter the *Serial. no. profile M003* on the *Plant data / stor. 2* view and press **Enter**.
- f) Enter the *Serial. No. Profile 0001* on the *WM Execution* view and press **Enter**.
- g) Confirm the *Last data screen reached* pop-up with *Yes*.
- h) Repeat these steps for the other two materials.



Hint: Be careful! They are supposed to have different serial number profiles for EWM.

- i) Choose *Exit*  to leave the transaction.
3. Confirm the **serial number profiles** of the product **T-EW80-##** in EWM.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Product → Maintain Product*.
 - b) Enter the *Product T-EW80-##* and select the *Global Data* view.
 - c) Choose *Display*.
 - d) Select the *Storage* tab. Confirm the *Serial No. Profile*.

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4. Create a new **warehouse-number-dependent serial number profile**. This serial number profile, **0002**, shall, differently than the **warehouse-independent** serial number profile, be on **warehouse number level** only.

- In the IMG of your EWM system, choose *Extended Warehouse Management → Master Data → Product → Define Serial Number Profile → Define Warehouse Number-Dependent Serial Number Profiles*.
- Choose *New Entries*.
- Create a new entry with the following details:

<i>Warehouse No.</i>	E1##
<i>Serial No. Prof.</i>	0002
<i>Description</i>	Warehouse Number Level
<i>Serial No. Reqm.</i>	B Serial Number Requirement on Warehouse Number Level

- Save  your new entry.
 - Choose *Exit*  to leave the transaction.
5. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW80-30
<i>PO Quantity</i>	5
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD30
<i>Conf. Control</i>	ANLI Inbound Delivery ECC
Item 2	
<i>Material</i>	T-EW81-30
<i>PO Quantity</i>	5

Continued on next page

<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD30
<i>Conf. Control</i>	ANLI Inbound Delivery ECC
Item 3	
<i>Material</i>	T-EW82-30
<i>PO Quantity</i>	5
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD30
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) Save  your purchase order. Note down the purchase order number.
 - d) Choose *Exit*  to end the transaction.
6. Create the inbound delivery. Enter the serial numbers for the products as following:

<i>Material</i>	<i>Serial Numbers</i>
T-EW80-##	80-##-01, 80-##-02, 80-##-03, 80-##-04, 80-##-05
T-EW81-##	81-##-01, 81-##-02, 81-##-03, 81-##-04, 81-##-05
T-EW82-##	82-##-01, 82-##-02, 82-##-03, 82-##-04, 82-##-05

Continued on next page

Inbound delivery:

-
- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Select the *Materials* one by one and choose *Extras* → *Serial Numbers*. Enter the serial numbers and choose *Continue* .
 - d) *Save*  your inbound delivery. Note down the inbound delivery number.
 - e) Choose *Exit*  to end the transaction.
7. Confirm if the serial numbers have been transmitted to EWM. Create and confirm your warehouse tasks.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* .
 - c) *Expand* the section for the *Details Delivery Item* and select the *Serial Numbers* tab.
 - d) Select one item and choose *Details* . Confirm the serial numbers.
 - e) Choose *Posting Change* → *Follow-On Functions* → *Warehouse Task*.
 - f) Use *Select All*  to select all three items. Then choose the *Create + Save Warehouse Task* button.
 - g) Choose *Warehouse Task* → *Confirm*.
 - h) Make sure that the warehouse order is selected and choose the *Confirm + Save* button.
 - i) Choose *Exit*  three times to exit the transaction.

Continued on next page

8. Use the warehouse management monitor to confirm the serial number statuses of your products.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) Choose *Stock and Bin* → *Serial Number on Whse Level*. Enter *Product T-EW80-##* to *T-EW82-##* and choose *Execute* .The system should only find the product **T-EW81-##**.
 - c) Choose *Stock and Bin* → *Physical Stock*. Enter again *Product T-EW80-30* to *T-EW82-30*.Select the product **T-EW80-30** and choose *Serial Number*. No serial numbers should be found.
 - Select the product **T-EW81-30** and choose *Serial Number*. No serial numbers should be found.
 - Select the product **T-EW82-30** and chose *Serial Number*. Now you can see the bin with the individual serial numbers.



Lesson Summary

You should now be able to:

- Set up serial number profiles
- Describe the different serial number requirements

Lesson: Quality Management

Lesson Overview

In this lesson you will learn about the possibilities of quality inspections in SAP Extended Warehouse Management. Different processes for quality inspections are possible in EWM.



Lesson Objectives

After completing this lesson, you will be able to:

- Create the settings for the Quality Inspection Engine
- Set up inspection rules
- Process the quality inspection

Business Example

It is important to ensure the quality of the goods you receive from your vendors. For that you create inspection rules, which describe how and when materials should be inspected.

Quality Management

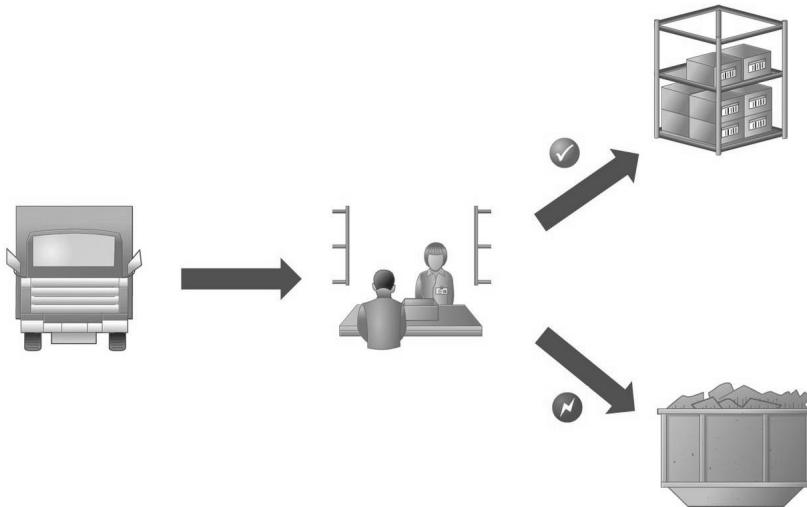
You use quality management to check whether delivered products satisfy your quality criteria. QM uses the **Quality Inspection Engine (QIE)** to map these inspection processes in SAP Extended Warehouse Management.

If you want to check products, packaging, or transports, you can perform the following inspections:

- A preliminary inspection of an inbound delivery
- A preliminary inspection of a handling unit
- A counting of inbound delivery items
- A quality inspection of products from an inbound delivery
- A quality inspection of products from a returns delivery
- A quality inspection of products that are in the warehouse



QM Examples

**Figure 80: Quality Management**

This different inspections are controlled by **inspection object types (IOT)**.

Inspection documents, which describe the inspection object, can be created automatically or manually. If the inspection object type is active, the system looks for an **inspection rule**. It can only generate inspection documents if you have created an inspection rule. If the system finds an inspection rule, it creates the inspection document.

Quality Inspection Engine

With the Quality Inspection Engine (QIE), you can integrate quality inspections in various SAP solutions in the SAP Business Suite, as well as in non-SAP applications. The QIE supplements the comprehensive existing quality management solution supplied by SAP Product Lifecycle Management (SAP PLM) and was designed for use in a heterogeneous system landscape. The QIE is service-oriented and thereby supports new processes, such as the execution of inspections using a decentralized Warehouse Management system in SAP Supply Chain Management (SAP SCM).

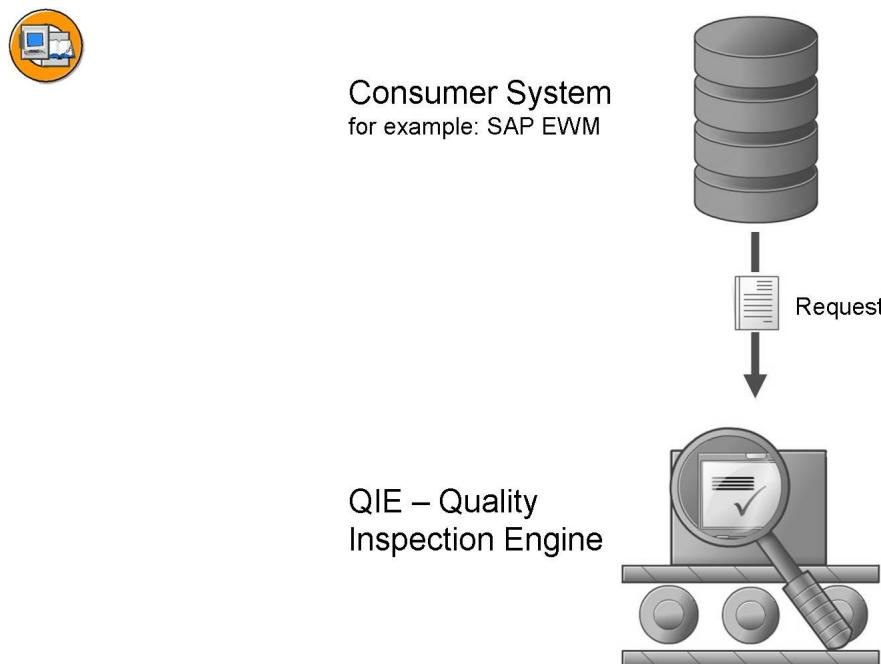


Figure 81: Quality Management with the Quality Inspection Engine

The QIE is called by a consumer system, for example, the SAP Extended Warehouse Management system, and carries out the inspection process that was triggered in this consumer system, for example, an inspection for a goods receipt for a delivery. The consumer system uses the QIE services. This process describes an example inspection process.

Inspection Object Types

Inspection object types (IOT) define the software component, process, and object in which you can create inspection documents in the Quality Inspection Engine. In the case of an active IOT, the system looks for an inspection rule.

- IOT Preliminary Inspection Inbound Delivery

If you activate an inbound delivery notification, the system automatically generates an inspection document for checking complete deliveries. The system requires an inspection rule for the current version of the inspection object type and warehouse number.

The inspection document is automatically released when being created, so that it is already available when the goods physically arrive. The document cannot contain samples or items and is stored as a reference document for the delivery header in the delivery.

- IOT Preliminary Inspection Handling Unit

Inspection documents for HUs cannot be scheduled in advance. You can only create them manually for the HU inspection using RF.

For each delivery of a complete commercial truck (with multiple deliveries), you can classify all HUs as “good” or “bad.” When you have classified all the HUs, 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.

Since you always create this inspection document manually, it makes sense to create only one inspection rule for the warehouse number and version of the inspection object.

- IOT 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.

- IOT Q-Inspection Returns Delivery

Providing you have not already defined the usage of returns in SAP Customer Relationship Management (SAP CRM), the system calls the inspection at the defined point in time, determines an inspection rule, and checks the dynamic modification rules.

The inspection document is automatically generated but released with the first goods receipt posting. The inspection quantity is determined from the deliver quantity. If the inspection rule contains a sample-drawing instruction, the system generates corresponding samples for the inspection document.

- IOT Q-Inspection Product/Batch Inbound Delivery

Also here the inspection document is automatically generated but released with the first goods receipt posting. The inspection quantity is determined from the deliver quantity and if the inspection rule contains a sample-drawing instruction, the system generates corresponding samples for the inspection document.

- IOT Q-Inspection Product/Batch Warehouse-Internal

Warehouse-internal inspection documents can only be created manually, using either the RF environment or desktop transactions. You can create inspection documents for all products in a work center or HU, or restrict the inspection to a particular product.

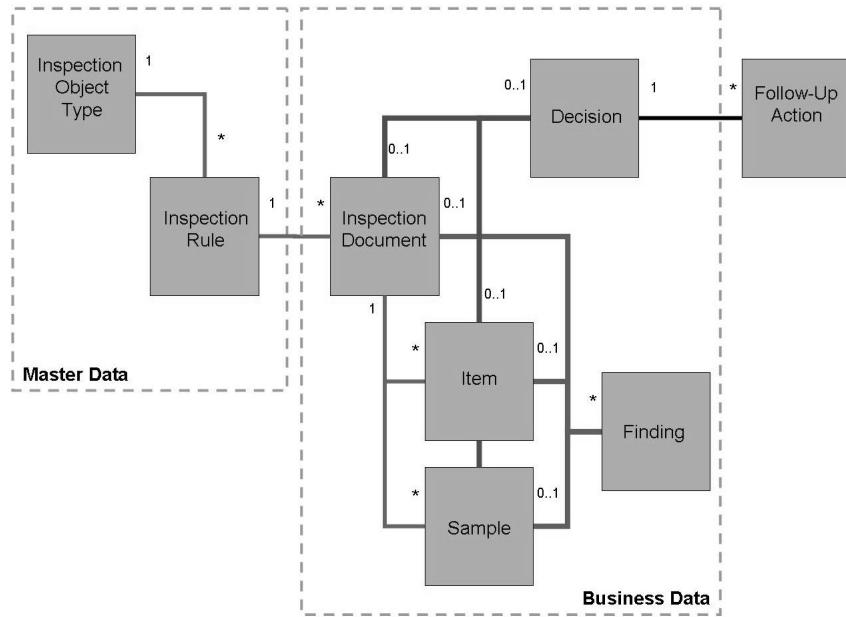


Figure 82: QIE Data Model

Inspection Rules

Inspection rules are dependent on the inspection object type, warehouse number, and version of the inspection object type.

Inspection rules contain the following parameters:

- Check criteria, such as material being checked, quality inspection group being checked, and supplier (in the *properties* section)
- Type of inspection (sample inspection, 100% inspection, or no inspection)
- Possible decisions, findings, and follow-up actions

Decision codes

With decision codes you describe if a sample is being accepted, what quality score is given, and what follow-up action is to be taken. The decision codes are arranged in **code groups**, which are then assigned to the inspection rules.

Findings

When you process an inspection document, you can record the results of the inspection as characteristic values or findings. A defect is any property of an object or process that does not fulfill the specifications of an inspection characteristic. You record the defects using predefined defect codes that you have defined in Customizing.

Whether findings are necessary depends on the object being checked and the inspection process

Follow-up actions

You can use logistical follow-up actions to trigger follow-up processes such as putaway, scrapping, stock transfer, or return delivery. Logistical follow-up actions are only available for the quality inspection of products.

Logistical follow-up actions generate warehouse documents and warehouse tasks.

Inspection Decision

In the end you have to make a decision to accept or reject the object being inspected. The inspection decision contains the results recording and follow-up action recording, and the inspection completion.

- For inspection documents of the inspection object type Preliminary Inspection Inbound Delivery, the result is the acceptance or rejection of the delivery.
- For inspection documents for HUs, you decide whether the contents of the HU are now to go through a standard goods receipt process, or whether you post them to blocked stock.
- For product inspection documents, the result can be acceptance, return delivery, stock transfer, or scrapping.

You complete the inspection by making the usage decision.

Dynamic Modification

There are several ways to determine the **inspection frequency** for a process in the Quality Inspection Engine. For example, you can use the data from past inspection valuations to calculate the current inspection scope. To be able to react flexibly to this data, you can dynamically modify the inspection scope. This can be achieved using sampling procedures and dynamic modification rules.



Figure 83: Dynamic Modification

With respect to sample sizes and inspection probability, dynamic modification allows you to control the inspection scope for a series of inspection documents so that you will be able to achieve a predefined quality goal with a high degree of certainty. In the QIE you can perform dynamic modification at inspection document level.

Activities for dynamic modification are:

1. The user maintains **dynamic modification criteria** and **dynamic modification rules** in an inspection rule.

The **dynamic modification criteria** define the properties that are the basis for combining inspections for dynamic modification.

The **dynamic modification rule** contains the definition of the **inspection stages**, the dynamic modification time, and the conditions for the inspection stage changes. An **inspection stage** specifies inspection parameters such as the inspection severity, as well as the probability that an inspection is to be performed.

2. Then the user creates a **quality level** according to the dynamic modification criteria of the inspection rule.

The information in the **quality level** determines which inspection stage will be used for the sample determination of the next inspection document.

3. The system calculates the inspection scope dependent on the current inspection stage based on the quality level.
4. A user performs a quality inspection.
5. The system saves the inspection decision that has been made in the quality level.
6. The system determines the inspection stage for the next inspection document based on the specified dynamic modification criteria and the dynamic modification rule and updates the quality level accordingly.

Quality Inspections in EWM Using an External QM System = ERP

If you require a more complex or full-blown quality management process, the QIE can be connected to an external QM system, such as SAP ERP QM. This way you can cover detailed analytical inspections with characteristics.

The inspection process when the QIE is connected to ERP QM is as following: Within the activation of an inspection document in EWM, the QIE triggers the creation of an inspection lot in ERP QM. The inspection process is executed in the external system, that is, the ERP QM system. ERP QM sends back the usage decision to the QIE after the inspection is done.

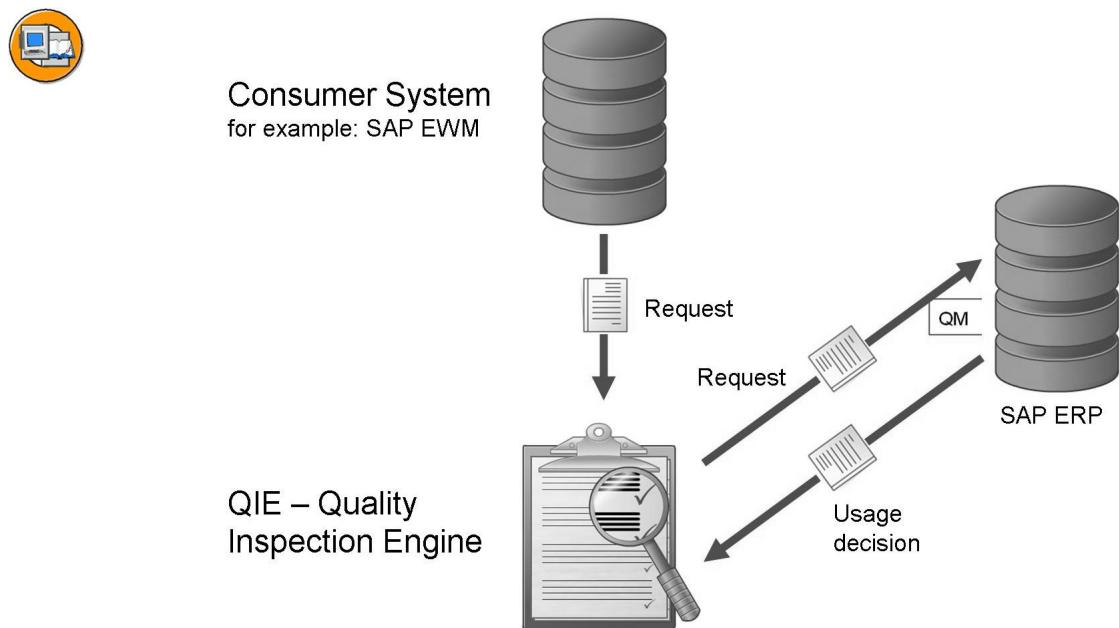


Figure 84: Quality Inspections Using an External QM System

Special settings and requirements for using ERP QM as external QM system for the QIE are:

For checks that are triggered by an external system, SAP delivers the inspection lot origin **17**. Select this inspection lot origin.

For samples that are created externally, SAP delivers sample type **10**.

The BADI **QPLEXT_COMM_TEC** on ERP side and **QIE_EX_COMMUNICATION** in the QIE have to be implemented according your requirements.

→ **Note:** For details, see SAP Note 1278425 – Connecting ERP QM to EWM.

Exercise 25: Quality Management in EWM

Exercise Objectives

After completing this exercise, you will be able to:

- Set up inspection documents for counting and quality inspection
- Set up process-oriented storage control for counting and quality inspection

Business Example

Some materials you receive need to be counted, and others need a quality inspection before they can be stored.

Task 1:

Set up the processes for counting and quality inspection.

1. Activate the inspection object types for counting and quality inspection of products in an inbound delivery in your warehouse number, **e1##**.

Details for counting:

<i>Follow-upAct. LF</i>	1 Inspection Planning at Activation of Delivery
<i>Number Range</i>	SIOT2
<i>Item Type</i>	SITM02
<i>Qty Diff. All.</i>	X
<i>Decis. Insp.Doc</i>	A 100% Inspection Decided with AutoCode

Details for the quality inspection:

<i>Follow-upAct. LF</i>	2 Inspection Planning at Status In Yard
<i>Number Range</i>	SIOT4
<i>Item Type</i>	SITM02
<i>Qty Diff. All.</i>	Yes
<i>Decis. Insp.Doc</i>	Inspection Document Decided with Code of Elements

Continued on next page

2. Maintain follow-up actions for your warehouse. Maintain the following entries.

For the follow-up action **A - PUTAWAY**:

<i>Warehouse Number</i>	<i>IOT</i>	<i>Int. Action</i>	<i>NST</i>
E1##	2	4 Put Away for Delivery	FF
E1##	4	4 Put Away for Delivery	FF

For the follow-up action **D - SCRAPPING**.

<i>Warehouse Number</i>	E1##
<i>IOT</i>	4
<i>Int. Action</i>	1 Scrapping
<i>NST</i>	BB
<i>Whse Proc. Type</i>	4020

3. Create the inspection rules for counting and quality inspection.

The details for the inspection rule for counting are:

<i>Product</i>	T-EW90-##
<i>Ent. to Dispose</i>	SPCW
<i>Inspection Procedure</i>	C
<i>Code Group</i>	SPI
<i>Code Group Item</i>	SPI
<i>Finding Type</i>	SEWM

The details for the quality inspection rule are:

<i>Product</i>	T-EW91-##
<i>Ent. to Dispose</i>	SPCW
<i>Inspection Procedure</i>	C
<i>Code Group</i>	SPI
<i>Code Group Item</i>	SPI

Continued on next page

<i>Finding Type</i>	SEWM
<i>Indep. ST Arg.</i>	QQ
<i>Step</i>	QIS

4. Create a new process-oriented storage process **10QM** for the counting process and a new process **11QM** for the quality inspection process. You will have the following steps.

For the counting process

Sequence Number	Step
1	IB01
2	CNT
3	IB03

For the quality inspection process:

Sequence Number	Step
1	IB01
2	QIS
3	IB03

5. Create two new **warehouse process types**. Use the process type **1011** as template for the new process types **10QM - Putaway with QIE Counting** and **11QM - Putaway with QIE Inspection**. Change the *Storage Process* in the new process types to **10QM** and **11QM**, respectively.
6. Define the new *control indicators* **90** and **91**.
7. Set up the determination of the new warehouse process types. Both shall be found for the *Document type* **INB** and with the respective *Control indicator*.
8. Set up the determination of the *Storage Type Search Sequence*. As we do not require a special search sequence for the new warehouse process types, just a create a general entry for your *Warehouse Number* **E1##**.
9. Create **warehouse products** for T-EW90-## and T-EW91-##. Assign the *Proc. Type Det. Ind.* **90** to T-EW90-## and **91** to T-EW91-##.
10. Create two new **work centers** for counting and quality inspection. Use the existing work centers **CNT** and **QINS** in *Warehouse Number* **E100** as template. Remove the entries for the *Inbound Section* and the *Outbound Section*; no other changes are necessary.

Continued on next page

11. Create two new storage bins with the following details:

Warehouse No.	Storage Bin	Storage Type
E1##	CNT	8020
E1##	QINS	8020

12. Connect the **work centers** to the bins.
13. Enter the storage bin **QINS** as *Destination storage bin* for the *External Step QIS* and the storage bin **CNT** as *Destination storage bin* for the *External Step CNT* in the process-oriented storage control. For the quality inspection step you also need the flag for *rule-based*; for the counting step you must **not** set this flag.



Hint: The entries exist already.; you just need to update them.

Task 2:

Test the QM process.

1. Create a purchase order as per the table below.

Vendor	EWM-VEND
Purch. Org.	1000
Purch. Group	000
Company Code	1000
Item 1	
Material	T-EW90-##
PO Quantity	100
Plnt	SPCW
Stor. Location	RD##
Conf. Control	ANLI Inbound Delivery ECC
Item 2	
Material	T-EW91-##
PO Quantity	100

Continued on next page

<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

2. Create an inbound delivery. Pack in that inbound delivery each product **separately** onto a *PKE-090*.

Inbound delivery (ERP):

3. Confirm that the inspection documents for your inbound delivery have been created. Create the warehouse tasks.

Inbound delivery (EWM):

Inspection document for counting:

Inspection document for quality inspection:

4. Confirm first the warehouse tasks for the material to be counted with the warehouse management monitor.
5. Confirm the counting of the product on the work center **CNT**.
6. Return to the warehouse management monitor and confirm the last process step for this product.
7. Now confirm the warehouse tasks for the material to be inspected with the warehouse management monitor.
8. Confirm the quality inspection of the product on the work center **QINS**.
9. Return to the warehouse management monitor and confirm the last process step for this product.

Solution 25: Quality Management in EWM

Task 1:

Set up the processes for counting and quality inspection.

1. Activate the inspection object types for counting and quality inspection of products in an inbound delivery in your warehouse number, **e1##**.

Details for counting:

<i>Follow-upAct. LF</i>	1 Inspection Planning at Activation of Delivery
<i>Number Range</i>	SIOT2
<i>Item Type</i>	SITM02
<i>Qty Diff. All.</i>	X
<i>Decis. Insp.Doc</i>	A 100% Inspection Decided with AutoCode

Details for the quality inspection:

<i>Follow-upAct. LF</i>	2 Inspection Planning at Status In Yard
<i>Number Range</i>	SIOT4
<i>Item Type</i>	SITM02
<i>Qty Diff. All.</i>	Yes
<i>Decis. Insp.Doc</i>	Inspection Document Decided with Code of Elements

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Quality Management* → *Basics* → *Warehouse-Dependent Activation of Inspection Object Type*.
- b) Choose *New Entries*.
- c) Create new entries with the following details:

<i>Warehouse No.</i>	E1##
<i>InspObject Type</i>	2
<i>Activ. InspObj.</i>	X

Continued on next page

<i>Follow-upAct. LF</i>	1 Inspection Planning at Activation of Delivery
<i>Number Range</i>	SIOT2
<i>Item Type</i>	SITM02
<i>Qty Diff. All.</i>	X
<i>Decis. Insp.Doc</i>	A 100% Inspection Decided with AutoCode

<i>Warehouse No.</i>	E1##
<i>InspObject Type</i>	4
<i>Activ. InspObj.</i>	X
<i>Follow-upAct. LF</i>	1 Inspection Planning at Activation of Delivery
<i>Number Range</i>	SIOT4
<i>Item Type</i>	SITM04
<i>Qty Diff. All.</i>	X
<i>Decis. Insp.Doc</i>	Inspection Document Decided with Code of Elements

- d) Save  your new entries.
e) Choose *Exit*  to leave the transaction.
2. Maintain follow-up actions for your warehouse. Maintain the following entries.

For the follow-up action **A - PUTAWAY**:

<i>Warehouse Number</i>	<i>IOT</i>	<i>Int. Action</i>	<i>NST</i>
E1##	2	4 Put Away for Delivery	FF
E1##	4	4 Put Away for Delivery	FF

For the follow-up action **D - SCRAPPING**.

Continued on next page

<i>Warehouse Number</i>	E1##
<i>IOT</i>	4
<i>Int. Action</i>	1 Scrapping
<i>NST</i>	BB
<i>Whse Proc. Type</i>	4020

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Quality Management* → *Results* → *Maintain Follow-Up Action*.
- b) Select *FollUpActn A* and in the dialog structure, select the entry *Follow-Up Actions for Quality Results*.
- c) Choose *New Entries*.
- d) Create two new entries with the following details:

<i>Warehouse Number</i>	<i>Follow-Up Actn</i>	<i>InspObject Type</i>	<i>Int. Action</i>	<i>Non-dep. Stk.Tpe</i>
E1##	A	2	4 Put Away for Delivery	FF
E1##	A	4	4 Put Away for Delivery	FF

- e) Save  your new entries.
- f) Choose *Back*  to return to the previous screen.
- g) Select *FollUpActn D* and in the dialog structure, select the entry *Follow-Up Actions for Quality Results*.
- h) Choose *New Entries*.
- i) Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>Follow-Up Actn</i>	D
<i>InspObject Type</i>	4
<i>Int. Action</i>	1 Scrapping

Continued on next page

<i>Non-dep. Stk.Tpe</i>	BB
<i>Whse Proc. Type</i>	4020

- j) *Save*  your new entry.
 k) Choose *Exit*  to leave the transaction.
3. Create the inspection rules for counting and quality inspection.

The details for the inspection rule for counting are:

<i>Product</i>	T-EW90-##
<i>Ent. to Dispose</i>	SPCW
<i>Inspection Procedure</i>	C
<i>Code Group</i>	SPI
<i>Code Group Item</i>	SPI
<i>Finding Type</i>	SEWM

The details for the quality inspection rule are:

<i>Product</i>	T-EW91-##
<i>Ent. to Dispose</i>	SPCW
<i>Inspection Procedure</i>	C
<i>Code Group</i>	SPI
<i>Code Group Item</i>	SPI

Continued on next page

<i>Finding Type</i>	SEWM
<i>Indep. ST Arg.</i>	QQ
<i>Step</i>	QIS

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Quality Management → /SCWM/QRSETUP Maintain Inspection Rule*.
 - b) If the button is active, choose the *Counting Inbound Deliv.* button.
 - c) Choose *Create* .
 - d) Select the new line and choose *Switch to Form View*.
 - e) Enter the details for the inspection rule for counting as in the table.
 - f) *Save*  your new inspection rule.
 - g) Choose the *Q-Inspection Inb. Del.* button.
 - h) Choose *Create* .
 - i) Select the new line and choose *Switch to Form View*.
 - j) Enter the details for the quality inspection rule as in the table.
 - k) *Save*  your new inspection rule.
 - l) Choose *Exit*  to leave the transaction.
4. Create a new process-oriented storage process **10QM** for the counting process and a new process **11QM** for the quality inspection process. You will have the following steps.

For the counting process

Sequence Number	Step
1	IB01
2	CNT
3	IB03

For the quality inspection process:

Sequence Number	Step
1	IB01
2	QIS
3	IB03

Continued on next page

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Process-Oriented Storage Control*.
- b) In the dialog structure, choose the entry *Storage Process - Definition*.
- c) Choose the *New Entries* button.
- d) Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>Storage Process</i>	10QM
<i>Description</i>	Counting
<i>Direction</i>	Putaway

- e) Select your new entry and in the dialog structure, choose the entry *Assign Storage Process Step*
- f) Choose the *New Entries* button.
- g) Create the following new entries:

<i>Sequence Number</i>	<i>Step</i>	<i>Auto WT</i>	<i>Prod/HU WT</i>
1	IB01	x	
2	CNT	x	
3	IB03		x

- h) Save  your new storage process.
- i) In the dialog structure, select the entry *Storage Process - Definition*.
- j) Choose the *New Entries* button.
- k) Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>Storage Process</i>	11QM
<i>Description</i>	Quality Inspection
<i>Direction</i>	Putaway

- l) Select your new entry and in the dialog structure, choose the entry *Assign Storage Process Step*.
- m) Choose the *New Entries* button.

Continued on next page

- n) Create the following new entries:

Sequence Number	Step	Auto WT	Prod/HU WT
1	IB01	x	x
2	QIS	x	
3	IB03		

- o) Save your new storage process.
- p) Choose *Exit* to leave the transaction.
5. Create two new **warehouse process types**. Use the process type **1011** as template for the new process types **10QM - Putaway with QIE Counting** and **11QM - Putaway with QIE Inspection**. Change the *Storage Process* in the new process types to **10QM** and **11QM**, respectively.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Warehouse Process Type*.
 - Position...* on the *Warehouse No.* **E1##** and the *Whse Proc. Type* **1011**.
 - Select the line and choose *Copy as...* .
 - Enter the following details:

<i>Whse Proc. Type</i>	10QM
<i>Description</i>	Putaway with QIE Counting
<i>Storage Process</i>	10QM

- Save your new warehouse process type.
- Position...* on the *Warehouse No.* **E1##** and the *Whse Proc. Type* **1011**.
- Select the line and choose *Copy as...* .
- Enter the following details:

<i>Whse Proc. Type</i>	11QM
<i>Description</i>	Putaway with QIE Inspection

Continued on next page

<i>Storage Process</i>	11QM
------------------------	-------------

- i) Save your new warehouse process type.
- j) Choose *Exit* to leave the transaction.
6. Define the new *control indicators* **90** and **91**.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Control Indicators for Determining Warehouse Process Types*.
 - Choose the *New Entries* button.
 - Create the following new entries:

<i>Warehouse Number</i>	<i>ProTypeDet</i>	<i>Description</i>
E1##	90	Storage Process with QIE Counting
E1##	91	Storage Process with QIE Inspection

- d) Save your new control indicators.
- e) Choose *Exit* to leave the transaction.
7. Set up the determination of the new warehouse process types. Both shall be found for the *Document type* **INB** and with the respective *Control indicator*.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Determine Warehouse Process Type*.
 - Choose the *New Entries* button.
 - Create the following new entries:

<i>Warehouse No.</i>	<i>Doc. Type</i>	<i>ProTypeDet</i>	<i>WhsePrcTpe</i>
E1##	INB	90	10QM
E1##	INB	91	11QM

- d) Save your entries.
- e) Choose *Exit* to leave the transaction.

Continued on next page

8. Set up the determination of the *Storage Type Search Sequence*. As we do not require a special search sequence for the new warehouse process types, just a create a general entry for your *Warehouse Number E1##*.
- In the IMG of your EWM system, choose *Extended Warehouse Management → Goods Receipt Process → Work Center → Define Work Center*. Create the following new entry.
 - Choose the *New Entries* button.
 - Create the following new entries:

<i>WhN</i>	E130
<i>Srch Seq.</i>	PUTW

- Save*  your entry.
- Choose *Exit*  to leave the transaction.

Continued on next page

9. Create **warehouse products** for T-EW90-## and T-EW91-##. Assign the *Proc. Type Det. Ind.* **90** to T-EW90-## and **91** to T-EW91-##.

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Product* → *Maintain Warehouse Product*.
- b) Enter the following.

<i>Product Number</i>	T-EW90-##
<i>Warehouse No.</i>	E1##
<i>Party Entitled to Dispose</i>	SPCW

- c) Choose *Create* .
- d) Select the *Whse Data* tab. Enter the *Proc. Type Det. Ind.* **90**.
- e) *Save*  your new warehouse product.
- f) Choose *Exit*  to return to the entry screen.
- g) Enter the following.

<i>Product Number</i>	T-EW91-##
<i>Warehouse No.</i>	E1##
<i>Party Entitled to Dispose</i>	SPCW

- h) Choose *Create* .
- i) Select the *Whse Data* tab. Enter the *Proc. Type Det. Ind.* **91**.
- j) *Save*  your new warehouse product.
- k) Choose *Exit*  twice to leave the transaction.

Continued on next page

10. Create two new **work centers** for counting and quality inspection. Use the existing work centers **CNT** and **QINS** in *Warehouse Number E100* as template. Remove the entries for the *Inbound Section* and the *Outbound Section*; no other changes are necessary.
- In the IMG of your EWM system, choose *Extended Warehouse Management → Master Data → Work Center → Define Work Center*.
 - Select the *Work Cntr: CNT* in the *Warehouse No. E100* and choose *Copy as...* .
 - Enter your *Warehouse No. E1##*. Remove the entries for the *Inbound Section* and the *Outbound Section* and press **Enter**.
 - Select the *Work Cntr: QINS* in the *Warehouse No. E100* and choose *Copy as...* .
 - Enter your *Warehouse No. E1##*. Remove the entries for the *Inbound Section* and the *Outbound Section* and press **Enter**.
 - Save*  your new work centers.
 - Choose *Exit*  to leave the transaction.
11. Create two new storage bins with the following details:

Warehouse No.	Storage Bin	Storage Type
E1##	CNT	8020
E1##	QINS	8020

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Storage Bin → Create Storage Bin*.
- Enter the *Warehouse No. E1##* and the *Storage Bin CNT*. Press **Enter**.
- Enter the *Storage Type*.
- Save*  your new storage bin.
- Repeat the process for the second bin.
- Choose *Exit*  to leave the transaction.

Continued on next page

12. Connect the **work centers** to the bins.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Work Center* → *Define Master Data Attributes*.
 - b) Enter the *Storage Bin QINS* to the *Work Cntr. QINS* and the *Storage Bin CNT* to the *Work Cntr. CNT*.
 - c) Save  your assignments.
 - d) Choose *Exit*  to leave the transaction.
13. Enter the storage bin **QINS** as *Destination storage bin* for the *External Step QIS* and the storage bin **CNT** as *Destination storage bin* for the *External Step CNT* in the process-oriented storage control. For the quality inspection step you also need the flag for *rule-based*; for the counting step you must **not** set this flag.



Hint: The entries exist already; you just need to update them.

- a) In the EWM IMG, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Process-Oriented Storage Control*.
- b) In the dialog structure, select the entry *Process-Oriented Storage Control*.
- c) *Position...* on the entry *Warehouse No. E1##* and *External Step QIS*.
- d) Enter the *Dest. Storage Type 8020* and the *Dest. Stor. Bin QINS*. Make sure that the flag for *Rules-Based* is set.
- e) *Position...* on the entry *Warehouse No. E1##* and *External Step CNT*.
- f) Enter the *Dest. Storage Type 8020* and the *Dest. Stor. Bin CNT*, and remove the flag for *Rules-Based*.
- g) Save  your settings.
- h) Choose *Exit*  to leave the transaction.

Task 2:

Test the QM process.

1. Create a purchase order as per the table below.

Continued on next page

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW90-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC
Item 2	
<i>Material</i>	T-EW91-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

-
- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) *Save*  your purchase order. Note down the purchase order number.
 - d) Choose *Exit*  to end the transaction.
2. Create an inbound delivery. Pack in that inbound delivery each product **separately** onto a *PKE-090*.

Continued on next page

Inbound delivery (ERP):

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Choose *Pack* .
 - d) Enter the *Packaging Materials*: **PKE-090** and press **Enter**.
 - e) Select the newly created *Handling Unit*, select *Material T-EW90-##*, and choose *Pack* .
 - f) Enter again the *Packaging Materials*: **PKE-090** and press **Enter**.
 - g) Select the newly created *Handling Unit*, select the *Material T-EW91-##*, and choose *Pack* .
 - h) *Save*  your inbound delivery. Note down the inbound delivery number.
 - i) Choose *Exit*  to end the transaction.
3. Confirm that the inspection documents for your inbound delivery have been created. Create the warehouse tasks.

Inbound delivery (EWM):

Inspection document for counting:

Continued on next page

Inspection document for quality inspection:

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
- b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search*  . Note down the number of the inbound delivery.
- c) Select the first item and, on the *Item* tab, choose the dropdown icon *Display Additional Data*  . Select the entry *Display Count*. Note down the document number
- d) Choose *Exit*  .
- e) Select the second material and, on the *Item* tab, choose the dropdown icon *Display Additional Data*  . Select the entry *Display Quality Inspection*. Note down the document number.
- f) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
- g) Select the *Handling Units* tab.
- h) *Select all*  and choose *Create + Save*  .
The system should inform you that **3 warehouse tasks were created**.
- i) Choose *Exit*  twice to leave the transaction.

Continued on next page

4. Confirm first the warehouse tasks for the material to be counted with the warehouse management monitor.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*
 - b) In the warehouse management monitor, choose *Inbound* → *Documents* → *Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose *Warehouse Task*.
 - c) Look for the active warehouse task with the **Process 10QM** and the **Step IB01**. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr.*.
 - d) A new warehouse task is created with the **Step CNT**. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr.*.



Hint: You should use a new session for the next step and not exit the warehouse management monitor.

5. Confirm the counting of the product on the work center **CNT**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Quality Inspection and Count*
 - b) Enter the *Work Center CNT* and choose *Execute*
 - c) Select the item in your handling unit.
 - d) In the lower-right section of the screen, select the *Count* tab.
 - e) Confirm the full quantity by choosing *Decide w/o Difference*.
 - f) *Save* your decision.
 - g) Select the HU and choose *Complete Process Step for HU* .
 - h) Choose *Exit* to leave the transaction.
6. Return to the warehouse management monitor and confirm the last process step for this product.
 - a) Use the *Refresh* icon to see if a new warehouse task has been created.
 - b) Look for the active warehouse task with the **Process 10QM** and the **Step IB03**. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr.*.

Continued on next page

7. Now confirm the warehouse tasks for the material to be inspected with the warehouse management monitor.
 - a) Look for the active warehouse task with the *Process 11QM* and the *Step IB01*. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr..*
 - b) A new warehouse task is created with the *Step QIS*. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr..*
-  **Hint:** You should use a new session for the next step and not exit the warehouse management monitor.
8. Confirm the quality inspection of the product on the work center **QINS**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Quality Inspection and Count*
 - b) Enter the *Work Center QINS* and choose *Execute* 
 - c) Select the item in your handling unit.
 - d) In the lower right section of the screen, select the *Qual. Insp* tab.
 - e) Enter the *Decision SA*.
 - f) *Save*  your decision.
 - g) Select the HU and choose *Complete Process Step for HU* .
 - h) Choose *Exit*  to leave the transaction.
9. Return to the warehouse management monitor and confirm the last process step for this product.
 - a) Use the *Refresh*  icon to see if the last warehouse task has been activated.
 - b) Look for the active warehouse task with the *Process 11QM* and the *Step IB03*. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr..*

Exercise 26: Quality Management: Counting with Difference

Exercise Objectives

After completing this exercise, you will be able to:

- See the effects of counting with difference

Business Example

You count materials after receipt to ensure the complete ordered quantity has been delivered. But there might be differences to the announced quantity found.

Task 1:

Set up the required exception code.

1. For entering differences in counting you also need to enter an **exception code**. This exception code has to be assigned to the correct **business context** and needs a **process code** and an assigned **delivery adjustment** setting.

The exception code we want to use is **DIFD**. The business context **QI1** uses step **16** in the desktop transaction. For all item types, the process code **1001** shall be used and the warehouse request shall be adjusted **with Difference Quantity**.

Task 2:

Test the process for counting. This time you find a difference in the delivery quantity.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
Item 1	
<i>Material</i>	T-EW90-##
<i>PO Quantity</i>	100

Continued on next page

<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

2. Create an inbound delivery. Pack in that inbound delivery the product onto a *PKE-090*.

Inbound delivery (ERP):

3. Confirm that the inspection document for your inbound delivery has been created. Create the warehouse tasks.

Inbound delivery (EWM):

Inspection document for counting:

4. Confirm the warehouse tasks for the material with the warehouse management monitor.
5. Confirm the counting of the product on the work center **CNT**. This time only 90 pieces have arrived!
6. Return to the warehouse management monitor and confirm the last process step for this product.
7. Confirm that the quantity of the inbound delivery in EWM and ERP has been corrected. Open the details for the inbound delivery in EWM from the warehouse management monitor.

Solution 26: Quality Management: Counting with Difference

Task 1:

Set up the required exception code.

1. For entering differences in counting you also need to enter an **exception code**. This exception code has to be assigned to the correct **business context** and needs a **process code** and an assigned **delivery adjustment** setting.

Continued on next page

The exception code we want to use is **DIFD**. The business context **QI1** uses step **16** in the desktop transaction. For all item types, the process code **I001** shall be used and the warehouse request shall be adjusted **with Difference Quantity**.

- a) In the IMG of your EWM system, choose *Extended Warehouse Management → Cross-Process Settings → Exception Handling → Define Exception Codes*.
- b) *Position...* on *Warehouse No. E1##* and *Exception Code DIFD*.
- c) Select the line with the exception code and in the dialog structure, select the entry *Define Exception Code*.
- d) Choose the *New Entries* button.
- e) Create the new entry:

<i>Business Contxt</i>	QI1 Quality Inspection / Counting
<i>Exec. Step</i>	16

- f) In the dialog structure, select the entry *Maintain Process Parameters*.
- g) Choose the *New Entries* button.
- h) Enter the *Int. Proc. Code DIFF* and the *Diff. Cat. 3 Difference As Charges for Inbound Delivery*.
- i) In the dialog structure, select the entry *Delivery Adjustment in Case of Differences*.
- j) Choose the *New Entries* button.
- k) Create a new entry:

<i>Item Type</i>	****
<i>Process Code</i>	I001
<i>Adjust WR</i>	1 Adjust with Difference Quantity

- l) *Save*  your entries.
- m) Choose *Exit*  to leave the transaction.

Continued on next page

Task 2:

Test the process for counting. This time you find a difference in the delivery quantity.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW90-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
 - b) Enter the details as described in the table.
 - c) Save your purchase order. Note down the purchase order number.
 - d) Choose *Exit* to end the transaction.
2. Create an inbound delivery. Pack in that inbound delivery the product onto a *PKE-090*.

Continued on next page

Inbound delivery (ERP):

-
- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Choose *Pack* .
 - d) Enter the *Packaging Materials*: **PKE-090** and press **Enter**.
 - e) Select the new created *Handling Unit*, select the *Material T-EW90-##*, and choose *Pack* .
 - f) *Save*  your inbound delivery. Note down the inbound delivery number.
 - g) Choose *Exit* .
3. Confirm that the inspection document for your inbound delivery has been created. Create the warehouse tasks.

Inbound delivery (EWM):

Inspection document for counting:

-
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - b) In the *Search criteria* dropdown, select the entry *ERP Document*. Enter your delivery number and choose *Perform Search* . Note down the number of the inbound delivery.
 - c) Select the item and on the *Item* tab, choose the drop-down icon *Display Additional Data* . Select the entry *Display Count*. Note down the document number.
 - d) Choose *Exit* .
 - e) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
 - f) Select the *Handling Units* tab.
 - g) Choose  *Create + Save*.
 - h) Choose *Exit*  twice to leave the transaction.

Continued on next page

4. Confirm the warehouse tasks for the material with the warehouse management monitor.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) In the warehouse management monitor, choose *Inbound* → *Documents* → *Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose *Warehouse Task*.
 - c) Look for the active warehouse task with the **Process 10QM** and the **Step IB01**. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr.*.
 - d) A new warehouse task is created with the **Step CNT**. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr.*.



Hint: You should use a new session for the next step and not exit the warehouse management monitor.

5. Confirm the counting of the product on the work center **CNT**. This time only 90 pieces have arrived!
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Quality Inspection and Count*.
 - b) Enter the *Work Center CNT* and choose *Execute*
 - c) Select the item in your handling unit.
 - d) In the lower right section of the screen, select the *Count* tab.
 - e) Enter the *Quantity 90* and press **Enter**.
 - f) Enter the *Exception Code D1FD*.
 - g) Save your decision.
 - h) Select the HU and choose *Complete Process Step for HU* .
 - i) Choose *Exit* to leave the transaction.

Continued on next page

6. Return to the warehouse management monitor and confirm the last process step for this product.
 - a) Use the *Refresh*  icon to see if a new warehouse task has been created.
 - b) Look for the active warehouse task with the *Process 10QM* and the *Step IB03*. Scroll to the right and confirm that this warehouse task is for the reduced quantity. Then confirm the warehouse task by choosing *Other Methods → Confirm. Backgr.*.
7. Confirm that the quantity of the inbound delivery in EWM and ERP has been corrected. Open the details for the inbound delivery in EWM from the warehouse management monitor.
 - a) Click one time on the *Document Number* of the inbound delivery in the warehouse management monitor.
 - b) Select the *Switch to Form View* icon on the *Items* tab. Confirm that the quantity has been reduced.
 - c) In the *Easy Access* menu of your ERP system, choose *Logistics → Logistics Execution → Inbound Process → Goods Receipt for Inbound Delivery → Inbound Delivery → Display → Single Document*.
 - d) Enter your *Inbound Delivery* and press **Enter**. Confirm that the number has been reduced.
 - e) Choose *Exit* .

Exercise 27: Quality Inspection Using a Sample

Exercise Objectives

After completing this exercise, you will be able to:

- Maintain a sample-drawing procedure
- Process the quality inspection with a sample

Business Example

For quality inspections you do not usually require all materials to be inspected; you only take a certain part of the complete quantity. This part is called a “sample.” You have to set up in the system what quantity is taken for the sample.

Task 1:

Create a sampling drawing procedure. Assign the sample drawing procedure to the inspection rule and modify your process-oriented storage control.

1. Create a new sample drawing procedure:

<i>Sampl-Draw.Proc.</i>	E1##Sample
<i>Samp.Draw.Type</i>	2 Quantity
<i>Automa. Release</i>	x
<i>Sample Drawing Unit</i>	
<i>Interval</i>	1
<i>Unit</i>	ea
<i>Sample Drawing Instruction</i>	
<i>ElmtSubcategory</i>	1
<i>Instruction Type</i>	1
<i>Factor</i>	1
<i>Fixed Number</i>	1

2. Change the existing inspection rule. You have to change the *Inspection Procedure* to **S - Sampling Instruction** and enter the details for the *Inspection Sample*:

Continued on next page

<i>Sampling Type</i>	2
<i>Sample Size (%)</i>	20
<i>Quality Ctrl. Relev.</i>	2
<i>Movement Relevance</i>	2
<i>Sample Type</i>	SSMP4
<i>Sample-Drawing Proc.</i>	E1##Sample
<i>Interval</i>	1
<i>Unit</i>	EA
<i>CodeGrp Phys-Samp. Dr</i>	SPI

3. For the sample we need to deconsolidate the pallet. Add the step **IB02** as second step in the process-oriented storage control **11QM**. You also have to enter the *Destination Storage Type* **8010** and the *Destination Storage Bin* **DEKO** for the step **IB02** when the *Source Storage Type* is **9010** and the *HU Type Group* is **0001**.

Task 2:

Test the process for quality inspection with a sample.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW91-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

-
2. Create an inbound delivery. Pack in that inbound delivery the product onto a *PKE-090*.

Continued on next page

Inbound delivery (ERP):

-
3. Confirm that the inspection document for your inbound delivery has been created. Create the warehouse tasks.

Inbound delivery (EWM):

Inspection document for counting:

4. Confirm the warehouse tasks for the material with the warehouse management monitor.
5. Process the deconsolidation of the pallet. Create a new HU with packaging material **PKE-090** and pack one part of the product into this pallet. Confirm the process steps for the pallets.



Hint: You have to actually move the *Warehouse Task* to pack the material associated with it into the new pallet.

6. Return to the warehouse management monitor and confirm the movement of the sample to the quality inspection bin and of the rest to the final bin.
7. Confirm the quality inspection of the product on the work center **QINS**.
8. Return to the warehouse management monitor and confirm the last process step for this product.
9. Confirm that the non-sample has been posted from *Stock Type Q4* to *Stock Type F2*. Use the warehouse management monitor to display the bin and look for the stock in the bin.

Solution 27: Quality Inspection Using a Sample

Task 1:

Create a sampling drawing procedure. Assign the sample drawing procedure to the inspection rule and modify your process-oriented storage control.

1. Create a new sample drawing procedure:

<i>Sampl-Draw.Proc.</i>	E1##Sample
<i>Samp.Draw.Type</i>	2 Quantity
<i>Automa. Release</i>	x
Sample Drawing Unit	
<i>Interval</i>	1
<i>Unit</i>	ea
Sample Drawing Instruction	
<i>ElmtSubcategory</i>	1

Continued on next page

<i>Instruction Type</i>	1
<i>Factor</i>	1
<i>Fixed Number</i>	1

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Quality Management* → *Maintain Sample-Drawing Procedure*.



Hint: This screen consists of three parts. If you see just two sections, choose the *Expand, enlarge* icon on the left side.

- b) In the uppermost part of the screen, choose *Create*
- c) In the popup, enter the *Samp-Draw.Proc. E1##Sample* and the *Samp.Draw. Type 2 Quantity* and choose *Continue*
- d) In the new procedure, set the *Auto. Rel.* flag.
- e) In the middle part of the screen, choose *Create*
- f) In the popup, enter the *Interval 1* and the *Unit EA* and choose *Continue*
- g) In the lower part of the screen, choose *Create*
- h) Choose the *Switch to Form View* icon and enter the following details:

<i>ElmtSubcategory</i>	1
<i>Instruction Type</i>	1
<i>Factor</i>	1
<i>Fixed Number</i>	1

- i) *Save*
- j) Choose *Exit*
2. Change the existing inspection rule. You have to change the *Inspection Procedure* to **S - Sampling Instruction** and enter the details for the *Inspection Sample*:

<i>Sampling Type</i>	2
<i>Sample Size (%)</i>	20
<i>Quality Ctrl. Relev.</i>	2

Continued on next page

<i>Movement Relevance</i>	2
<i>Sample Type</i>	SSMP4
<i>Sample-Drawing Proc.</i>	E1##Sample
<i>Interval</i>	1
<i>Unit</i>	EA
<i>CodeGrp Phys-Samp. Dr</i>	SPI

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Quality Management* → *Maintain Inspection Rule*.
- Confirm that the title bar says: “Inspection Rule - Warehouse Number E1## - Q-Inspection Inb. Del.”. If not, choose the *Q-Inspection Inb. Del.* button.
- b) Choose *Perform Search* and confirm the popup with *Yes*.
- c) Select the lowest line of the found inspection rules. *Switch to Form View* and choose *Change* .
- d) Change the *Inspection Procedure* to **S - Sampling Instruction** and enter the *Inspection Sample* details as in the table.
- e) *Save* your changed inspection rule.
- f) Choose *Exit* to leave the transaction.
3. For the sample we need to deconsolidate the pallet. Add the step **IB02** as second step in the process-oriented storage control **11QM**. You also have to enter the *Destination Storage Type* **8010** and the *Destination Storage Bin* **DEKO** for the step **IB02** when the *Source Storage Type* is **9010** and the *HU Type Group* is **0001**.
- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Process-Oriented Storage Control*.
- b) In the dialog structure, select the entry *Storage Process - Definition*.
- c) *Position...* on the *Warehouse No.* **E1##** and the *Storage Process* **11QM**. Select the entry and in the dialog structure, choose the entry *Assign Storage Process Step*.
- d) Choose the *New Entries* button.
- e) Create a new entry for the *Step IB02* and set the *Auto. WT* flag.
- f) Choose *Back* once to see the complete list of steps.

Continued on next page

- g) Select the step **IB02** and use the *Next value; previous entry*  button to move it up to the second position.

The final picture should look like this:

<i>Sequence Number</i>	<i>Step</i>	<i>Auto WT</i>	<i>Prod/HU WT</i>
1	IB01	x	x
2	IB02	x	
3	QIS	x	
4	IB03		

- h) In the dialog structure, select the entry *Process-Oriented Storage Control*.
 i) *Position...* on the following entry:

<i>Warehouse No.</i>	E130
<i>External Step</i>	IB02
<i>Source Stro. Ty.</i>	9010
<i>HU Type Group</i>	0001

- j) **Add** the following details:

<i>Dest. Storage Type</i>	8010
<i>Dest. Storage Section</i>	INBD
<i>Dest. Stor. Bin</i>	DEKO



Caution: There is already an entry for the *Whse.Proc. Type*: **3060**. Do not change this entry!

Remove the *Rule-Based* flag.



Hint: Rule-based does not work here! Rule-based is triggered through having different deconsolidation groups assigned to the final warehouse tasks. The bin QINS is not assigned to any activity area, so it also has no deconsolidation group. The system will react with an error and NOT create the warehouse task if you try this.

Continued on next page

- k) Save  your changes.
- l) Choose *Exit*  to leave the transaction.

Task 2:

Test the process for quality inspection with a sample.

1. Create a purchase order as per the table below.

<i>Vendor</i>	EWM-VEND
<i>Purch. Org.</i>	1000
<i>Purch. Group</i>	000
<i>Company Code</i>	1000
<i>Item 1</i>	
<i>Material</i>	T-EW91-##
<i>PO Quantity</i>	100
<i>Plnt</i>	SPCW
<i>Stor. Location</i>	RD##
<i>Conf. Control</i>	ANLI Inbound Delivery ECC

Purchase order:

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Materials Management* → *Purchasing* → *Purchase Order* → *Create* → *Vendor/Supplying Plant Known*.
- b) Enter the details as described in the table.
- c) Save  your purchase order. Note down the purchase order number.
- d) Choose *Exit*  to end the transaction.
2. Create an inbound delivery. Pack in that inbound delivery the product onto a *PKE-090*.

Continued on next page

Inbound delivery (ERP):

- a) In the *Easy Access* menu of your ERP system, choose *Logistics* → *Logistics Execution* → *Inbound Process* → *Goods Receipt for Inbound Delivery* → *Inbound Delivery* → *Create* → *Single Documents*.
 - b) The *Vendor* and the *Purchase Order* should default. Enter the purchase order number as *External ID* and press **Enter**.
 - c) Choose *Pack* .
 - d) Enter the *Packaging Materials*: **PKE-090** and press **Enter**.
 - e) Select the newly created *Handling Unit*, select the *Material T-EW91-##*, and choose *Pack* .
 - f) Save  your inbound delivery. Note down the inbound delivery number.
 - g) Choose *Exit*  to end the transaction.
3. Confirm that the inspection document for your inbound delivery has been created. Create the warehouse tasks.

Inbound delivery (EWM):

Continued on next page

Inspection document for counting:

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Inbound Delivery* → *Maintain Inbound Delivery*.
 - b) Select in the *Search criteria* drop-down the entry *ERP Document*. Enter your delivery number and choose *Perform Search on* . Note down the number of the inbound delivery.
 - c) Select the item and on the *Item* tab, choose the *Display Additional Data* drop-down icon . Select the entry *Display Quality Inspection*. Note down the document number
 - d) Choose *Exit* .
 - e) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
 - f) Select the *Handling Units* tab.
 - g) Choose *Create + Save* .
The system should inform you that **3 warehouse tasks were created.**
 - h) Choose *Exit* twice to leave the transaction.
4. Confirm the warehouse tasks for the material with the warehouse management monitor.
- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*
 - b) In the warehouse management monitor, choose *Inbound* → *Documents* → *Inbound Delivery*. You can enter your *Inbound Delivery* or just use the list of all your documents. Select your inbound delivery and choose *Warehouse Task*.
 - c) Look for the active warehouse task with the *Process 11QM* and the *Step IB01*. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr.*.
 - d) A new warehouse task is created with the *Step IB02* to move the pallet to the deconsolidation station. Select this warehouse task and confirm it by choosing *Other Methods* → *Confirm. Backgr.*.



Hint: You should use a new session for the next step and not exit the warehouse management monitor.

Continued on next page

5. Process the deconsolidation of the pallet. Create a new HU with packaging material **PKE-090** and pack one part of the product into this pallet. Confirm the process steps for the pallets.



Hint: You have to actually move the *Warehouse Task* to pack the material associated with it into the new pallet.

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Execution → Deconsolidation in Goods Receipt*.
 - b) Enter the *Work Center DEKO* and choose *Execute*
 - c) On the *Create HU* tab, enter the *Pack. Material PKE-090* and choose the *Execute* button. A new HU will be created.
 - d) Listed below the existing pallet coming from your inbound delivery you should have two lines for the same product, both with a little ► icon in front of it. Click on this icon to see the details for the product. The details actually are the existing, but inactive warehouse tasks.
 - e) Drag and drop one of the warehouse tasks into the new HU.
 - f) Select the HUs one by one and choose *Complete Process Step for HU*
 - g) Choose *Exit* to leave the transaction.
6. Return to the warehouse management monitor and confirm the movement of the sample to the quality inspection bin and of the rest to the final bin.
- a) Use the *Refresh* icon to see if a new warehouse task has been created.
 - b) Look for the **active** warehouse task with the *Step IB03*. This is the warehouse task for the non-sample part. Confirm the warehouse task with *Other Methods → Confirm. Backgr.*.
 - c) Look for the **active** warehouse task with the *Step QIS*. This is the warehouse task for the non-sample part. Confirm the warehouse task with *Other Methods → Confirm. Backgr.*.

Continued on next page

7. Confirm the quality inspection of the product on the work center **QINS**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Quality Inspection and Count*
 - b) Enter the *Work Center QINS* and choose *Execute* 
 - c) Select the item in your handling unit.
 - d) In the lower right section of the screen, select the *Qual. Insp* tab.
 - e) Enter the *Decision SA*.
 - f) *Save*  your decision.
 - g) Select the HU and choose *Complete Process Step for HU* .
 - h) Choose *Exit*  to leave the transaction.
8. Return to the warehouse management monitor and confirm the last process step for this product.
 - a) Use the *Refresh*  icon to see if a new warehouse task has been created. You should notice that one of the warehouse tasks is cancelled (*Status* is **A**). Scroll to the right and confirm the difference to the new, active warehouse task.
 - b) Select the active warehouse task and confirm the warehouse task with *Other Methods* → *Confirm. Backgr.*.
9. Confirm that the non-sample has been posted from *Stock Type Q4* to *Stock Type F2*. Use the warehouse management monitor to display the bin and look for the stock in the bin.
 - a) Select the warehouse task for the putaway of the non-sample part for the final putaway. Scroll to the right to see the *Destination Storage Bin*.
 - b) Click once on the number of the bin; after a moment a new session, *Display Storage Bin*, opens.
 - c) Select the *Stock* tab and look for the *Stock Type*.
 - d) Choose *Back* .



Lesson Summary

You should now be able to:

- Create the settings for the Quality Inspection Engine
- Set up inspection rules
- Process the quality inspection

Lesson: Kitting

Lesson Overview

In this lesson you will learn about the possibilities to transfer simple production processes into your warehouse, which might help you to react faster on short-term demand or to use the workforce in the warehouse during quiet periods.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the different kitting scenarios
- Set up a kit-to-order process

Business Example

You might sell products that actually consists of a set of products that can be combined flexibly and in changing configurations. If you do not require special tools or machinery for these sets, you can use the **kitting** process in EWM to build these sets.

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, a display or assortment of products to sell in a retail store, or an assortment of tools used for a particular repair or assembly task.

Extended Warehouse Management 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.

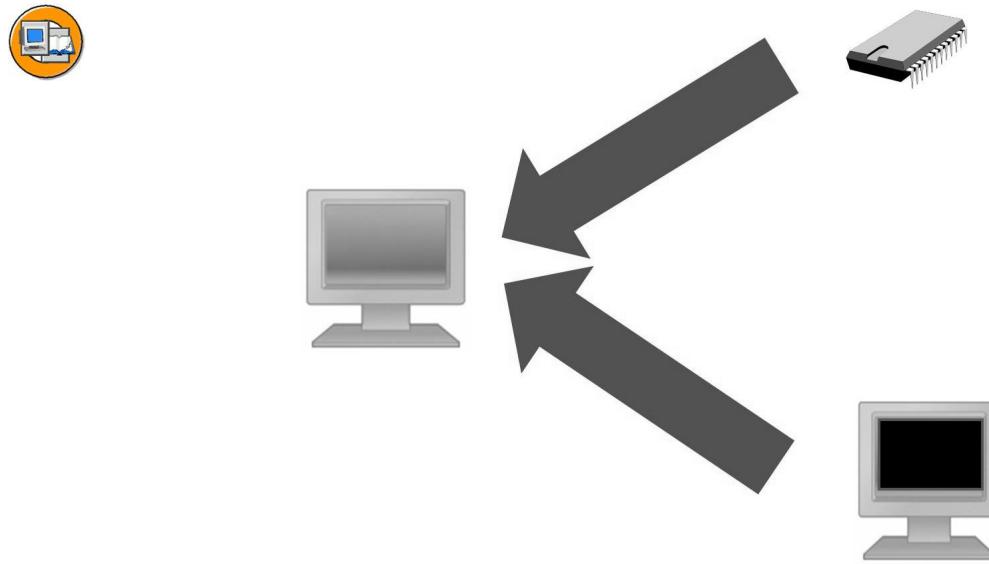


Figure 85: Kitting – Kit Header and Kit Components

A kit can consist of the following levels:

- A kit header represents the finished kit.
- A kit component is a product in the kit.

EWM does not support nested kits, that is, kits in 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.

Kit to Order

With **kit to order**, you can have the system automatically assemble kits if there is no kit in stock.

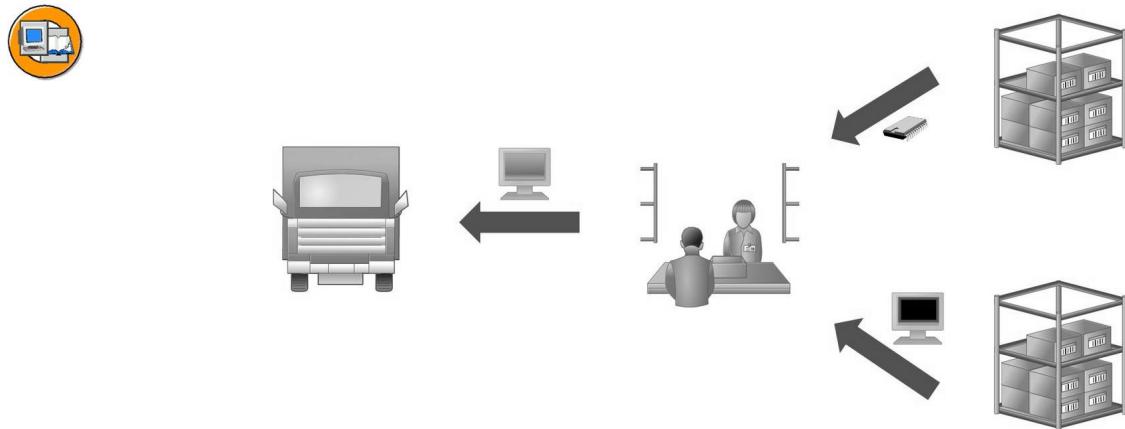


Figure 86: Kit to Order

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 (this can be achieved by means of internal transfer between warehouses).
- 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. This quantity ratio is recalculated as soon as there are changes at kit header level or at kit component level.

Kitting at a Work Center with a VAS Order

You can use this process to create a kit with a value-added service order (VAS order). This provides you with the following VAS order options:

- Working with a special kitting work center
- Automatic determination of the kitting work center
- Integrating VAS processing into the delivery

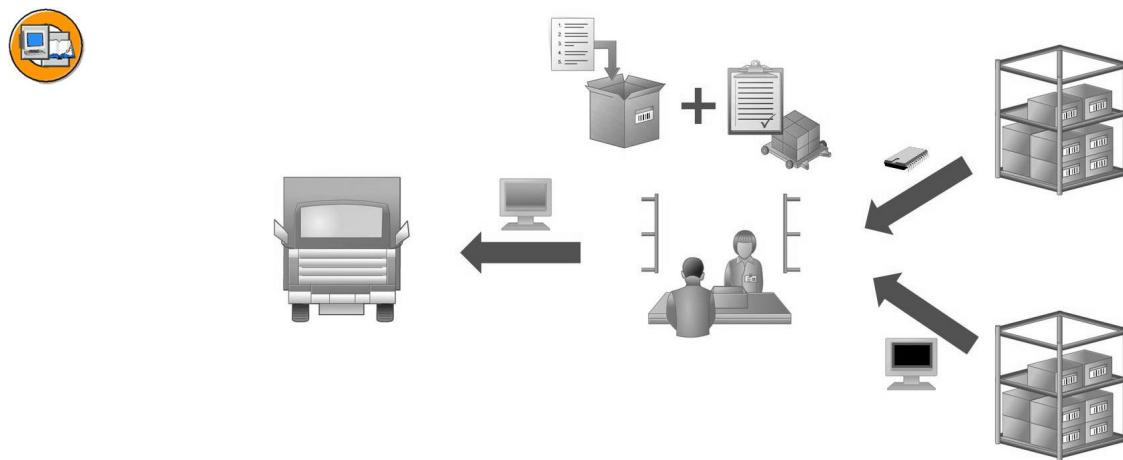


Figure 87: Kitting at a Work Center with a VAS oOrder

This process requires a packaging specification for the product of the kit header item as master data, so that you can create a VAS order. This packaging specification must have a level of the level type *Kitting*. If you are using process-oriented storage control, you must assign the corresponding warehouse process step (such as KIT) of the warehouse process used to the kitting level.

Kitting at a Work Center Without a VAS Order

You can also create a kit without a VAS order at a work center. You can configure a work center where you also pack in such a way that you can confirm generated kits there. This process is suitable for the following cases:

- You do not require detailed documentation of the kitting procedure in EWM.
- You are not performing kitting in one special kitting work center, but at a work center where you are also packing.

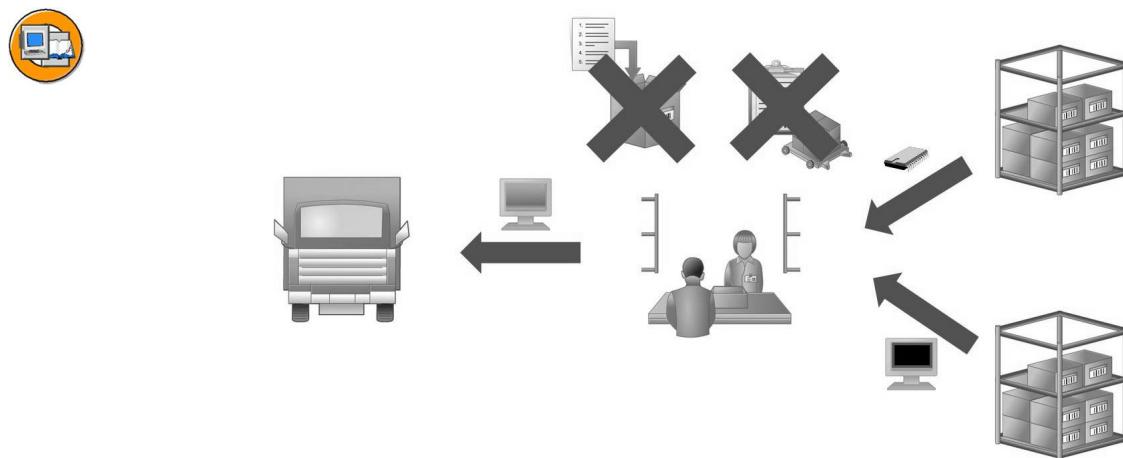


Figure 88: Kitting at a Work Center

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.

Kitting During Picking without a VAS Order

You can use this process in 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.

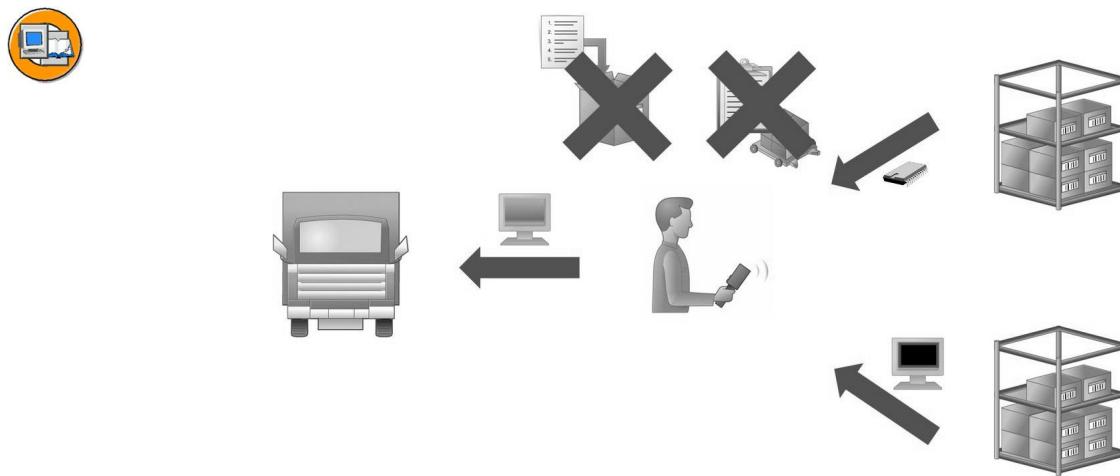


Figure 89: Kitting During Picking

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 HUs that represent the kits.

Settings for Kit to Order

The BC Sets **/SPE/KIT_TO_ORDER** on the ERP side and **/SCWM/DLV_KTO** in EWM contain the important required settings for the kit -to-order process.

Kit to Stock

You can use this process 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).

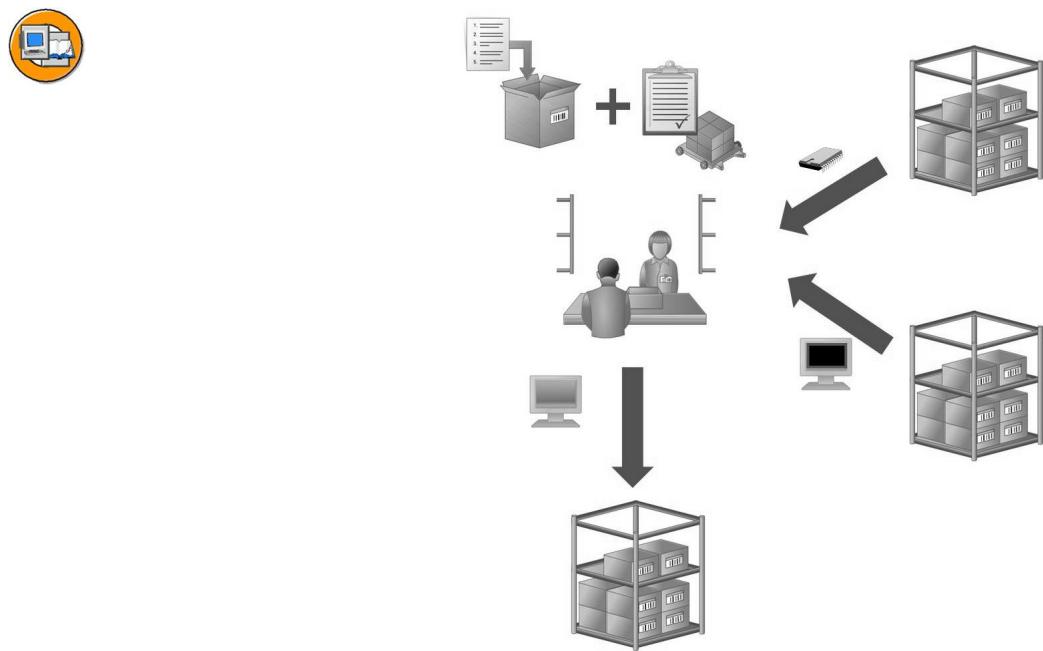


Figure 90: Kit to Stock

You can also perform **reverse kitting**, which you can use to split a kit back into its components.

Exercise 28: Kit to Order

Exercise Objectives

After completing this exercise, you will be able to:

- Set up the process for kit to order
- Maintain the required master data for kitting

Business Example

Some products might not require production resources and tools for assembly. For these products you can use a kit-to-order process, which allows you to assemble the parts combined with the picking process.

Task 1:

Set up the required data and settings for a kit-to-order process.

1. Create a BOM for **sales**. The header material T-EW70-## shall have two components: two pieces of T-EW71-## and one piece of T-EW72-##.
2. Create a **work center layout** for the kit-to-order process. Use the layout **KITO** in *Warehouse No. E100* as a template.
3. Define a **work center** for the kit-to-order process. Use the work center **KITO** in *Warehouse No. E100* as a template.
4. Create a new storage bin with the following details:

<i>Warehouse No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>	<i>Stor. Section</i>
E1##	KITTING	WCKT	0001

5. Connect the new **work center** to the storage bin.
6. Create a new process-oriented storage process **KITO** for the kit-to-order process. You will have the following steps:

<i>Sequence Number</i>	<i>Step</i>
1	OB01
2	VKTO
3	OB03

Also assign the new *Storage Bin KITTING* as *Destination Storage Bin* to the external step **VKTO**.

Continued on next page

7. For the outbound process, you need a **warehouse order creation rule** to determine the process-oriented storage control. Use the warehouse order creation rule **KITO** in *Warehouse No.* **E100** as a template.
8. For the determination of the warehouse order creation rule, use a new **warehouse process type**. Use the warehouse process type **3KTO** in *Warehouse No.* **E100** as a template.
9. Set up the determination of the new warehouse process type. The warehouse process type shall be found for the *Document type* **OUTB** and the *Item Type* **OKC**.
10. Set up the **storage type search** for the new warehouse process type. The *Storage Type Search Sequence* is **PICK** and the *Removal Rule* is **FIFO**
11. Set up the determination of the packaging specification and the VAS relevance for your products. Define the VAS relevance as following:

<i>Warehouse Number</i>	E1##
<i>Doc. Cat.</i>	PDO Outbound Delivery
<i>Doc. Type</i>	OUTB
<i>Item Type</i>	OKM
<i>Pack.Spec.Proc.</i>	OVSO
<i>VAS Order</i>	1 Create When Creating Warehouse Request/Warehouse Req. Item
<i>PS Exist. Check</i>	Do not conduct existence check
<i>Partner Role</i>	VENDOR
<i>Date / Time Type</i>	TDELVERY

12. Create a packaging specification for the kitting. Enter the *product T-EW70-##* as content and enter the *External Step* **VKTO** on the pack level on the *Warehouse* tab. The packaging specification determination shall be done with the product only.

<i>PS Group</i>	KITO
<i>Description</i>	Kit to Order T-EW70-##
<i>Condition record</i>	
<i>CCtC</i>	OVSO
<i>Product</i>	T-EW70-##

Continued on next page

Content / Product	
Product	T-EW70-##
Kit-to-Order	
External Step	VKTO

Task 2:

Test the kit-to-order process.

1. Create a sales order as detailed below.

Order Type	OR
Customer	T-E01A-##
PO Number	##
Req.deliv.date	next day
Item 1	T-EW70-##
Quantity	1

Sales order: _____

2. Create the outbound delivery.

Delivery: _____

3. Confirm the existence of the VAS order for the kitting.

Outbound delivery order: _____

VAS order: _____

4. Confirm the first warehouse order with the warehouse management monitor. Pack both items into one pick HU in the same step with packaging material PKE-090.
5. Confirm the kitting of the product on the work center **KITO**.
6. Return to the warehouse management monitor and confirm the last process step for this product.
7. Post goods issue for the outbound delivery order.

Solution 28: Kit to Order

Task 1:

Set up the required data and settings for a kit-to-order process.

1. Create a BOM for **sales**. The header material T-EW70-## shall have two components: two pieces of T-EW71-## and one piece of T-EW72-##.
 - a) In the *Easy Access* menu of your ERP system, choose *Logistics → Production → Master Data → Bills of Material → Material BOM → CS01 Create*.
 - b) Enter the *Material T-EW70-##, Plant SPCW*, and *BOM Usage 5* (Sales and Distribution). Press **Enter**.
 - c) Enter the *components*: two pieces of T-EW71-30 and one piece of T-EW72-30.
 - d) *Save*  your new BOM.
 - e) Choose *Exit*  to leave the transaction.
2. Create a **work center layout** for the kit-to-order process. Use the layout **KITO** in *Warehouse No. E100* as a template.
 - a) In the *IMG* of your EWM system, choose *Extended Warehouse Management → Master Data → Work Center → Specify Work Center Layout*.
 - b) Select the *Layout KITO* in *Warehouse No. E100*.
 - c) Choose *Copy as...* 
 - d) Enter your *Warehouse Number E1##* and press **Enter**.
 - e) *Save*  your new layout.
 - f) Choose *Exit*  to leave the transaction.

Continued on next page

3. Define a **work center** for the kit-to-order process. Use the work center **KITO** in *Warehouse No.* **E100** as a template.

- In the IMG of your EWM system, choose *Extended Warehouse Management → Master Data → Work Center → Define Work Center*.
- Select the *Work Cntr:* **KITO** in *Warehouse No.* **E100**.
- Choose *Copy as...* .
- Enter your *Warehouse Number* **E1##** and press **Enter**.
- Save*  your new work center.
- Choose *Exit*  to leave the transaction.

4. Create a new storage bin with the following details:

<i>Warehouse No.</i>	<i>Storage Bin</i>	<i>Storage Type</i>	<i>Stor. Section</i>
E1##	KITTING	WCKT	0001

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Storage Bin → Create Storage Bin*.
- Enter the *Warehouse No.* **E1##** and the *Storage Bin* **KITTING**. Press **Enter**.
- Enter the *Storage Type*, and the *Storage Section*.
- Save*  your new storage bin.
- Choose *Exit*  to leave the transaction.

5. Connect the new **work center** to the storage bin.

- In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management → Master Data → Work Center → Define Master Data Attributes*.
- Enter the *Storage Bin* **KITTING** to the *Work Cntr:* **KITO**.
- Save*  your assignment.
- Choose *Exit*  to leave the transaction.

6. Create a new process-oriented storage process **KITO** for the kit-to-order process. You will have the following steps:

Continued on next page

Sequence Number	Step
1	OB01
2	VKTO
3	OB03

Also assign the new *Storage Bin KITTING* as *Destination Storage Bin* to the external step **VKTO**.

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Process-Oriented Storage Control*.
- b) In the dialog structure, select the entry *Storage Process - Definition*.
- c) Choose the *New Entries* button.
- d) Create a new entry with the following details:

<i>Warehouse Number</i>	E1##
<i>Storage Process</i>	KTSO
<i>Description</i>	Kit to Order
<i>Direction</i>	1 Stock Removal

- e) Select your new entry and in the dialog structure, select the entry *Assign Storage Process Step*.
- f) Choose the *New Entries* button.
- g) Create the following new entries:

Sequence Number	Step	Auto WT
1	OB01	Set flag
2	VKTO	Set flag
3	OB03	

- h) Save  your new storage process.
- i) In the dialog structure, select the entry *Process-Oriented Storage Control*.
- j) Choose the *New Entries* button.
- k) Create the following new entry:

Continued on next page

<i>Warehouse No.</i>	E1##
<i>External Step</i>	VKTO
<i>Whse Proc. Type</i>	3070
<i>Dest. Storage Type</i>	WCKT
<i>Dest. Storage Section</i>	0001
<i>Dest. Stor. Bin</i>	KITTING

- l) Save your entry.
- m) Choose *Exit* to leave the transaction.
7. For the outbound process, you need a **warehouse order creation rule** to determine the process-oriented storage control. Use the warehouse order creation rule **KITO** in *Warehouse No. E100* as a template.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Order* → *Define Creation Rules for Warehouse Order*.
 - Select the **WOCR KITO** in *Warehouse No. E100*.
 - Choose *Copy as...* .
 - Enter your *Warehouse Number* **E1##** and press **Enter**.
 - Save your new warehouse order creation rule.
 - Choose *Exit* to leave the transaction.
8. For the determination of the warehouse order creation rule, use a new **warehouse process type**. Use the warehouse process type **3KTO** in *Warehouse No. E100* as a template.
- In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Define Warehouse Process Type*.
 - Select the *Whse Proc. Type* **3KTO** in *Warehouse No. E100*.
 - Choose *Copy as...* .
 - Enter your *Warehouse Number* **E1##** and press **Enter**.
 - Save your new warehouse process type.
 - Choose *Exit* to leave the transaction.

Continued on next page

9. Set up the determination of the new warehouse process type. The warehouse process type shall be found for the *Document type* **OUTB** and the *Item Type* **OKC**.

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Warehouse Task* → *Determine Warehouse Process Type*.
- b) Choose the *New Entries* button.
- c) Create the following new entry:

<i>Warehouse Number</i>	E130
<i>Doc. Type</i>	OUTB
<i>Item Type</i>	OKC
<i>WhsePrcTpe</i>	3KTO

- d) *Save*  your new entry.
- e) Choose *Exit*  to leave the transaction.
10. Set up the **storage type search** for the new warehouse process type. The *Storage Type Search Sequence* is **PICK** and the *Removal Rule* is **FIFO**

 - a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Goods Issue Process* → *Strategies* → *Determine Storage Type Search Sequence for Stock Removal*.
 - b) Choose the *New Entries* button.
 - c) Create the following new entry:

<i>Warehouse No.</i>	E1##
<i>Whse Process Type / Group</i>	3KTO
<i>Storage Type Search Seq.</i>	PICK
<i>RemR</i>	FIFO

11. Set up the determination of the packaging specification and the VAS relevance for your products. Define the VAS relevance as following:

<i>Warehouse Number</i>	E1##
<i>Doc. Cat.</i>	PDO Outbound Delivery
<i>Doc. Type</i>	OUTB
<i>Item Type</i>	OKM

Continued on next page

Pack.Spec.Proc.	OVSO
VAS Order	1 Create When Creating Warehouse Request/Warehouse Req. Item
PS Exist. Check	Do not conduct existence check
Partner Role	VENDOR
Date / Time Type	TDELIVERY

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Cross-Process Settings* → *Value-Added Service* → *Define Relevance for VAS*.
- b) Choose *New Entries* and enter the details as in the table above.
- c) Save  your settings.
- d) Choose *Exit*  to leave the transaction.
12. Create a packaging specification for the kitting. Enter the *product T-EW70-##* as content and enter the *External Step VKTO* on the pack level on the *Warehouse* tab. The packaging specification determination shall be done with the product only.

PS Group	KITO
Description	Kit to Order T-EW70-##
Condition record	
CCtC	OVSO
Product	T-EW70-##
Content / Product	
Product	T-EW70-##
Kit-to-Order	
External Step	VKTO

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Master Data* → *Packaging Specification* → *Maintain Packaging Specification*.
- b) Choose *Add a new line* .
- c) In the *PS Group* field, select **KITO**, then press the **Enter** key.

Continued on next page

- d) Select your packaging specification row, then choose *Change* .
- e) In the *Packaging Specification* area on the right side of the screen, enter the *Description* from the table above.
- f) On the *Determination* tab, enter the *Product* from the table above.
Press **Enter**.
- g) Highlight the *Content* line under the *Packspec./Level/Elements* column.
- h) Choose the *Add Product* line from the *Add Level or Content*  drop-down icon.
- i) Open the *Content* node by selecting .
- j) Click on *Product*.
- k) In the *Content* section on the right side of the screen, enter your product number in the *Product* field.
Press **Enter**.
- l) In the *Packspec./Level/Elements* column, click on the *Kit-to-Order* line.
On the right side of the screen, select the *Warehouse* tab. Enter the *External Step* **VKTO**.
- m) Choose *Activate* . Your packaging specification is saved and is now ready for use.
- n) Choose *Exit*  to leave the transaction.

Task 2:

Test the kit-to-order process.

- Create a sales order as detailed below.

<i>Order Type</i>	OR
<i>Customer</i>	T-E01A-##
<i>PO Number</i>	##
<i>Req.deliv.date</i>	next day
<i>Item 1</i>	T-EW70-##
<i>Quantity</i>	1

Continued on next page

Sales order: _____

- a) In the *Easy Access* menu of your ECC system, choose *Logistics* → *Sales and Distribution* → *Sales* → *Order* → *Create*.
 - b) Enter *Order Type*: **OR** and press **Enter**.
 - c) Enter the details as described in the table.
 - d) *Save*  your sales order. Note down the sales order number.
 - e) Choose *Exit*  to end the transaction.
2. Create the outbound delivery.
- Delivery: _____
- a) In the *Easy Access* menu of your EWM system, choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*
 - b) Enter the *Shipping point* **Z0##**; the *Order* should default. Press **Enter**.
 - c) *Save*  your delivery. Note down the delivery number.
 - d) Choose *Exit*  to return to the *Easy Access* menu.
3. Confirm the existence of the VAS order for the kitting.

Outbound delivery order:

Continued on next page

VAS order: _____

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Delivery Processing* → *Outbound Delivery* → *Maintain Outbound Delivery Order*.
- b) In the *Search criteria*, select drop-down the entry *ERP Document*. Enter your delivery number and choose *Perform Search*  . Note down the number of the outbound delivery order.
- c) On the *Items* tab, select the first item. On the Item tab page, select the drop-down icon *Display Additional Data*  . Select the entry *Display Order for Value-Added Service*. Note down the document number.
- d) Choose *Exit*  .
- e) Select the inbound delivery and choose *Inbound Delivery* → *Follow-on Functions* → *Warehouse Task*.
- f) Select the *Handling Units* tab.
- g) Select all  and choose *Create + Save*  .
- h) Choose *Exit*  twice to leave the transaction.

Continued on next page

4. Confirm the first warehouse order with the warehouse management monitor. Pack both items into one pick HU in the same step with packaging material PKE-090.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
 - b) In the warehouse management monitor, choose *Outbound* → *Documents* → *Outbound Delivery Order*. You can enter your *Outbound Delivery Order* or just use the list of all your documents. Select your outbound delivery order and choose *Warehouse Order*.
 - c) Click **one time** on the number of the *Warehouse Order*.
 - d) Select the *Pick-HU* tab.
 - e) Choose *Create* .
 - f) Enter the *Packaging Material PKE-090* and press **Enter**.
 - g) Choose *Create HU*.
 - h) Choose the *Confirm + Save* button.
 - i) Choose *Exit* .



Hint: You should use a new session for the next step and not exit the warehouse management monitor.

5. Confirm the kitting of the product on the work center **KITO**.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Execution* → *Create Confirmation for VAS*.
 - b) Enter the *Work Center KITO* and choose *Execute* .
 - c) In the *VAS/Activity/Item* area, select the entry for *Kit-to-Order*. Enter the *Start* and *End, w/o Variances* (via the buttons) and *Save* .
 - d) Select the HU in the *Section/Bin/HU/Item* area. Choose *Generate Kits* .
 - e) Select the HU again. Choose *Complete Process Step for HU* . A new warehouse task is created.

Continued on next page

6. Return to the warehouse management monitor and confirm the last process step for this product.
 - a) Use the *Refresh*  icon to see the new warehouse task.
 - b) Select the warehouse task and confirm it with *Other Methods* → *Confirm. Backgr.*.
7. Post goods issue for the outbound delivery order.
 - a) Click one time on the number of the *Document* for the outbound delivery order.
 - b) Choose the *Goods Issue*  button.



Lesson Summary

You should now be able to:

- Describe the different kitting scenarios
- Set up a kit-to-order process



Unit Summary

You should now be able to:

- Explain the different organizational models for material staging
- Set up production supply areas and control cycles
- Describe the possibilities of goods receipt from production
- Set up serial number profiles
- Describe the different serial number requirements
- Create the settings for the Quality Inspection Engine
- Set up inspection rules
- Process the quality inspection
- Describe the different kitting scenarios
- Set up a kit-to-order process

Unit 7

EWM Analytics

Unit Overview

Extended Warehouse Management offers tools for your day-to-day work and for supervising potentially critical situations. These tools are customizable to your specific needs. In addition, SAP NetWeaver Business Warehouse offers in-depth analytics for optimizing and planning your warehouse usage.



Unit Objectives

After completing this unit, you will be able to:

- Modify the warehouse management monitor according your requirements
- Set up measurement services and warehouse cockpits to monitor key figures

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Lesson: Monitoring and Analytical Functions

Lesson Overview

For your day-to-day work as well as for long-term planning, EWM offers various tools to support department managers and warehouse supervisors.



Lesson Objectives

After completing this lesson, you will be able to:

- Modify the warehouse management monitor according your requirements
- Set up measurement services and warehouse cockpits to monitor key figures

Business Example

Whether you are responsible for ensuring that the waiting time of a truck at a door is not exceeded, or for long-term resource planning and management, you require information about potential critical situations and developments in your warehouse.

Warehouse Management Monitor

The warehouse management monitor is the central tool for keeping warehouse managers constantly up to date as to the current situation in the warehouse and to enable you to initiate appropriate responses to critical situations. It also contains alert monitoring capabilities, which highlight actual and potential problematic situations in the warehouse and provides exception handling tools.

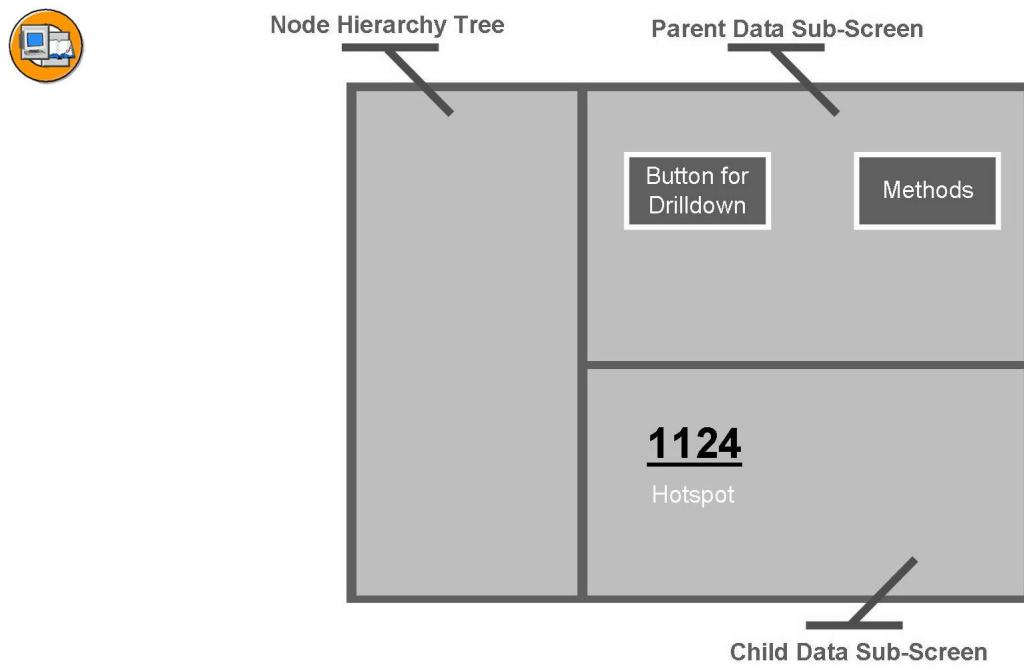


Figure 91: Warehouse Management Monitor

The warehouse management monitor offers the following features:

- **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 management monitor contains nodes for object classes relating to the following:

- Documents such as warehouse requests (WRs), warehouse orders (WOs), warehouse tasks (WTs), 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
- **Parent data and child data**

Besides the navigation tree you have two sub-screens. One sub-screen is used to display data of the parent objects. The other sub-screen displays the data of the child objects

- **List and form views**

For internal use by CSC only

By default, object information is displayed as a **list view**. The list view is displayed in an ALV grid, and offers all standard ALV functionalities, including sorting, filtering, and printing.

You also have the option of toggling to a **form view** for a selected object. The form view provides a focused view of the object and more detailed information than the list view. The form view is displayed in an HTML viewer.

- Methods

After object information is displayed in either view area, you can call methods to perform actions on selected objects.

- Hotspots

Using hotspots for output fields in the ALV list the corresponding user interface can be called for an object. For example, clicking on the warehouse task number calls the warehouse task display transaction.

- Customizing options

You can use the standard SAP monitor or you can create your own monitor in Customizing.

Even 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. A user can also hide nodes or complete branches which he or she does not need them or create nodes with a given layout for the ALV list view.

There is an extensive documentation for creating completely new functions modules and methods available on the SAP Marketplace for download. It is called “Adding Application Content to the Warehouse Management Monitor.”

Measurement Services and Warehouse Cockpit

Measurement services use key figures delivered by the warehouse. Examples for warehouse key figures are:

- Outbound or inbound deliveries that have left or arrived in the warehouse
- Number of handling units
- Number of open warehouse tasks or warehouse orders

First you require the **basic** measurement services. To evaluate the key figures you use **tailored** or **calculated** measurement services.

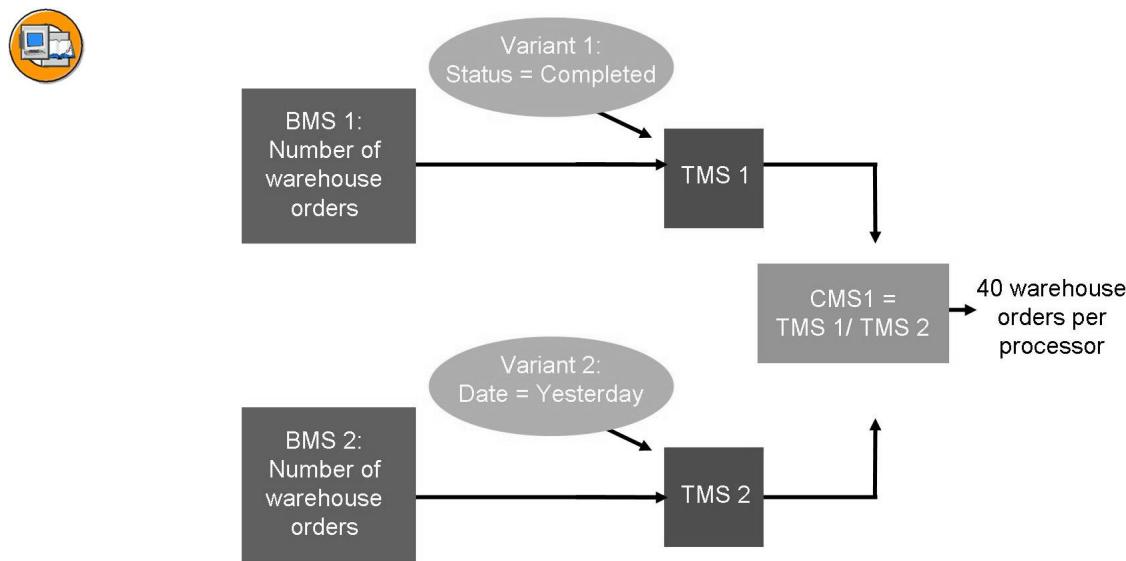


Figure 92: Basic, Tailored, and Calculated Measurement Services

Basic measurement services are the pure key figures that can also be found in the warehouse management monitor when display for example a list of warehouse tasks and showing the total number of these warehouse tasks. They have assigned the functions modules for queries, selection screens, and the node profiles which defines them for the warehouse management monitor. They are grouped in **basic measurement service groups**. Basic measurement services are predefined. SAP Note 1178089 describes how you can define your own basic measurement services

For a **tailored measurement service**, you assign a selection variant to a basic measurement service to specify the key figure you like to see. For example you only are interested in open warehouse task. Additionally you can assign upper and lower threshold values for alerts and exceptions which can be triggered if thresholds are violated.

In a **calculated measurement service** you connect multiple tailored measurements services in a complex formula. With these you can check the effectiveness of your warehouse or the performance of your employees, for example.

Measurement services can be used in:

- Operational planning in Labor Management and for calculating engineered labor standards
- The Warehouse Cockpit
- BI Content for Extended Warehouse Management

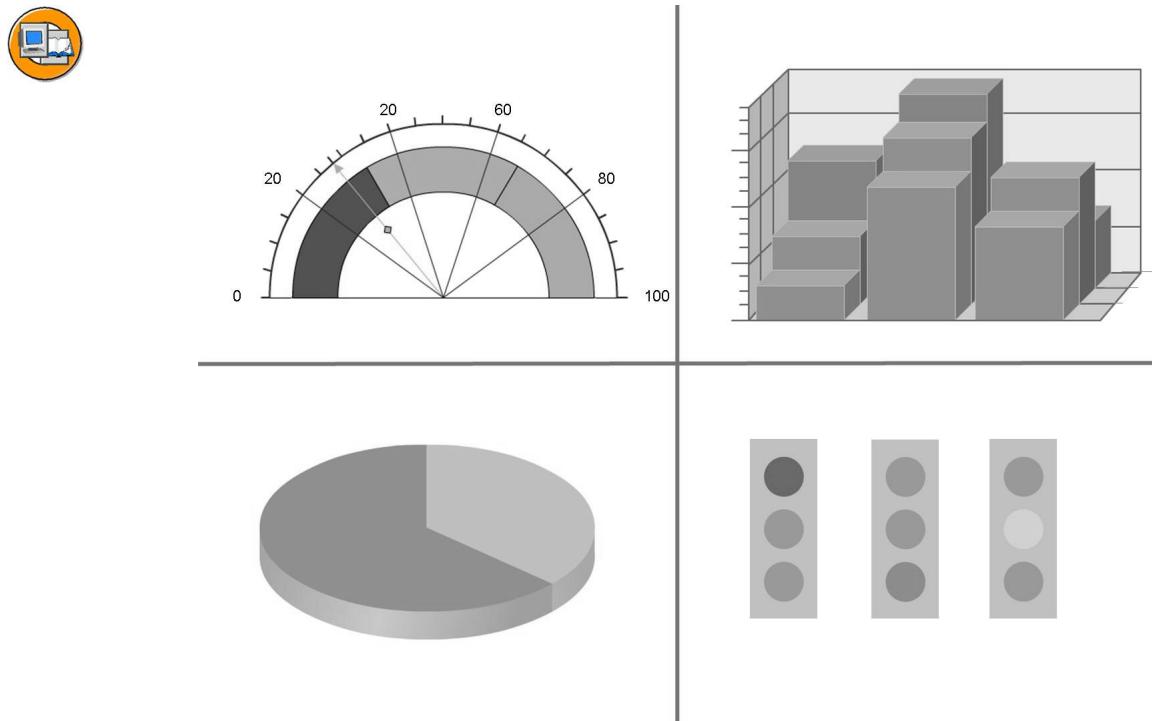


Figure 93: Warehouse Cockpit and Easy Graphics Framework

You can use the **Warehouse Cockpit** to display your warehouse key figures and defined Easy Graphics Framework objects (EGF objects) graphically, and to evaluate or monitor them using defined chart types. It enhances text-based SAP solutions, and was developed to be implemented in a strategically oriented warehouse. It supports new processes, such as working with analytical functions when managing a warehouse using Extended Warehouse Management.

Analytical Functions

The reporting, analysis, and interpretation of business data is of central importance to a company when it comes to guaranteeing a competitive edge, optimizing processes, and being able to react quickly and in line with the market. With business intelligence (BI), SAP NetWeaver provides data warehousing functionality, a business intelligence platform, and a suite of business intelligence tools, which an enterprise can use to attain these goals. Relevant business information from productive SAP applications and external data sources can be integrated, transformed, and consolidated in BI with the toolset provided. BI provides flexible reporting, analysis, and planning tools to support you in evaluating and interpreting data, and tools for distributing information. Businesses can make well-founded decisions and identify target-oriented activities on the basis of the analyzed data.

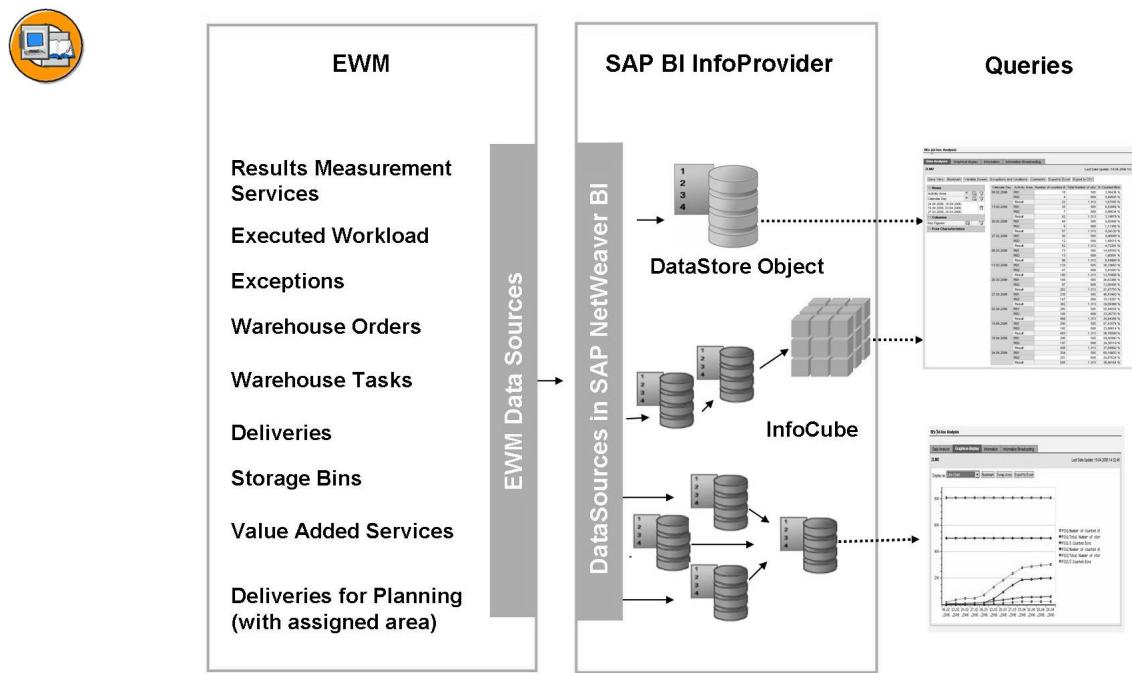


Figure 94: Analytics and Strategic Planning with SAP NetWeaver Business Warehouse

SAP delivers **BI Content** for Extended Warehouse Management to enable you to analyze your warehouse offering key figure functions and functions for graphical analysis, monitoring, or control.

BI Content is a preconfigured set of role- and task-related information models that are based on consistent metadata in SAP NetWeaver Business Intelligence. BI Content provides selected roles within a company with the information that the roles need to perform their tasks.

This information model includes integral roles, workbooks, queries, InfoSources, InfoCubes, DataStore objects, key figures, characteristics, update rules, and extractors for SAP applications.

BI Content can:

- Be used in specific industries without the need to modify it
- Be adapted so that you can work with it to any degree of detail
- Serve as a template or as an example for customer-defined BI Content

InfoArea **0WM** consists of BI Content for Extended Warehouse Management. You can use it to conduct actual and planned data analyses for warehouse management, using reporting methods. This enables you to develop a strategy to improve the efficiency in your warehouse. You can plan your workers better, develop your warehouse strategy, monitor and constantly check how individual scenarios affect your business targets.

The data basis provided by the BI Content (SAP NetWeaver 2004s BI Content Add-On 3) contains the following data flows:

- Measurement Service Results
- Executed Workload
- Exceptions
- Warehouse Order - Warehouse Task
- Delivery Items
- Storage Bins
- Value-Added Services
- Strategic Planning

You can use **strategic planning** to perform long-term planning based on your historical data. You can change values, and conduct planning based on these changed values, for example, to calculate the number of workers required for each month of the year.

Exercise 29: Warehouse Management Monitor

Exercise Objectives

After completing this exercise, you will be able to:

- Create variant nodes and layouts in the warehouse management monitor

Business Example

The warehouse management monitor is the main tool in Extended Warehouse Management for your day-to-day work. You wish to adapt it to your specific needs.

Task:

Create a variant to see the stock in the staging areas and create a separate node for it.

1. Create a variant node to see the physical stock in storage types 9010 and 9020. Also create a layout to group by document. To see the document number, move the column for the document number to the front.



Hint: To see the physical stock with a selection of the bins, you have to open the *Storage Bin* node.

Solution 29: Warehouse Management Monitor

Task:

Create a variant to see the stock in the staging areas and create a separate node for it.

1. Create a variant node to see the physical stock in storage types 9010 and 9020. Also create a layout to group by document. To see the document number, move the column for the document number to the front.



Hint: To see the physical stock with a selection of the bins, you have to open the *Storage Bin* node.

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Management Monitor*.
- b) Choose *Stock and Bin* → *Storage Bin* → *Physical Stock*.
- c) Right-click on the node and choose *Create Variant Node for Category Level*.
- d) Enter the *Text GI/GR - ##* and the same as *Presentation Txt*.
- e) Choose *Create Variant Node* .
- f) Double-click on the new node.
- g) In the popup, select the *Multiple Selection* for *Storage Type*. Enter the *Single Values 9010* and *9020* and choose *Copy* .
- h) Choose *Save as Variant* .
- i) Enter the *Variant Name GI/GR - ##* and the *Description Stock in GI/GR Bins*. Choose *Save* .
- j) Choose *Execute* .
- k) Select on the drop-down icon *Change Layout* . In the *Displayed Columns*, select the entry *Document*, select it, and choose *Select row(s) to top* .
- l) Select the *Sort Order* tab. In the *Column Set*, select the entry *Document*, select it, and choose *Add sort criterion* . For the *Sort criteria*, choose *Sort in ascending order*  and *Calculate subtotals* .
- m) Choose *Save layout* . Enter the *Save layout EWM##* and the *Name GI/GR - ##* and set the flag for *User-Specific*.

Continued on next page

- n) Choose *Continue* ✓ and *Transfer* ✓ .
- o) Right-click on the new node and choose *Assign Selection Variant*. In the popup, select the variant and choose *Choose* ✓ .
- p) Right-click again on the new node and choose *Assign Layout Variant*. Click on the new variant.
- q) Test if the assignments are correct. Open any other node and confirm the selection. Return to the new node and confirm that it opens the assigned query and layout. Choose *Exit* ⌘ and open the warehouse management monitor again. Select the new node and confirm that it opens the assigned query and layout.

Exercise 30: Measurement Services and Warehouse Cockpit

Exercise Objectives

After completing this exercise, you will be able to:

- Create tailored and calculated measurement services
- Define warehouse cockpits and assign measurement services

Business Example

Key figures and their graphical display are important tools to observe potential critical situations in the warehouse. The warehouse cockpit helps you to easily create visualizations for these key figures.

Task 1:

Create two tailored measurement services.

1. Create a tailored measurement service to see the total number of *Inbound Deliveries*.

<i>Warehouse Number</i>	E1##
<i>Measurement Service</i>	TMS1
<i>MS Description</i>	Inbound Deliveries

2. Create a tailored measurement service to see the total number of *Outbound Deliveries Orders*.

<i>Warehouse Number</i>	E1##
<i>Measurement Service</i>	TMS2
<i>MS Description</i>	Outbound Deliveries

Task 2:

Create a calculated measurement service.

1. Create a calculated measurement service to compare the number of inbound deliveries in relation to the number of outbound deliveries (divide the number of inbound deliveries by the number of outbound deliveries).

Continued on next page

<i>Warehouse Number</i>	E1##
<i>Measurement Service</i>	CMS2
<i>MS Description</i>	Inbound/Outbound Deliveries

Task 3:

Create a Warehouse Cockpit for the graphical display of your measurement services.

1. Create a new Warehouse Cockpit **ZWCE1## - Warehouse Cockpit E1##** in the IMG. Then in the *Easy Access* menu, add the following *EGF Objects* and assign the following *EGF Chart Types*:

<i>EGF Objects</i>	<i>EGF Chart Types</i>
_E1##CMS1C	012 Speedometer
_E1##TMS1T	004 Vertical Bars
_E1##TMS2T	003 Horizontal Bars

Task 4:

Start the Warehouse Cockpit.

1. Open the new created Warehouse Cockpit.

Solution 30: Measurement Services and Warehouse Cockpit

Task 1:

Create two tailored measurement services.

1. Create a tailored measurement service to see the total number of *Inbound Deliveries*.

<i>Warehouse Number</i>	E1##
<i>Measurement Service</i>	TMS1
<i>MS Description</i>	Inbound Deliveries

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Settings* → *Measurement Services* → *Tailored Measurement Service with Wizard*.
 - b) Choose *Continue*  on the introduction popup.
 - c) Select *Create* as *Action*.
 - d) Enter the *Warehouse Number* **E1##**, the *Measurement Service* **TMS1**, and the *MS Description* **Inbound Deliveries**.
 - e) Select the *BMS Group* **06 Delivery** and the *BMS 0001 Number of Inbound Deliveries*.
 - f) Choose the *Create/Edit Variant* button.
Do not enter any restrictions and choose *Save as Variant* .
 - g) Enter the *Variant Name* **E1##Inbound** and the *Description* **Inbound Deliveries**. Choose *Save* .
 - h) Choose *Execute*  to close the selection screen, then choose *Continue*  two times (we do not want to enter any threshold).
 - i) Select *Test Service*  to check if any deliveries can be found (the number will be shown as *Result*).
 - j) Choose *Continue*  and then *Complete* .
2. Create a tailored measurement service to see the total number of *Outbound Deliveries Orders*.

Continued on next page

<i>Warehouse Number</i>	E1##
<i>Measurement Service</i>	TMS2
<i>MS Description</i>	Outbound Deliveries

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Settings* → *Measurement Services* → *Tailored Measurement Service with Wizard*.
- b) Choose *Continue*  on the introduction popup.
- c) Select *Create as Action*.
- d) Enter the *Warehouse Number* **E1##**, the *Measurement Service* **TMS1**, and the *MS Description* **Inbound Deliveries**.
- e) Select the *BMS Group 06 Delivery* and the *BMS 0018 Number of Outbound Delivery Orders*.
- f) Choose the *Create/Edit Variant* button.
Do not enter any restrictions and choose *Save as Variant* .
- g) Enter the *Variant Name* **E1##Outbound** and the *Description* **Outbound Deliveries**. Choose *Save* .
- h) Choose *Execute*  to close the selection screen, then choose *Continue*  two times (we do not want to enter any threshold).
- i) Select *Test Service*  to check if any deliveries can be found (the number will be shown as *Result*).
- j) Choose *Continue*  and then *Complete* .

Task 2:

Create a calculated measurement service.

1. Create a calculated measurement service to compare the number of inbound deliveries in relation to the number of outbound deliveries (divide the number of inbound deliveries by the number of outbound deliveries).

Continued on next page

<i>Warehouse Number</i>	E1##
<i>Measurement Service</i>	CMS2
<i>MS Description</i>	Inbound/Outbound Deliveries

- a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Settings* → *Measurement Services* → *Calculated Measurement Service with Wizard*.
- b) Choose *Continue*  on the introduction popup.
- c) Select *Create* as *Action*.
- d) Enter the *Warehouse Number* **E1##**, the *Measurement Service* **CMS1**, and the *MS Description* **Inbound/Outbound Deliveries**.
- e) On the formula editor, select the *Tailored Measurement Service Inbound Deliveries*, the button for */Division*, and the *Tailored Measurement Service Outbound Deliveries*.
Choose *Copy*  to continue.
- f) We do not want to enter any threshold, so choose *Continue*  on the next screen.
- g) Choose *Test Service*  to see if your formula is set up correctly.
- h) Choose *Continue*  and then *Complete* .

Task 3:

Create a Warehouse Cockpit for the graphical display of your measurement services.

1. Create a new Warehouse Cockpit **ZWCE1## - Warehouse Cockpit E1##** in the IMG. Then in the *Easy Access* menu, add the following *EGF Objects* and assign the following *EGF Chart Types*:

Continued on next page

<i>EGF Objects</i>	<i>EGF Chart Types</i>
<u>E1##CMS1C</u>	012 Speedometer
<u>E1##TMS1T</u>	004 Vertical Bars
<u>E1##TMS2T</u>	003 Horizontal Bars

- a) In the IMG of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Easy Graphics Framework* → *Define Cockpits*.
- b) Choose the *New Entries* button.
- c) Enter the *EGF Implementation ZVCE1##* and the *Description Warehouse Cockpit E1##*.
- d) Save  your new cockpit.
- e) Choose *Exit*  to leave the transaction.
- f) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Settings* → *Measurement Services* → *Configure Measurement Service in the Warehouse Cockpit*.
- g) Select youy new *EGF Implementation ZVCE1##* and in the dialog structure, select the entry *Objects*.
- h) Choose the *New Entries* button.
- i) Enter (or select with *F4*) the *EGF Objects*.
- j) When you have entered the third *EGF Object*, choose *Back*  once to see the list of the three objects.
Scroll to the right until you see the *Chart Type* column. Select the *Chart Types* as in the table.
- k) Save  your entries.
- l) Choose *Exit*  to leave the transaction.

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Task 4:

Start the Warehouse Cockpit.

1. Open the new created Warehouse Cockpit.
 - a) In the *Easy Access* menu of your EWM system, choose *Extended Warehouse Management* → *Monitoring* → *Warehouse Cockpit* → *Warehouse Cockpit*.
 - b) When you start the cockpit for the first time, you are requested to select the *EGF Implementation*. Otherwise choose *Cockpit* → *Start Other Cockpit*. Select the items on the *Object List* to display them.
 - c) Choose *Exit*  to leave the transaction.



Lesson Summary

You should now be able to:

- Modify the warehouse management monitor according your requirements
- Set up measurement services and warehouse cockpits to monitor key figures



Unit Summary

You should now be able to:

- Modify the warehouse management monitor according your requirements
- Set up measurement services and warehouse cockpits to monitor key figures



Course Summary

You should now be able to:

- Create wave templates and set up the determination of wave templates for your deliveries
- Offer better value to customers by using value-added services
- Process cross-docking and describe the different cross-docking scenarios
- Create deliveries from EWM for special purposes
- Organizes movements on the yard and determine staging areas and doors
- Plan transportation in ERP or EWM
- Make optimal use of your workforce through resource management and the RF framework
- Explain the possibilities of MFS integration
- Create the production supply and receive materials from production into your warehouse
- Set up quality management for your goods receipt processes in EWM

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.