EWM130

Production Integration with SAP EWM

PARTICIPANT HANDBOOK
INSTRUCTOR-LED TRAINING

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Typographic Conventions

American English is the standard used in this handbook.

The following typographic conventions are also used.

This information is displayed in the instructor's presentation	
Demonstration	
Procedure	
Warning or Caution	
Hint	
Related or Additional Information	
Facilitated Discussion	
User interface control	*Example text*
Window title	*Example text*

Contents

Course Overview

TARGET AUDIENCE

This course is intended for the following audiences:

- Application Consultant
- Project Manager
- Project Stakeholder
- Systems Architect

UNIT 1

Integration of Production and Extended Warehouse Management (EWM)

Lesson 1

UNIT OBJECTIVES

- Understand the integration of production and EWM

Unit 1
Lesson 1

Integrating Manufacturing Processes

LESSON OVERVIEW
In this lesson, you learn about the different options of the integration of production supply in SAP EWM.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Understand the integration of production and EWM

Production Integration with SAP EWM

The goal of the integration of production and warehouse management is the staging of products in time, the proper posting of the consumption of the components from the production process, and the receipt of the final products in the warehouse.

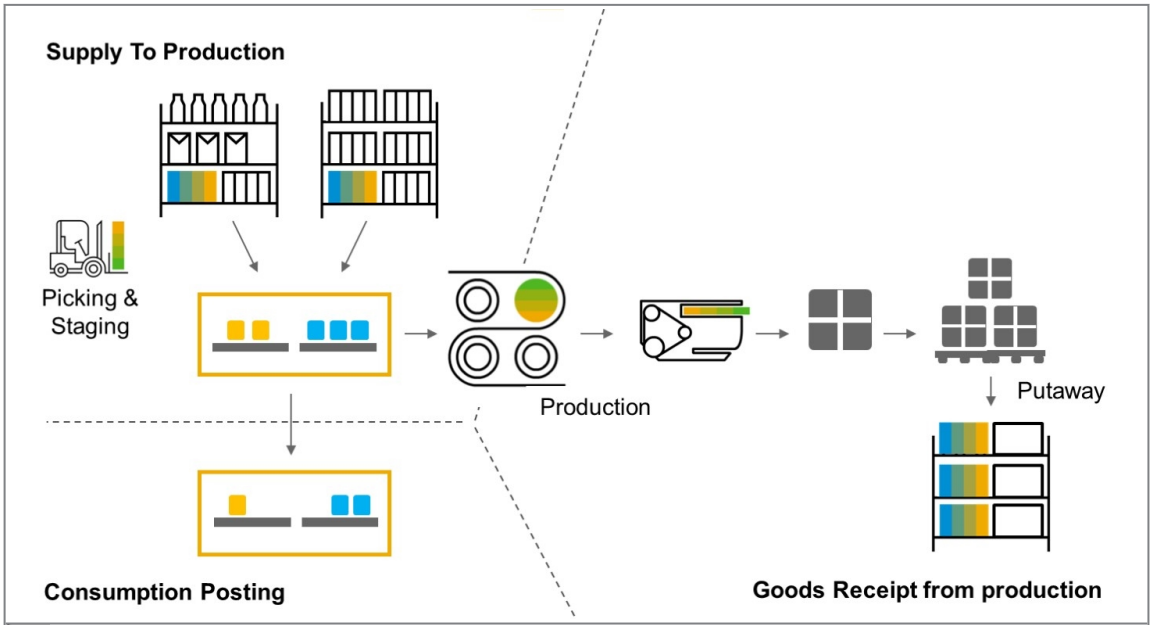

Figure 1: Integration with Production Processes

Manufacturing Integration Options

SAP EWM offers two ways to integrate production processes.

For the delivery-based integration, the ERP system creates deliveries for materials to be staged, and also for materials that are consumed, and sends these deliveries to EWM. Quantities to be staged and consumed are entered in ERP, while in EWM, only the physical movement is triggered and confirmed.

In the Advanced Production Integration, a production material request (PMR) for a manufacturing order is created in EWM when ERP sends a message containing the

information from production. Details about quantities for staging and consumption are controlled with entries in EWM.

Delivery-Based Production Integration Process

For the delivery-based production integration scenario, more information flows between the ERP and the EWM system. Several deliveries can be created (for staging pick parts, staging release order parts, goods issue posting) and most steps are triggered from ERP.

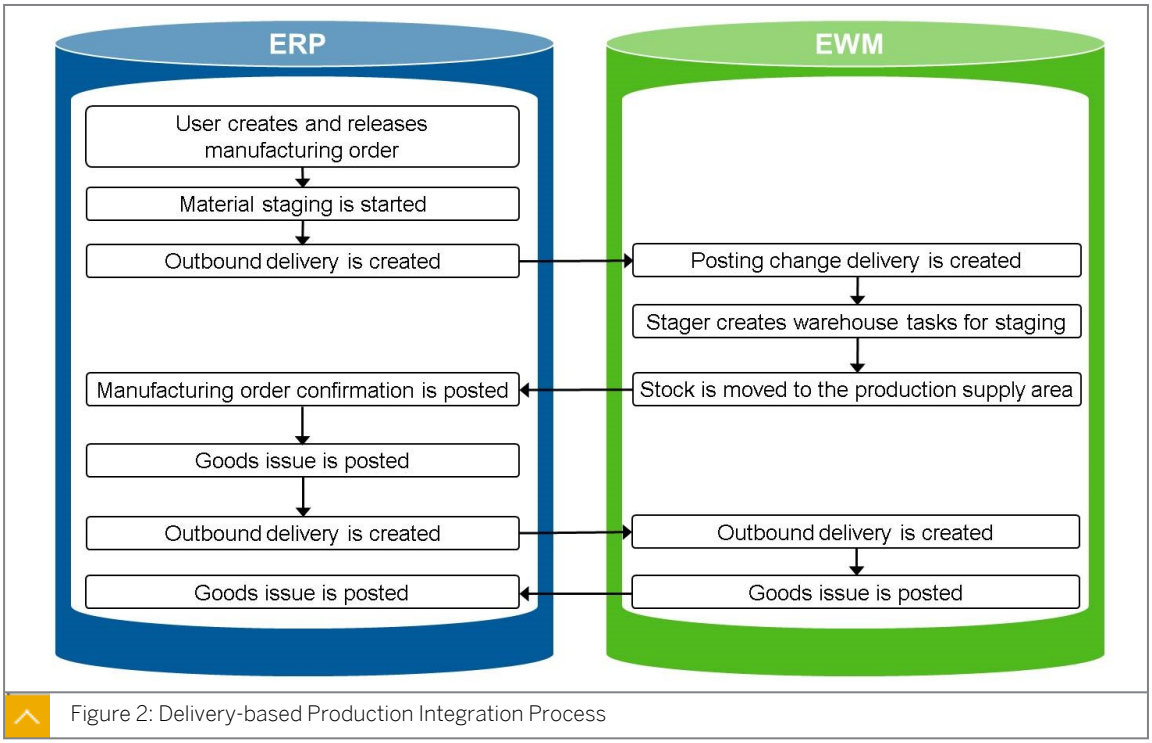

Figure 2: Delivery-based Production Integration Process

Note:
The figure, Delivery-based Production Integration Process, shows only one outbound delivery for staging, and this is for the scenario with two storage locations and one warehouse number. During a production process, several deliveries might be created, and the details look different when using another organizational structure.

Advanced Production Integration Process

With the advanced production integration, the ERP side has no delivery documents and all steps between the initial request for the material staging and the completion of the manufacturing order are controlled in EWM.

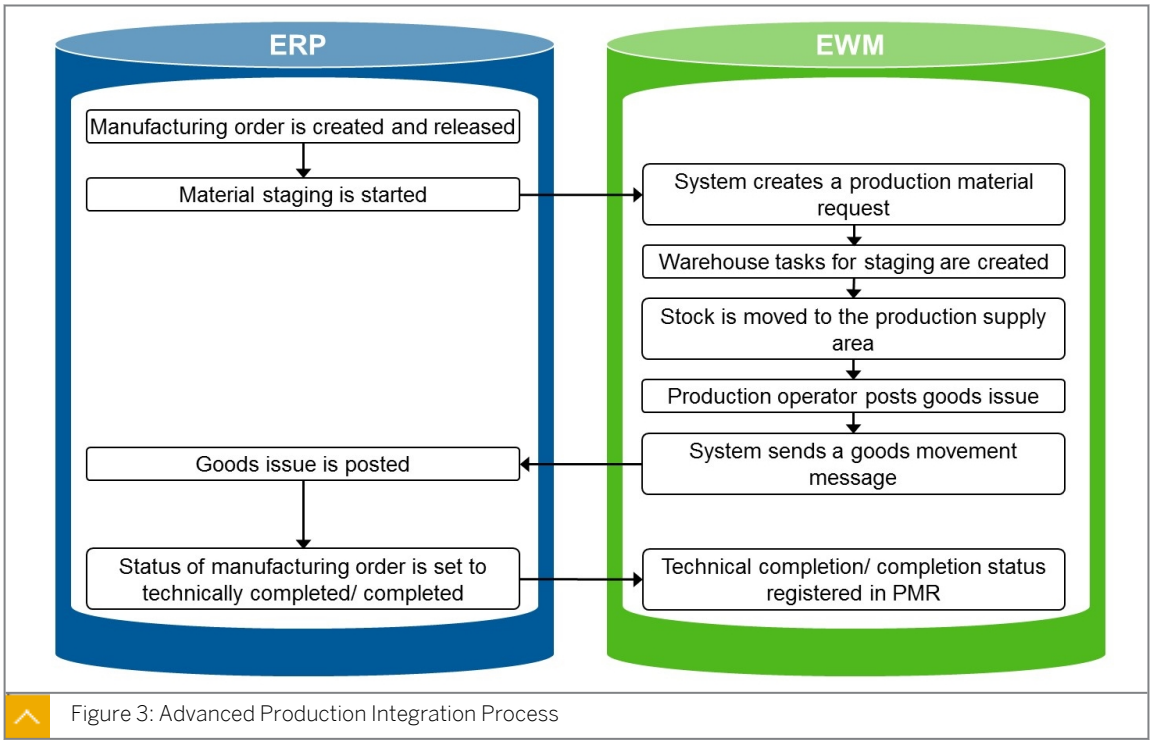

Figure 3: Advanced Production Integration Process

Note:
Embedded EWM in SAP S/4HANA offers special integration options for kanban and just-in-time (JIT) calls. These options are described in separate lessons.

Solution Comparison

Table 1: Solution Comparison

The following table provides a comparison between the two possibilities, and their advantages and limitations:

	Delivery-Based Production Supply	Advanced Production Integration
Supported Processes	Production Orders Process Orders Kanban Repetitive Manufacturing	Production orders Process orders

	Delivery-Based Production Supply	Advanced Production Integration
Informing SAP EWM about requirements from production	You use the standard SAP ERP functionality to trigger staging. SAP ERP creates outbound deliveries and sends them to SAP EWM. Depending on the combination of storage locations in the SAP ERP control cycle, SAP EWM creates outbound delivery orders or posting changes.	You use the standard SAP ERP functionality to trigger staging. SAP ERP sends a message to SAP EWM. SAP EWM creates a PMR.
Quantities for Staging	The system uses the full quantity of a reservation item (pick parts) or multiple reservation items (release order parts) for staging.	The system creates a staging proposal based on the current stock on the PSA bin, the open warehouse tasks for this bin, and the current requirements for the product. You can define how much of a product is to be staged at a time, for example, you always stage a full pallet. You can also decide to stage a different quantity to the quantity proposed by the system.
Planning Staging	You create warehouse tasks for the outbound delivery orders and posting changes that SAP EWM has created from the SAP ERP messages.	You create the warehouse tasks directly from the *Staging for Production* screen. You can also schedule regular creation of warehouse tasks for staging for production using the report *Schedule for Production.*
Overview	Not available	You can display an overview of the current stock on the production supply area bin, the open warehouse tasks for this bin, and the current requirements for the product.
Typical scenario	Mechanical Engineering	Consumer products or process industry

SAP Note 2352810, FAQ: Using the PMR - Differences Between PMR and Deliveries, also lists some details and differences between the delivery-based and the advanced production integration.

Summary of Solution Comparison

The advantages of PMR-based production supply are as follows:

- Once the PMRs are created, you can work independently of SAP ERP.
- You can use the warehouse management capabilities to organize the staging for production.
- You can split a high quantity of a component into smaller quantities that fit into your PSA. This is useful when space in your PSA is restricted or when production runs manufacturing orders over longer periods.
- Your production users work in SAP EWM to post the goods issue of the components. However, if the same users also have to enter additional data, for example time tickets, they have to work in both systems.
- You can post goods issue for more of a material than was planned in the PMR.
- PMR-based production supply performs a lean system communication by sending just goods movement messages to SAP ERP instead of creating several delivery documents. When the number of goods issues is high, the usage of system resources is much lower.

The advantages of delivery-based production supply are as follows:

- You can continue to work in SAP ERP.

  When you work with a typical pick parts scenario, you can put all or most parts of the bill of material together in a container before you bring it to the work center. The user at the work center enters all his or her production data and goods movements in SAP ERP.
- You can transport the materials from the warehouse to the production location in a shuttle scenario.
- You can use the shipping functionality.
- You can use Kanban functions.

LESSON SUMMARY

You should now be able to:

- Understand the integration of production and EWM

Learning Assessment

1. Delivery-based production integration supports which of the following processes?

   Choose the correct answers.

   - ☐ A Production Orders
   - ☐ B Process Orders
   - ☐ C Kanban
   - ☐ D Repetitive Manufacturing

2. Advanced production integration is typically used in which of the following scenarios?

   Choose the correct answers.

   - ☐ A Mechanical Engineering
   - ☐ B Consumer products
   - ☐ C Process industry

Learning Assessment - Answers

1. Delivery-based production integration supports which of the following processes?
   Choose the correct answers.

   [X] A Production Orders

   [X] B Process Orders

   [X] C Kanban

   [X] D Repetitive Manufacturing

2. Advanced production integration is typically used in which of the following scenarios?
   Choose the correct answers.

   [ ] A Mechanical Engineering

   [X] B Consumer products

   [X] C Process industry

UNIT 2 Master Data for Production Integration

Lesson 1

UNIT OBJECTIVES

- Define organizational structures
- Define master data for the production integration

Unit 2
Lesson 1

Defining Master Data

LESSON OVERVIEW
In this lesson, you learn how to set up the master data.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Define organizational structures
- Define master data for the production integration

Organizational Structures for Production

There are different models for organizing stocks for production in SAP Extended Warehouse Management (EWM)s:

- Two SAP EWM-managed storage locations in one warehouse

  The system manages the stock for the production separately from the other stocks. This increases the transparency at storage-bin level in the SAP EWM system, and at storage location level in the SAP ERP system. When staging the products, the SAP EWM system executes a posting change by changing the stock type. In the SAP ERP system, this is a stock transfer between the storage locations.

- One SAP EWM-managed storage location

  The production stocks are only managed in SAP EWM, and are, therefore, transparent in the SAP EWM system only. When staging the products, the system does not execute a posting change.

- MM-IM Managed storage location

  The product stocks are not managed in the SAP EWM system; they are managed in the SAP ERP system at MM-IM storage location level. Staging is an outbound delivery from an SAP EWM perspective, and, from an SAP ERP perspective, a posting change to a storage location outside of the SAPE WM system.

- Two SAP EWM-managed storage locations in two warehouses

  The production stocks are managed in the EWM system in another warehouse number. The staging takes place in a two-step posting change, as follows:

  - Outbound delivery from the sending EWM warehouse
  - Inbound delivery to the receiving EWM warehouse

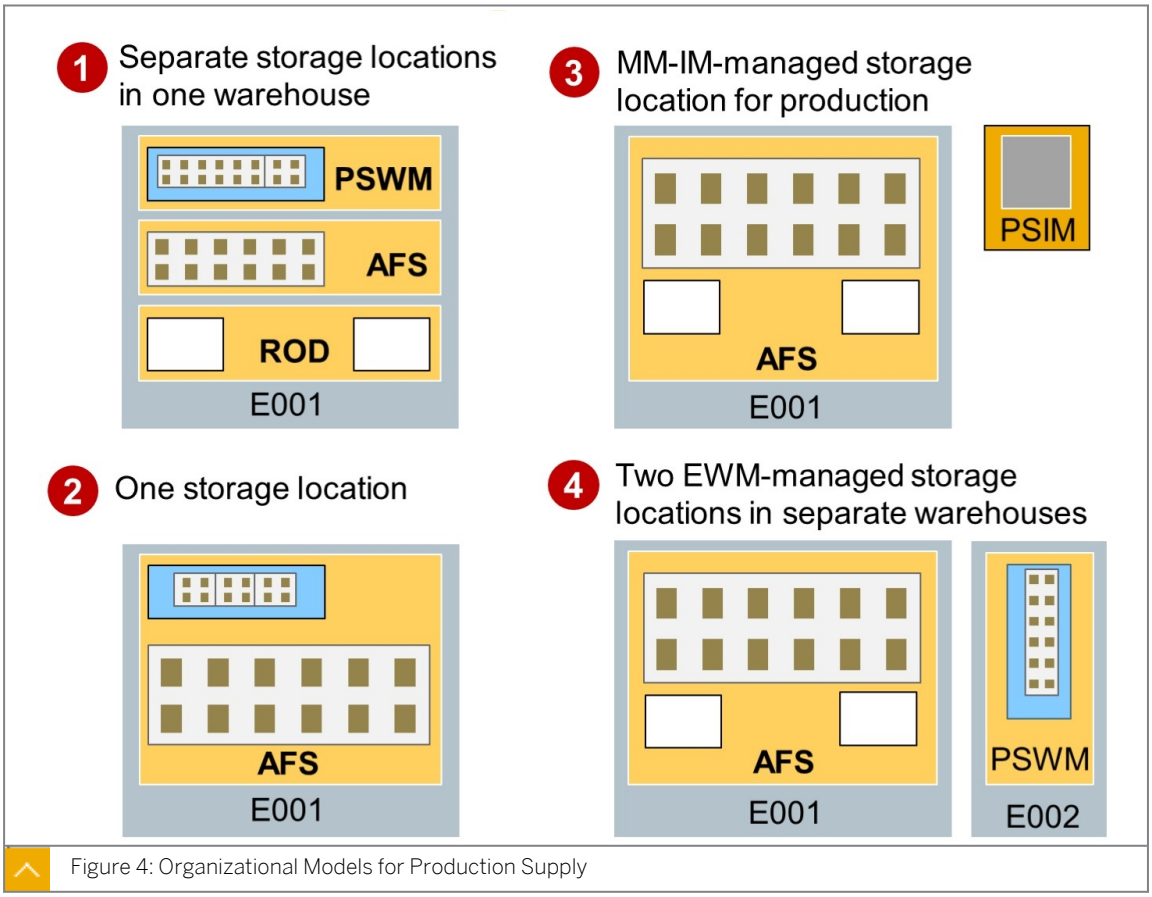

Figure 4: Organizational Models for Production Supply

The first two models are supported by the delivery-based integration and the advanced production integration. Only with the delivery-based integration is it possible to work with a storage location that is not SAP EWM managed, or that has its own EWM warehouse.

Production Supply Area (PSA)

The production supply area (PSA) is an area on the shop floor where products are staged or withdrawn. To stage products for a production order, information about where to bring products must be available. For production orders in the SAP ERP system, the PSA contains this information.

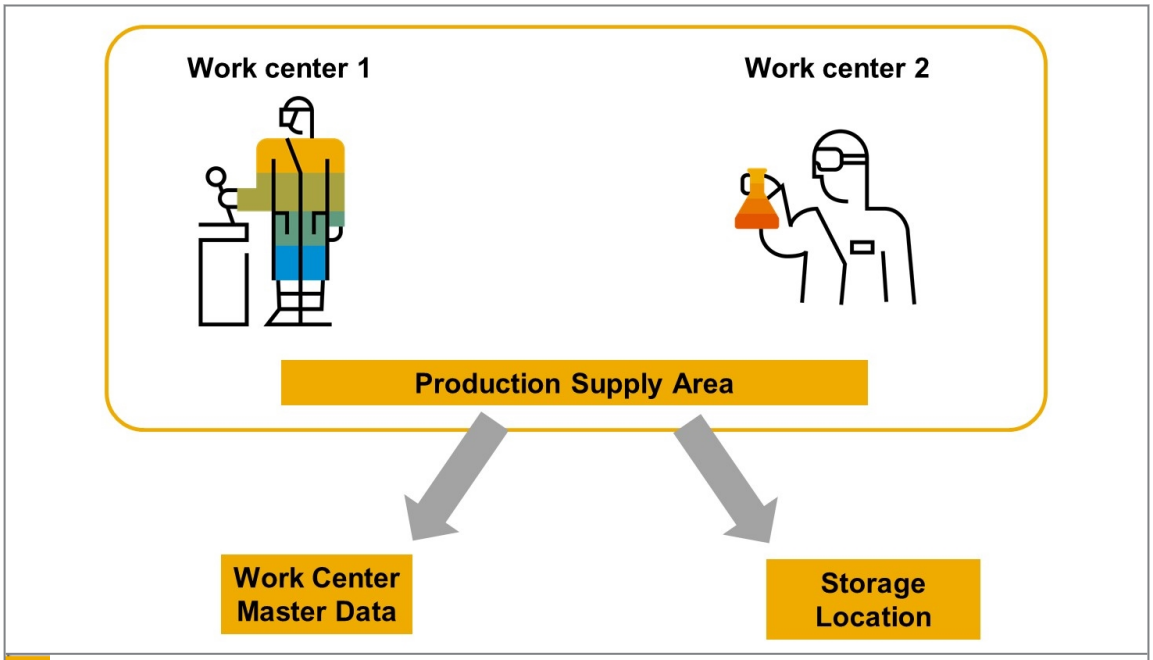

Figure 5: Production Supply Area (PSA)

The PSA is always created in the ERP system. You can then create the PSA manually in the EWM system and do a mapping between these two; or you can replicate the PSA from the ERP to the EWM system, which takes care of the mapping in the same step. The name being for the PSA in EWM during the replication is controlled by the BAdI /SCWM/EX_ERP_PSA_NAME. There is a sample BAdI implementation available, /SCWM/CL_DEF_PSA_NAME. This sample implementation can be used to generate the PSA name by concatenating the PSA name in ERP, a '/' sign and the plant from the ERP system.

In SAP S/4HANA embedded EWM, the PSA from ERP is automatically copied to EWM (since SAP S/4HANA 1909).

A PSA usually contains one or more storage bins where you can stage the products of a production order. For this reason, the SAP EWM system needs information about the PSAs to determine the correct storage bin for staging the products. The assignment of the bins to the PSA is done in EWM. One PSA can have multiple storage bins and one storage bin can be used by multiple PSAs (which is not recommended).

Components and Control Cycles

Usually, the production needs components in different ways. Certain components are required only rarely, and only for specific production orders. Others are needed for more than one production order on most days, so it is picked only once, if possible, in the warehouse. For other components, a similar quantity is used every day. Using control cycles, you define the way the different components are staged.

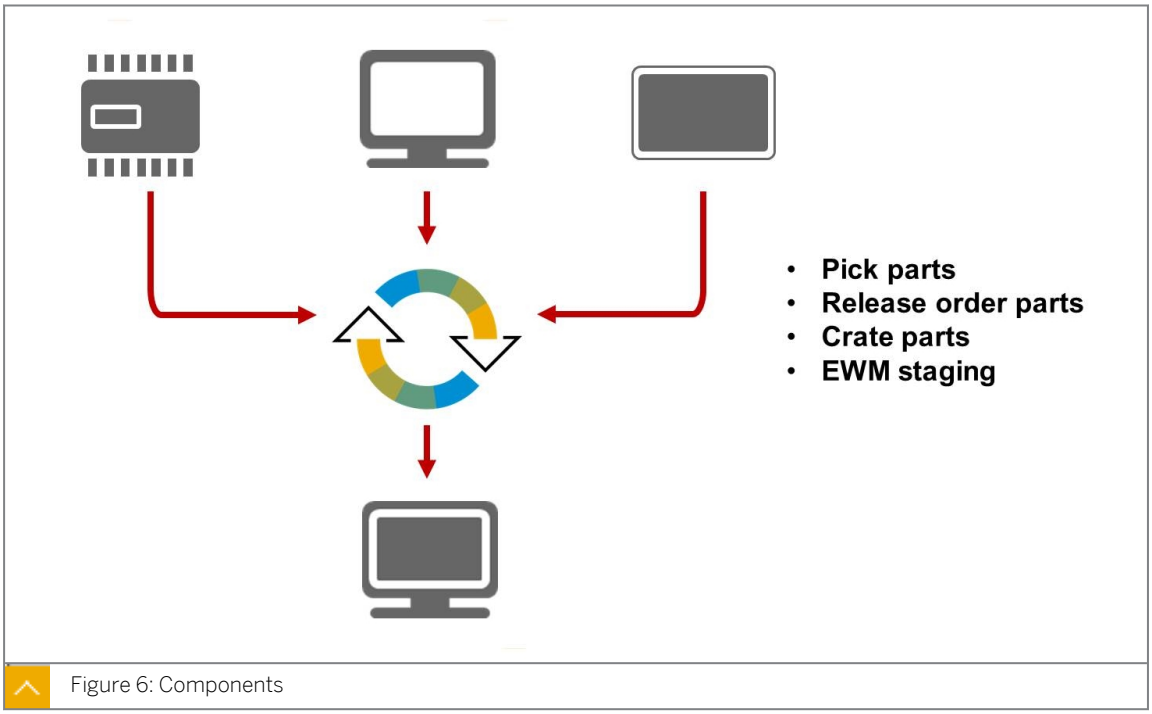

Figure 6: Components

The different control cycles used for SAP EWM are as follows:

Pick Parts

Using pick parts, you trigger material staging from the warehouse to production based only on the production order. You stage the quantity of the material requested in the production order with a direct reference to the production order. This is only relevant for delivery based production integration.

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. This is only relevant for delivery based production integration.

Crate Parts

This is material stored in crates or other standard containers. You request this from the warehouse for production, independent of existing production orders. Crate part staging for SAP EWM-managed supply warehouses is defined in the PSA in SAP EWM. Crate parts can be used for the advanced production integration and for the delivery-based production supply, but only for inside one warehouse.

EWM Staging

This type of control cycle is specifically for the advanced production integration. In EWM, you decide whether to use “single-order staging” (which corresponds to pick parts), or “cross-order staging” (which is similar to release order parts).

The assignment of the storage bins for staging is done in SAP EWM in something similar to a Control Cycle. A bin is assigned to a combination of party entitled to dispose / PSA and product / product group (or none, if it is generic). Depending on the type of staging, several control parameters are also assigned. When using SAP S/4HANA embedded EWM, you can navigate directly from the ERP control cycle to the EWM control cycle.

LESSON SUMMARY

You should now be able to:

- Define organizational structures
- Define master data for the production integration

Learning Assessment

1. A production integration scenario with two warehouse numbers, one for the supply and one for the consumption, is supported by which of the following?

   Choose the correct answer.

   - [ ] A Delivery-based production integration
   - [ ] B Advanced production integration

2. A production supply area is required in SAP ERP and in SAP EWM. What possibilities do you have to create the PSA?

   Choose the correct answers.

   - [ ] A A PSA is manually created in SAP ERP and then replicated into SAP EWM with automatic mapping
   - [ ] B A PSA is manually created in SAP ERP, manually created in SAP EWM and a manual mapping is required
   - [ ] C A PSA is manually created in SAP EWM and then replicated to SAP ERP

3. Control cycles are required to control which of the following processes?

   Choose the correct answer.

   - [ ] A How a material is staged
   - [ ] B What costs are to be calculated
   - [ ] C Which warehouse process type is used for picking

Learning Assessment - Answers

1. A production integration scenario with two warehouse numbers, one for the supply and one for the consumption, is supported by which of the following?

   Choose the correct answer.

   [X] A Delivery-based production integration

   [ ] B Advanced production integration

   That is correct. A production integration scenario with two warehouse numbers is supported by the delivery based production integration.

2. A production supply area is required in SAP ERP and in SAP EWM. What possibilities do you have to create the PSA?

   Choose the correct answers.

   [X] A A PSA is manually created in SAP ERP and then replicated into SAP EWM with automatic mapping

   [X] B A PSA is manually created in SAP ERP, manually created in SAP EWM and a manual mapping is required

   [ ] C A PSA is manually created in SAP EWM and then replicated to SAP ERP

3. Control cycles are required to control which of the following processes?

   Choose the correct answer.

   [X] A How a material is staged

   [ ] B What costs are to be calculated

   [ ] C Which warehouse process type is used for picking

UNIT 3 Delivery-based Production Supply

UNIT OBJECTIVES

- Define Master Data for the delivery based production supply.
- Perform staging for production
- Post consumption with the delivery based production integration
- Use Kanban in Production
- Execute Kanban Replenishment
- Create Stock Transfers for JIT Calls

Setting Up Master Data for Delivery-based Production Supply

LESSON OVERVIEW
In this lesson, you learn how to set up the master data for the delivery based production supply.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Define Master Data for the delivery based production supply.

Production Supply Area (Delivery-based Production Integration)

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 SAP ERP system, the Production Supply Area (PSA) contains this information.

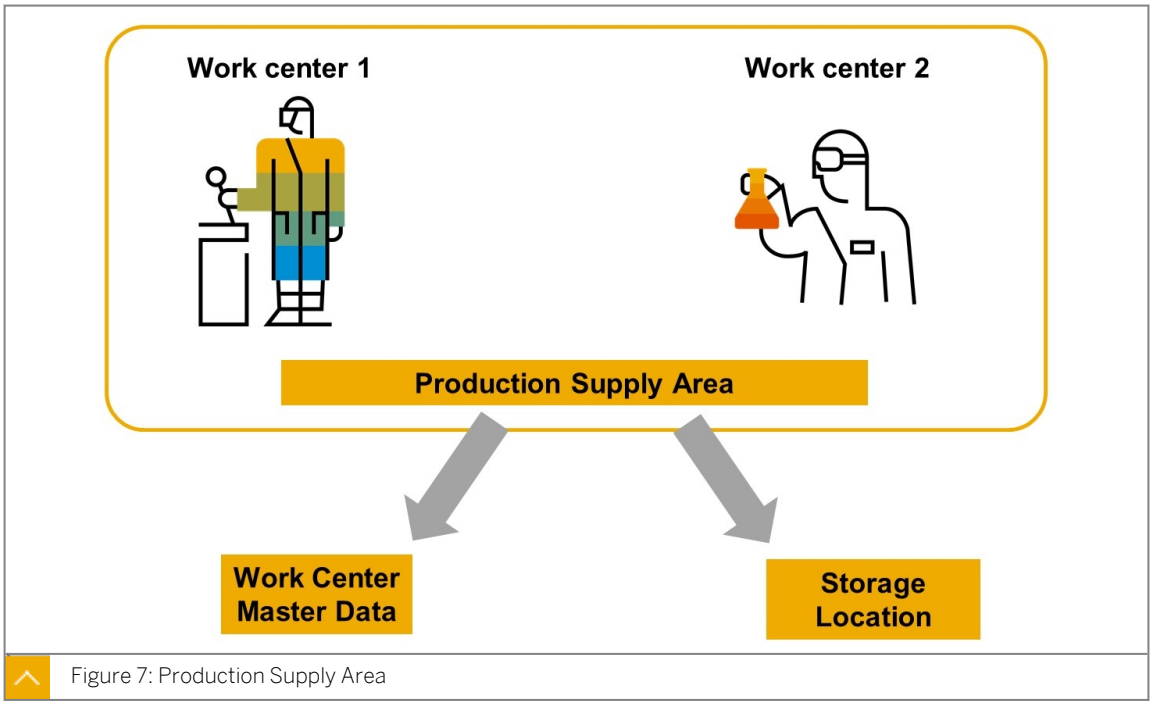

Figure 7: Production Supply Area

The PSA also contains the information about the storage location from where the material is taken during the production process. This is important for the delivery-based production integration, where this storage location can be a different storage location than the one supplying the material. It can even be connected to a different warehouse. In this way, the SAP ERP system knows what type of delivery is required.

Control Cycles for Delivery-based Production Integration

In the delivery-based production supply, you have to determine whether you want to stage the components as pick parts, release order parts, or crate parts. For pick parts and release order parts, you have to maintain the proper control cycles in SAP ERP.

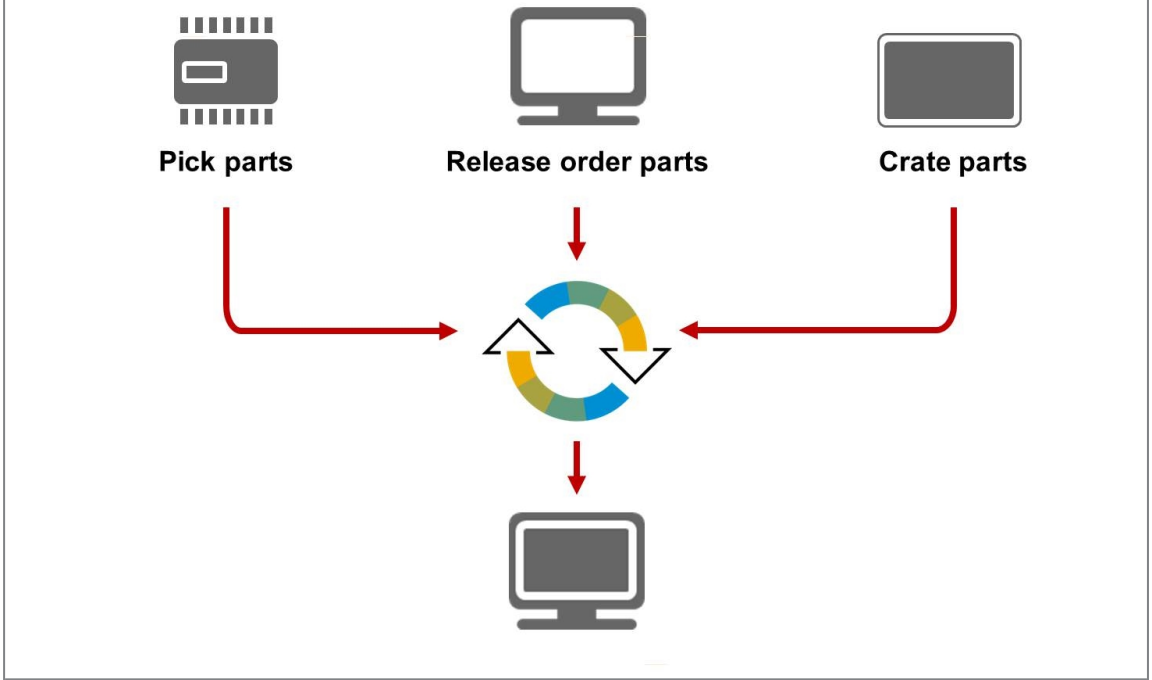

Figure 8: Components

Crate Parts

For crate parts, the more important setting is in SAP EWM. The control cycle in SAP ERP can say that it is for crate parts, and never really be used in this way, or it can say *manual staging*. The quantities to be staged are defined in the EWM control cycle. You can either select:

- Calculation based on packaging specification

  In the control cycle you enter the *quantity classification* from the packaging specification to be used, the *number of containers* (containers refers to this quantity classification) to be replenished, and the *minimum number of containers* which have to be available in the PSA. The determination procedure for the packaging specification is assigned in the warehouse number settings, in the field *CPRepl. Proced*.

- Quantity-based calculation

  You enter in the control cycle the *replenishment quantity*, the *minimum product quantity in the PSA* and the *unit*.

For crate part replenishment you have to define the required replenishment settings for the storage type in customizing (as for any other kind of replenishment) and trigger the replenishment with the transaction *Replenish Stock* (`/SCWM/REPL`.

LESSON SUMMARY

You should now be able to:

- Define Master Data for the delivery based production supply.

Staging Products for Delivery-based Production Supply

LESSON OVERVIEW
In this lesson, you learn how to stage products with the delivery based production integration.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Perform staging for production

Staging for Delivery-based Production Supply

Depending on your organizational model, you will have different documents for the staging process.

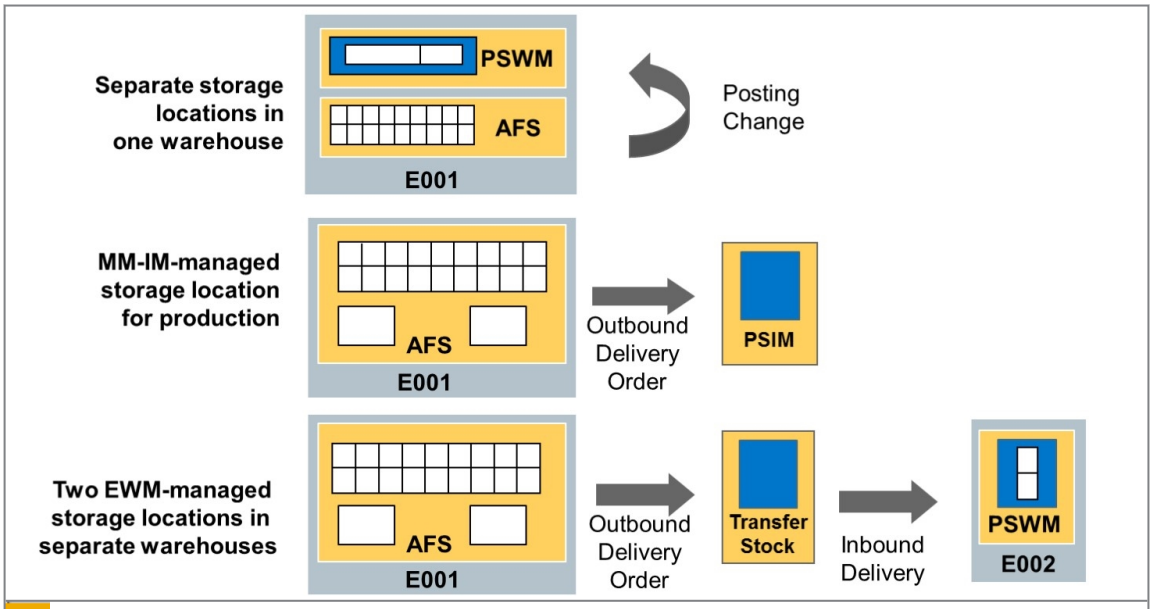

Figure 9: Process Scenarios for Production Supply

When the destination storage location is an inventory-managed (MM-IM) storage location only, you have an outbound delivery from the supplying storage location or SAP EWM warehouse. You can have a two-step stock transfer when using two SAP EWM-managed storage locations with two separate warehouse numbers. In this case there is an outbound delivery from the supplying storage location or warehouse for the first step, and an inbound delivery for the second step.

If using two separate SAP EWM-managed storage locations in one warehouse, or one single SAP EWM-managed storage location, the system uses a posting change delivery.

The ERP system does not know of such a delivery, so technically the delivery in ERP is always an outbound or an inbound delivery. In a warehouse internal movement, it is an outbound delivery document type.

Delivery-based Staging Documents

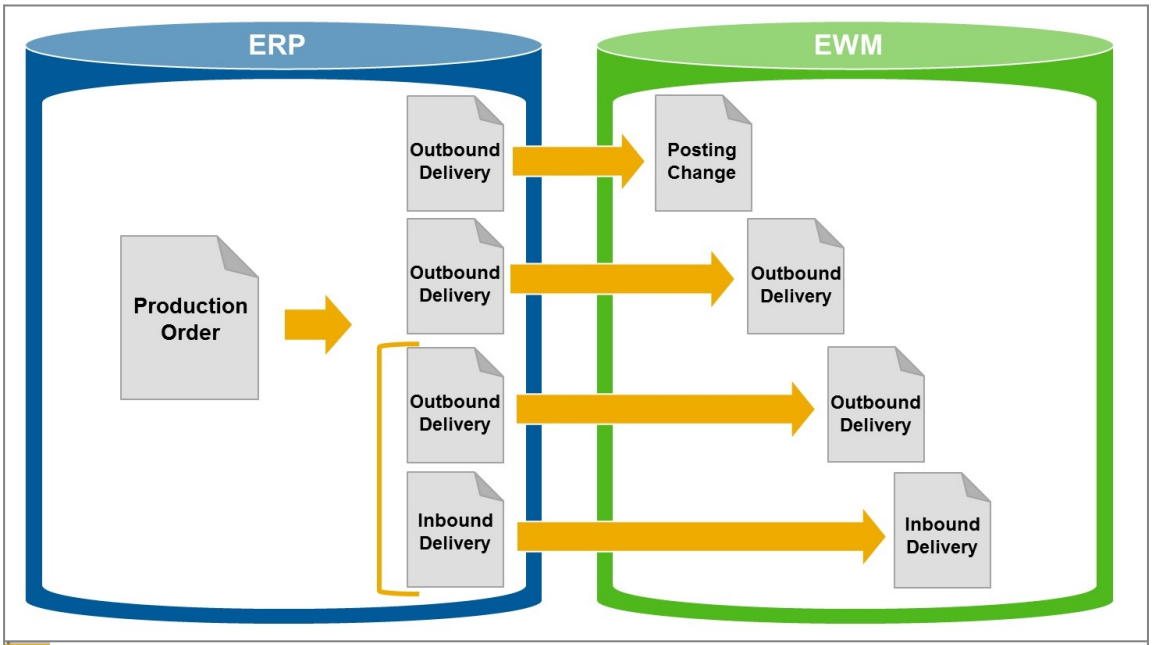

Figure 10: Delivery-based Staging Documents

Note:
When there is one single storage location in one warehouse number, technically, we only have a stock transfer from bin to bin, there is no posting change. However, a warehouse request for a stock transfer cannot be created from the ERP system, only a posting change. That is why, if the material stays in one warehouse, a posting change, as a warehouse request, is created in SAP EWM.

These different scenarios are reflected at two customizing topics, one in SAP ERP, one in SAP EWM. In SAP ERP there is a *Delivery Type Determination in EWM Manufacturing Integration*, the path is *Logistics Execution → SAP EWM Integration → Production Planning and Control → Define Delivery Type Determination*. For a combination of plant (optional), storage location (optional) and *Process* (mandatory), you define the delivery type and movement type (only for 1-step stock transfers) to be used. SAP delivery some default entries in the standard.

With the *Process*, you distinguish the following:

- Different staging indicators (pick parts or release order parts)
- Specific production processes (kanban or repetitive manufacturing)
- Whether it is a staging step or a goods issue step

This process translates in SAP EWM into the *Code for Initiator of a Communication Chain*, which is used to map the ERP document type to the EWM document type (*SCM Extended Warehouse Management → Extended Warehouse Management → Interfaces → ERP Integration → Delivery Processing → Map Document Types from ERP System to EWM*. Examples are:

- PSD Production Supply (Inbound/Outbound)

  This would be used for an inbound (if required) and an outbound delivery in the scenario where the supplying storage location and the receiving storage location are **not** connected to the same warehouse number.

- PSP Production Supply (Posting Change)

  Only one storage location is used or the supplying and the receiving storage location are connected to the same warehouse number.

- PCD Consumption for Production

  When the staged components are consumed from ERP and goods issue is posted.

LESSON SUMMARY

You should now be able to:

- Perform staging for production

Posting Consumption for Delivery-based Production Supply

LESSON OVERVIEW
In this lesson, you learn how to post consumption for a production order in SAP ERP.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Post consumption with the delivery based production integration

Consumption Posting Delivery for Production Supply

You trigger the consumption of the components from SAP ERP. One way is to trigger a goods issue posting with reference to the production order. With the confirmation of the production order, it is possible in the SAP ERP system to generate a consumption posting for backflushing. In both cases, an outbound delivery is then created and replicated to SAP EWM. The delivery is not relevant for picking in SAP EWM and, with the correct settings, the system posts a goods issue immediately on creating this delivery.

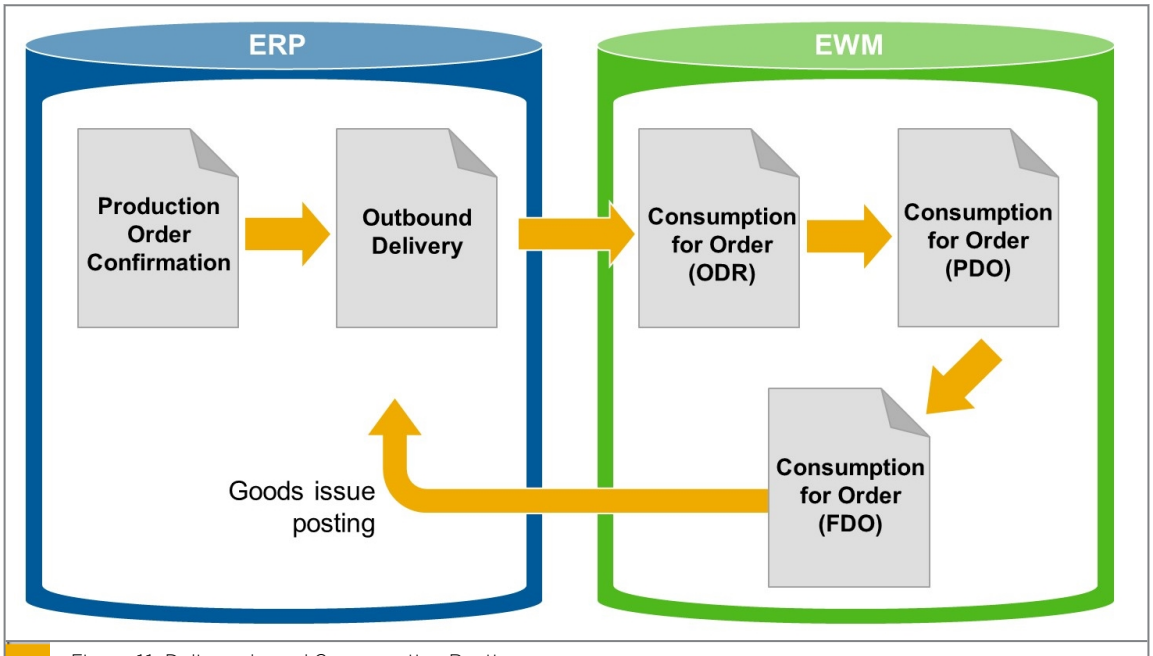

Figure 11: Delivery-based Consumption Posting

Note:
As with other documents, there is no outbound delivery request in an SAP S/4HANA embedded EWM.

LESSON SUMMARY
You should now be able to:

- Post consumption with the delivery based production integration

Using Kanban as Production Process

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Use Kanban in Production
- Execute Kanban Replenishment

Kanban

In kanban, material flow is organized using containers that are kept directly at the appropriate work centers in production. Each container contains the quantity of material required by the personnel at that work center for a certain period of time.

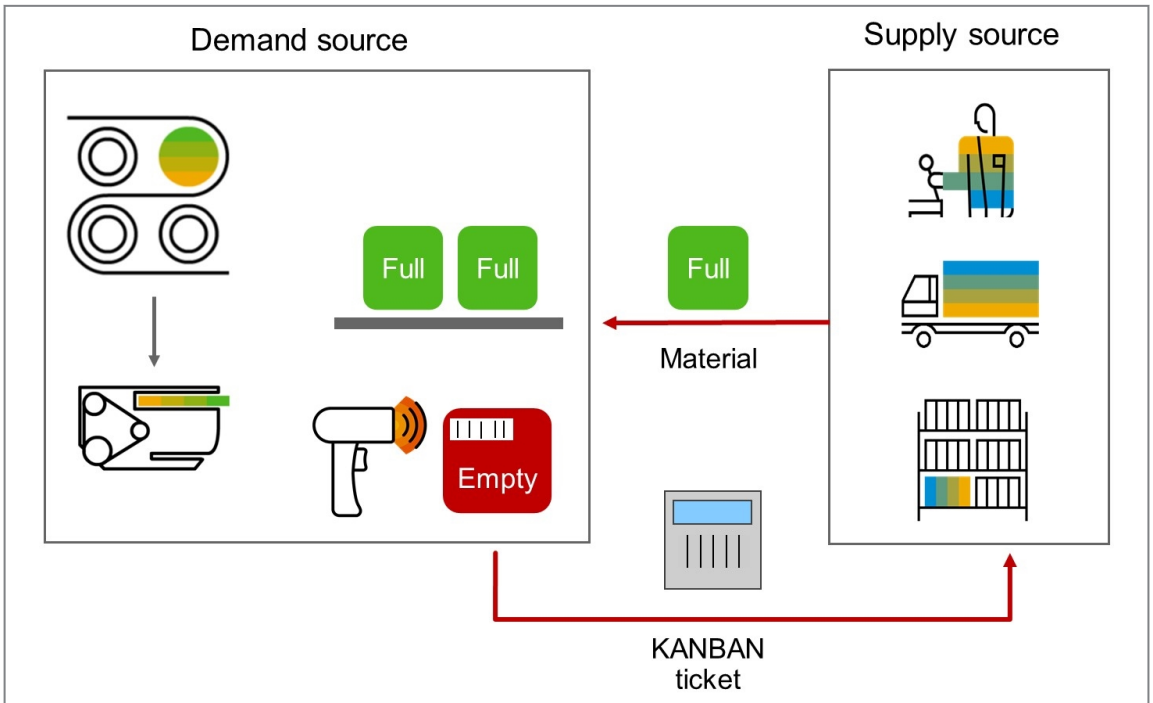

Figure 12: Kanban Process

As soon as a container is emptied at the demand source, replenishment is initiated. The supply source for the required material can be another place in production, an external supplier, or a warehouse. The demand source can use material from other containers until the filled container returns.

The aim is that the replenishment process is controlled by production itself, and that the employee has to perform fewer manual postings. This self-management process and the fact that replenishment elements are created close to the time they are actually consumed means

that stocks are reduced and lead times are shortened. (Replenishment is only triggered when a material is actually required, and not before.)

Master data for Kanban Replenishment

In general, the master data for kanban is the same as with any other delivery-based production integration scenario.

- Storage location

  You can use a separate storage location within the supplying warehouse, a storage location that is MM-IM managed or has its own EWM warehouse, or not use a separate storage location at all.

- Production Supply Area

  The PSA is defined in SAP ERP and must be known in SAP EWM as well.

- Control Cycle

  The kanban control cycle looks different in SAP ERP than the control cycles for production orders, as in kanban the source can also be an external vendor or internal production. The control cycle in SAP EWM is similar to the ones for pick parts or release order parts.

For the plant, a replenishment strategy for stock transfer must be defined. SAP supplies a *Control Type*: *7 Delivery from an EWM-Controlled Storage Location* for this purpose.

Kanban Replenishment

The progress of production in kanban is controlled by setting the kanban to the appropriate status. Usually, only the **Empty** and **Full** statuses are used.

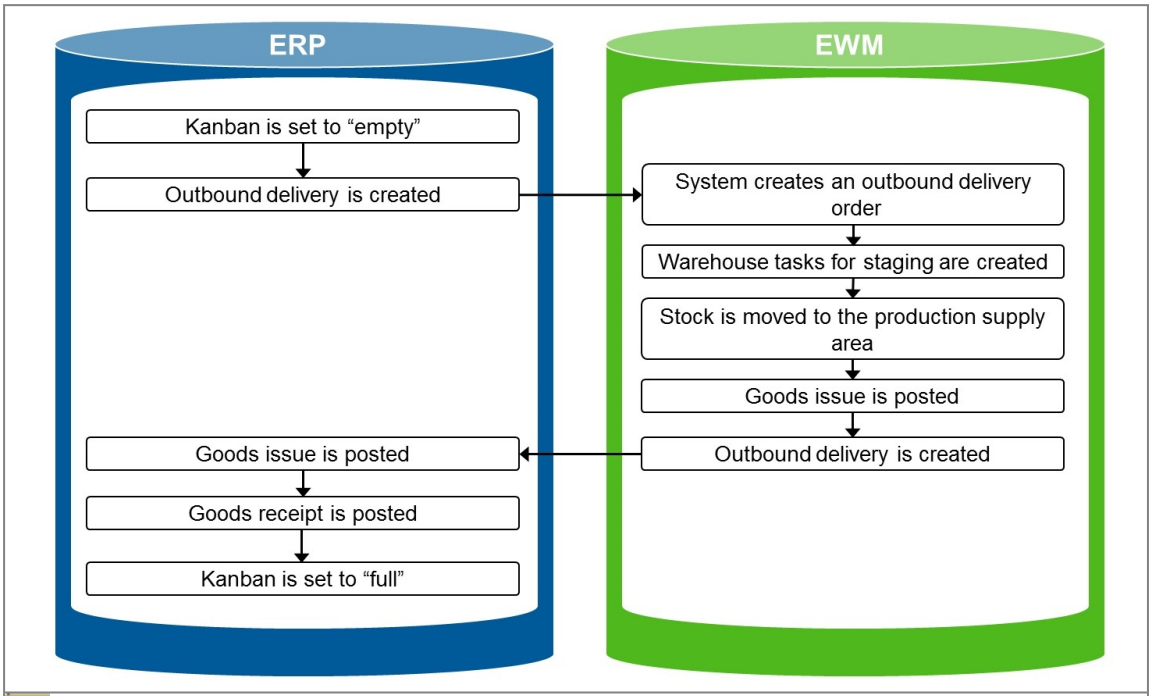

Figure 13: Kanban with two Storage Locations

When the demand source sets the status to **Empty**, the system creates a replenishment element, instructing the material supply source to delivery. When the supply source is an EWM-managed storage location, the ERP system creates an outbound delivery. The resulting warehouse request in the EWM system (posting change or outbound delivery) depends on the

relationship of the supplying and receiving storage locations. For the warehouse request the warehouse tasks are created and processed. The picture above shows the scenario when the receiving storage location is MM-IM managed and a one-step stock transfer is used (the goods issue from EWM triggers automatically the goods receipt in the receiving storage location).

Since the SAP S/4HANA 1909 release, a new replenishment strategy is available in SAP S/4HANA embedded EWM. With this replenishment strategy, the warehouse tasks to replenish a kanban container are automatically created when the kanban is set to empty, without the need for a delivery.

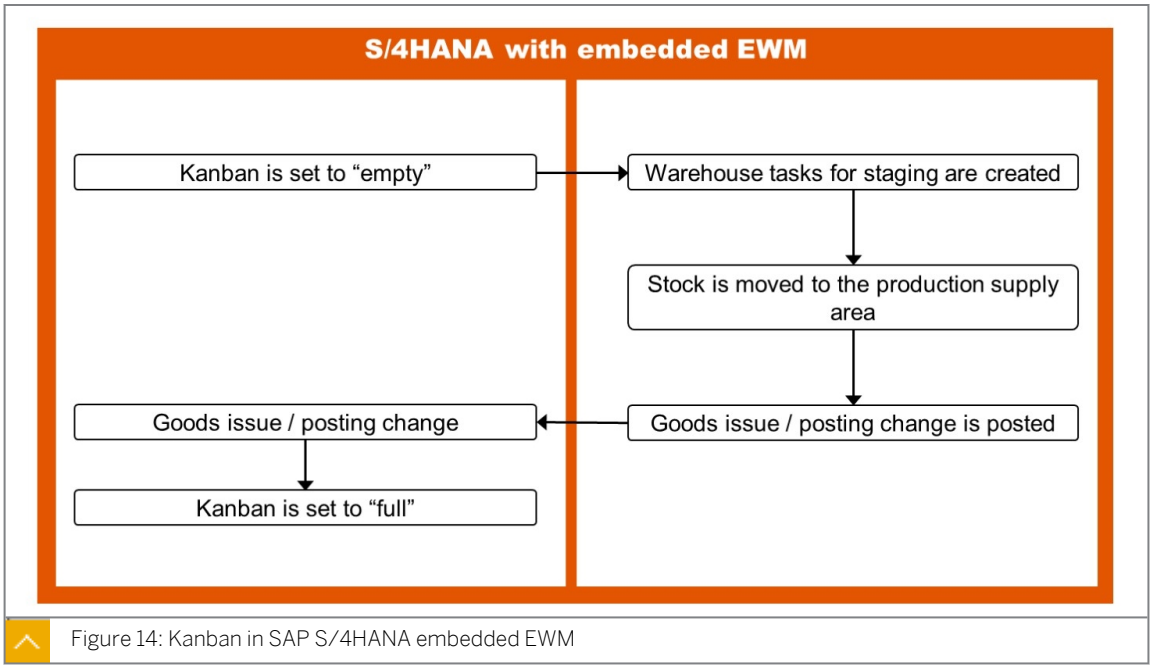

Figure 14: Kanban in SAP S/4HANA embedded EWM

Setting the status of a kanban to empty, is not the same as a goods issue posting. In kanban, goods issues are typically backflushed during the confirmation of the production order or the manual goods issue posting for the production order.

LESSON SUMMARY

You should now be able to:

- Use Kanban in Production
- Execute Kanban Replenishment

Creating Stock Transfers for JIT Calls

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Create Stock Transfers for JIT Calls

Stock Transfers for JIT Calls

Just-In-Time (JIT) is a logistics concept of providing material at the exact point in time when it is needed in the production process. Therefore, material buffers are reduced to a minimum to meet the current needs of the production line. JIT relies on streamlined processes for supply chain planning and operations.

JIT processing is commonly used in repetitive manufacturing and discrete manufacturing, specifically in the automotive industry. It is used when large quantities of products are required on the production line and when the demand is known beforehand, which allows accurate forecasting for replenishment. JIT processing allows tight alignment between suppliers, both external and internal, and production warehouses, which often operate the last segment of replenishment to the production line.

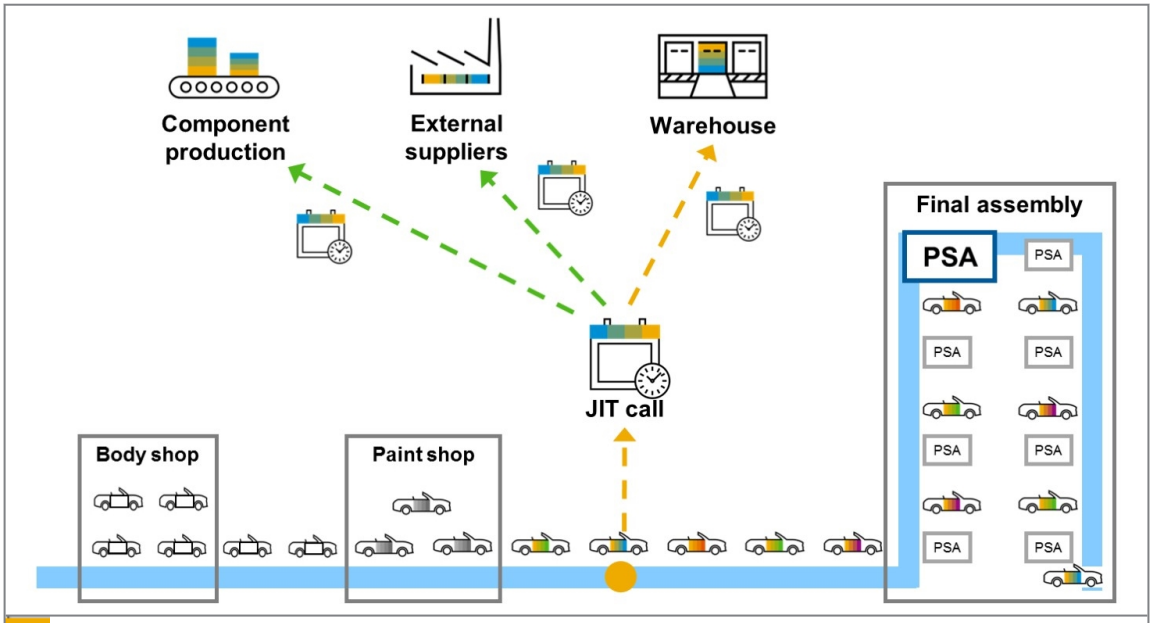

Figure 15: JIT Supply to Production

A JIT call is sent from the production supply area to the warehouse, external supplier or to the internal production, requesting replenishment of materials. The JIT call specifies the quantity, date, time, destination production supply area, destination storage location, material and partner information, scheduling agreement for each requested material.

In the **Supply to Production** process **from Warehouse**, the recipient of the call is the intra-company production warehouse. It is located close to the production to ensure short lead times.

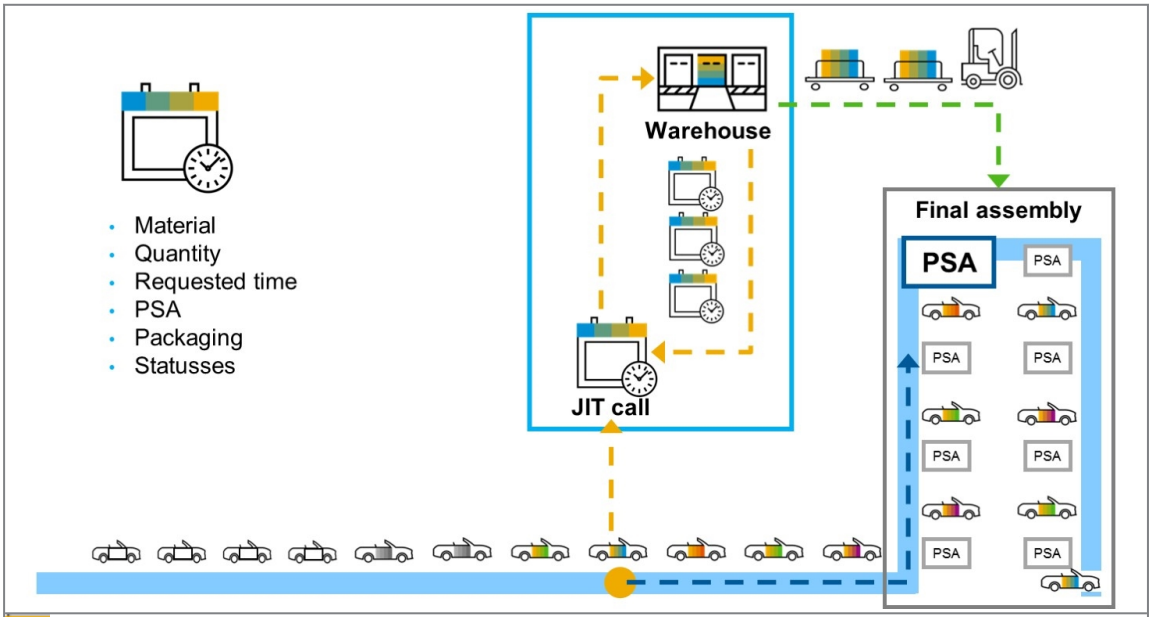

Figure 16: JIT Supply with Stock Transfer

A relevant JIT call creates synchronously an EWM stock transfer. This is a warehouse request with the document category *WMR*. Usually, warehouse requests with this document category can only be created internally. To enable this integration, SAP S/4HANA 2020 offers a new interface for the *JIT Supply to Production*.

> Note:
> Stock transfers for JIT calls are only available in embedded EWM.

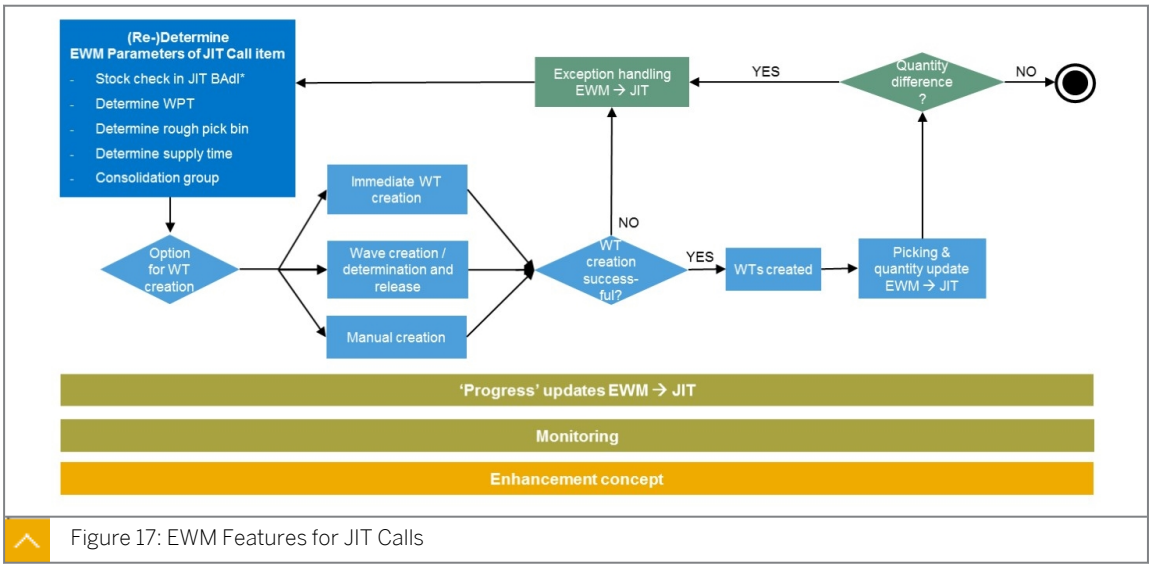

Figure 17: EWM Features for JIT Calls

The warehouse request created for the JIT call can be relevant for wave management, but warehouse tasks can also be created manually, or automatically using a PPF action. Exceptions during the warehouse task creation or picking can be used to update the JIT call.

Furthermore, updates of the quantity, supply date and time, or the priority in the JIT call can be used to update the warehouse request.

LESSON SUMMARY

You should now be able to:

- Create Stock Transfers for JIT Calls

Learning Assessment

1. How does the system calculate the quantities to replenish for crate parts?

   Choose the correct answers.

   - ☐ **A** With the information of the EWM control cycle and the determined packaging specification
   - ☐ **B** With the defined quantities in the EWM control cycle
   - ☐ **C** With the quantities in the ERP control cycle
   - ☐ **D** With the required quantities in the manufacturing order

2. For the delivery based production integration with one warehouse the delivery document in SAP ERP is always which of the following?

   Choose the correct answer.

   - ☐ **A** An outbound delivery
   - ☐ **B** An inbound delivery
   - ☐ **C** A posting change

3. For the consumption posting with the delivery based production integration you start the posting process in which of the following?

   Choose the correct answer.

   - ☐ **A** SAP ERP
   - ☐ **B** SAP EWM

4. What is happening when a kanban is set to “empty”, the supplying storage location is EWM managed, and the receiving storage location is IM managed?

   Arrange these steps into the correct sequence.

   - [ ] An outbound delivery is created in SAP ERP
   - [ ] A warehouse task for picking is created and processed
   - [ ] An outbound delivery order is created in SAP EWM
   - [ ] Goods issue and goods receipt is posted in SAP ERP
   - [ ] The kanban is set to “Full”
   - [ ] Goods issue is posted in SAP EWM.

Learning Assessment - Answers

1. How does the system calculate the quantities to replenish for crate parts?

   Choose the correct answers.

   [X] A With the information of the EWM control cycle and the determined packaging specification

   [X] B With the defined quantities in the EWM control cycle

   [ ] C With the quantities in the ERP control cycle

   [ ] D With the required quantities in the manufacturing order

   That is correct. The system either has a packaging specification and quantity classification, minimum and replenishment number of containers in the EWM control cycle, or unit, minimum and replenishment quantities directly in the EWM control cycle.

2. For the delivery based production integration with one warehouse the delivery document in SAP ERP is always which of the following?

   Choose the correct answer.

   [X] A An outbound delivery

   [ ] B An inbound delivery

   [ ] C A posting change

   That is correct. For the delivery based production integration with one warehouse the delivery document in SAP ERP is always an outbound delivery.

3. For the consumption posting with the delivery based production integration you start the posting process in which of the following?

   Choose the correct answer.

   [X] A SAP ERP

   [ ] B SAP EWM

   That is correct. For the consumption posting with the delivery based production integration you start the posting process in SAP ERP.

4. What is happening when a kanban is set to “empty”, the supplying storage location is EWM managed, and the receiving storage location is IM managed?

   Arrange these steps into the correct sequence.

   1 An outbound delivery is created in SAP ERP

   3 A warehouse task for picking is created and processed

   2 An outbound delivery order is created in SAP EWM

   5 Goods issue and goods receipt is posted in SAP ERP

   6 The kanban is set to “Full”

   4 Goods issue is posted in SAP EWM.

   That is correct. An outbound delivery in SAP ERP and subsequently an outbound delivery in SAP EWM is created. The warehouse task for picking is created and processed. The goods issues in posted in SAP EWM, this creates a goods issue and a goods receipt posting in SAP ERP and the kanban is set to “Full”.

UNIT 4 Advanced Production Integration

UNIT OBJECTIVES

- Set up the master data for the advanced production integration.
- Stage products with the advanced production integration
- Consume products with the advanced production integration

Unit 4
Lesson 1

Setting Up Master Data for Advanced Production Integration

LESSON OVERVIEW
In this lesson, you learn how to set up master data for the advanced production integration.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Set up the master data for the advanced production integration.

Production Supply Area (Advanced Production Integration)

The production supply area (PSA) 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.

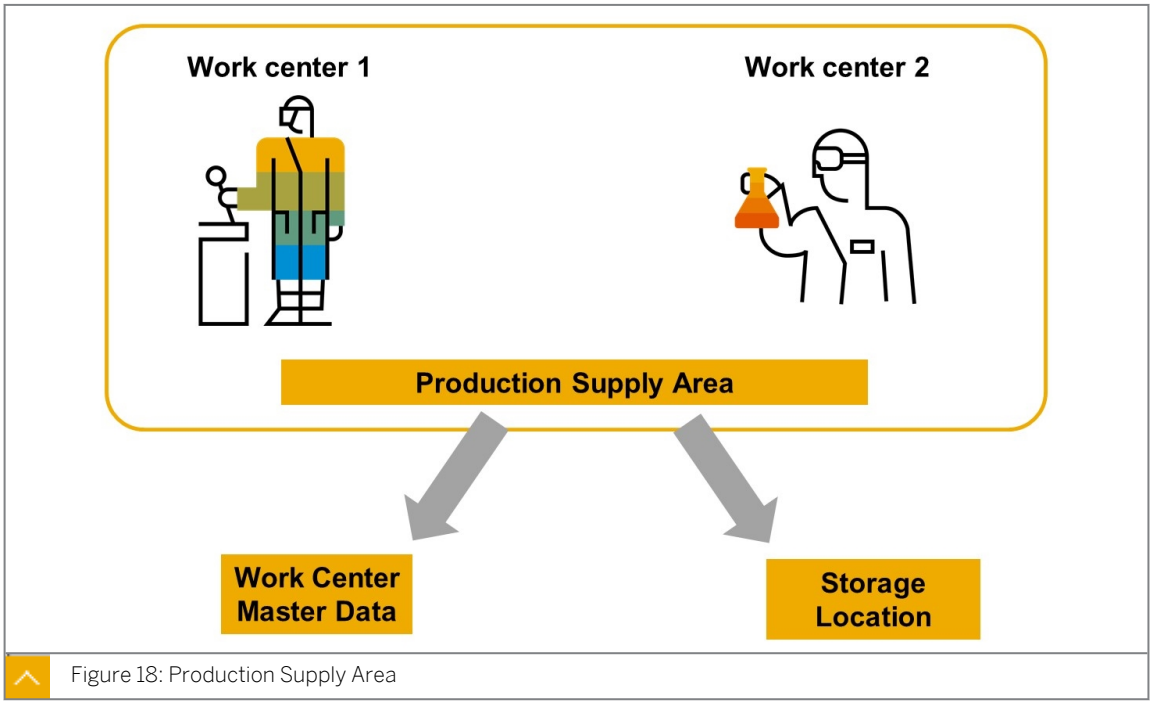

Figure 18: Production Supply Area

In the advanced production integration, the PSA will always contain a storage location, which is connected to the same warehouse as the storage location supplying the material, or it is the same storage location. A shuttle scenario, that is, one where the PSA storage location is not connected to the warehouse or is connected to another warehouse than the supplying storage location, is not supported.

Control Cycles for Advanced Production Integration

For the advanced production integration, all control cycles in ERP look the same; the staging indicator is 5 – EWM Staging. The detailed settings are done in EWM.

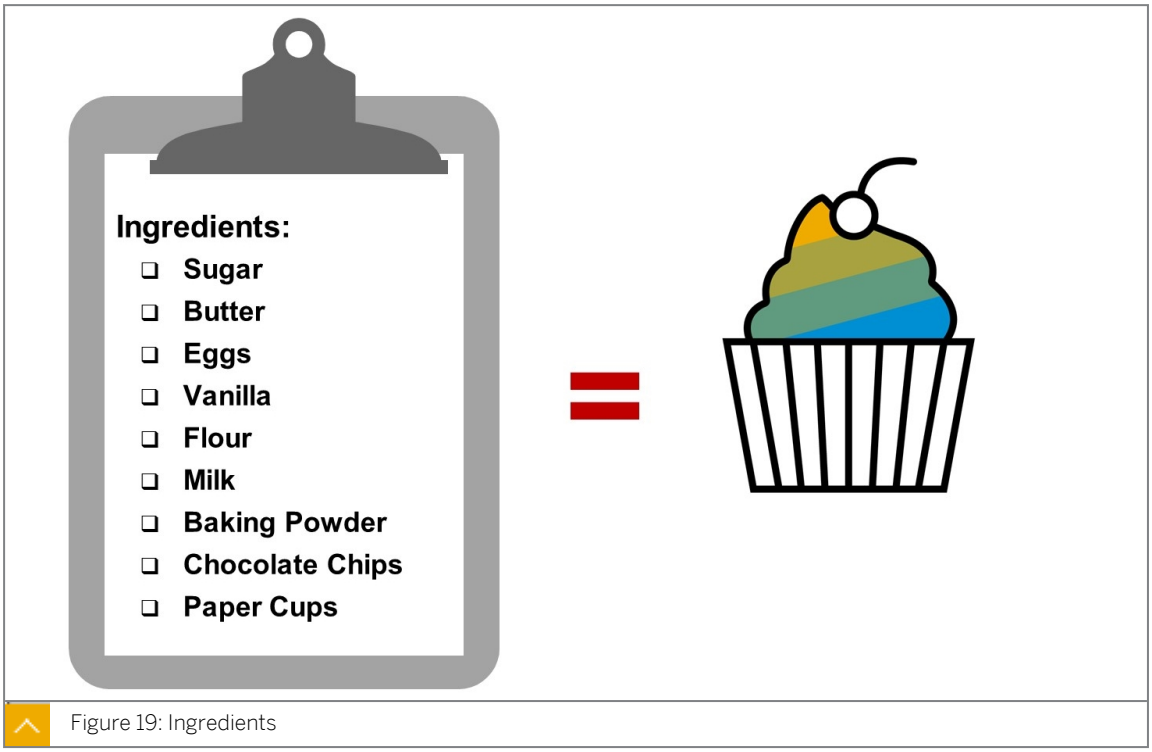

Figure 19: Ingredients

In the assignment of bins to a product staging area, you can distinguish whether a product is staged for an individual manufacturing order (single-order staging) or for several combined (cross-order staging). Also, crate parts can be staged for a production material request.

As with crate parts, settings in the EWM control cycle are required for the quantities that are to be staged. The system receives the demand for supply from the production material request, but the quantity is defined in the bin assignment. This enables the controller executing the staging process to stage partial quantities of the products at intervals as they are required. This is controlled by the BAdI /SCWM/EX_MFG_STAGE_INFO, so that it can be influenced by customers with their own BAdI implementation.

LESSON SUMMARY

You should now be able to:

- Set up the master data for the advanced production integration.

Staging Products for Advanced Production Integration

LESSON OVERVIEW
In this lesson, you learn how to stage materials based on a production material request.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Stage products with the advanced production integration

Staging Products

When using the advanced production integration, for each manufacturing order in ERP, the system creates a Production Material Request (PMR) directly in EWM, without any additional document in ERP. SAP ERP sends a message containing the required information from production when the manufacturing order is released and WM material staging is triggered. The WM material staging can be triggered automatically, or in the production order transaction, either by choosing *Function* → *WM Material Staging* → *Execute*, or by choosing the *WM Material Staging* button. If the manufacturing order is changed in ERP, the system updates the PMR for changes that are relevant for EWM, such as a changed quantity for staging.

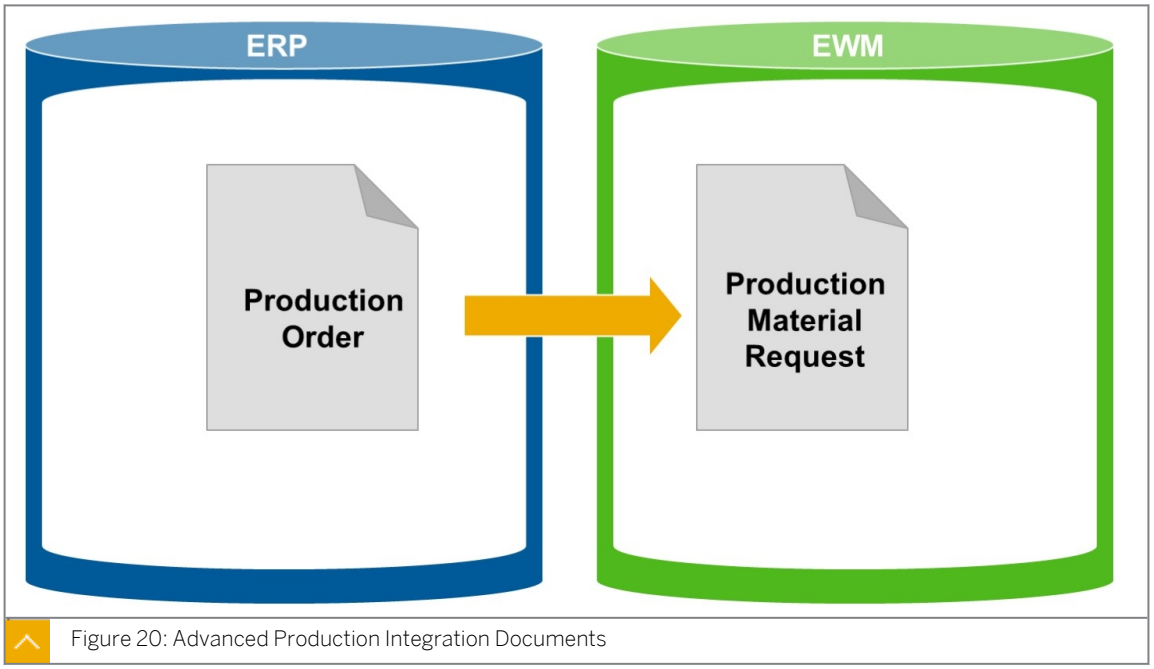

Figure 20: Advanced Production Integration Documents

Staging with Advanced Production Integration

This PMR contains the **receiving product**, and all the components from the manufacturing order in their required quantity.

The user can trigger the staging process manually *Staging for Production*, and automatically or manually with the transaction *Schedule Staging for Production* (/SCWM/STAGE). *Schedule Staging for Production* should be used for scheduling the staging run in the background, using a variant that contains the input parameters, such as warehouse, production staging area, and staging method. It is necessary to specify a time beyond which the system does not collect open staging requirements.

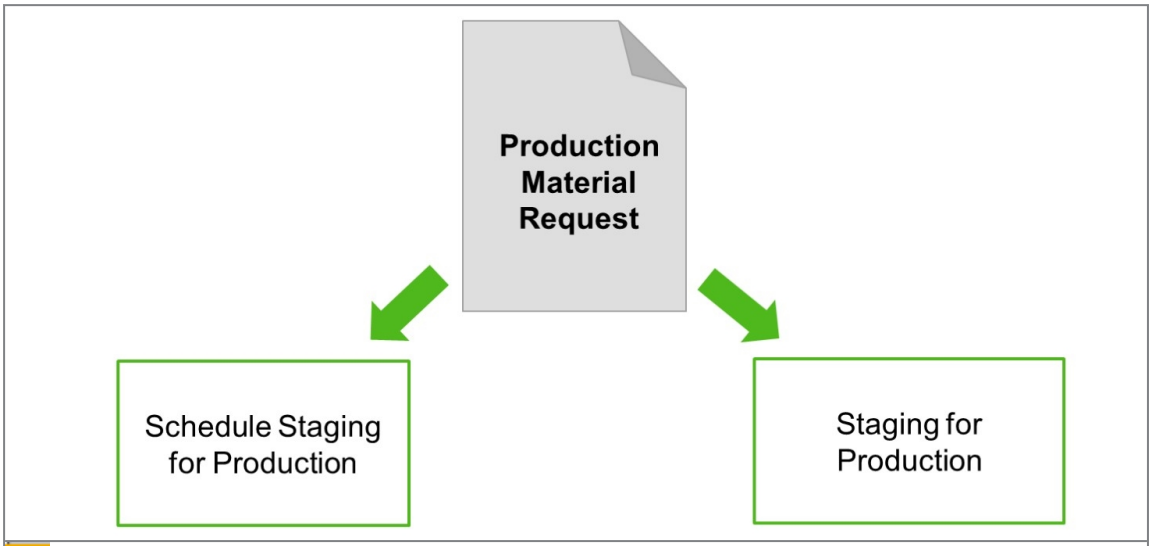

Figure 21: Staging with Advanced Production Integration

If the user decides which PMRs and which materials are to be staged, the Web Dynpro UI in the transaction *Staging for Production* enables the user to react to the stock situation in the PSA to stage more slowly when the production is delayed, or more quickly when production is ahead of time. This ensures that there is enough material when needed, but also that, if space in your production supply area (PSA) is limited, space is not blocked unnecessarily by products that are not required until later.

Staging Single Order versus Cross Order Items

Depending on the bin assignment settings, components are staged differently as follows:

Single Order Staging

The system creates a warehouse task to move the product to the PSA for each production material request (PMR) item. Each warehouse task has a reference to a single PMR. After the warehouse task is confirmed, the stock on the PSA has a reference to the PMR item, so the stock is reserved for the reference PMR item. Only this PMR can be used to consume the stock. You can manually release the reference to the PMR item for the stock.

Cross-Order Staging

The system accumulates products from more than one PMR and creates a warehouse task to move them to the PSA together. The warehouse tasks have no reference to the PMR item. After the warehouse task is confirmed, the stock has no reference to a PMR item. Each PMR that has an item with the product can be used to consume the stock.

This is a flexible method, which allows you to stage products whether the product is required for one PMR in particular, or by several PMRs.

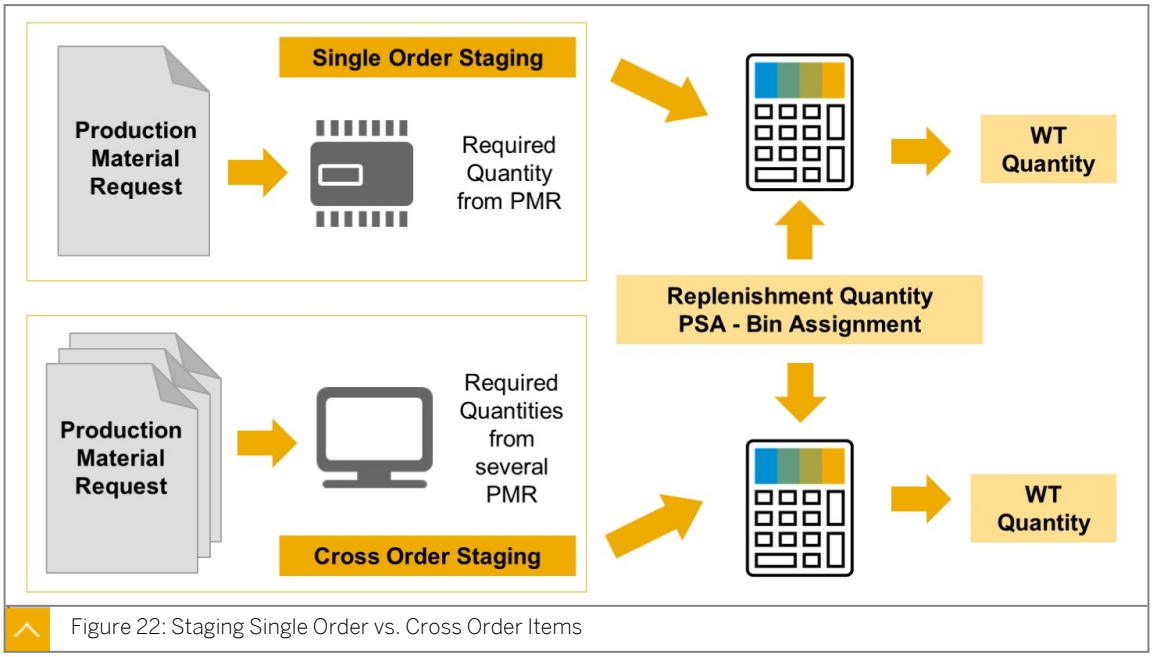

Figure 22: Staging Single Order vs. Cross Order Items

In the bin assignment, a minimum quantity for the product on the PSA is maintained. If the quantity on the PSA, plus the quantity of any open warehouse tasks, is lower than the minimum quantity, the system creates a warehouse task to move the replenishment quantity of the product to the PSA.

LESSON SUMMARY

You should now be able to:

- Stage products with the advanced production integration

Unit 4
Lesson 3

Consuming Products with Advanced Production Integration

LESSON OVERVIEW
In this lesson, you learn how to post the consumption of components for a manufacturing order with the advanced production integration.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Consume products with the advanced production integration

Product Consumption with a Production Material Request

For components that have not been marked for backflush, the consumption posting is triggered through the production material request (PMR). Consumption can be posted in a desktop transaction or using RF; a reversal of the consumption posting is also possible. You can post consumption for the entire quantity of the product at once, or you can post consumption for partial quantities of the product at intervals. You also can post consumption for a greater quantity of a product than was planned in the PMR. For consumption of partial quantities, you can post the consumption based on the quantity that has been consumed or the quantity that remains.

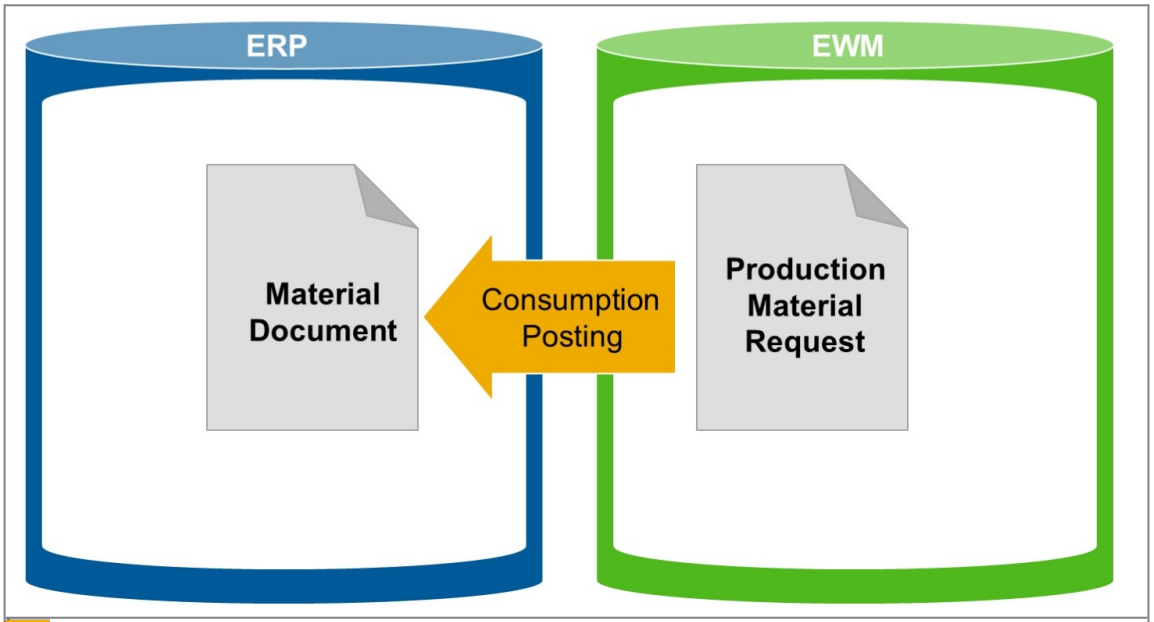

Figure 23: Advanced Production Integration Consumption Posting

The consumption posting in EWM directly creates material documents in ERP. They can be found under the list of *documented goods movements* from the manufacturing order.

Batches in Staging and Consumption

When you work with a batch managed product and PMRs, you have the following options for handling the batch:

- You do not enter any batch information in the manufacturing order.
- You enter batch selection criteria in the manufacturing order in SAP ERP.
- You enter the batch number in the manufacturing order in SAP ERP, either manually or through batch determination in SAP ERP.

SAP EWM uses the batch or the batch selection criteria to ensure that you use a batch that fulfills the requirements transferred from SAP ERP.

If a batch is already in the manufacturing order, you can display the batch data in SAP EWM, but you cannot change it.

For PMRs that contain batches or batch selection criteria, the system uses the staging method single-order staging only, to ensure that each manufacturing order gets a batch that fits its requirements.

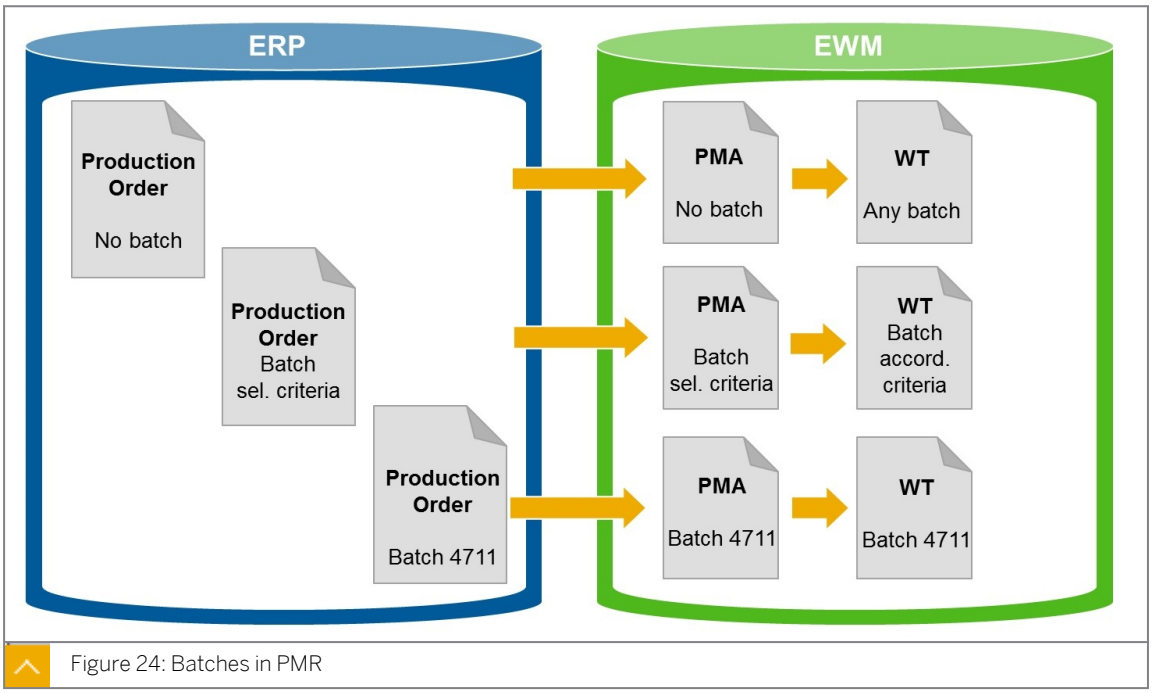

Figure 24: Batches in PMR

When creating a warehouse task for the PMR that contains batch information, SAP EWM takes into account only the batches that are allowed for the PMR item in the source stock determination, as follows:

- If the PMR item does not contain any batch information, the system uses any batch.
- If the PMR item contains batch selection criteria, the system uses stock from batches that fit the batch selection criteria only.
- If the PMR item contains the batch number, the system only uses stock from this batch.

LESSON SUMMARY

You should now be able to:

- Consume products with the advanced production integration

Learning Assessment

1. What types of staging can you select in the EWM control cycle for the advanced production integration?

   Choose the correct answers.

   - ☐ A Single-order staging
   - ☐ B Cross-order staging
   - ☐ C Pick-parts

2. When staging is triggered from SAP ERP with the advanced production integration, which of the following occurs?

   Choose the correct answer.

   - ☐ A An outbound delivery is created in ERP and copied to SAP EWM as a posting change.
   - ☐ B An outbound delivery and an inbound delivery are created in SAP ERP.
   - ☐ C A production material request is created in SAP EWM.

3. With the advanced production integration, the consumed quantity is entered in the production confirmation in SAP ERP.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

4. With the advanced production integration, it is possible to determine a batch in the production order and to pick this batch.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

Learning Assessment - Answers

1. What types of staging can you select in the EWM control cycle for the advanced production integration?

   Choose the correct answers.

   - [X] A Single-order staging
   - [X] B Cross-order staging
   - [ ] C Pick-parts

   That is correct. In the EWM control cycle you can select single-order staging or cross-order staging.

2. When staging is triggered from SAP ERP with the advanced production integration, which of the following occurs?

   Choose the correct answer.

   - [ ] A An outbound delivery is created in ERP and copied to SAP EWM as a posting change.
   - [ ] B An outbound delivery and an inbound delivery are created in SAP ERP.
   - [X] C A production material request is created in SAP EWM.

3. With the advanced production integration, the consumed quantity is entered in the production confirmation in SAP ERP.

   Determine whether this statement is true or false.

   - [ ] True
   - [X] False

4. With the advanced production integration, it is possible to determine a batch in the production order and to pick this batch.

   Determine whether this statement is true or false.

   - [X] True
   - [ ] False

UNIT 5 Goods Receipt from Production

UNIT OBJECTIVES

- Execute a goods receipt
- Clear the bins in the production supply area

Receiving Goods from Production

LESSON OVERVIEW
In this lesson, you learn how the goods receipt for material produced with a manufacturing order can be posted when using SAP EWM and how to clear a PSA if the material is not needed anymore for production.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Execute a goods receipt

Goods Receipt from Production

The goods receipt for the materials produced through a manufacturing order can be triggered either by SAP ERP or by SAP EWM.

Both processes can be used in parallel. 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 an Expected Goods Receipts from SAP ERP or SAP EWM, and you can only post the goods receipt in SAP EWM.

Technically, you always post the goods receipt in EWM first; the question is where the initial document, for which the GR is posted, is created.

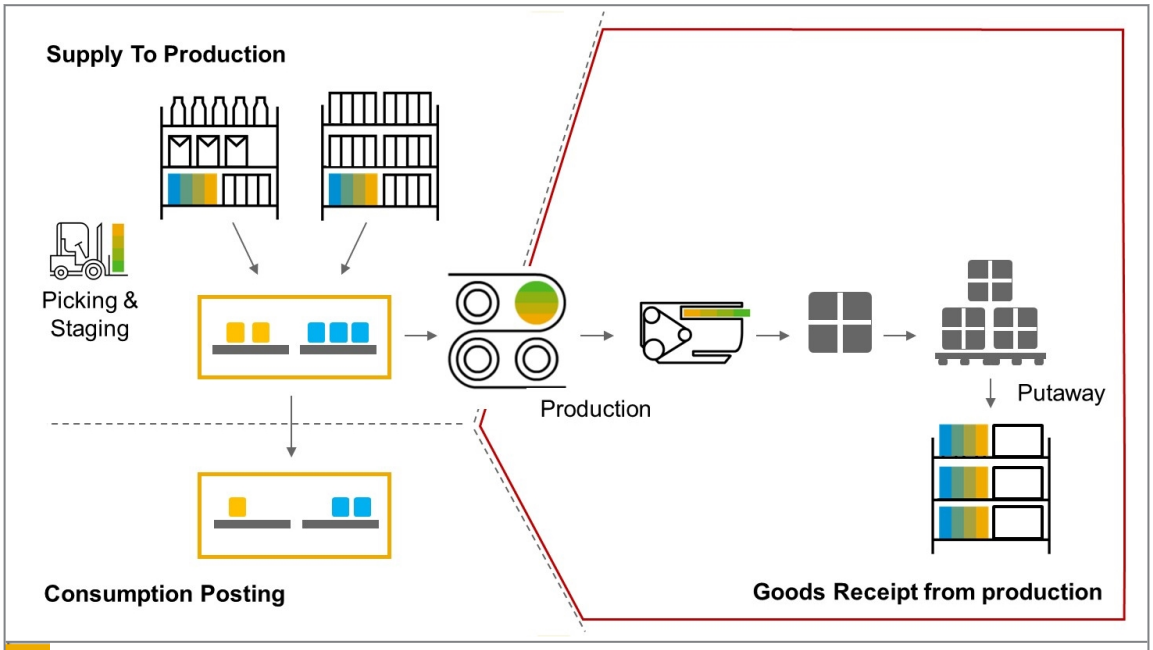

Figure 25: Goods Receipt from Production

Goods Receipt for Manufacturing Order in ERP

For posting a goods receipt (GR) from production, you can use a separate inventory management posting transaction. You can also trigger the posting at the same time as the goods issue posting of the components with the production order confirmation. For SAP EWM, this means that an inbound delivery has to be created, which is replicated to SAP EWM, and contains the information about the material and quantity being produced.

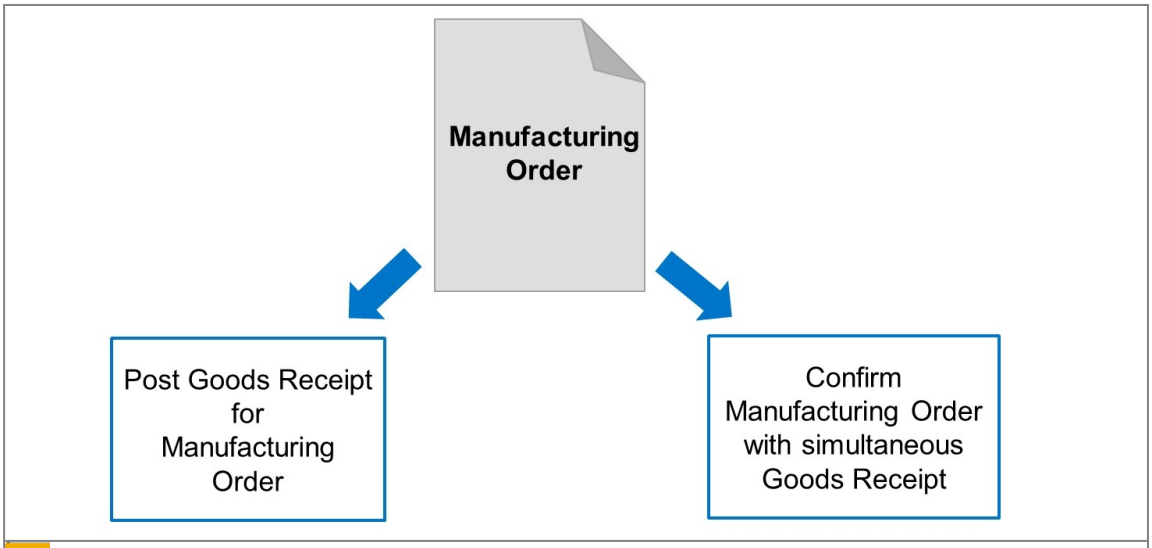

Figure 26: Goods Receipt for Manufacturing Order in ERP

This inbound delivery is then processed in SAP EWM. Either the GR is posted as the first step, which is then replicated to SAP ERP, and then the physical putaway is done. Or the putaway warehouse task (WT) is created as the first step and with the confirmation of the WT, the GR is automatically posted and replicated to SAP ERP.

Goods Receipt from ERP

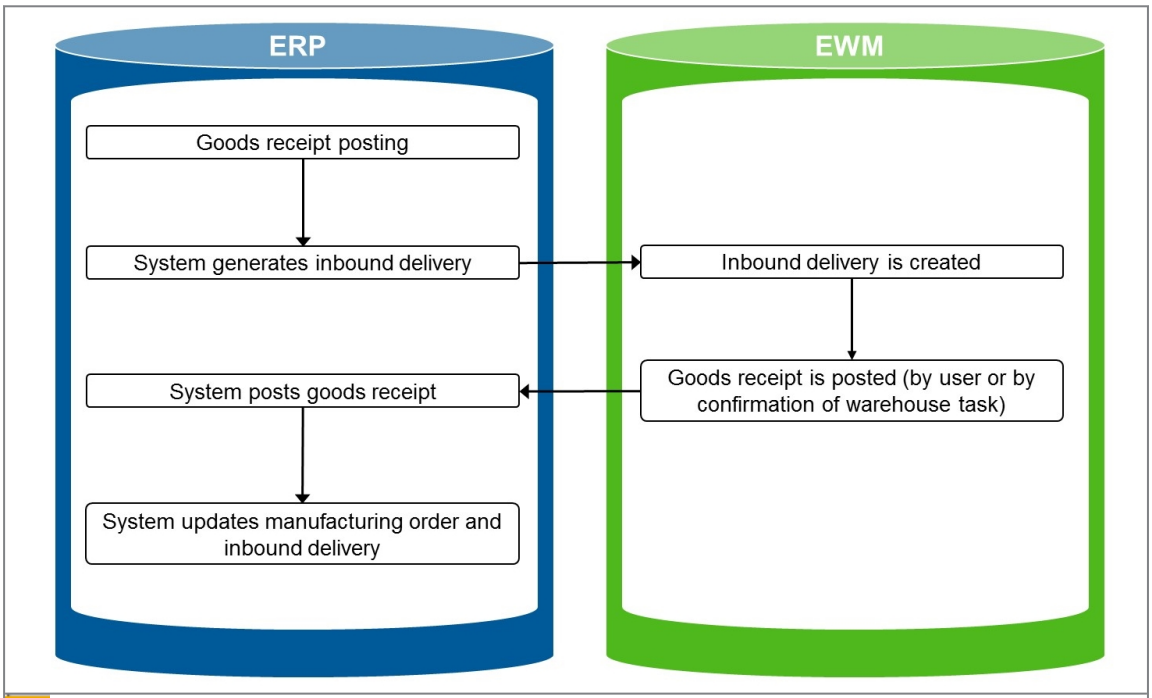

Figure 27: Goods Receipt from ERP

On the ERP side, it is necessary to set up the determination of a delivery type and a vendor. As the delivery is an inbound delivery, a vendor is required for it. The determination of this information is done with settings used in several other SAP ERP scenarios, it is not specific to SAP EWM.

The delivery is then mapped in SAP EWM as any other delivery type transferred from SAP ERP. SAP EWM uses document type Inbound Delivery from Production (IDPD) to differentiate that an SAP EWM inbound delivery from production takes place.

Goods Receipt Posting Triggered by SAP EWM

Starting the goods receipt from EWM means that you work with an Expected Goods Receipt Document in EWM, which is created through a report that runs in either SAP ERP or SAP EWM. Since SAP S/4HANA 1909 FP01, it is also possible to automatically create, update, and delete the expected goods receipt document when a production order is created or changed. For details, see the SAP Note 2811153 - Manufacturing Integration: Automatic creation / update of expected goods receipt in SAP EWM.

The expected goods receipt document contains data of an open purchase order or open manufacturing order. It represents a template that enables you to copy data from a purchase order or production order when creating a delivery in SAP EWM manually. The report creates the *Notification of Expected Goods Receipt*, and, through a PPF action, the *Expected Goods Receipt* is created.

This expected goods receipt is then used to create an inbound delivery directly in EWM. Further processing of this inbound delivery is as with any other inbound delivery, you can post a goods receipt, or create a warehouse task for putaway.

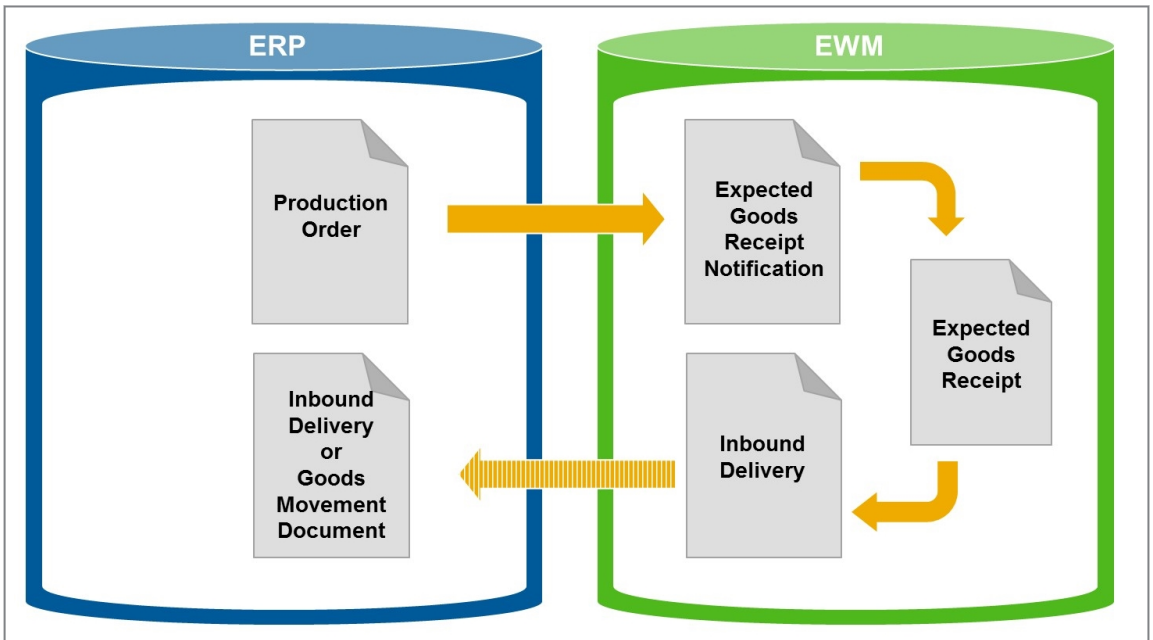

Figure 28: Expected Goods Receipt Documents

Note:
There is no Expected Goods Receipt Notification or Expected Goods Receipt (EGR) document in an SAP S/4HANA embedded EWM system. However, you can create the inbound delivery with the same transaction as in the decentralized EWM, the EGR is simply not necessary.

Depending on your settings this inbound delivery will create an inbound delivery in ERP or not. SAP delivers two standard delivery types for this process as follows:

- INBI (Inbound Delivery GR Production): this document type is set up to send a message to ERP and to create an inbound delivery there as well. On the ERP, side the goods receipt posting is visible through the goods movement status in this delivery and the goods receipt posting document can be found in the document flow.
- INBM (Inbound Delivery GR Manufacturing): no inbound delivery is created in ERP and the goods receipt posting in EWM directly creates an inventory management posting in ERP. This document type was introduced with the Advanced Production Integration.

Note:
This behavior is controlled by the *Communication to ERP* field, which is part of the process profile in the document type. When the selection is *via goods movement interface*, no delivery is created in ERP.

When the communication to ERP is through the goods movement interface, no Handling Unit information is sent back. If it is required, the BAdI /SCWM/EX_ERP_GOODSMVT_EXT can be implemented.

Receipt of HU from Production

The receipt of HUs from production using RF is how the goods receipt process at the end of a production line is automated. Before receiving the HUs from production, the line operator has to log on to a work center on his RF device. The system takes the storage bin assigned to that work center as the goods movement bin for the inbound deliveries that are created for each received HU.

The use of a work center in EWM offers a higher flexibility for the goods movement bin and the work center can be used for the printer determination (for HU labels). You also assign a proposal for a packaging material to the work center; in this way, no packaging specification is necessary.

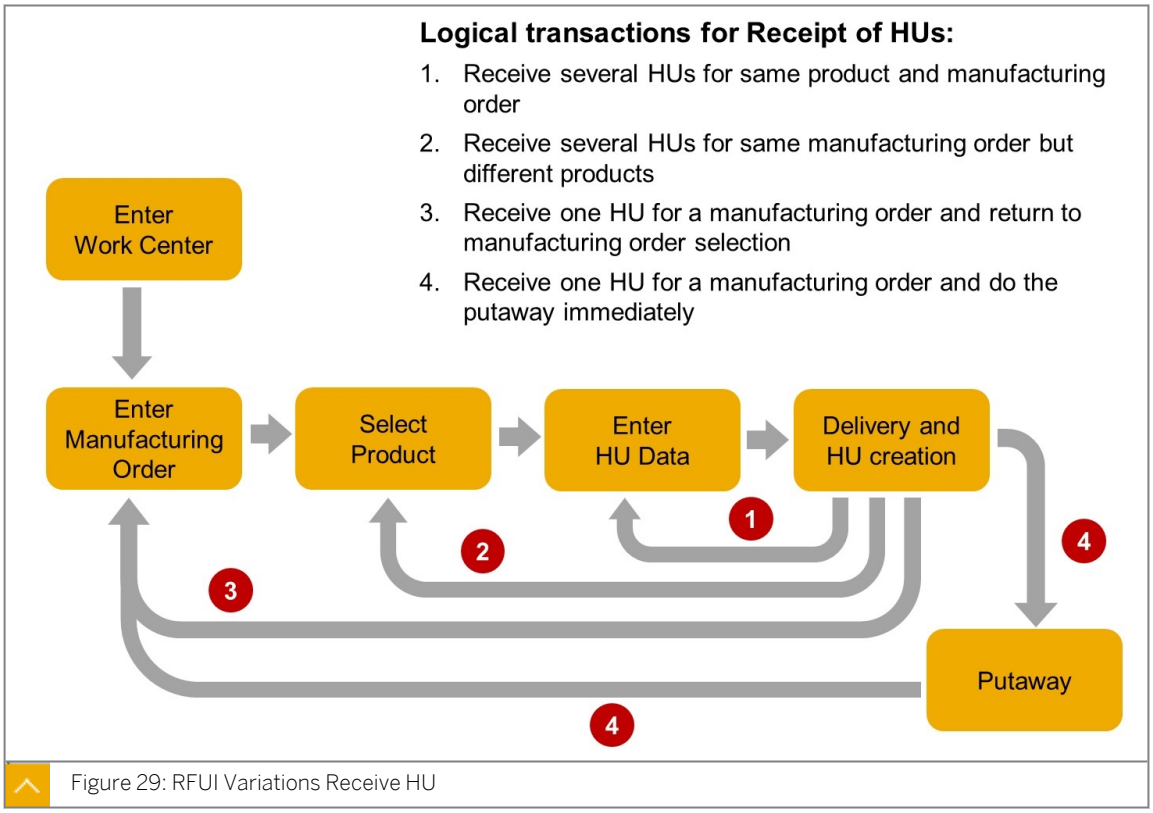

Figure 29: RFUI Variations Receive HU

An expected goods receipt document is required for the receipt of HUs from production.

Correction of Receipt from Production

You can reverse a full HU or a partial quantity of an HU in the RF transactions or in the warehouse management monitor screen, *Production Overview*.

The prerequisites are as follows:

- The HU contains one single stock item and the HU is not nested.
- The HU still has a reference to the inbound delivery; the final putaway is not confirmed yet.
- The HU was received from production (the delivery has a reference to a manufacturing order).
- No VAS is attached to the stock.

Completion of Open Inbound Deliveries

The report /SCWM/R_MFG_PDI_COMPLETE can be used to report to complete open inbound deliveries once you do not expect to receive any more products for a manufacturing order. For example, if a physical HU received from production loses its label, and you create a new HU to receive it, the original HU is still open in the system but the physical HU has been received. With the report, you can reverse the actions that have already been performed on the original inbound delivery and set the delivery quantity to zero.

The prerequisites are as follows:

- The open inbound deliveries have an existing manufacturing order reference.
- Any putaway warehouse tasks for the inbound delivery have not been confirmed.

LESSON SUMMARY

You should now be able to:

- Execute a goods receipt

Clearing the Production Supply Area

LESSON OVERVIEW
Once the production is finished and material is still left in the PSA, this material is to be moved by to the regular bins for later picking.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Clear the bins in the production supply area

Production Supply Area Clearing

After a PMR is completed and the production process in ERP is finished, it is possible that there is still a quantity of the product on the PSA, and that no other PMR needs the product. In this case, the product should be brought back to the warehouse so that it does not occupy space on the PSA. You create warehouse tasks for this movement with the transaction *Clear Production Supply Area*.

For products staged using the single-order staging method, you must first release the reference document to clear the reference in the stock (with the same transaction). If you do not release the reference document, the stock can never be used for another PMR.

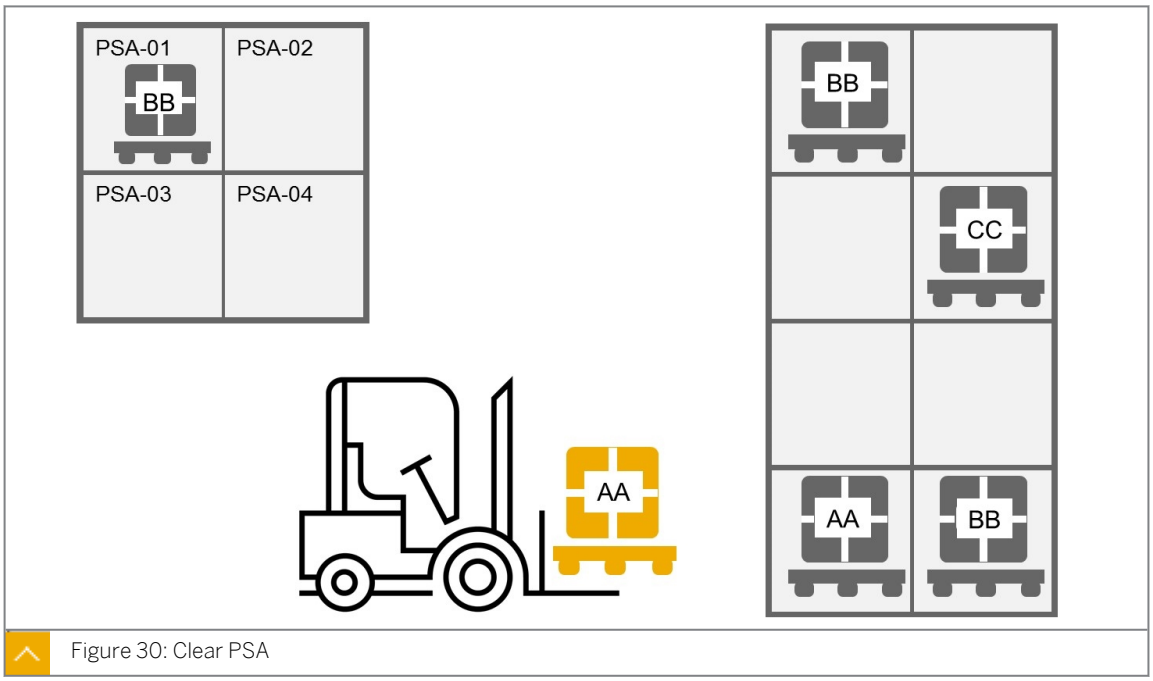

Figure 30: Clear PSA

There are no special functions to clear a PSA when using the delivery-based production staging. You create ad-hoc warehouse tasks after the information from production that the

excess components are not required anymore (the same way you would create warehouse tasks if there are additional quantities needed).

LESSON SUMMARY
You should now be able to:

- Clear the bins in the production supply area

Learning Assessment

1. For the goods receipt posting triggered from the SAP ERP system, which of the following is created in the ERP system?

   Choose the correct answer.

   - ☐ A An inbound delivery
   - ☐ B An outbound delivery
   - ☐ C A posting change

2. The report to create the expected goods receipt document can run in which of the following?

   Choose the correct answers.

   - ☐ A SAP ERP
   - ☐ B SAP EWM
   - ☐ C SAP CRM

3. For an inbound delivery, which is created directly in SAP EWM for an expected goods receipt document, you always receive an inbound delivery in SAP ERP.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

4. When a manufacturing order is technically completed, the PSA is automatically cleared of any components that are still there.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

Learning Assessment - Answers

1. For the goods receipt posting triggered from the SAP ERP system, which of the following is created in the ERP system?

   Choose the correct answer.

   [X] A An inbound delivery

   [ ] B An outbound delivery

   [ ] C A posting change

   That is correct. For the goods receipt posting triggered from the SAP ERP system, an inbound delivery is created.

2. The report to create the expected goods receipt document can run in which of the following?

   Choose the correct answers.

   [X] A SAP ERP

   [X] B SAP EWM

   [ ] C SAP CRM

   That is correct. The report to create the expected goods receipt document can run in SAP ERP or in SAP EWM.

3. For an inbound delivery, which is created directly in SAP EWM for an expected goods receipt document, you always receive an inbound delivery in SAP ERP.

   Determine whether this statement is true or false.

   [ ] True

   [X] False

   That is correct. The inbound delivery in SAP EWM can create an inbound delivery or directly create a goods movement document in SAP ERP.

4. When a manufacturing order is technically completed, the PSA is automatically cleared of any components that are still there.

   Determine whether this statement is true or false.

   ☐ True

   ☒ False

   That is correct. You have to clear the PSA manually, because components can also be used by other manufacturing orders if they are not single-order staged.