

Browse the Book

This chapter explores the supply chain with SAP S/4HANA. Covering key topics including embedded EWM, embedded TM, advanced ATP, and more, you'll get the full tour of SAP S/4HANA's supply chain functionality, as well as insight into SAP S/4HANA Cloud for supply chain.

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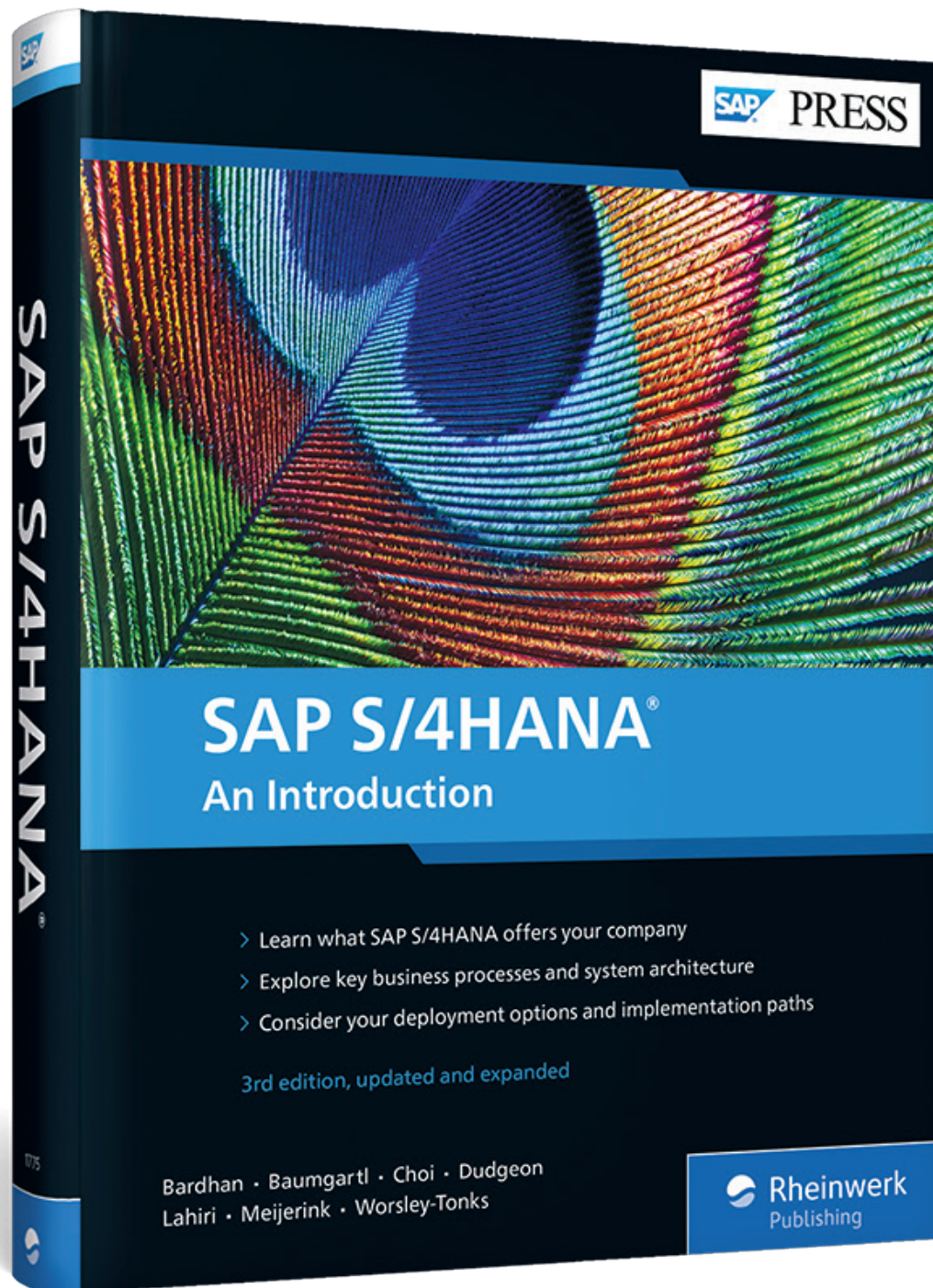
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Chapter 4

Supply Chain

In this chapter, we'll discuss how SAP S/4HANA Enterprise Management addresses the pain points and challenges related to the supply chain industry.

Let's switch our focus to the supply chain line of business (LoB) within SAP S/4HANA Enterprise Management. We'll review the industry pain points for the supply chain and explain what key SAP S/4HANA benefits will resolve today's pain points. Then, we'll discuss the SAP S/4HANA innovations in a more detailed way, starting with the simplified data model and material valuation.

Next, we'll discuss the embedded extended warehouse management (EWM) and embedded transportation management (TM) in SAP S/4HANA functionalities and their key benefits compared to the decentralized option. We'll also take a look at the improved catch weight management capabilities, quality management, and commodity management functionalities integrated into the SAP S/4HANA core.

We'll conclude this chapter with a look at the SAP S/4HANA Cloud supply chain functionality, planned innovations for the supply chain, and a summary of the SAP S/4HANA innovations that will resolve the pain points.

4.1 Industry Pain Points and SAP S/4HANA Benefits

In today's world, a company must meet three key demands: speed, individuality, and innovation. With the rise of new technologies, customer expectations have increased significantly. Customers have more specific product requirements and want the delivery of their orders as quickly as possible. In addition, with the heavy competition of today, customers have a lower threshold and can switch at any moment to another supplier or to someone who hasn't entered the market before.

Following are some of today’s key challenges for supply chains:

- Increasing customer requirements cause companies to produce products adapted to individual requirements. Classic inventory planning can’t keep up with the flexible accommodations or custom configurations that customers are expecting today.
- Lack of real-time reports on stock levels often leads to delivery delays and dissatisfied customers.
- Lack of transparency and real-time insights causes companies to struggle with data analysis.

Inventory management in SAP S/4HANA enables organizations to harmonize warehouse inventories and demand and supply planning, as well as use all data and analysis on a company-wide basis. Real-time processing of inventory postings and inventory values rather than overnight jobs can lead to a higher accuracy of inventory, increase in turnover, and reduced days of items in stock.

In addition, inventory management can take all production locations and external supply chains into account and can manage the changing demand for smaller lot sizes passing through entire logistics operations with all involved parties. Real-time information, including early error detection, creates precise where-used information per unit.

SAP S/4HANA allows real-time processing of inventory postings and visibility of warehouse inventory, resulting in the following business benefits:

- Improved on-time delivery
- Increased inventory turnover
- Reduced cost of inventory
- Single source of truth for inventory in one system
- Decreased stock levels due to increased transparency

The user experience (UX) offered by SAP Fiori enables users to access data anytime and anywhere. Within SAP Fiori, there are three types of SAP Fiori apps: transactional, analytical, and fact sheet.

Transactional SAP Fiori apps allow you to execute specific tasks and transactional activities. Those that are currently available for inventory management allow you to do the following:

- Post goods receipts (GRs) for purchase orders
- Transfer stock from one storage location to another storage location and make changes to stock type
- Manage stock by posting an initial GR or scrapping from stock

Analytical SAP Fiori apps are used to provide real-time insights and/or key performance indicator (KPI) information into specific parts of a process. Related to inventory management, an analytical SAP Fiori app is available for material document overview and stock overview (for a single material). It provides the user with an overview of inventory level and material postings at any point in time and on any device.

Fact sheet SAP Fiori apps allow users to quickly navigate to other related documents and provide links to follow-on processes. Fact sheets for inventory management are provided for the following:

- Goods receipt (GR)
- Goods issue (GI)
- Material

Table 4.1 describes the key challenges for the chief supply chain officer (CSCO) for the area of supply chain management and how SAP S/4HANA functionalities can address today’s challenges.

Challenge for the CSCO	How SAP S/4HANA Can Help
Lack of visibility: <ul style="list-style-type: none"> ■ Lack of visibility of most-up-to-date stock levels (internal and extended supply chain). ■ Lack of real-time support to improve planning and execution decisions. ■ Lack of support to identify where and how many products are stocked, how to allocate stocks to improve the service levels and reduce logistics costs, and how to reduce waste along the supply chain. 	SAP S/4HANA increases visibility using the following functions: <ul style="list-style-type: none"> ■ Real-time insights on inventory levels, improving accuracy. ■ Advanced available-to-promise (ATP), improving visibility into remaining noncommitted inventories, and possibilities to cover incoming customer orders. ■ Embedded EWM in SAP S/4HANA. ■ Embedded TM in SAP S/4HANA.

Table 4.1 Supply Chain Management Challenges and SAP S/4HANA Advances

Challenge for the CSCO	How SAP S/4HANA Can Help
<p>Increasing volatility in demand and supply:</p> <ul style="list-style-type: none"> ■ Limited system capabilities to provide real-time data to identify issues, to react to stock shortages, and to ultimately improve service levels and optimize processes. 	<p>Enterprises can be more resilient against supply and demand volatilities due to the following benefits:</p> <ul style="list-style-type: none"> ■ Better real-time data and analytics, allowing enterprises to quickly identify issues and follow up. ■ Real-time alerts for the current stock situation and supply issues.
<p>Increased complexity:</p> <ul style="list-style-type: none"> ■ Complex data models for inventory management (various tables for stock status), increasing complexity in programming and decreasing throughput. ■ Inflexible valuation methods, not allowing different currencies, and complexity in table structures containing transactional data and master data attributes (decreased throughput). 	<p>SAP S/4HANA provides simplifications in the following processes:</p> <ul style="list-style-type: none"> ■ Simplified data model for inventory management, reducing memory footprint. Only main tables remain, with no redundancies. ■ Simplified inventory valuation data model of one valuation method instead of two in the traditional SAP ERP system (inventory management and Material Ledger [ML]). In addition, transactional data is retrieved from the ML instead of stored in separate tables, increasing system throughput. ■ Embedded EWM in SAP S/4HANA, reducing complexity of interfaces and data setup. ■ Integrated quality management processes and increased efficiency achieved by optimizing quality inspection process.
<p>Lack of collaboration:</p> <ul style="list-style-type: none"> ■ Inability to view accurate inventory levels across different departments, resulting in different views, incorrect commitments to customers, and misalignment between departments. 	<p>SAP S/4HANA improves collaboration using the following:</p> <ul style="list-style-type: none"> ■ Advanced available-to-promise (AATP), allowing better visibility into remaining noncommitted inventories and possibilities to cover incoming customer orders. ■ Increased collaboration among manufacturing, logistics, sales, and quality teams through embedded quality management and EWM processes.

Table 4.1 Supply Chain Management Challenges and SAP S/4HANA Advances (Cont.)

In the next section, we'll describe the key innovations in the supply chain and provide you with more details about SAP S/4HANA functionalities and how they can resolve the issues in the traditional system.

4.2 Key Supply Chain Functionality

In this section, we'll look at some of the major changes SAP S/4HANA brings to the supply chain—for example, the simplification of the materials management/inventory management (MM/IM) data model and the simplification of the inventory valuation data model.

We'll explore the embedded EWM and embedded TM in SAP S/4HANA, before concluding with a look at catch weight management, quality management, and commodity management functionalities.

4.2.1 Data Model Simplification

In SAP ERP, material documents are stored in two document tables, MKPF and MSEG. In addition, there are other tables that store aggregated actual stock quantity and material master attributes. On top of these, specific tables with aggregated actual stock quantity by stock type (e.g., sales order stock) also exist.

With SAP S/4HANA, material document data isn't stored in tables MKPF and MSEG any longer. Instead, it's stored in the new denormalized table MATDOC, which will contain the header and item data of a material document, as well as many other attributes. The tables for aggregated actual stock quantities don't exist any longer; instead, actual stock quantity will be calculated on the fly from the new material document table MATDOC. As a result, the new data model will work on the database level in an INSERT mode without database locks.

Figure 4.1 shows the traditional data model and the new simplified data model in SAP S/4HANA.

The key benefit of the SAP S/4HANA data model change is a significant decrease in aggregates and history tables (24 tables), resulting in the following improvements:

- Increased throughput due to fewer tables to be updated and thus fewer tables to be locked

- Better and faster reporting due to most information coming from just one table, MATDOC, and more flexibility because actual stock quantity data is calculated on the fly
- Flexible design for new stock types (no additional tables)

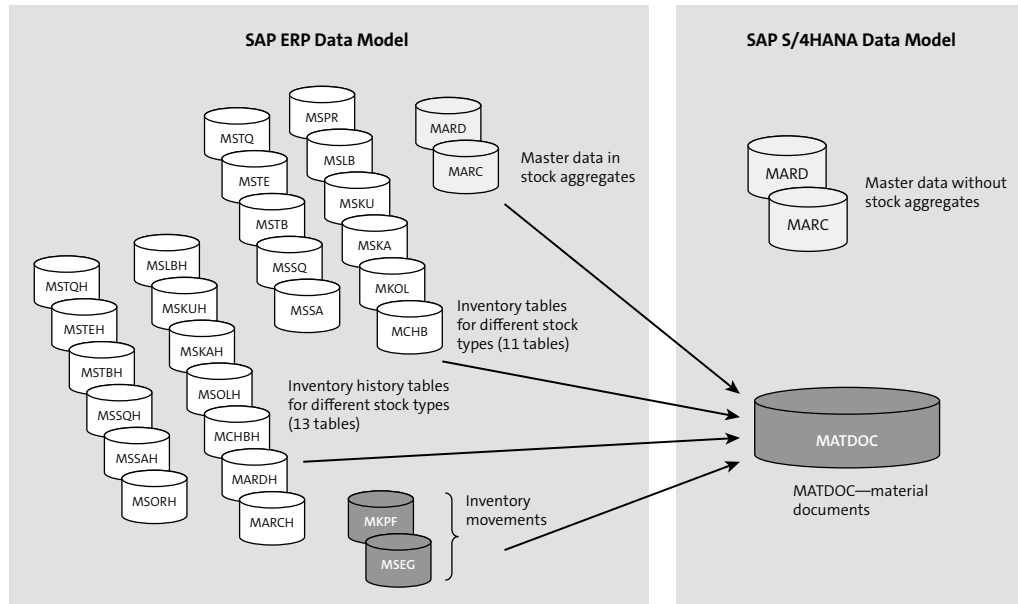


Figure 4.1 Inventory Management: Data Model Design

All aggregates tables will continue to exist in SAP S/4HANA. Through a redirect feature in SAP S/4HANA, any redundant table will be guided to the new table. Therefore, all customers’ coding will continue to work in SAP S/4HANA as well.

4.2.2 Inventory Valuation and Advanced Available-to-Promise

In SAP ERP, the inventory valuation tables contain transactional and master data attributes. With SAP S/4HANA, this is simplified. The inventory valuation tables do still exist as Data Dictionary definitions as well as database objects. However, they will only be used to store material master data attributes. The transactional fields will be retrieved from the ML, which is mandatory in SAP S/4HANA. As a result, those fields aren’t updated any longer in the original tables. The original tables will be updated less often, which will increase the system throughput.

SAP S/4HANA features scalable material valuation capabilities using only one ML. That way, customers can use multiple currencies and valuation methods per different accounting laws, such as generally accepted accounting principles (GAAP). In the traditional SAP ERP system, material valuation needs to occur on the IM level and the MM level.

Activation of the ML is mandatory in SAP S/4HANA, which enables improved and more flexible valuation methods in multiple currencies and parallel accounting standards. It also improves scalability of the business processes. In addition, the ML is a prerequisite for the use of actual costing.

With SAP S/4HANA, there is a simplification of the data model structure for inventory valuation. Data will now be stored mainly in the Universal Journal table ACDOCA.

SAP also provides functionality related to ATP, which is called advanced ATP (AATP). It combines the simplicity of the traditional SAP ERP system with the sophisticated back order and product allocation checks of SAP APO using an entirely new logic, making it more flexible and more user-friendly within one system.

The benefits of AATP compared to the traditional ATP functionality are as follows:

- Built for high-performance mass ATP checks
- Increased automation due to more flexible order confirmation rules and priorities
- New requirement classification for automatic exception handling
- Improved accuracy due to real-time inventory information
- Unified and simplified data all within one system

These benefits are supported by key functionality within AATP, which can be divided into three key areas of innovations:

- Back order processing (BOP)
- Product allocation
- Release for delivery

Now, let’s explain each area in more detail.

Back Order Processing

The BOP functionality in SAP S/4HANA consists of four SAP Fiori apps that provide increased flexibility and enable the user to configure BOP rules, set up and schedule BOP runs, and monitor the results of the BOP run.

Figure 4.2 shows the available SAP Fiori apps that will enable users to set up the entire back order process, as follows:

- **Configure BOP Segment**
This SAP Fiori app allows users to define their own sets of rules and to prioritize the distribution of supply when the demand of materials exceeds the available inventory.
- **Configure BOP Variant**
This SAP Fiori app enables users to define a variant for BOP for automatic reschedule processing and materials rescheduling in case of limited supply. In a variant configuration, a combination of filters and prioritizers are assigned to a confirmation strategy for BOP.
- **Schedule BOP Run**
This SAP Fiori app enables users to schedule a BOP run to occur at any point.
- **Monitor BOP Run**
After the BOP run has been executed, this SAP Fiori app enables the user to display the result of the executed run, in either simulation or active mode, and show the confirmation status of requirements and any processing issues during the run.

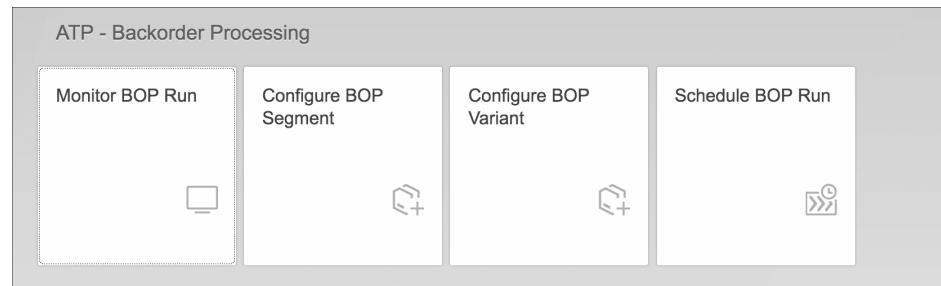


Figure 4.2 Back Order Processing

Within AATP BOP, there is a new concept for requirement classification that allows orders to be confirmed according to predefined criteria. There are five classifications (win, gain, redistribute, fill, and lose), each with its own rule for order confirmation prioritization. For example, the winner and the gainer have the highest priorities and will never lose their confirmed quantities, whereas the loser will always lose all the confirmed quantities to any of the other classifications. Figure 4.3 shows the five requirement classifications in BOP and their priorities for order confirmation.

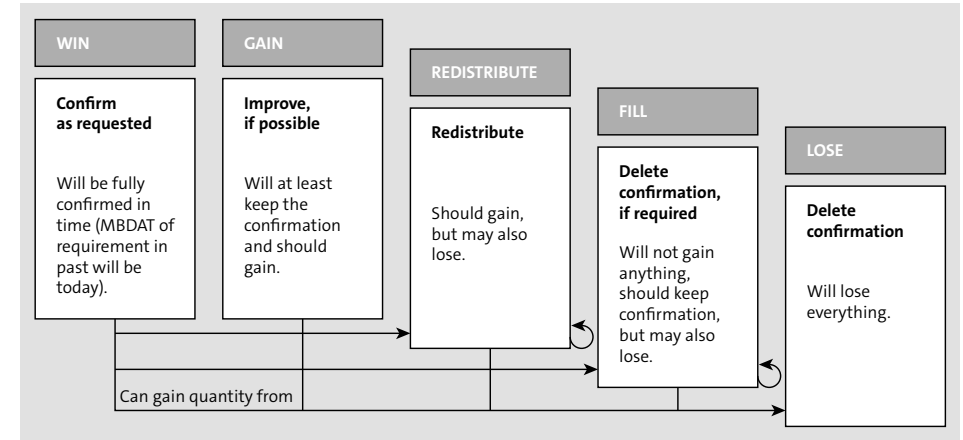


Figure 4.3 Requirement Classifications

Within the segment definition of the BOP variant, users can use a global filter (optionally) that can be restrictive or inclusive. Figure 4.4 shows an example of BOP without a global filter.

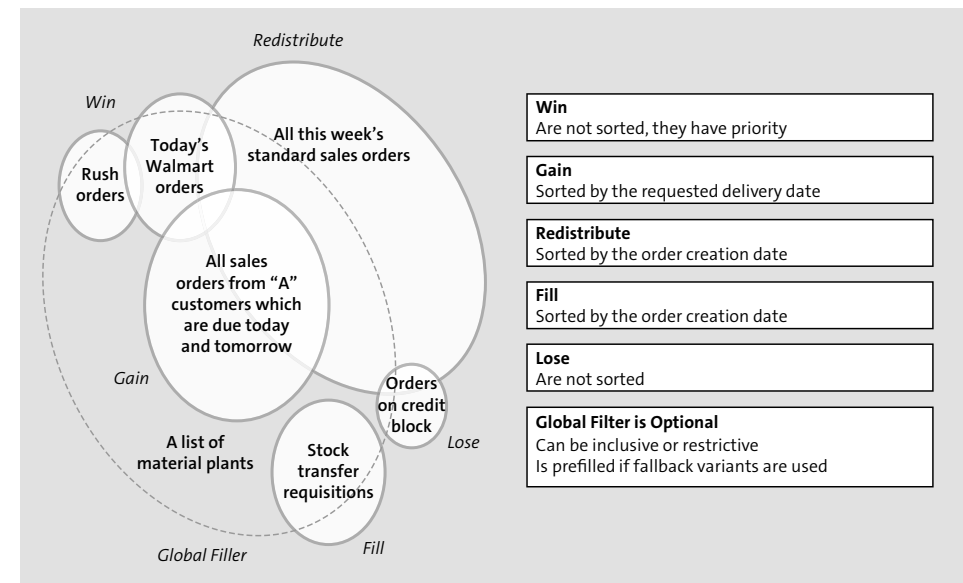


Figure 4.4 BOP without a Global Filter

When no global filter is used in the BOP segment definition of the BOP variant, the BOP run will only take orders into account that fall within the criteria of the BOP segment definition and will reschedule and reconfirm orders based on the priority of each requirement classification.

When a global filter is applied within the BOP segment definition, BOP first will account for orders that meet the segment definition, then a global filter will be applied that will restrict all the orders for BOP that aren't part of the global filter. Figure 4.5 shows an example of BOP with a restrictive global filter.

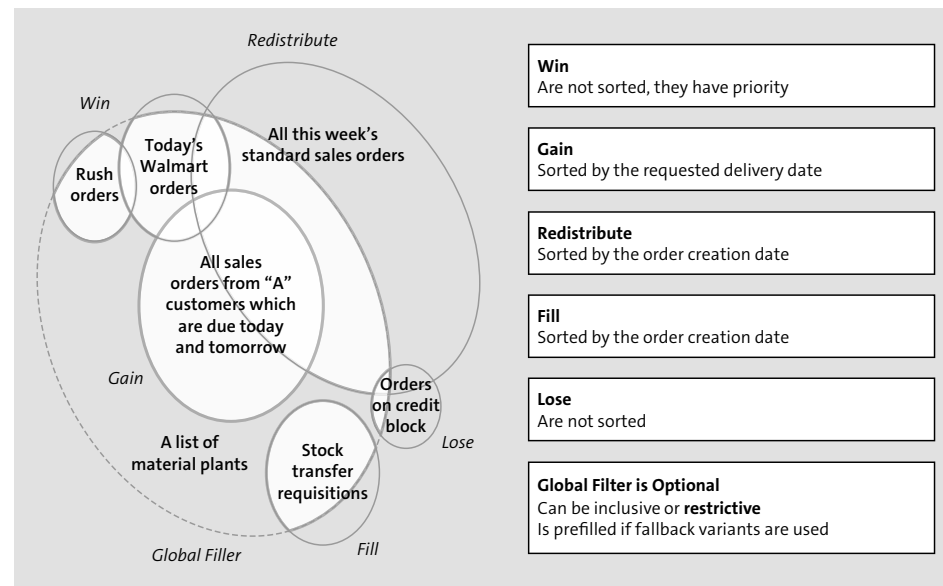


Figure 4.5 BOP with a Restrictive Global Filter

In the example in Figure 4.6, the global filter is the master filter, which will define the set of requirements to be included in BOP. The BOP segmentation definition is only used to cluster and prioritize requirements within the BOP variant.

After the BOP run has been executed, users can access the SAP Fiori app to monitor the result and see the orders that have been successfully (re)confirmed and the issues that occurred during processing, as shown in Figure 4.7. In this example, orders that are successfully confirmed have a green status (checkmark), and ones with issues have a red status (exclamation point).

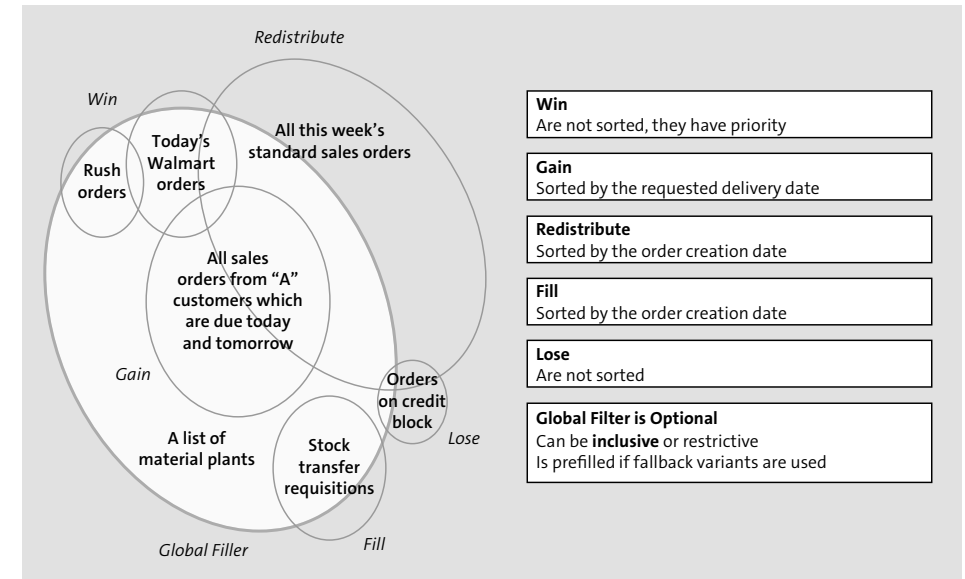


Figure 4.6 BOP with an Inclusive Global Filter

Material	Plant	Processing Status	Requirements	On-Time Confirmation	Overall Confirmation
CSC-ATP-04	0001	<input checked="" type="checkbox"/>	2	50% → 100%	100% → 100%
CSC-ATP-04	A001	<input checked="" type="checkbox"/>	3	0% → 33%	100% → 100%
CSC-ATP-06	A001	<input checked="" type="checkbox"/>	4	0% → 25%	100% → 100%
CSC-ATP-07	A001	<input checked="" type="checkbox"/>	5	20% → 40%	100% → 100%
CSC-ATP-08	A001	<input checked="" type="checkbox"/>	4	0% → 0%	100% → 100%
CSC-ATP-09	A001	<input checked="" type="checkbox"/>	5	20% → 20%	100% → 100%
CSC-PPDS-01	A001	<input checked="" type="checkbox"/>	2	0% → 0%	100% → 100%
CSC-PPDS-02	A001	<input checked="" type="checkbox"/>	1	0% → 0%	100% → 100%
CSC_A12FERT	0001	<input checked="" type="checkbox"/>	3	33% → 33%	100% → 100%
DH-ATP-01	0001	<input type="checkbox"/>	1	0% → 0%	100% → 0%
DH-ATP-03	0001	<input type="checkbox"/>	2	100% → 100%	100% → 100%

Figure 4.7 Result of a BOP Run

Product Allocation

We'll now walk through the product allocation design within the AATP functionality in SAP S/4HANA. As with BOP, SAP S/4HANA provides a design for product allocation that enables increased flexibility for users to set up product allocation rules by using five SAP Fiori apps, as shown in Figure 4.8.

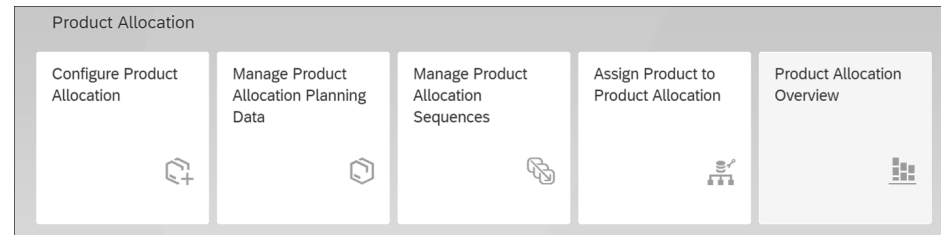


Figure 4.8 Available SAP Fiori Apps for Product Allocation

These five SAP Fiori apps will enable users to set up product allocation functionality in a more flexible way compared to traditional SAP ERP, in which product allocation is set up through configuration. The details of each app are as follows:

■ Configure Product Allocation

This SAP Fiori app enables users to configure product allocation objects based on a variety of attributes at the sales order, material, plant, or customer level.

■ Manage Product Allocation Planning Data

This SAP Fiori app enables users to manage product allocation data. The user can view all data relevant to product allocation in one screen and can use group and aggregation capabilities to allow mass allocations and easy maintenance of characteristics and planned allocation quantities.

■ Manage Product Allocation Sequences

This SAP Fiori app enables sequential product allocation and combines multilevel supply constraints with an alternative source of supply.

■ Assign Product to Product Allocation

This SAP Fiori app allows users to assign a product allocation object to a product to support business decisions about whether and to what extent a sales order must be confirmed.

■ Product Allocation Overview

This SAP Fiori app provides an overview of characteristic value combinations, overloaded/under-/high-loaded periods, product allocation order items with subsequent drilldown options to relevant sales order, etc.

With release 1809, some additional enhancements have been made to the product allocation functionality, enabling increased flexibility by allowing custom fields users to add and display custom fields to the product allocation object header data in the Configure Product Allocation app and then use these fields during the product allocation process for stock transport orders as well. Additionally, it's now possible to automatically reorganize product allocation planning data and assignments after changing characteristics (e.g., deletion or reactivation) and combining values.

Release for Delivery

An additional key innovation within the AATP functionality that we'll describe is the Release for Delivery app, which enables the user to do the following:

- Review order confirmation situations and take timely actions on short-term supply and demand changes.
- Redistribute already-confirmed quantities to the order according to the company's prioritization strategy.

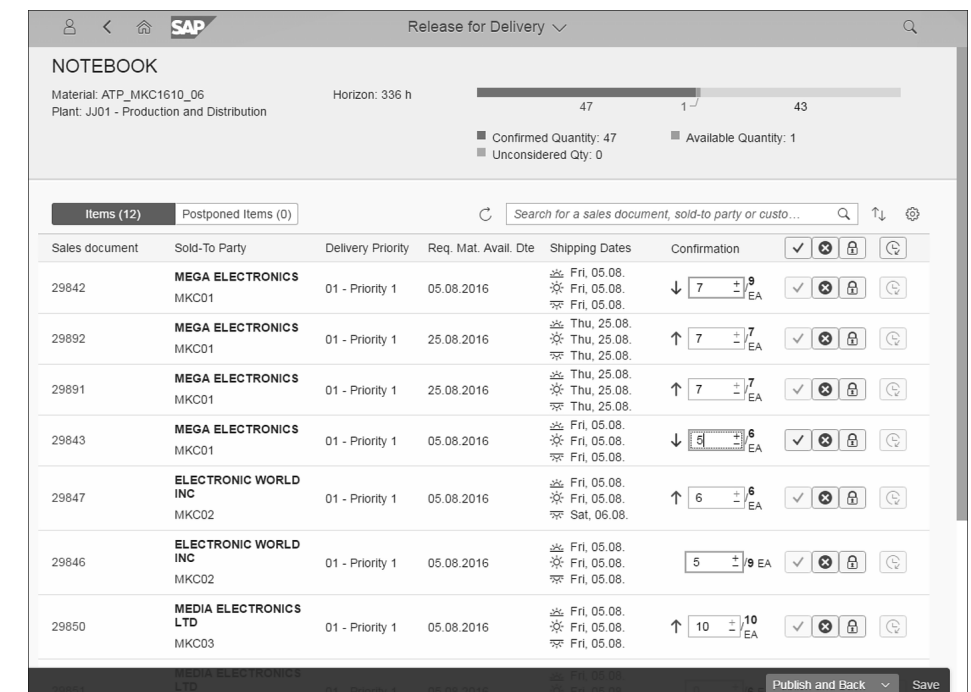


Figure 4.9 Release for Delivery App in SAP Fiori

- From release 1809, users can see dependencies on product allocation and delivery groups in the app. They have the ability to process items as part of a delivery group and validate the confirmation. Items constrained by product allocations can't be changed.

Figure 4.9 shows the Release for Delivery app, which enables users to review and redistribute order confirmation situations.

Alternative-Based Confirmations

Also, alternative-based confirmations (ABCs) is a new functionality (with two new SAP Fiori apps, as shown in Figure 4.10) introduced in 1809. ABC offers the substitution functionality for location, which is similar to SAP Advanced Planning and Optimization (SAP APO) global available-to-promise (GATP)'s location substitution.

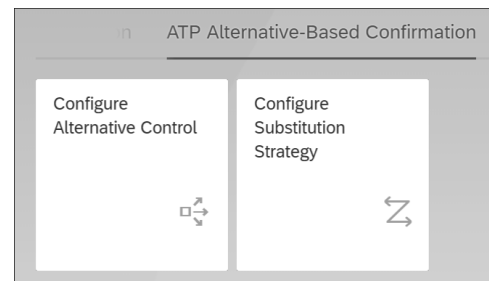


Figure 4.10 ATP Alternative-Based Confirmation

4.2.3 Extended Warehouse Management

Traditional warehouse management (WM) is available within SAP S/4HANA, and all existing business processes and functionalities will remain available. However, traditional WM isn't the target architecture; in the long term, it will be replaced by EWM. EWM has been embedded in SAP S/4HANA since release 1610, providing state-of-the-art warehousing capabilities within one system. With this functionality, SAP offers an additional deployment option for its customers to have EWM deployed within the core of SAP S/4HANA.

Figure 4.11 shows the available deployment options for WM.

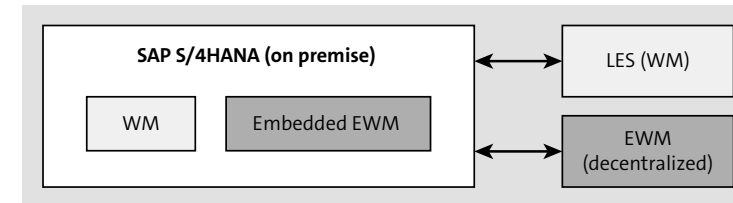


Figure 4.11 Warehouse Management Deployment Options in SAP S/4HANA

In the long term, SAP will continue to support and invest only in embedded EWM in SAP S/4HANA and decentralized SAP EWM, and a common core of functionalities within SAP EWM will evolve over time for both options. Decentralized SAP EWM, either integrated with SAP S/4HANA or SAP ERP, will remain a valid deployment option in the longer term for the following business reasons for customers:

- Risk mitigation
- Regional SAP EWM systems
- Multiple SAP ERP connections (e.g., some logistic service provider scenarios in which multiple SAP ERP systems need to be connected)

Embedded EWM in SAP S/4HANA will contain the scope of SAP EWM 9.4, and both deployment options will have an almost identical common core, covering the same business scenarios and processes with very few minor exceptions (e.g., multiple SAP ERP connections aren't possible in embedded EWM in SAP S/4HANA). The technical integration with SAP ERP will be different for embedded EWM in SAP S/4HANA and decentralized SAP EWM; however, the same integration will be used with other systems (e.g., SAP Global Trade Services [SAP GTS] or SAP TM). Embedded EWM in SAP S/4HANA will use the scope of SAP EWM 9.4 with a focus on simplification and reduction of redundant objects and data.

With embedded EWM in SAP S/4HANA, SAP provides the latest warehousing capabilities. The following are the high-level key benefits of this change:

- A single system
- Reduction of data redundancy
- Elimination of the Quality Inspection Engine
- Simplification

We'll describe these benefits in greater detail in the following sections.

A Single System

First, with embedded EWM in SAP S/4HANA, the integration with SAP S/4HANA core processes is simplified. Core interfaces are no longer required for master data objects, resulting in a reduction of data replication, which offers the following benefits:

- Reduced database footprint
- Reduced effort for monitoring and data alignment and thus less total cost of ownership (TCO)
- Simplification of system and data setup

Master data objects and actual data—for example, accounting objects and material values—are all contained within one system, allowing a direct read of data, increasing system throughput, and reducing system complexity. In the decentralized SAP EWM version, several almost identical Customizing tables exist between the SAP ERP system and SAP EWM. In embedded EWM in SAP S/4HANA, these redundant tables are reduced, resulting in a significant reduction of Customizing in SAP EWM.

In addition, with embedded EWM in SAP S/4HANA, the SAP Fiori launchpad is enabled, providing warehouse users with a similar UX as found with the SAP Fiori launchpad as the single point of access for all SAP Fiori apps.

We'll now describe the main details of these changes for each object:

■ Business partners

In the classic version of SAP EWM, core interfaces are needed to transfer business partners (customers/vendors) to SAP EWM, and these will be mapped to business partner objects in SAP EWM. SAP EWM uses different numbering, and due to differences in data objects, different address check routines need to be set up in SAP ERP and in SAP EWM. With embedded EWM in SAP S/4HANA, there will only be one business object (i.e., business partner), which will be used for both customers and vendors across different LoBs in SAP S/4HANA.

■ Material master

Like business partners, in embedded EWM in SAP S/4HANA, there's no need to transfer master data from the SAP ERP system to SAP EWM; instead, all the relevant data (e.g., various SAP APO tables) will be read through Core Data Services (CDS) views and used for SAP EWM. Embedded EWM in SAP S/4HANA also provides the additional benefit of support for 40-digit material masters.

■ Batch master

In embedded EWM in SAP S/4HANA, all relevant batch information will be available immediately for usage within SAP EWM. This offers users various benefits, such as the ability to manage batches with shelf life even without batch classifications and the ability to manage batches based on plant-specific attributes, addressing a limitation of SAP EWM 9.4.

Figure 4.12 shows the traditional scenario and the embedded EWM in SAP S/4HANA scenario for the three data objects.

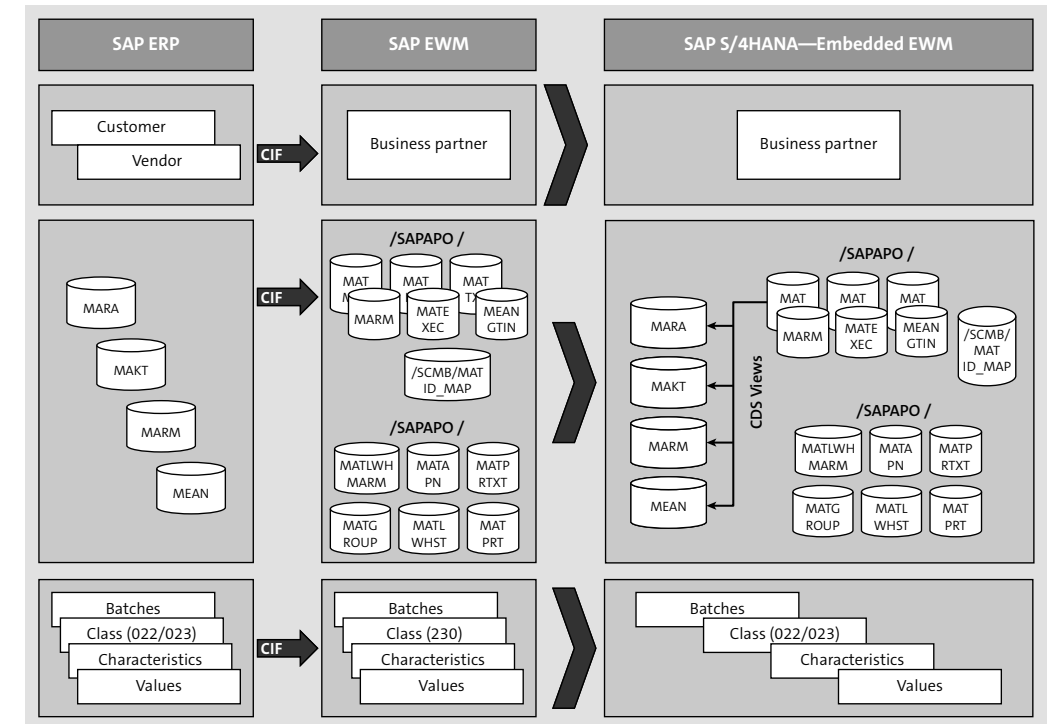


Figure 4.12 Classic SAP EWM versus Embedded EWM in SAP S/4HANA

In addition to the data objects discussed previously, the same principles apply for the following data objects:

■ Product valuation data and accounting data

Standard table MBEW is used to store material valuation data. Specific information from this table in the traditional scenario is transferred through remote function

calls (RFCs) into two tables in SAP EWM to store the material price and split valuation. In embedded EWM in SAP S/4HANA, all material values can be read directly in SAP S/4HANA from the main table MBEW.

In addition, only relevant accounting objects will be replicated in SAP EWM through RFCs; therefore, not all accounting-related information is available in SAP EWM. With embedded EWM in SAP S/4HANA, all accounting documents will be immediately available and can be accessed directly. There is no longer any need to replicate accounting objects.

■ Project stock

With embedded EWM in SAP S/4HANA, the existing table /SCWM/ERP_PSP with the mapping and conversion routine will be redundant because you can access standard table PRPS directly.

■ Dangerous goods/hazardous substances and phrases

No data replication through Application Linking and Enabling (ALE) is required. With embedded EWM in SAP S/4HANA, you have direct access to all standard tables.

With embedded EWM in SAP S/4HANA, several Customizing tables have been eliminated due to similar Customizing in SAP ERP. An example is table THUTYPE in SAP ERP for the handling unit (HU) type configuration and its equivalent in SAP EWM, table /SCWM/THUTYPE, with the exact same configuration. As a result, 12 different tables have been removed in SAP EWM, eliminating double data maintenance and the risk of data mismatch.

Reduction of Data Redundancy

The following changes have been made to optimize processes and reduce data redundancy:

■ Expected goods receipt (EGR) will no longer be used

With decentralized SAP EWM, EGR can be used to copy data from a purchase order or production order to the inbound delivery. Data replication occurs through a report in SAP EWM. With embedded EWM in SAP S/4HANA, EGR no longer exists and isn't needed because the inbound delivery can be created directly from the purchase order or production order with the most up-to-date information. Figure 4.13 shows the decentralized SAP EWM option versus the new embedded EWM in SAP S/4HANA version.

■ Delivery request (notification) and posting change request document eliminated

The delivery request (notification) document can be used for inbound and outbound processes to save and transfer all relevant information from a reference document to the delivery document. With decentralized SAP EWM, the delivery request (notification) document is skipped; instead, the delivery document in SAP EWM is created directly from either the inbound or outbound delivery document in SAP S/4HANA. Therefore, any functionalities in standard SAP EWM that are linked to the delivery request or notification document will no longer be available in embedded EWM in SAP S/4HANA.

The same applies for the posting change request document. In embedded EWM in SAP S/4HANA, the posting change document is created directly from the outbound delivery document.

Figure 4.14 shows the current process and the new option for both inbound and outbound processes.

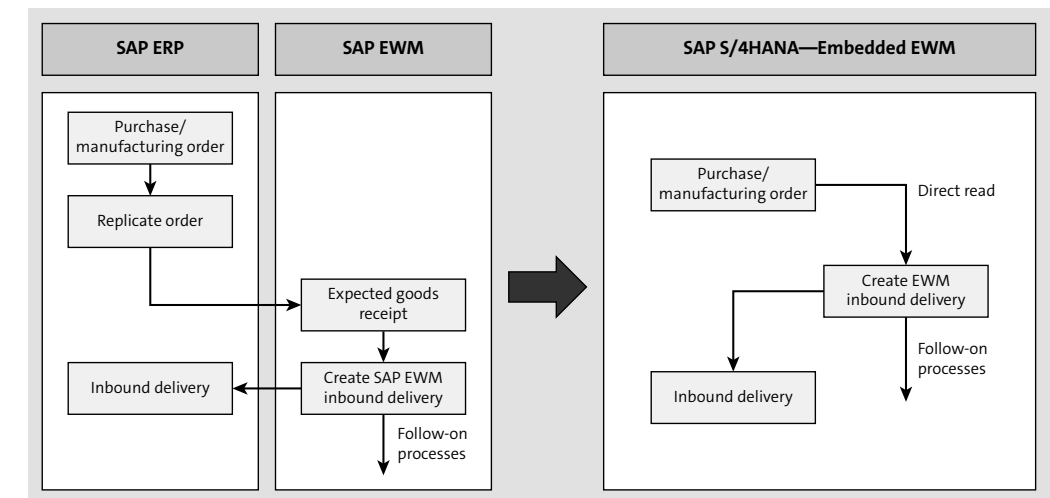


Figure 4.13 Expected Goods Receipt in Classic SAP EWM versus Embedded EWM in SAP S/4HANA

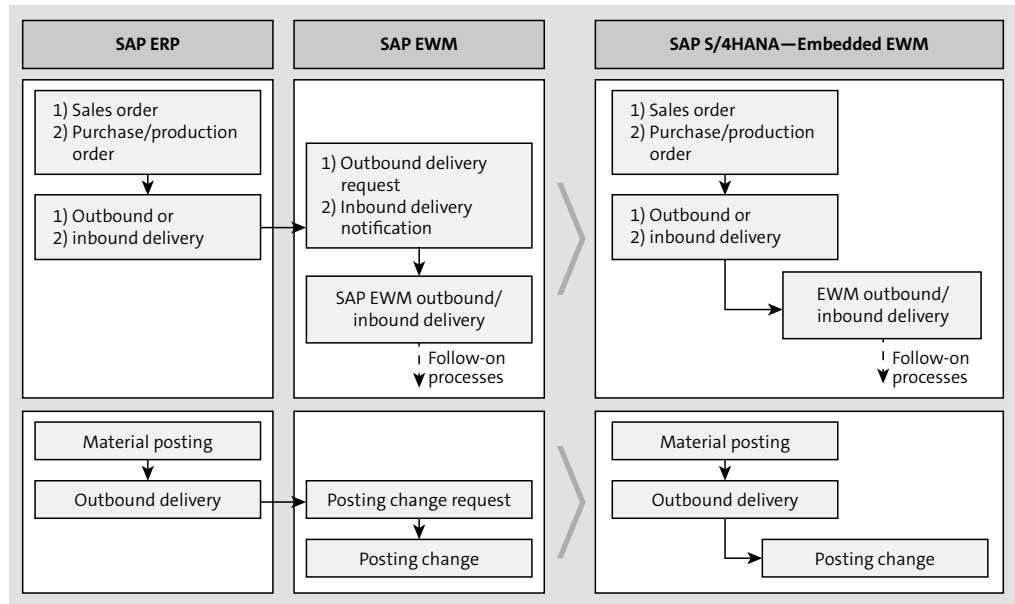


Figure 4.14 Delivery Request (Notification) and Posting Change Request Documents in Classic SAP EWM versus Embedded EWM in SAP S/4HANA

Elimination of the Quality Inspection Engine

The important new benefit of eliminating the Quality Inspection Engine is the result of reducing data redundancy. The Quality Inspection Engine had been used as a lean solution to support the quality inspection process and offered functionalities that provided flexibility for configuration inspection rules. In the classic SAP EWM scenario, inspection details are set up in the material master, and the inspection rule details are set up to determine the inspection relevance of a document.

With embedded EWM in SAP S/4HANA, no inspection setup is required in the material master; all details are captured in embedded EWM in SAP S/4HANA.

Due to the elimination of the Quality Inspection Engine, the process will be optimized significantly. In classic SAP EWM, the inspection process is as follows:

1. In SAP EWM, a GR of an inbound delivery is waiting to be posted.

Note

The trigger can also be at delivery creation or **In Yard** status.

2. Based on the inspection rules setup, the Quality Inspection Engine will determine whether it's relevant for the inspection process.
3. If yes, an inspection document is created and saved.
4. After release of the inspection document, the Quality Inspection Engine informs the SAP ERP system of the creation of an inspection document.
5. An inspection lot is created based on the inspection setup data in SAP ERP. The inspection document in the Quality Inspection Engine and inbound delivery is updated accordingly.
6. The inspection is executed, and details are recorded in SAP ERP.
7. The usage decision is also recorded in SAP ERP.
8. SAP ERP transfers the relevant inspection details to the Quality Inspection Engine, and the inspection document is updated.
9. Follow-up actions in SAP EWM are executed accordingly.

With embedded EWM in SAP S/4HANA, the inspection process is as follows:

1. In SAP EWM, a GR of an inbound delivery is waiting to be posted.
2. Based on the inspection rules setup, using the quality management functionalities in SAP S/4HANA, the system determines whether it's relevant for the inspection process.
3. If yes, the system determines the inspection setup data and creates an inspection lot.
4. The inspection is executed, and details are recorded in SAP S/4HANA.
5. The inspection details are recorded.
6. The usage decision is recorded.
7. In SAP EWM, follow-up actions are executed accordingly.

Simplification

Embedded EWM in SAP S/4HANA offers massive simplifications through reduction of redundant data and through leaner processes and fewer business documents. In addition, specific functionalities within the classic SAP EWM have been disabled or replaced to meet the SAP S/4HANA guidelines and vision. The following functionalities have been disabled/replaced:

- **SAP TM (freight order management [FOM])**

The decision not to include FOM in embedded EWM in SAP S/4HANA arose mainly because TM offers enhanced functionalities and has been made available as an

embedded functionality within SAP S/4HANA. SAP TM is also offered as a sidecar solution. We'll describe embedded TM in SAP S/4HANA more detail in the next section.

- **Supply chain routing (SAP Supply Chain Management [SAP SCM] routes)**
SAP doesn't want to offer routes in SAP ERP, SAP TM, and SAP SCM in the long run; therefore, the SAP SCM routes are disabled, and only SAP ERP routes are used.
- **Microsoft Silverlight UI replaced by SAPUI5 technology**
The official end-of-support date for Microsoft Silverlight is October 5, 2021. Microsoft Silverlight will be replaced by SAPUI5 technology for the following four use cases:
 - Creating appointments
 - Monitoring appointments
 - Planning staging areas
 - Maintaining capacity

Due to the mentioned massive simplifications of embedded EWM in SAP S/4HANA, the effort required for basic setup of EWM has been reduced significantly and now includes only a third of the setup in the SAP EWM/SAP ERP integration guide.

Optimization and Monitoring

SAP is adding new innovations and apps in every release to optimize the warehousing processes and create better insights to reduce TCO and investments.

Let's start with the following enhanced and new SAP Fiori apps:

- **Enhanced Run Outbound Process app**
Allows you to perform several outbound process-related activities into one app, such as cancellation of picking, warehouse tasks, and GI. It also allows you to manually create picking tasks.
- **Enhanced Change Inbound Delivery app**
Enables all inbound delivery process activities to be executed from one single app, such as canceling GR, manually creating putaway tasks, reprinting HU labels, changing stock types, and displaying and canceling warehouse tasks.
- **Enhanced Product Maintenance app**
Allows you to create, update, and mark product master data for deletion. In addition, you can archive product data and storage type data with other product data and enable warehouse product data search by warehouse number.

- **New Pack Outbound Deliveries app**
This app is used for work centers to execute the following packing-related processes:
 - Packing of picked stock into a shipping HU
 - Packing of complete or partial item quantities
 - Printing shipping labels for HU
 - Capturing weight and connecting to scale
 - Creating and changing shipping HUs
 - Packing and shipping for batch managed and serial products
- **New Inventory Counting, Enabling Activation, Printing and Counting of Physical Inventory Documents app**
This app can be used to capture result counts, capture quantities on bins, and capture HUs and sub-HUs, as well as include batch and serial numbers.

Additionally, the following new reports and enhanced functionalities are provided to monitor warehouse operations:

- **ABC Analysis report**
Enables users to classify products based on historical warehouse task-related information with the option for the users to update the putaway indicator, section indicator, and cycle counting indicator, as well as specify ABC limits.
- **Storage bin-change logs**
Enhanced to enable users to activate and create change logs for storage bins and view this information from the EWM storage bin master.
- **EWM warehouse monitor functionality**
Enhanced to include new methods for users to create ad hoc product or HU warehouse tasks from a list of selected stocks and create ad hoc posting changes to change stock type, post to another product or batch, and release the stock from a customer order. A new monitor node and methods are also provided to simplify unassigning HUs to picked stock from an outbound delivery order.
- **Mass warehouse products creation and mass updates functionality to storage type data**
This functionality includes the following:
 - Ability to retrieve a list of products with or without storage type or warehouse-specific data

- Enhanced methods to mass create warehouse and storage-type-specific data
- New selection options by material type and plant-specific data

Now that we've discussed all the EWM-specific functionalities, it's time to move on to the next key topic, transportation management (TM). Just like EWM, in the next section, we'll discuss all the key innovations from TM.

4.2.4 Transportation Management

With release 1709, embedded SAP TM basic and advanced shipping functionality were offered in SAP S/4HANA. They offer best-of-breed transportation functionalities, leveraging existing SAP TM, built within SAP S/4HANA. Just like the embedded EWM in SAP S/4HANA functionality, embedded TM in SAP S/4HANA is the target architecture and will replace the legacy SAP TM functionality brought over from SAP ERP in the long run. With embedded TM in SAP S/4HANA, SAP is following the principle of one: one set of master data within one system, with no more data redundancy.

Table 4.2 shows the differences in functionality between basic and advanced SAP TM. One additional note is that advanced TM requires an additional license.

Basic Shipping	Advanced Shipping
<ul style="list-style-type: none"> ■ Main parts of the transportation network except trade lane, allocations, business shares, and resources ■ Freight agreements ■ Charge management, except air-specific charges, event-based charges, and consolidated charge calculation ■ Separate inbound /outbound freight order/booking management (delivery-based) ■ Basic transportation planning ■ Transportation execution without event management ■ Freight settlement with agency billing ■ Direct tendering/subcontracting ■ TM output management ■ SAP BW analytics 	<ul style="list-style-type: none"> ■ Strategic freight management ■ Service product catalog/service order management ■ Advanced charge calculation ■ Combined inbound/outbound transportation process ■ Advanced transportation planning with optimization capability ■ Driver management ■ EWM integration ■ Group logistics ■ Embedded analytics with CDS views

Table 4.2 Basic and Advanced Shipping

Figure 4.15 shows the different options to deploy basic shipping functionalities within SAP S/4HANA. In the traditional SAP ERP system, basic shipping functionalities were offered through Transportation in SAP ERP (LE-TRA); however, in the longer term, this will be replaced by embedded TM in SAP S/4HANA. With the first option, SAP offers compatibility packs to enable users to continue using the existing transportation functionalities (which are based on LE-TRA) within SAP S/4HANA until end of life of the compatibility packs. The second option, available since 1709, is to use embedded TM in SAP S/4HANA. The third option is to deploy SAP TM as a side-car.

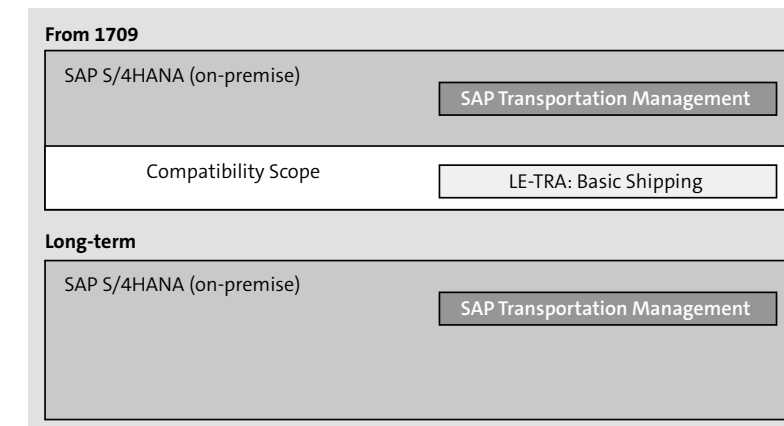


Figure 4.15 Different Deployment Options for Basic Shipping Functionalities

Key benefits of embedded TM in SAP S/4HANA are as follows:

- One system, leading to the following:
 - Harmonized master data, with no interfaces required (see Figure 4.16)
 - Harmonized Customizing
 - Harmonized transport scheduling
- Real-time embedded analytics
- SAP Fiori launchpad UI for SAP S/4HANA
- Integrated TM and EWM functionalities

Figure 4.16 shows the business partner and material master requirements for traditional SAP ERP and embedded TM in SAP S/4HANA.

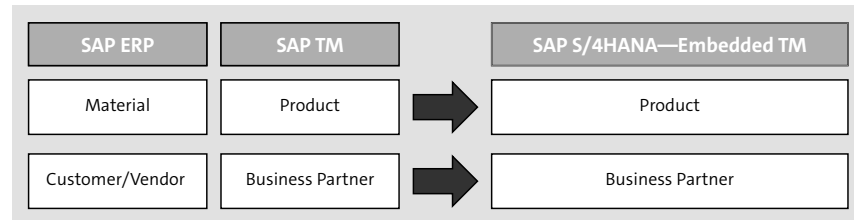


Figure 4.16 Integration of SAP TM with Traditional SAP ERP versus Embedded TM in SAP S/4HANA Functionality

Because SAP TM is the target architecture, SAP is planning to continue providing more innovations and functionalities for the enablement of TM core functionalities. Since release 1809, the following new innovations have been added:

- General functionalities added to the TM core, including the following:
 - Ability to perform cost distribution for forwarding orders
 - Internal settlement agreement
 - Export and import processing
 - Updates to the delivery, for example, in case of delivery splits, triggering GR/GI posting, planning status updates, dates, and so on
 - Creation of freight units out of scheduling agreements
- Integration to SAP Logistics Business Network, including the following benefits:
 - Integrated tendering and subcontracting processes from SAP TM to SAP Logistics Business Networks
 - Integrated carrier invoicing processes
 - Tour tracking capabilities, including functionality to initiate tour tracking and receive events from the outside world and calculate the estimated time of arrival based on real-time information
- Mixed pallet and load planning capabilities and optimization, including the following benefits:
 - Improved capabilities to create precision in building pallets by optimizing the physical positions of cartons on a pallet (considering stackability and orientation constraints of products)
 - Capabilities to put different products from the customer into one carton and stack products for different customers into one pallet

Next, we'll discuss the capabilities within catch weight management.

4.2.5 Catch Weight Management

Since release 1610, catch weight management functionality is integrated into the SAP S/4HANA core and can be used by activating the business functions for catch weight management. Catch weight management in SAP S/4HANA isn't identical to the former industry solution IS-CWM. Therefore, some features from the traditional architecture of IS-CWM won't be supported in SAP S/4HANA, and some additional changes in the new catch weight management functionality in SAP S/4HANA may have an impact on customer coding when converting IS-CWM to catch weight management in SAP S/4HANA. In this section, we'll describe the functionalities that are available in SAP S/4HANA catch weight management and also highlight those areas that aren't supported (yet) in SAP S/4HANA.

With catch weight management in SAP S/4HANA, companies can use a parallel, variable quantity in inventory management to value goods movement independently of their logistics quantity. The catch weight management solution is mainly used in the consumer products and the foods processing industry. Catch weight management provides the following functionalities:

- Capability to manage two independent units of measure (UoMs) throughout the main inventory management and in different LoBs (sales, purchase, production, inventory management)
- Full support for processing of BOM materials with advanced returns management
- Automated value correction by initiating handling of differences in parallel UoMs

Traditional IS-CWM functionalities that are no longer supported in SAP S/4HANA catch weight management include the following:

- Parallel unit of measure category "B" because it's unnecessary to store quantities in a second UoM without any depending functionality, and because category "B" is reserved for EWM in SAP S/4HANA
- Flexible material prices
- Screen sequences "CW" and "CE" delivered for the material master because they have been replaced by new SAP S/4HANA standard screen sequences
- Some attributes, such as /CWM/TOLGR and /CWM/TY2TQ

In addition to these functions that are no longer supported in SAP S/4HANA, there may also be business add-ins (BADIs) and functions that can't be migrated to SAP S/4HANA. Since release 1709, SAP offers migration tools for clients to migrate their existing catch weight management solution into SAP S/4HANA.

4.2.6 Quality Management

In Section 4.2.3, we already highlighted some of the key innovations around EWM. One of the key optimizations with the embedded EWM in SAP S/4HANA is the elimination of the Quality Inspection Engine to create a leaner solution for the quality inspection process. In this section, we'll highlight some more quality management-related innovations in SAP S/4HANA.

The newest improvements provided for quality management in SAP S/4HANA are the new SAP Fiori apps that are provided to record quality inspection results and the improved analytics and monitoring capabilities:

- **Quality Results Recording app**

Enables users to carry out and process several individual inspections at different intervals or during a particular event during production. It allows users to use inspection points during production or the inspection interval.

- **Defect Monitoring app**

Users can record defects manually that need to be documented and rectified. This app allows users to identify the quality issues and evaluate the defect data for further follow up and determine the corrective actions to prevent the issue from reoccurring.

- **New Manage All Quality-Related Tasks app**

Users can perform different quality-related activities all through one single app. Examples of these activities are task planning based on a general catalog for tasks, maintaining a general catalog, issue processing, text recording, and flexible and state-of-the-art worklists for monitoring quality tasks.

- **Manage Quality Level app**

Provides the users with an overview page of the quality level of the material or material/supplier. This data is used to determine the inspection stage for the sample determination of the next inspection lot. This can be displayed in a worklist with the option for a graphical presentation enabling users to reset the quality level in the overview page.

In the next section, we'll discuss the last innovation area in the supply chain LoB (on-premise): commodity management.

4.2.7 Commodity Management

In earlier SAP S/4HANA releases, commodity management for sales, purchasing, and risk management was technically switched off, and, as a result, customers with these

commodity business functions activated weren't able to convert to SAP S/4HANA. Since releases 1709 and 1809, the commodity management functionality has become available in SAP S/4HANA for sales, procurement, and risk application. The key functionality of SAP S/4HANA commodity management for sales, purchasing, and risk application include the following:

- **Commodity management for purchasing**

With commodity management for purchasing, companies can manage their procurement processes for buying commodities and commodity-dependent goods. It can help them create commodity contracts based on market quotes, automate pricing calculations, and streamline the invoicing processes. Some of the key functionalities are as follows:

- New entered price fixations (priced quantities in purchase and sales orders) can be automatically allocated to GR and deliveries.
- Market identifier code isn't mandatory anymore when creating commodity forwards based on derivative contract specifications (DCS).
- The commodity pricing engine can access commodity curves based on DCS to determine forecast market values for the DCS of commodity derivatives.
- Swap rates can be used to determine exchange rate forecasts for currency conversions using exchange rate forecast routine.

- **Commodity management for sales**

With commodity management for sales, companies can process and manage sales documents, deliveries and billing documents, or commodities and perform simple formula-based commodity pricing. Some of the key functionalities are as follows:

- Commodity-related market data management: Use market data management based on derivative contract specifications or basis market data entered manually in the system and accessed by the commodity pricing engine.
- Commodity pricing: Apply complex pricing formulas, rules, and conditions in all the sales documents for provisional billing and/or final billing.
- Processing commodity sales transactions and documents: Commodity sales support the creation and processing of sales orders, sales contracts, and deliveries, as well as provisional, differential, and final billing documents.
- Period-end valuation: This functionality is used for deliveries of commodities with GIs, where the commodity price is floating and a final invoice hasn't been posted yet either on or before the valuation key. Period-end valuation can be

used to calculate the accrual amount from the difference between an anticipated final invoice and the posted amount.

■ Commodity management for risk management

Commodity management for risk management enables companies to identify and quantify exposure to commodity price risks and mitigate risks with financial commodity derivatives. It helps companies comply with regulations and accounting standards that are applicable to financial derivatives. Users can create and update commodity risk positions in real time and provide a comprehensive insight into commodity risk positions by flexible positions and mark-to-market reporting. Some of the key functionalities include the following:

- Risk reporting from purchase contract capture and subsequent documents to risk analysis.
- Mark-to-market queries, including stock logistics documents and financial derivatives; unified mark-to-market reporting, including key figures for contract value and market value; and undiscounted mark-to-market valuations for stock, logistics documents, and financial derivatives.
- End-of-day snapshot reporting and “current” data valuations.

You now have a better understanding of the latest innovations in SAP S/4HANA version for the supply chain LoB. In the next section, we’ll discuss the supply chain functionalities that are available in the SAP S/4HANA Cloud, public option.

4.3 Supply Chain in SAP S/4HANA Cloud

We’ll now discuss the key functionalities in the SAP S/4HANA Cloud, public option, for supply chain. We can divide these key features into the following five areas:

■ Inventory management

The key functionalities that are available within SAP S/4HANA Cloud for IM are as follows:

- Physical inventory/inventory count and adjustments capabilities, enabling users to perform periodic stock count and adjustment process. Users can generate inventory count sheets and book materials during physical count. Results of the count can be entered in the system and accepted.
- Post goods movements, based on a standard list of movement types.
- Display price change documents with the valuation of the material.

- Reporting and monitoring capabilities, providing users with a standard list of reports to, for example, identify overdue stock transfers and evaluate total stock of a material at a plant/storage location level. Users will also have the options to monitor and adjust inventory processes for day-to-day activities.

■ Logistics execution

Contains functionalities around inbound and outbound delivery processing, as follows:

- Inbound delivery processing: This is the process that starts when the goods are shipped from the vendor’s location and ends when the GR is done at the ship-to location. SAP S/4HANA Cloud provides standard inbound delivery processing functionalities to support this process. When users create a purchase order or a scheduling agreement, a goods receiving point is determined, followed by an inbound delivery and receipt.
- Outbound delivery processing: Similar standard transactions are available in SAP S/4HANA Cloud, enabling users to create outbound deliveries based on a list of sales documents, display logs for the sales order or delivery, perform picking, print the picklist, and perform GI.

■ ATP

The ATP functionality offers the availability check and the BOP capabilities. With the availability check, companies can determine on which date and in which quantity a particular requirement can be fulfilled based on a specific checking rule and the current supply for a material. The BOP functionality enables users to reprioritize sales orders and stock transport orders and then perform automated mass availability checks in the case of limited stock to supply the available stock according to a specific inventory.

■ AATP

The AATP functionality offers the product allocation and release for delivery capability, enabling users to allocate material for a specific time period based on characteristic value combinations. The release for delivery functionality allows users to manually reprioritize sales orders and stock transport orders in the case of limited stock. After reprioritizing, the logistics process can be triggered.

■ Warehousing

SAP S/4HANA Cloud supports basic integration scenarios for logistics/warehousing processes with SAP EWM. The following integration scenarios are currently supported:

- Transfer of warehouse-related master data.
- Inbound processing scenario, which supports the inbound process from procurement, stock transport order, or customer returns.
- Outbound processing scenario, which supports the GI from sales order and stock transport order.
- Production supply and receipt from production, which supports the outbound delivery process from production and transfer of the delivery note to SAP EWM. In addition, the GR performed in SAP EWM will be transferred back to the SAP S/4HANA Cloud system for further processing.

More functionality is constantly being added to SAP S/4HANA Cloud; therefore, this list isn't exhaustive.

4.4 Outlook

As mentioned earlier in this chapter, embedded EWM and TM will be the target architecture; as a result, SAP has scheduled more innovations in these two areas. In addition, SAP will add more enhanced and predictive analytics, especially in the area of logistics, IM, and EWM. Machine learning and artificial intelligence (AI) will be introduced in several areas, such as quality management and IM, to improve process optimization.

Table 4.3 lists key innovations that are scheduled for the supply chain in future releases coming in 2019 and later.

Area	Future Innovations
Inventory management	<ul style="list-style-type: none"> ■ New scenarios for demand-driven intercompany and stock transfers ■ Machine learning and AI for master data and process optimization
Logistics execution	<ul style="list-style-type: none"> ■ New and improved analytics for shipping and receiving specialists ■ Improved KPIs and KPI monitoring capabilities to foster insight to action

Table 4.3 Key Innovations Planned in Supply Chain Areas

Area	Future Innovations
Transportation management	<ul style="list-style-type: none"> ■ Industry requirements for the following: <ul style="list-style-type: none"> – Retail – E-commerce – Direct store delivery (DSD) – Bulk transportation ■ Integration with advanced ATP ■ Internet of Things (IoT) integration capabilities for track and trace ■ Simulation capabilities for freight capacity ■ Integration into external optimization/planning ■ Integration into supply chain planning and SAP BW/4HANA ■ Driver management
Quality management	<ul style="list-style-type: none"> ■ Improved analytics of quality management data to provide insights to action ■ New SAP Fiori apps and pages for compliance management ■ Simplified inspection planning processes ■ Machine-learning capabilities for compliant processes with solutions proposals capabilities ■ Standardization of issue-resolution procedures
Extended warehouse management	<ul style="list-style-type: none"> ■ Simulation and forecasting capabilities ■ Industry-specific extensions (e.g., automotive) ■ New scenarios for IoT ■ Enhanced analytics ■ Expanded warehouse automation ■ Extended e-commerce capabilities
Advanced ATP	<ul style="list-style-type: none"> ■ Integration of ABC with product allocation and BOP

Table 4.3 Key Innovations Planned in Supply Chain Areas (Cont.)

4.5 Summary

In this chapter, we've shown the key pain points from our C-level executives and how SAP S/4HANA innovations can resolve some of these challenges. The innovations discussed in this chapter include the following:

- Simplified data model and table structure, reducing the complexity of both the data model and custom code implementation
- Embedded functionalities in SAP S/4HANA, such as EWM and TM, strengthening the back-office functionalities from the core and reducing complexity in the system landscape
- No redundant data and simplified processes because all processes are executed within one system (direct postings and no redundant documents, such as expected GR documents)
- Real-time analytics providing the most accurate information on inventory levels and ability for better decision-making due to improved visibility
- One material valuation instead of two (IM and ML), reducing complexity and redundant setup and information
- AATP enabling a high level of flexibility for users to implement ATP or product allocation scenarios
- Release for delivery supporting users in the case of ad hoc order-confirmation changes, providing an oversight of all the current order confirmation status
- Catch weight management, quality management, and commodity management functionalities

We also explored the key supply chain functionality offerings for SAP S/4HANA Cloud, as of fall 2018.

SAP will continue to provide innovations for the supply chain LoB. The areas of focus for next releases will be embedded TM, improved analytics, and machine-learning and AI capabilities.

In the next chapter, we'll move on to sales, marketing, commerce, and service management functionality in SAP S/4HANA.

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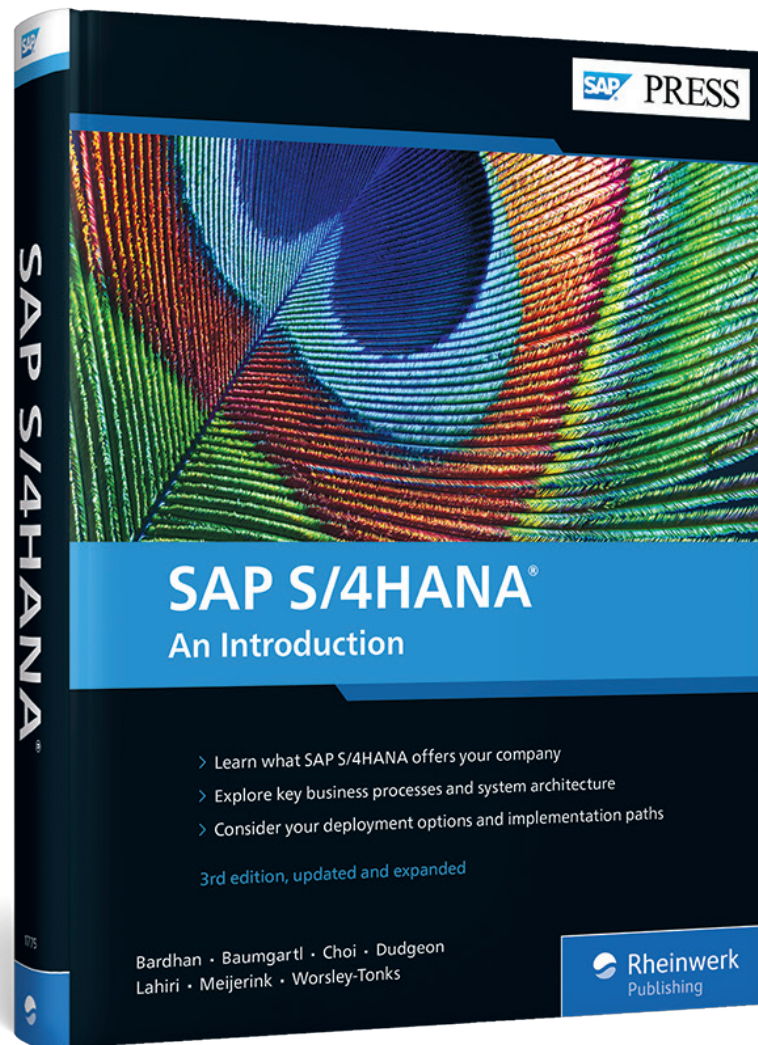
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