Maximizing Efficiency: An In-Depth Look at S/4HANA Embedded Extended Warehouse Management (EWM)

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Abstract: *Utilizing SAP Extended Warehouse Management (EWM) offers businesses an integrated and streamlined approach to warehouse operations, facilitating enhanced efficiency, accuracy, and responsiveness throughout the supply chain. This paper provides an overview of the benefits and functionalities of SAP EWM, highlighting its role in optimizing inventory management, order fulfilment, and resource utilization. By leveraging SAP EWM, organizations can achieve greater visibility into warehouse activities, improve inventory accuracy, and enhance customer service levels. Furthermore, SAP EWM enables seamless integration with other SAP modules and external systems, facilitating comprehensive data exchange and process automation. This abstract serves as a gateway to understanding the transformative impact of SAP EWM on modern business operations, emphasizing its value in driving operational excellence and competitiveness in today's dynamic marketplace.*

Keywords: SAP EWM, SAP S4 Hana

1. Introduction
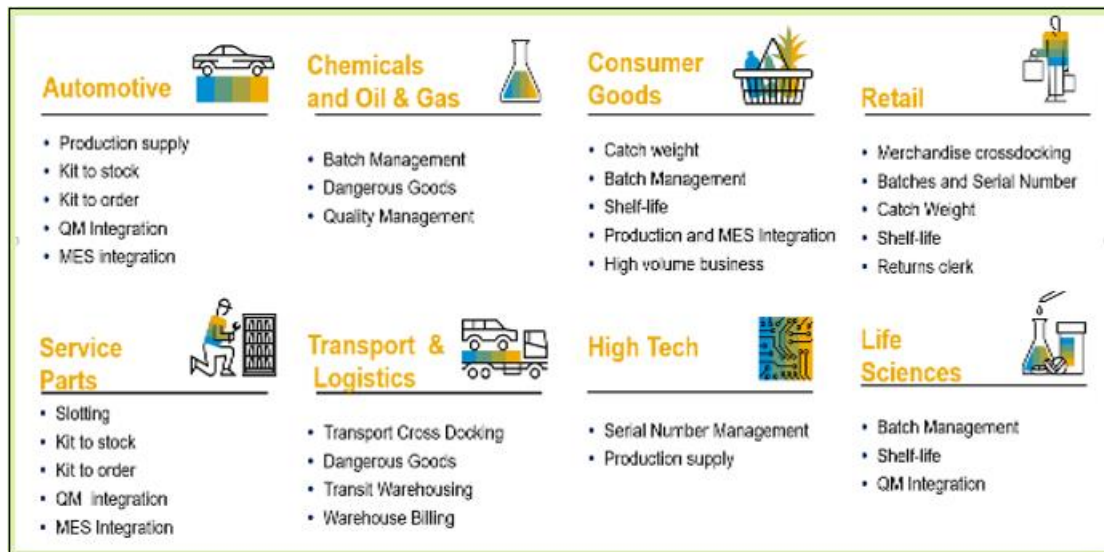
SAP Extended Warehouse Management (EWM) stands as a cornerstone solution in modernizing and optimizing warehouse operations, offering a comprehensive suite of tools and functionalities to efficiently manage inventory and facilitate the seamless processing of goods movement within warehouse facilities. As businesses navigate the complexities of today's supply chain landscape, the ability to effectively control inbound and outbound processes, as well as the movement of goods, is paramount to ensuring operational excellence and meeting customer demands. EWM emerges as a robust solution, empowering companies to gain precise control over warehouse activities, including the receipt and issuance of goods, order fulfilment, and the distribution of products to end customers or other facilities. Moreover, EWM extends beyond basic warehouse management functions, providing advanced capabilities such as serial and batch number management, vendor-managed inventory, resource optimization, and value-added services, thereby enabling organizations to orchestrate their warehouse operations with heightened efficiency and accuracy. With SAP EWM seamlessly integrated into the SAP S/4HANA platform, businesses can harness the power of a unified data model, simplifying data management and unlocking synergies across their supply chain processes. This integration not only enhances warehouse management capabilities but also paves the way for greater agility, innovation, and competitiveness in the ever-evolving landscape

of modern commerce. The core operations within a warehouse encompass the handling of incoming and outgoing materials, managing goods receipt and goods issue processes, fulfilling customer orders, and orchestrating the distribution of goods to their respective destinations. However, in instances where a company does not maintain inventory, the necessity for warehouse management to oversee goods diminishes accordingly.

SAP Extended Warehouse Management (EWM) serves as a pivotal tool in streamlining and optimizing these warehouse processes. By centralizing control over goods movements through a comprehensive warehouse management system, SAP EWM empowers organizations with the necessary tools to closely monitor and manage warehouse activities. Additionally, EWM facilitates the execution of supplementary functions within the warehouse environment, such as the creation of serial and batch numbers, vendor-managed inventory, resource optimization, and the provision of value-added services.

The comprehensive functionalities of SAP Extended Warehouse Management extend beyond mere inventory monitoring, enabling businesses to effectively oversee critical functions and ensure the efficient delivery of goods. Through its robust suite of features, SAP EWM empowers organizations to achieve operational excellence and enhance customer satisfaction by optimizing warehouse operations and streamlining the delivery process. SAP S/4HANA, renowned as the Digital Core, represents the forefront of ERP innovation, poised to usher businesses into the era of Digital Business transformation. Within the SAP ecosystem, various lines of business solutions persist as standalone entities or seamlessly integrate as part of the SAP S/4HANA Lines of Business solutions, offering customers unparalleled flexibility and choice. This approach fosters true hybrid scenarios and enables incremental deployments, aligning with diverse organizational needs and preferences.

In Q4/2016, a significant milestone was reached as SAP EWM transitioned into an embedded application component within SAP S/4HANA (on-premise edition 1610), colloquially referred to as "embedded EWM." This integration marks a pivotal moment, as both basic warehousing and extended warehouse management functionalities operate on a unified code base deeply embedded within SAP S/4HANA.

The advent of SAP Extended Warehouse Management (SAP EWM) as an embedded application within SAP S/4HANA heralds a new era of warehouse management capabilities. By seamlessly blending best-in-class warehouse management functionalities with the inherent benefits of SAP S/4HANA, this integration empowers organizations with unparalleled efficiency and agility in managing their warehouse operations.

Technically, the streamlined integration of embedded EWM within the on-premise edition of SAP S/4HANA is achieved through the adoption of a unified data model, representing a new product code line. This strategic move aims to simplify the data model, eliminating complexities and redundancies. Key

simplifications include the cessation of Core Interface usage for master data management, such as business partners, material masters, and batches. Additionally, redundant customizing tables are eliminated, while direct access to actual data within SAP S/4HANA replaces the need for data replication across various modules, encompassing material values, accounting objects, purchase orders, production orders, and more. This refined approach enhances data integrity, streamlines processes, and lays the foundation for unparalleled efficiency and innovation in warehouse management within the SAP S/4HANA ecosystem.

2. Deployment Strategies

The embedded EWM in S/4HANA bears similarities to EWM-on-ERP. A critical factor in decision-making revolves around system sizing. SAP offers the Quicksizer tool, which includes a 'HANA version' for quick sizing. Within this HANA Version, the Quick Sizer Tool encompasses the embedded EWM sizing tool under 'SAP S/4HANA -> EWM Inbound and 'SAP S/4HANA -> EWM Outbound for large-scale rollout plans.

SAP recommends leveraging an SAP DBS service to assess specific requirements and boundary conditions, crafting a tailored proposal for EWM deployment strategy. SAP brings ample experience to such services, now inclusive of the embedded EWM option in S/4HANA.EWM and WM can coexist within a single S/4HANA client, running in parallel. However, to maintain operational integrity, warehouses must be linked to distinct storage locations. It's imperative to note that running a single warehouse (single storage location) with a blend of WM and EWM processes is not feasible. EWM can be implemented in two distinct deployment modes within SAP S/4HANA systems:

- Embedded EWM on SAP S/4HANA
- Decentralized EWM on SAP S/4HANA
- Embedded EWM on SAP S/4HANA:

Embedded EWM seamlessly integrates with local ERP storage locations and is available in two license versions.
**Basic EWM:** SAP offers the Basic EWM application component with the default S/4HANA license.
**Advanced EWM:** Additional licensing is required to access advanced functionalities.

Benefits with SAP S/4HANA Embedded EWM:
- Reduced data replication: Business partner data, material master data, and batch master data do not require replication and can be directly accessed from S/4HANA ERP.
- Elimination of Core Interface (CIF) usage.
- Direct read access to transactional data such as purchase order and production order data.
- Elimination of additional documents like outbound delivery.
- SAP S/4HANA ERP and SAP EWM can operate within the same landscape.
- Simplified system structure compared to decentralized options.

- Cost savings: The license for basic EWM functionality is included in the SAP S/4HANA ERP license.
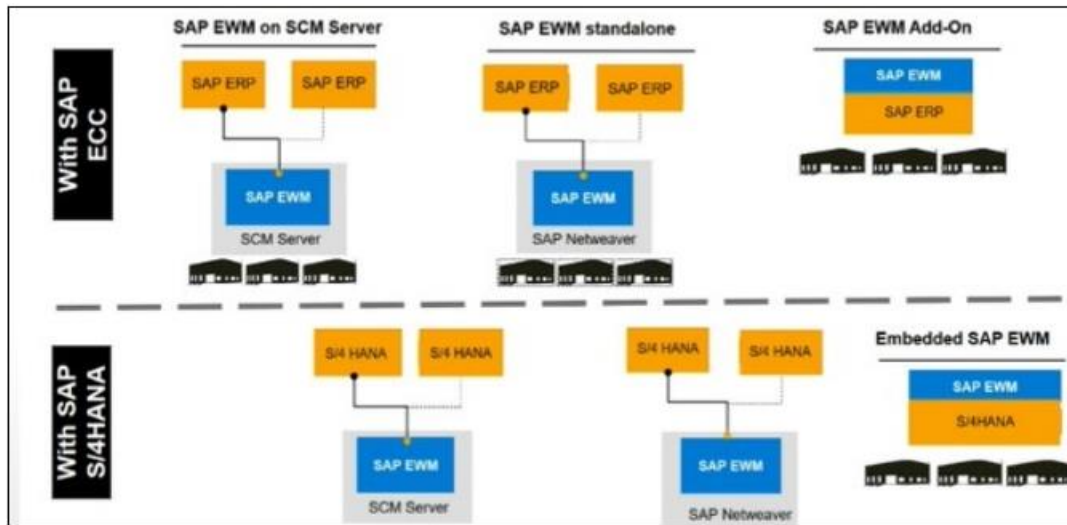
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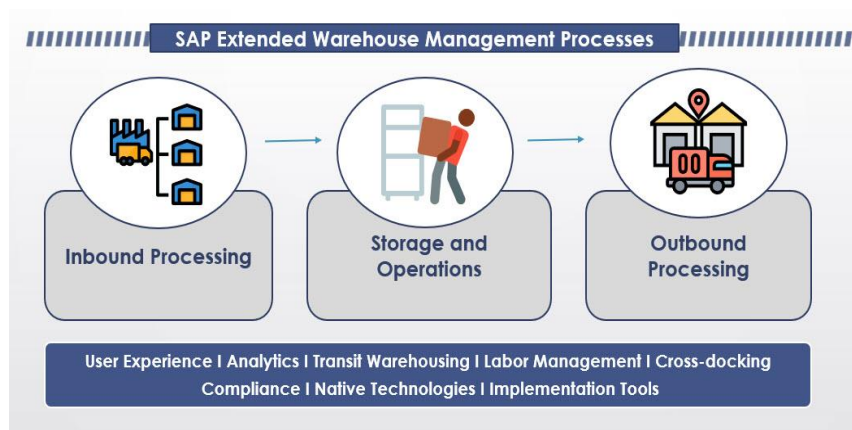
Master and Transaction Data Management

In the embedded EWM integrated in S/4HANA, there's no need for movement data and master data transfer via the Core Interface (CIF). Material master data is now accessible not only in traditional tables like MARA, MARC, and MARD but also in the table for the product master / SAPAPO / MATKEY. In EWM, products correspond to materials. Through Fiori apps like "Maintain Product" and "Maintain Products Warehouse Data," you can enrich warehouse data sourced from the material master. Additionally, there are Fiori apps for managing master data related to packaging specifications, storage locations, fixed storage locations, resources, etc.

Goods Receipt with Delivery

With Embedded EWM, data exchange is streamlined. Delivery notifications are no longer generated, and delivery replication occurs automatically via the qRFC interface (queue remote function call). This enhances transparency. Radio Frequency Framework functions (RF) are also available for truck unloading, goods receipt booking, and storage, enabling the use of mobile scanners and barcodes (EAN 128).

Goods Issue with Delivery

Goods Issue with Delivery (GI) refers to the process of releasing goods from the warehouse inventory for outbound shipment to customers or other destinations. In the context of Extended Warehouse Management (EWM), this process involves several steps to ensure accurate and efficient handling of goods for shipment. Key Components of Goods Issue with Delivery in EWM:

- **Order Processing**: The process begins with the creation of a sales order in the SAP system, which triggers the subsequent steps for goods issue.
- **Delivery Creation:** Using EWM functionalities, such as the "Create Delivery" application, a delivery document is generated to consolidate the items to be shipped. This document contains information about the goods, quantities, destinations, and other relevant details.

- **Warehouse Task Generation:** Upon creation of the delivery, warehouse tasks are automatically generated in the EWM system to execute the necessary activities for preparing the goods for shipment. These tasks include picking, packing, and staging of the items.
- **Picking Optimization**: EWM employs advanced algorithms to optimize the picking process, ensuring that items are selected from the warehouse in the most efficient manner. This optimization considers factors such as item location, availability, and order priorities.
- **Packing:** After picking the items, they are packed into appropriate containers or packages based on predefined packing specifications. EWM provides functionalities for managing packing materials, defining packing rules, and ensuring compliance with shipping requirements.
- **Staging:** Once the goods are packed, they are staged in the warehouse staging area or loading dock, ready for transfer to the outbound transportation vehicles. Staging activities may involve consolidating multiple orders or shipments for efficient loading.
- **Load Management**: EWM facilitates the management of loading activities, including the assignment of goods to specific transportation units (e.g., trucks, containers) and the optimization of loading sequences to maximize space utilization and minimize handling times.
- **Goods Issue Confirmation:** Finally, the goods issue process is completed by confirming the shipment in the EWM system. This step updates the inventory records, marks the items as shipped, and triggers any relevant accounting or reporting transactions.
- **Internal Processes: Various** internal processes can be mapped using a storage process, such as unloading, quality control, counting, deconsolidation, kitting, and additional logistical services.
- **Returns:** Supplier returns involve goods received that are returned due to negative quality inspection results. Customer returns may require quality assurance and rework. Returns, especially in online retail, are core processes. Customer returns begin with a return order, which must be completed for customer credit.
- **Physical Inventory:** Physical inventory is conducted annually to reconcile actual inventory with system stock. Storage location-related and product-related inventories can be distinguished.

4. Integration Overview

The integration of SAP Extended Warehouse Management (EWM) with other modules within the SAP ecosystem is critical for ensuring seamless end-to-end business processes and data flow across various functional areas. Here's an overview of how SAP EWM integrates with key modules:

1) SAP Materials Management (MM):
- Integration with MM enables the synchronization of material master data, procurement processes, and inventory management between EWM and other SAP modules.
- Material documents created in EWM are synchronized with MM to update inventory levels and financial records.

- Goods movements within the warehouse are reflected in MM, ensuring accurate inventory valuation and procurement planning.

2) SAP Sales and Distribution (SD):
- Integration with SD facilitates order processing, delivery creation, and shipment execution in alignment with customer sales orders.
- Deliveries created in SD trigger warehouse tasks in EWM for picking, packing, and staging of goods.
- Shipment confirmations from EWM update delivery status in SD, enabling real-time visibility into order fulfillment.

3) SAP Production Planning (PP):
- Integration with PP supports production supply chain processes by synchronizing production orders, material requirements planning (MRP), and inventory management.
- EWM receives production orders to plan and execute inbound material flows for production consumption.
- Finished goods produced are staged and managed in EWM until they are ready for outbound delivery to customers.

4) SAP Quality Management (QM):
- Integration with QM ensures quality inspection processes are seamlessly incorporated into warehouse operations.
- Inspection lots triggered in QM are linked to warehouse tasks in EWM for quality checks during goods receipt and outbound processes.
- Inspection results recorded in EWM update quality status and trigger follow-up actions such as rework or quarantine.

5) SAP Transportation Management (TM):
- Integration with TM enables end-to-end visibility and optimization of transportation processes from warehouse to customer delivery.
- Outbound deliveries created in EWM are transferred to TM for transportation planning, carrier selection, and route optimization.
- Shipment tracking and status updates from TM are synchronized with EWM to monitor delivery progress and coordinate warehouse activities.

6) SAP Finance and Controlling (FICO):
- Integration with FICO ensures accurate financial accounting and cost management for warehouse operations.
- Goods movements in EWM are posted to the general ledger in FICO, reflecting changes in inventory valuation, cost of goods sold (COGS), and warehouse-related expenses.
- Financial documents generated in EWM, such as goods issue postings, are synchronized with FICO to maintain financial transparency and compliance.

By integrating with these modules and others within the SAP landscape, SAP EWM enables holistic warehouse management that optimizes processes, enhances visibility, and supports end-to-end supply chain operations.

5. Advantages of deploying EWM

Implementing SAP Extended Warehouse Management (EWM) offers numerous advantages for warehouses, enabling them to optimize operations, improve efficiency, and enhance overall performance. Here are some key advantages of implementing SAP EWM:

- **Advanced Warehouse Management Capabilities**: SAP EWM provides robust functionality to efficiently manage complex warehouse operations, including inbound and outbound processes, storage, inventory management, picking, packing, and shipping. It offers comprehensive features for task management, labor optimization, and resource utilization.
- **Process Optimization**: By streamlining warehouse processes and workflows, SAP EWM helps organizations optimize resource utilization, reduce cycle times, and increase throughput. It supports best practices in warehouse management, such as cross-docking, wave picking, and slotting optimization, leading to improved productivity and operational efficiency.
- **Real-time Visibility and Control**: SAP EWM offers real-time visibility into warehouse operations, inventory levels, and order status. With comprehensive monitoring dashboards, reporting tools, and analytics, organizations can track performance metrics, identify bottlenecks, and make data-driven decisions to optimize warehouse performance.
- **Inventory Accuracy and Control**: With advanced inventory management features, including cycle counting, stock visibility, and bin management, SAP EWM helps ensure accurate inventory levels and minimize stockouts or overstocks. It enables organizations to maintain optimal inventory levels, improve order fulfillment rates, and enhance customer satisfaction.
- **Integration with Enterprise Systems**: SAP EWM seamlessly integrates with other SAP modules, such as Materials Management (MM), Sales and Distribution (SD), Production Planning (PP), and Finance (FI), enabling end-to-end visibility and data consistency across the supply chain. This integration facilitates smooth information flow and enables better decision-making.
- **Scalability and Flexibility**: SAP EWM is highly scalable and adaptable to meet the evolving needs of warehouses, from small distribution centers to large, multi-site facilities. It supports flexible warehouse configurations, process configurations, and business rules, allowing organizations to accommodate growth, changing customer demands, and industry requirements.
- **Enhanced Customer Service**: By improving order accuracy, reducing lead times, and optimizing order fulfillment processes, SAP EWM helps organizations deliver superior customer service. It enables faster order processing, on-time deliveries, and accurate order tracking, leading to increased customer satisfaction and loyalty.
- **Compliance and Regulatory Compliance**: SAP EWM helps warehouses comply with industry regulations, quality standards, and safety requirements. It supports traceability, serialization, and quality management initiatives, enabling organizations to maintain compliance with regulatory agencies and industry standards.
- **Support for Automation and Innovation**: SAP EWM provides support for emerging technologies such as RFID, IoT, and robotics, enabling warehouses to automate processes, enhance efficiency, and leverage innovation. It facilitates the adoption of advanced warehouse technologies to stay competitive in a rapidly evolving market.
- **Lower Total Cost of Ownership (TCO)**: While the initial implementation of SAP EWM may require investment, it offers long-term cost savings through improved efficiency, reduced operational costs, and better resource utilization. By optimizing warehouse operations and minimizing errors, SAP EWM helps organizations achieve a lower total cost of ownership over time.

6. Conclusion

Implementing SAP EWM offers industries a robust solution for optimizing warehouse operations, streamlining processes, and enhancing overall efficiency. With SAP EWM, industries can achieve greater inventory visibility, improve order accuracy, reduce operational costs, and enhance customer satisfaction. By leveraging advanced features and integration capabilities, SAP EWM enables industries to adapt to changing market demands, drive innovation, and stay competitive in today's dynamic business landscape

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