

Optimizing Packaging Efficiency: A Case Study of Oracle E-Business Suites Implementation

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Abstract: This paper delves into the intricate landscape of packaging requirements within the Business-to-Business (B2B) model, highlighting the diverse needs dictated by customer preferences and regulatory mandates. It explores how Oracle E-Business Suites (EBS) serves as a comprehensive ERP solution for managing packaging processes, addressing both customer-specific packing and material planning for pallets and skids. In the B2B realm, each customer necessitates materials to be shipped according to specific formats, ranging from cartons to custom packing pallets or skids. Oracle EBS stands as a prominent ERP application adept at addressing these requirements, leveraging sub-applications such as Oracle Warehouse Management System (WMS) and Oracle Advanced Supply Planning (ASCP). It outlines distinct packing requirements, emphasizing the need for meticulous attention to detail, especially in scenarios where customers provide customized packing materials. The paper outlines common packing requirements, such as specific box or material preferences, prohibition of mix and match, limiting packing to maximum pack size, and facilitating partial packing. Furthermore, it elucidates the implementation of these requirements within Oracle EBS, utilizing functionalities like customer cross-reference and descriptive flex fields within Oracle Inventory. It also describes the customized packing process via Oracle WMS and Oracle Mobile Supply Chain Application (MSCA), ensuring compliance with customer specifications and minimizing errors. The journal extends to material planning for pallets and skids, emphasizing the importance of effective planning and integration with Oracle Inventory, Bill of Materials (BOM), and Work In Progress (WIP) modules. It details the process of defining rack or skid items, receiving them from customers, and incorporating them into work orders. Finally, the journal concludes by highlighting the advantages of Oracle EBS in streamlining packaging processes and ensuring efficiency, compliance, and customer satisfaction. It underscores the pivotal role of technology in navigating the complexities of modern manufacturing and supply chain management, positioning Oracle EBS as a steadfast ally in driving operational excellence and sustained growth. Overall, the journal provides a comprehensive overview of the intricate dynamics of packaging requirements within the B2B model and the pivotal role of Oracle EBS in addressing these challenges.

Keywords: Oracle EBS, Oracle WMS, WMS, EBS, ASCP, MSCA, Warehouse Management System, Advanced Supply Chain Planning, Mobile Supply Chain Planning, Packaging solution. Skids, pallets, packing box

1. Introduction

Each customer necessitates materials to be shipped according to specific formats, which may stem from customer preferences or regulatory mandates imposed by destination port authorities. These distinct requisites are commonly encountered in the Business-To-Business (B2B) model, where one entity supplies materials to another. Packing specifications vary among customers and also depend on the nature of the products. For smaller items that can fit into cartons or onto pallets, they may be assorted based on availability during shipment preparation. In such cases, customers typically do not supply packing materials, as they are easily procurable in the market, but adherence to customer or destination port regulations is imperative.

However, for larger end products, customers may furnish custom packing pallets, often referred to as skids, onto which products are loaded. Yet, these pallets or skids are not readily accessible in the market, necessitating meticulous planning and timely communication with the customer to acquire them beforehand.

Oracle E-Business Suites (EBS) stands as a prominent ERP application for managing such business operations. This paper delineates the process mapping within Oracle EBS, addressing two facets of requirements: (a) instances where customers mandate specific packing methods while the manufacturing company provides the materials, emphasizing customer-specific packing over raw material packing

planning, and (b) scenarios where customers insist on using their packaging materials (i.e., skids or pallets), necessitating meticulous planning for pallet material while the packing requirements are less stringent.

Packing, the final stage in manufacturing, demands precision and adaptability to meet diverse customer and regulatory standards. It involves the arrangement of materials into boxes, containers, pallets, or foam bags. The choice of packaging depends on the size and value of the materials, with considerations for customer or governmental regulations that may dictate specific packaging requirements. Occasionally, customers provide customized packing materials to streamline the receiving process at their end, thereby reducing time and effort.

Integration of these packing processes into ERP applications is crucial for efficient management. Oracle E-Business Suite (EBS) offers a comprehensive ERP software solution designed to handle various business processes, including packaging. Within Oracle EBS, multiple sub-applications are available and configured to address these requirements.

The Oracle Warehouse Management System (WMS) serves as a warehouse application capable of modeling packing requirements. Additionally, Oracle Advanced Supply Planning (ASCP) facilitates the planning of packaging material requirements, including those for customer-supplied packaging materials. Other sub-applications such as

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Inventory and Bill of Materials must also be configured to align with these packaging requirements.

The proposed solution primarily emphasizes leveraging Oracle WMS to enforce customer-specific packing requirements and Oracle ASCP for material planning tailored to customer-specific materials. This comprehensive approach ensures efficient packaging management within the Oracle EBS ecosystem.

2. Customer-Specific Packing Of The Products

When assembling end products, adherence to specific packing conditions, often dictated by customer specifications, becomes imperative. These conditions may pertain to small-sized products that can be packed using commonly available materials like cardboard boxes supplemented with foam or bubble wrap. While such materials are standard, meticulous attention must be paid to packing requirements by shipping or end-of-line personnel. Below are some common packing requirements elucidated:

- 1) Specific Packing Box or Material Preference: Certain customers may require packing to be executed using specific boxes or materials. In such instances, the ERP application should restrict the selection to only the designated packing materials, thereby averting potential user errors.
- 2) Prohibition of Mix and Match: Some customers mandate that identical finished goods must be packed together in a single box, disallowing mix-and-match practices. The ERP system should enforce this restriction, preventing users from combining different products in the same package.
- 3) Limiting Packing to Maximum Pack Size: If a particular carton box can accommodate a maximum of 10 quantities of Product A, the system should prohibit packing beyond this limit. This precautionary measure prevents overpacking, which could lead to damage during transit.
- 4) Facilitating Partial Packing: Similarly, in scenarios where a customer order consists of 9 units, but the maximum pack size is set at 10 units, the system should allow for partial packing. This ensures that each package contains a specified quantity, thereby mitigating the risk of underpacking or overpacking for particular customers.

Incorporating such specific packing requirements into ERP applications such as Oracle E-Business Suite (EBS), particularly within Oracle Warehouse Management System (WMS), is crucial for efficient warehouse operations. Additionally, Oracle WMS facilitates integration with mobile applications installed on handheld scanners, which are commonly utilized for warehouse management tasks, eliminating the need for desktop terminals. The following solution elucidates how the aforementioned packing requirements can be mapped using Oracle WMS in conjunction with Oracle Inventory applications and Oracle Mobile Supply Chain Application (MSCA).

Specific Packing Box or Material Preference: Oracle WMS can be configured to recognize and enforce specific packing requirements designated by customers. Integration with Oracle Inventory applications ensures that only approved packing materials are available for selection, thereby

preventing user errors. Oracle MSCA enables warehouse personnel to access and adhere to customer specifications using handheld scanners, ensuring accuracy and compliance.

Prohibition of Mix and Match: Oracle WMS settings can be adjusted to restrict mix-and-match packing practices as per customer mandates. By configuring Oracle Inventory applications to align with these restrictions, users are prevented from combining different products in the same package. Oracle MSCA provides real-time visibility into packing instructions, allowing warehouse staff to comply with mix-and-match prohibitions efficiently.

Limiting Packing to Maximum Pack Size: Oracle WMS configurations can enforce maximum pack size limits for specific products or customer orders. Integration with Oracle Inventory applications ensures that warehouse personnel are aware of and adhere to these limitations during packing operations. Oracle MSCA provides handheld scanners with prompts and alerts regarding maximum pack size constraints, preventing overpacking and potential damage.

Facilitating Partial Packing: Oracle WMS can be configured to allow partial packing for customer orders that do not meet maximum pack size requirements. Oracle Inventory applications provide visibility into available inventory quantities, enabling warehouse staff to determine the feasibility of partial packing. Oracle MSCA guides warehouse personnel through the partial packing process, ensuring that each package contains the appropriate quantity of products.

By leveraging Oracle WMS, Oracle Inventory applications, and Oracle MSCA, businesses can effectively map and implement these packing requirements, ensuring compliance with customer specifications and minimizing the risk of errors and damages in the warehouse environment.

a) To store master data related to packing specifications within Oracle Inventory, you can utilize the "customer cross-reference" functionality and extend it by incorporating flexible fields known as "Descriptive Flex-fields (DFF)." These DFFs allow for the capture of specific settings for each customer item. Below is a breakdown of the required fields:

- **Packing Box Item Code:** This field maps the customer item to the corresponding manufacturing part number for packing purposes.
Default value: 'Any' if the customer does not provide any specific packing box item code.
- **Mix-and-match Allowed:** Indicates whether mix-and-match packing is permitted for the customer item.
Options: Yes or No.
- **Maximum Item to be Packed:** Specifies the maximum quantity of the customer item that can be packed into a single container.
Default value: 99999 (indicating infinite) if not otherwise specified by the customer.
- **Partial Packing Allowed:** Indicates whether partial packing of the customer item is permitted.
Options: Yes or No.

Default value: Yes, allowing for partial packing unless otherwise specified.

To implement these specifications:

- Modify the "customer cross-reference" mapping within Oracle Inventory to incorporate the additional flexible fields.
- Utilize the Descriptive Flex-fields (DFF) functionality provided by Oracle Inventory to add the required fields for each customer item.
- Configure the DFF fields to capture the specified settings (Packing Box Item Code, Mix-and-Match Allowed, Maximum Item to be Packed, Partial Packing Allowed) for each customer item.
- Ensure that default values are set appropriately for each field to accommodate scenarios where customers do not provide specific packing specifications.

By leveraging Oracle Inventory's "customer cross-reference" functionality and incorporating flexible fields using DFFs, one can effectively store and manage master data related to packing specifications for each customer item, thereby ensuring accurate and compliant packing processes within your organization.

- The Oracle MSCA application provides a transaction known as 'packing' which handles packing operations. During this transaction, a license plate number (LPN) is generated to manage various finished goods. Customization of this process is required to incorporate additional controls according to the settings specified above.
- When initiating a new LPN (License Plate Number) for a packing box, the user begins by scanning the first item. If

the item possesses a serial number, the corresponding serial number is scanned to identify the associated finished goods, nullifying any prior transactions linked to the serial number. Once the item is identified, the 'Customer Cross Reference' data is retrieved to establish context. This context encompasses the current LPN number, the scanned serial number, and the specific packaging settings for the corresponding items.

Following the packaging settings, the initial item is scanned. Upon scanning, the system references the customer's cross-reference settings to determine the appropriate packing box. If the packing box is unknown, the automated packing process transitions to manual packing. In manual packing mode, the maximum pack quantity is unrestricted, allowing users to select any available packing box during the packing process. However, mixed pack and partial pack values are still validated, and the item must be present in inventory and not previously packed.

If the packing box is not 'Unknown,' the system verifies whether the selected packing box matches the prescribed one, throwing an error if they differ. Additionally, the system checks if any other items are permitted to be packed into the same box. If permitted, the user can scan additional items until reaching the maximum pack size, provided partial packing is disallowed. Conversely, if partial packing is allowed, the user retains the flexibility to skip packing tasks at any point. The packing process is illustrated in the following flowchart.

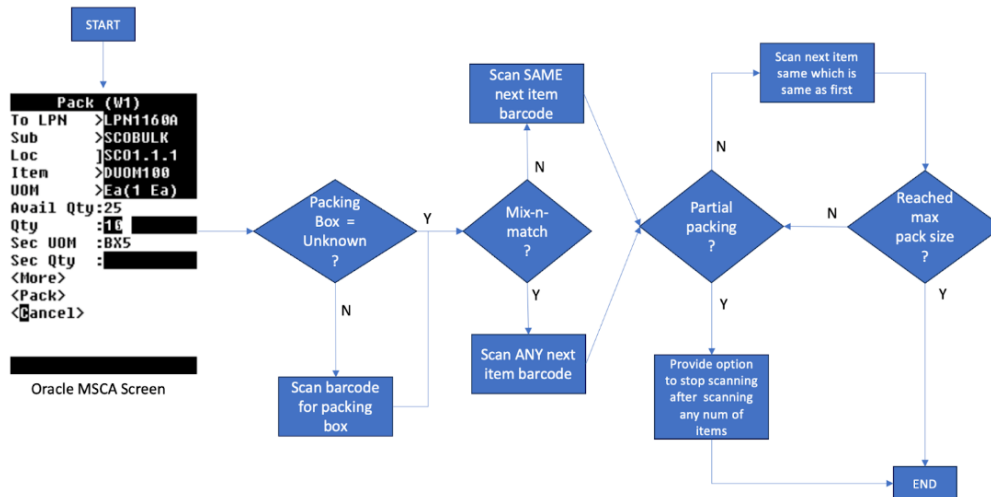


Figure 1: Custom Packing Process via Oracle WMS

To implement the described modifications, the Oracle MSCA/OAF framework is utilized, requiring the development of new Java class files and additional personalization. The packing and LPN update procedures leverage Oracle's seeded API. This customization solely focuses on validating data according to business requirements. Ultimately, the Oracle WMS application documents the transaction as 'packing.' Through these customized packing processes within Oracle EBS, customer-specific packaging requirements are effectively enforced.

3. Material Planning for Pallets or Skids

Some manufactured products, particularly those of significant size such as car doors or chassis produced in fabrication companies, may not align well with packing methods involving partial packing or mix-and-match options. Instead, specific racks, pallets, or skids are utilized when transporting such materials to car manufacturing facilities. These racks are typically provided by the car manufacturing plants, making timely acquisition of these racks critical for fabrication companies. Therefore, effective material planning for these packing materials becomes imperative.

The proposed solution leverages various sub-applications within Oracle EBS, including Oracle Inventory, Oracle Bill of Material (BOM), Oracle Work in Progress (WIP), and Oracle Advanced Supply Chain Planning (ASCP), to address this challenge comprehensively.

To implement the solution:

- Define rack or skid items in the Oracle item master within the Oracle Inventory.

- Incorporate the corresponding rack item into the bill of materials (BOM) within the Oracle Bill of Material application.
- Ensure that these rack items are designated with a zero-dollar cost to avoid any impact on inventory valuation or the final product's cost roll-up process.

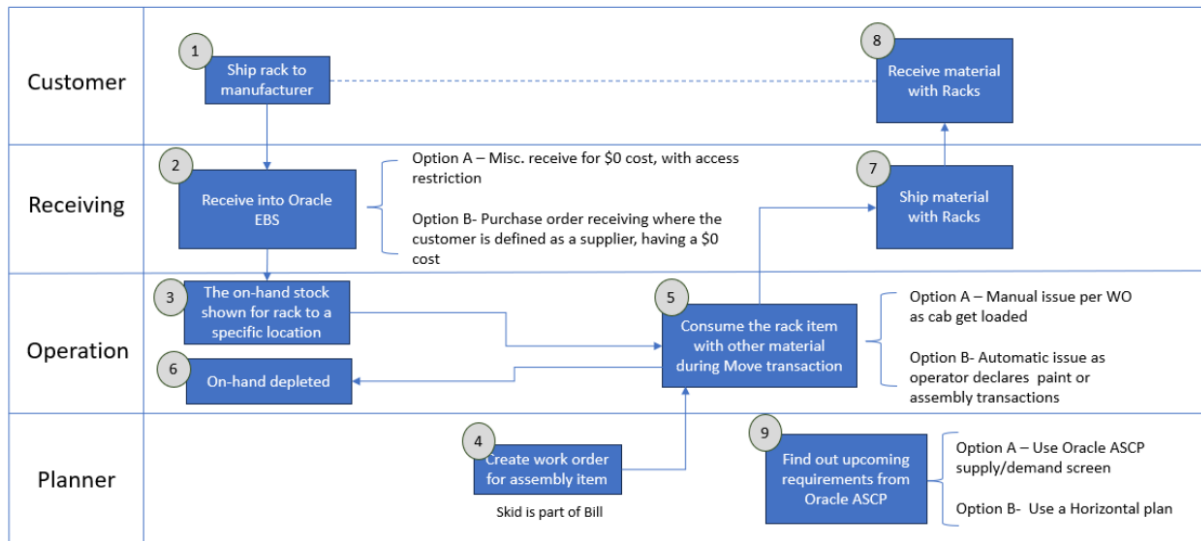


Figure 2: Custom Packing Process via Oracle WMS

As explained in the preceding process, rack items are shipped from the customer to the manufacturing plant. Subsequently, these items are received, and corresponding transactions are recorded in Oracle. Two options are available for receiving such items:

- The rack items can be received as miscellaneous receipts. Given that the item cost is zero, it does not have any financial impact.
- Alternatively, the items can be received against a purchase order. In this scenario, the customer is defined as the supplier, and the buyer must create a blanket agreement with the customer to receive material as needed. Upon receipt, the on-hand quantity increases, but it does not impact inventory valuation.

Once the material is received, corresponding work orders are created, referencing the bill of materials containing the rack placeholder item. During production, the rack or skid items are consumed along with other raw materials. If the rack is not available in inventory, the corresponding transaction fails, ensuring that all materials are staged properly. Simultaneously, the corresponding inventory is depleted as work order transactions are executed. Eventually, the finished goods reach the customer while the racks remain in circulation.

Throughout the process, material planners can access Oracle ASCP to review upcoming material requirements. The advantages of this solution include:

- Treating the skid item as a regular elementary item allows for tracking its position.

- Utilizing Oracle ASCP for future material planning enables the publication of skid requirements to the customer in advance.
- As an extension to the solution, supplier forecasts can be published, and commitments can be obtained from the supplier. Given that the customer is defined as a supplier, additional applications such as Oracle Supplier Scheduling or Oracle Collaborative Planning can facilitate this process.

4. Conclusion

In summary, the dynamics of contemporary business underscore the crucial importance of meticulous attention to packing requirements, particularly in the Business-to-Business (B2B) model where specific specifications often prevail. Oracle E-Business Suites (EBS) emerges as a pivotal ERP solution, adept at managing the intricate facets of packaging within manufacturing enterprises.

Packing, being the final stage in manufacturing, requires precision and adaptability to meet diverse customer and regulatory standards. Oracle EBS seamlessly orchestrates this process, integrating various sub-applications such as Oracle Warehouse Management System (WMS) and Oracle Advanced Supply Planning (ASCP) to streamline operations.

For customer-specific packing processes, Oracle WMS acts as the cornerstone, enforcing unique requirements and optimizing efficiency. Through customized processes and Oracle Mobile Supply Chain Applications (MSCA), the system ensures adherence to specific packing guidelines, thereby enhancing accuracy and productivity.

Furthermore, Oracle EBS extends its functionality to encompass material planning for pallets and skids, essential for large-scale products. By integrating Oracle Inventory, Bill of Materials (BOM), and Work In Progress (WIP) modules, businesses can effectively forecast and manage packing material requirements, thereby facilitating smooth operations and timely deliveries.

The advantages of this comprehensive solution are manifold. With Oracle EBS as the backbone, enterprises can navigate the complexities of modern manufacturing, ensuring efficiency, compliance, and customer satisfaction in every facet of the packing process. Such a solution could be readily utilized in industries like automotive component manufacturing and perishable food production, including various types of milk and its products.

In essence, the integration of Oracle EBS empowers businesses to adapt to evolving packing requirements, optimize resource allocation, and drive innovation in the realm of manufacturing and supply chain management. As technology continues to evolve, Oracle EBS remains a steadfast ally, guiding businesses toward operational excellence and sustained growth in an ever-changing landscape.

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