The objective of this blog is to show how to integrate the SAP System with 3PL Warehouse management system (WMS) for Outbound Delivery. This document focuses on how to do a seamless integration between a Company's SAP delivery process and 3PL WMS with minimal or no manual intervention.

The global expansion of businesses has made it imperative for organizations to have a micro level visibility of their inventory along with efficient inventory receiving, put-away, optimization of picking and shipping of orders. The situation becomes further complicated when we look at this in the context of a 2 Tier ERP architecture between the Headquarter and the Subsidiary. The inventory is owned by two different entities on two different ERP instances or single ERP instance. The visibility of inventory right up to the bin level is of utmost importance before creating a Purchase order for a Supplier or confirming a Sales order to a Customer.

Challenges faced without 3PL integration

• Keeping Inventory in Sync as inventory is being handled by a third party. Having incorrect inventory count results in a poor customer experience as it's fallacious to make a promise to fulfill an order without having sufficient inventory.

• Data Matching and confirming: Time delay in giving confirmation for an order due to lack of real-time inventory updates from the third party.

• Delay in a delivery process due to manual intervention: Updating the 3PL WMS on an hourly or daily basis about a delivery can cause unnecessary delay in a Customer shipment. Also, in case someone changes the delivery information, it can result into the delivery of wrong products. Not updating a delivery cancellation request on time can cause unnecessary wastage of time, resources, and money.

Benefits of Integrating SAP with 3PL

The ultimate goal of 3PL integration with SAP is to have real-time, end-to-end supply chain traceability, allowing you to provide the best possible customer service.

• Inventory optimization: Having the right mix and the right amount of inventory on hand is paramount to both customer and investor satisfaction. Planning the right level and amount of inventory requires your sales order, purchase order and planning systems to have real-time visibility of your inventory.

• Supply chain visibility: The inventory system must be integrated not only with the company's back office systems but also with 3PL systems. By seeing company's fluctuating inventory levels, suppliers can ensure their product is available in their warehouse or 3PL when customers need it.

• Accurate financial reports: Ensuring your annual reports and tax returns are accurate is crucial for investors and the government. The only effective way to ensure financial integrity in company's reporting is to integrate the transactions in inventory system with a back-office chart of accounts.

• Faster and Accurate Delivery process: As the 3PL WMS is being updated with the delivery details in real time, resulting in a faster and accurate delivery process.

SAP Process Orchestration (PO) is used as a Middleware Engine to communicate between SAP system and 3PL WMS system. The heart of PO is Integration Engine that is used for integrating different technologies using Standard Messaging techniques, e.g. XML. SAP system sends information via IDOC. SAP PO converts IDOC to XML to send information to 3PL WMS and vice versa.
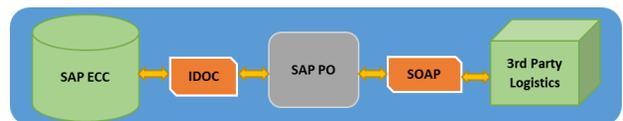
Business Process

End-to-end business process integration of SAP to 3PL The process steps to integrate the SAP delivery process with 3PL WMS are below.

• Customer places an order and a sales order is created in SAP system. After this sales order is confirmed using an availability check, an outbound delivery is created in SAP for 3PL WMS using transaction VL01N / VL10A.

• As outbound delivery is created in SAP, we need to send this information to the 3PL WMS, to pass the shipping information to 3PL. This information is sent to 3PL WMS using SAP IDOCs.

• SHPORD05 IDOC will be generated based on Create/Change event of the outbound delivery document. The outbound delivery process integration takes place via this IDOC message generation that is triggered through the output type. Some of the key information SAP will send to 3PL include:

- o Delivery Number
- o Sales Order number
- o Customer information
- o Customer shipping preferences
- o Delivery Item Information (Item number, Material, Quantity, etc.)

4. SAP Process Orchestration will convert the SHPORD05 IDOC into XML IDOC and will send the information to 3PL WMS. IDOC Message Type = SHPORD, Basic Type = DELVRY03 or DELVRY05.

5. Once the shipment processing is completed at the 3PL WMS based on outbound delivery information, they will communicate the relevant information needed to update the open outbound delivery in SAP, so that it can be processed to complete the Post Goods issue (PGI), and thus post the stock movements in SAP.

6. SHPCON IDOC (Message Type: SHPCON, Basic Type: DELVRY03 or DELVRY05)) will be sent by 3PL WMS which will then be converted into XML IDOC by SAP-PO (Process Orchestration). The XML IDOC will then be processed that will be read by SAP system to perform relevant updates based upon data transmitted via the mapped segments at both item/header level, and thus completing the shipping process for the outbound delivery based upon inputs from 3PL WMS.

7. Some of the key information that will be sent back from 3PL WMS will include:

- Delivery Number

- Material number and Serial Numbers

- Material Quantities

- Carrier Information, such as Tracking Number, etc.

- Country of Origin

8. Once the mapped data is processed from this INBOUND IDOC, the delivery is completed and Post Goods Issue (PGI) is processed for the delivery and inventory is reduced in SAP.

9. After PGI is processed for delivery, SAP will send a delivery confirmation email to the customer with a tracking number of the shipment.
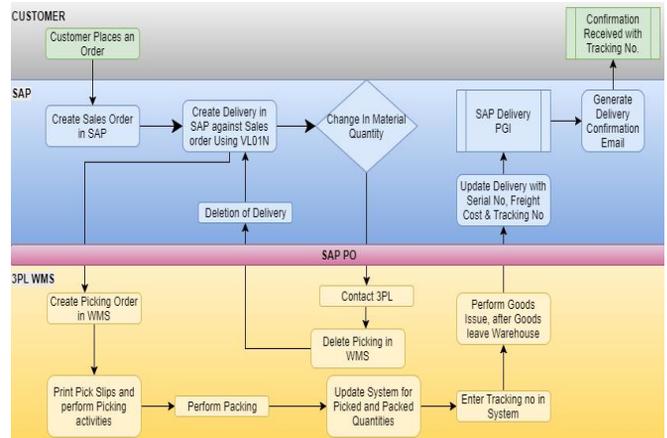
End-to-end business process integration of SAP to 3PL

Note: There could be various scenarios in which delivery may have to be changed.

Case 1: A delivery block is set for all the outbound deliveries that are created. The blocked deliveries will be reviewed to check if any changes are required. Once the changes to the delivery are finalized, the delivery block will be released. The Delivery IDOC to 3PL will only be triggered after the delivery block is removed.

Case 2: In case changes to delivery is needed after delivery IDOC is sent to 3PL, manual communication is needed with 3PL for making changes. If 3PL has not packed or shipped the delivery, a cancelation delivery block will be put in delivery. This will trigger a delivery cancelation IDOC to be sent to 3PL. This IDOC will cancel Picking request in the 3PL WMS system. The cancelation of Pick request in 3PL WMS will send an IDOC to SAP, which will delete the delivery. The user can then manually create a new delivery with material or quantity changes.

Case 3: In case changes to delivery is needed after delivery IDOC is sent to 3PL, manual communication is needed with 3PL for making changes. If 3PL has already packed or shipped the delivery, a manual process will have to be followed**.**

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