

Original Article

# Enhancing SAP EWM–S/4HANA Integration for Shuttle Stock Transfers through an Advanced RF Validation Framework

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**Abstract** - This paper presents the implementation of a tailored Radio Frequency (RF) solution that aims to enhance the connectivity between SAP Extended Warehouse Management (EWM) and SAP S/4HANA with respect to the shuttle stock transfers between main production sites and the partner 3PL. The method tackles major issues in the standard SAP process, which involve manual handling of development requests and inconsistent data entries. Above all, there is no expected result validation in real-time. Using the Direct Outbound Delivery Order (DODO) framework and placing configurable, rule-based checks, the enhanced RF transaction enables the successful end-to-end process of scanning shuttle bins to automatic goods issue and inbound delivery creation. It runs in real-time to stop work from happening, errors from happening, and improve the correct data. All in all, this paper demonstrates bespoke RF design for greater efficiency, reliability, and agility of warehouse operations, resulting in resilient supply chain ecosystems through further digitalization.

**Keywords** - Stock Transport Order (STO), Outbound Delivery (OBD), Direct Outbound Delivery Order (DODO), Radio Frequency (RF) Transaction.

## 1. Introduction

In the present-day scenario of the supply chain, moving goods from one location to another has become essential for operational excellence and competitive advantage. For many businesses, this means moving products between primary manufacturing spots and outside warehouses run by 3PL companies.

In the SAP world, these transfers are managed mostly through Stock Transport Orders (STOs) and Outbound Deliveries. Nonetheless, the standard process was often inflexible and manual and lacked the adaptability required to move shuttle stocks between plants and 3PL. The stiff nature can create data inconsistencies in SAP EWM and S4 HANA, which leads to process delay, increased cost, and lowered transparency.

A custom RF transaction will be applied to automate and optimize the material transfer process to overcome the limitations. The suggested approach uses the DODO function of SAP to establish a seamless integrated workflow from EWM to S/4HANA.

By putting in advanced validation logic in the RF transaction, the process ensures the accuracy of the data, limits

manual work, and reduces user error. This innovation generates a more trustworthy, efficient stock transfer mechanism, which helps organizations in achieving higher synchronization of supply chain operations.

## 2. Challenge of Manual Warehouse Operations

According to the SAP standard, the STO is created in the SAP system before the creation of Outbound Delivery for transferring stocks between the plant and the 3PL partner. While it works, it has several difficulties in a fast-moving, high-volume shuttle stock transfer situation. As outlined below, manual data entry and a lack of real-time validation can lead to many issues.

### 2.1. Data Inconsistencies

When the data between S/4HANA EWM and the ERP does not match, delivery updates get stuck in the system queues that need to be intervened manually, which takes time and can lead to further errors.

### 2.2. Operational Inefficiencies

It takes a long time to do the processes, and they are open to human error. This causes the delay in shipment, which is responsible for increasing operational costs significantly. Every manual step is a potential point of failure.



### 2.3. Lack of Flexibility

Since specific validation requirements associated with shuttle stock transfers may not be addressed by standard practice, this may lead to compliance issues and friction. The problems show us that a simpler solution is needed. It should also guarantee data consistency and cut out manual effort. Being able to tweak the system for shuttle stock transfers is important, too.

## 3. Methods: The Custom RF Transaction

The suggested solution consists of an RF transaction, custom-built for the automation and simplification of shuttle stock transfer. This transaction is created in the standard RF outbound process menu, which means that the warehouse operator will be able to execute all the steps to transfer stocks to the shuttle bin through a user-friendly transaction. This process will involve scanning the shuttle bin during the transfer order and goods issue initiation. The SAP Direct Outbound Delivery Order functionality is the heart of the solution. With this, you can create an outbound delivery directly from the RF transaction. Consequently, there is no need to manually create outbound deliveries, and data will be consistent on both S/4HANA EWM and ERP.

### 3.1. Core Functionality: Direct Outbound Delivery Order (DODO)

A custom RF transaction designed to facilitate the movement of shuttle stock was the proposed solution. This transaction is implemented in the standard RF outbound process menu and allows warehouse operators to perform all the functions from scanning the shuttle bin to goods issue for a shuttle stock transfer in an easy-to-use process. This solution is based on the DODO functionality in SAP that lets you create an outbound delivery from the RF transaction. As a result, outbound deliveries are not created manually, and the data remains the same between S/4HANA EWM and ERP.

### 3.2. Ensuring Accuracy: Advanced Validation Checks

The improved RF transaction will include an additional number of validations that will be simulated before the goods issue is posted. The verification processes aim to avoid the common mistakes made during any procedure while ensuring consistency of the data. The validation checks are enabled through configurable entries in a custom table and can be disabled without a transport for the system. The validation checks include.

#### 3.2.1. Open Warehouse Tasks (WTs) Check

When there are open WTs for the HUs in the shuttle bin, the goods issue cannot be posted. Ensures that all materials are present and correct before shipment takes place.

#### 3.2.2. Automatic Partner Prompt

This functionality will fill the Ship-to Party for the user from the scanned bin to avoid any mistakes that can happen due to user error.

#### 3.2.3. Stock Type Checks

This confirms the stock types of the material shipment, so as to prevent issues during the execution of the STO.

#### 3.2.4. Empty Returnable Container (RC) Shipment Check

If an empty RC is not set for an outbound delivery type, it will not be shipped.

#### 3.2.5. Dangerous Goods (DG) Master Data Check

This ensures that the DG master data exists for any DG-relevant materials, preventing issues during route determination.

## 4. Workflow and Impact

Results show that enhanced RF transaction is able to provide an easier process flow for the warehouse operator to execute transactions.

### 4.1. Process Workflow



Fig. 1 RFUI Movement between Plant and 3PL

#### 4.1.1. Step 1 - Scan Shuttle Bin

The operator of the warehouse scans the shuttle bin that represents the physical shuttle running between the plant and 3PL in predefined intervals. Based on custom table configurations, the system automatically defaults to the Ship-to Party associated with the 3PL for the relevant warehouse.

#### 4.1.2. Step 2 - Scan Printer

The operator scans the printer, in which documents addressing the delivery (packing list and delivery note) are to be printed. This way, the right paperwork gets created at the right location for the shuttle driver.

#### 4.1.3. Step 3 - Confirm Ship-to Party

The operator confirms or manually enters the Ship-to Party (3PL's Partner ID). The system validates the entry against configured partner associations.

Fig. 2 RF Shuttle Transaction – Stock Transfer

#### 4.1.4. Step 4 - Initiate Goods Issue (PGI)

Once the operator presses the PGI button or function key, the system executes the following automated sequence:

- a) Selects all HUs in the shuttle bin (both outer and nested HUs).
- b) Executes all validation checks defined in the enhancement framework for each HU and product
- c) If validation errors are detected, it displays specific error messages and prevents DODO creation.
- d) If all validations pass, it creates the outbound delivery in S/4HANA EWM
- e) Distributes the corresponding OBD to the S/4HANA ERP system
- f) Automatically prints delivery documents (packing list and delivery note) using the current print utility programs
- g) Performs goods issue for the OBD
- h) Triggers automatic inbound delivery creation at the receiving location through standard SPED output processing

#### 4.1.5. Step 5 - Display Confirmation

The delivery document number of S/4HANA ERP is displayed on the system, which, along with shuttle bin info, allows the operator to know a successful process immediately.

#### 4.1.6. Step 6 - Return to Home Screen

When an RF transaction completes, it returns to the home screen for the shuttle stock transfer. Ready to scan again. The operator can either scan another shuttle bin or return to the original RF menu screen.

### 4.2. Impacts and Results

The updated RF transaction has immensely decreased data inconsistencies observed in S/4HANA EWM and ERP systems. DODO frequently became stuck in S/4HANA queues that needed to be processed manually, which in turn required a lot of time for reversal in EWM before implementation.

The Automatic Partner Prompt feature takes care of entering partner information, which is a common user error. Before, sometimes warehouse operators entered the wrong Ship-to Party. This caused DODO to be processed successfully in EWM but failed in S/4HANA. This needed a complete transaction reversal by the support team, which wasted valuable resources and delayed shipments. The automatic entries of Ship-to Party and information on Printer Ford, based on scanned bin data, have entirely removed this error vector.

A smooth flow of outbound deliveries from EWM to ERP, along with automatic creation of STO and generation of inbound delivery at the receiving location, makes the end-to-end process automated. The system allows data on all systems to be in real-time, preventing delays and demarcation that was the previous manual system.

The validation checks have proven to be reliable and effective in all cases. The Open Warehouse Tasks, Automatic Partner Prompt feature. The Stock Type Validation check, the Empty RC Check, and the Dangerous Goods Master Data Check were able to prevent shipments with pending warehouse activities from moving ahead in a high percentage of cases.

The implementation has translated into tangible improvements in key operational metrics. The daily processing capacity was enhanced by 73%, for the daily throughput of 4~5 shipments per day/per plant increased to 11 shipments per day/per plant.

The productivity of operators rose from 62% to 94% due to less manual work and error correction activities. We solved the issues with documentation not being done properly, which was causing shipment delays. Due to lesser manual intervention and reduced errors, overall operational costs have reduced by around 35%.

### 4.3. Limitations and Considerations

Organizations that are going to implement this solution need to set up good governance processes to manage validation rules and keep configuration tables up to date. If shuttles, partners, or warehouses get changed, then update these configuration tables.

Organizations must implement a change management process to maintain configuration accuracy. Because the solution depends on the use of RF devices and barcode scanning, hardware reliability and connectivity will be pivotal. Companies must have sturdy structures that will support mobile warehouse operations and must also have backup procedures for outages.

## 5. Conclusion

The better RF transaction offered here is an end-to-end solution to automate shuttle stock transfers in your SAP environment. Using the DODO function along with a robust validation framework, this solution can effectively resolve some of the main challenges within SAP standard processes. It has been demonstrated that employing intelligent validation to prevent errors before event occurrences is more effective than plugging the holes after they have happened. It also reduces manual intervention to a large extent. Overall supply chain performance is improved.

The outcome shows a better guarantee of data consistency, operating efficiency, and system integration. The validation framework can be configured so that it can be used across various warehouse locations. Thus, it works to meet different business needs while keeping the same process at different locations. Companies using this solution can save money because there is less manual effort needed, fewer errors in systems, and less time taken to process, making them more agile and competitive.

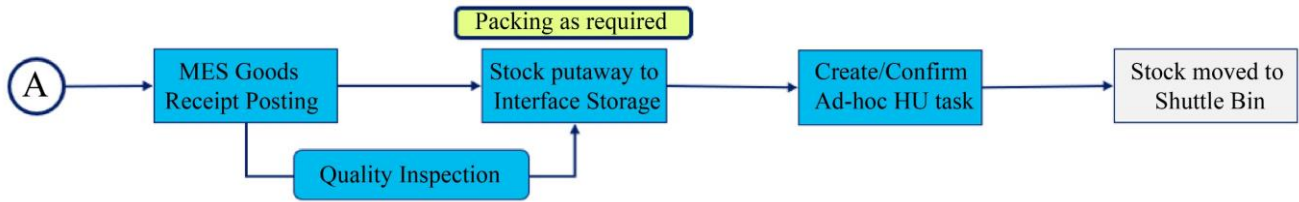


Fig. 3 User process before Shuttle Transfer

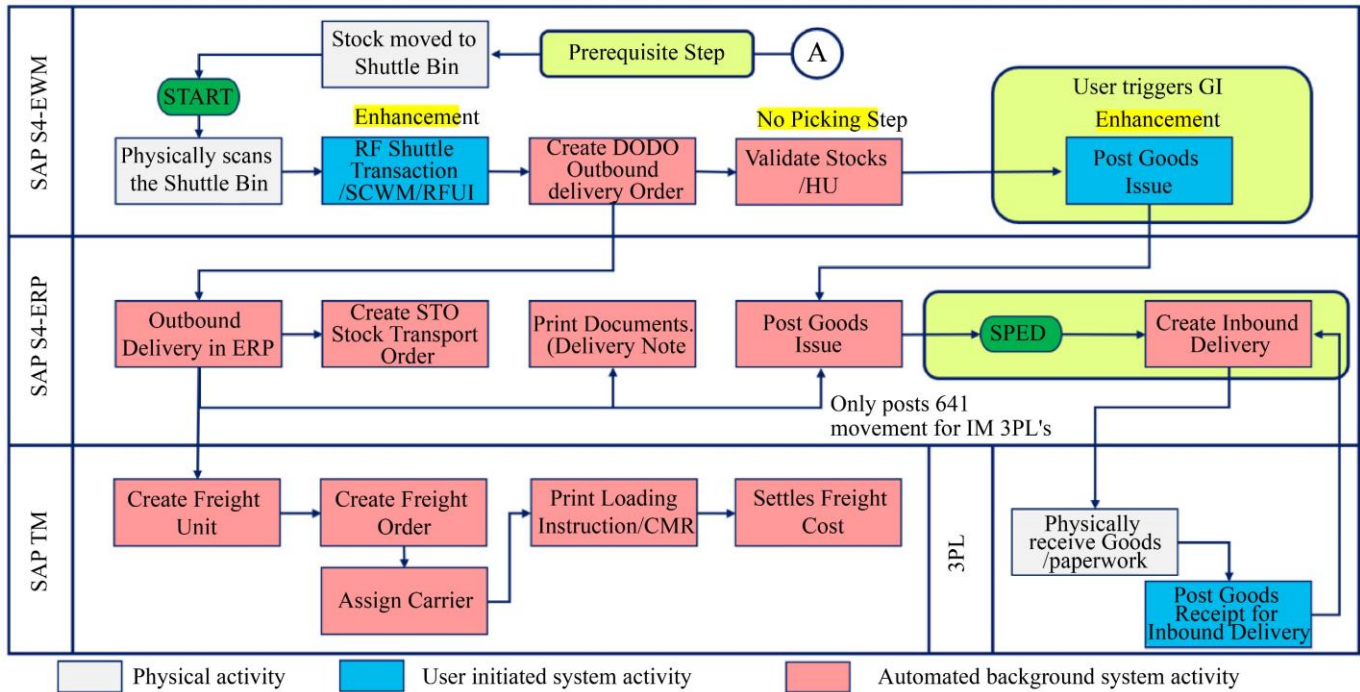


Fig. 4 User process - Shuttle Transfer

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