# OILFIELD ASSET MANAGEMENT: EQUIPMENT TRACK & TRACE WITH RFID – SAP INTEGRATION

## Abstract

The oilfield equipment supply chain is grappling with the challenges brought about by new regulations, operational inefficiencies, lack of end-to-end visibility and pressure to increase profitability. The inability to quickly track and trace equipment for logistics and repair is impacting the asset utilization and profit per equipment. The solution lies in automated asset identification, capture and processing of logistics information, besides better monitoring of asset status and reporting.

This paper reveals how RFID (radio frequency identification) and SAP ERP integration can be leveraged to build a robust equipment tracking solution that eliminates inefficiencies and provides improved visibility and control.

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## Current state of equipment tracking

Oilfield equipment (OFE) companies and their partners need to keep track of a variety of equipment. Pumps, valves, pipes, frac tanks, drill bits, etc. need to be tracked to increase profitability, revenue and compliance. If not tracked properly, losing an expensive drill or large borehole valve can quickly become cost prohibitive. However, industry data indicates that this has not been addressed effectively. Following are the challenges faced by the OFE supply chain ecosystem in proper tracking of the equipment:

**High non-value to value added ratio**

- Effort wastage in searching and

tracking equipment. For example, in a plant servicing 50-75 customer orders per day, 7 to 8 employees deployed for this task

- Manual data entry of 50 man hours per day for a plant servicing 50-75 orders per day, assuming it takes at least 8-10 minutes per equipment

**Operational level data is not updated in a timely and accurate manner in SAP systems**

- Usually it takes a minimum of one to five days before the system data is updated

**High cost of delay due to missing and misplaced equipment**

- Companies with 10,000 units of equipment make investments in at least 5% excess stock to plan for missing or misplaced equipment in addition to revenue loss of $150k per day.

**In view of these concerns, it is critical to:**

- Increase the supply chain visibility and efficiency
- Enhance monitoring and reporting

## The Infosys Approach

OFE companies need the capability to track each equipment right from their commissioning, rent and dispatch to customers, their receipt at the plants for inspection and repair. Access to complete, timely and accurate information –

regarding the availability for rent, location of the equipment and information on the status of service orders is key to making the OFE supplier's logistics and repair business more efficient and profitable. A typical OFE company logistics and repair business

includes the following 4 key process areas:

1. Commissioning equipment
2. Renting equipment to customer
3. Receiving equipment from customer
4. Repair of received equipment

| Manufacture/ Procure | Transfer to base | Rent | Delivery | Return | Re-man |
|---|---|---|---|---|---|
| • Receive new Rental equipment<br>• Commission Rental equipment | • Ship equipment to other facility<br>• Receive at the facility | • Receive Customer request<br>• Create Rental contract<br>• Assign rental equipment<br>• Creates order<br>• Invoice to customer | • Find Equipment with status<br>• Pick the equipment for the Order<br>• Ship the equipment to Customer | • Receive Equipment from customer<br>• Complete the return process | • Inspect equipment received from customer / Set Repair status<br>• Create Repair PO<br>• Issue debit memo to customer |

Figure 1: Equipment supply chain

These scenarios (Figure 2) have specific requirements over and above regular logistics management:

- Equipment acquisition and capitalization
- Serialization of equipment
- Consignment order, consignment fill-up and return based rental process
- Repair/ refurbishment order creation based on notifications
- Business process specific requirements to handle service cost associated with in-house repair or sub-contracting
- Offline transaction postings
- Network environment profiling
- Tag data management
- Error handling in SAP for failed transactions

Infosys has leveraged automatic identification technology - RFID (radio frequency identification) integration with SAP ERP to help OFE companies achieve speed and accuracy on business transactions –

- Enable access to location, state and history data of equipment across supply chain
- Improve operations efficiency of logistics and repair processes
- Efficiently update their SAP systems with timely information

## Equipment tracking solution (ETS) enabling RFID integration with SAP ERP:

Infosys' Equipment Tracking solution (ETS) facilitates visibility, efficiency and monitoring. This is achieved by:

**Enhancing supply chain visibility through:**

- Accurate and automatic equipment identification
- Enabling the capture of data when and where it is created in the field
- RFID integration with SAP systems in various logistics and repair scenarios

**Efficient logistics processes through:**

- Automated information capturing and processing
- Operations efficiency through optimized logistics and repair operations
- New system features of alerts and reports to utilize the improved data quality

**Enhanced monitoring and reporting through:**

- Advance notification about equipment shipments
- Capturing and storing the equipment lifecycle data for each transaction
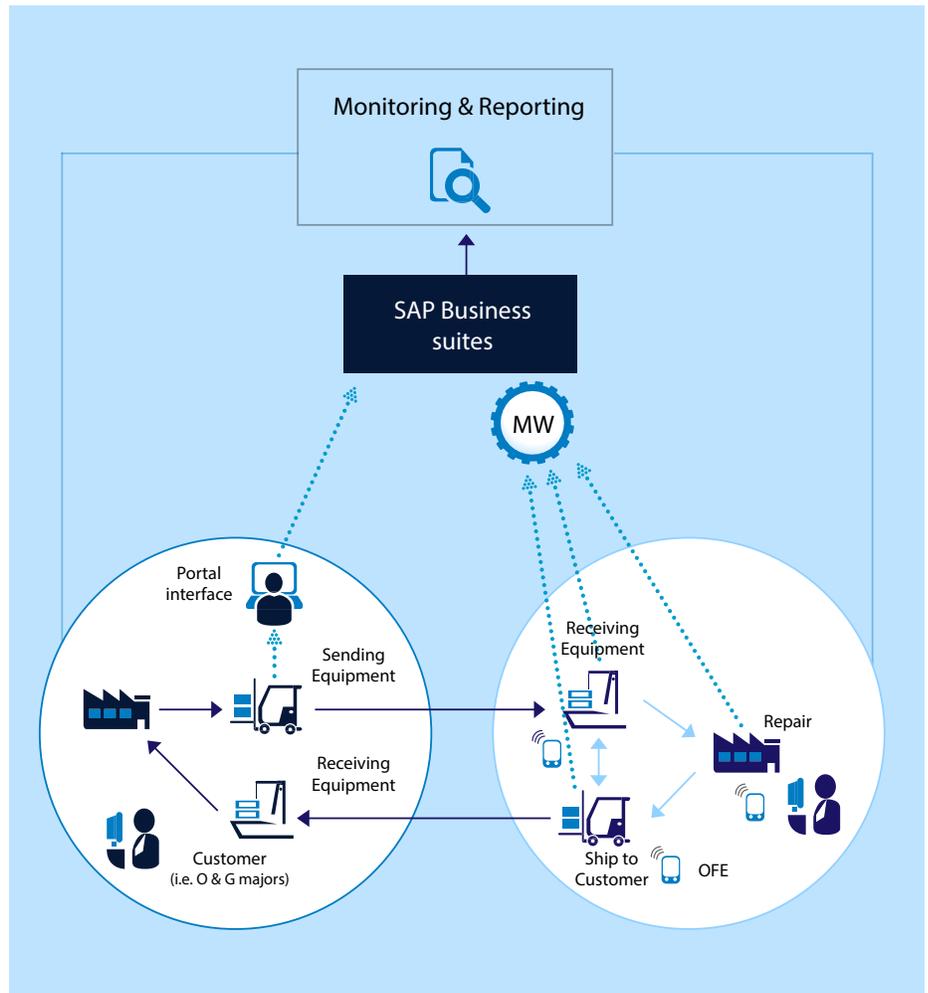


Figure 2: Solution Architecture for Infosys Track & Trace Solution

Depending upon the use case, transaction volume, and offline capabilities requirements, type of device and geo spread of the solution; at least two solution options are possible for RFID integration.

- **Mediated RFID integration** - SAP Auto ID enterprise (AIE) is the key component in this integration. It provides a complete business middleware solution that:
  - Connects RFID data directly from RFID readers
  - Converts raw RFID data into business process information by making associations with key business rules and master data
  - Integrates the data directly into enterprise applications

- **Direct RFID integration** – Handheld application is the key component in this integration.

Infosys' pre-configured solution can be tuned to address specific RFID integration requirements of OFE companies. Both mediated and direct integration solutions are available:

- Mediated RFID integration leverages SAP RFID technology platform of AIE and OER (object event repository)
- Direct RFID integration leverages handheld applications developed for Windows, Android and IOS platforms

It integrates RFID data with back end enterprise applications (SAP ERP in this case) and OER. This solution supports the use cases needed for equipment tracking in the OFE supply chain.

| Track & Trace Scenarios | RFID integration with SAP (Mediated or Direct) | Monitoring and Reporting (Manual or through Report tool) |
|---|---|---|
| Accurate and automatic equipment and component identification | Translates RFID data on each component into unique business data | Each equipment is uniquely identified for tracking |
| Automated information capturing and processing | Automatically triggers business transaction in enterprise system to update the equipment's inventory at different stores | Actual logistics and geo-spatial data is captured for each equipment for tracking |
| Operations efficiency with the use of accurate information on available inventory and reduced decision making time | Translates RFID data on each component into unique business data | Each equipment is uniquely identified for tracking |
| Features such as alerts and reports to utilize the improved information quality | Maintains the audit trail for equipment transactions providing the status of any equipment location and its status by filters – "location", "Date range", "Serial#" | Reports are generated for cycle time, inventory status, equipment location |
| Making the required information available to users irrespective of network connectivity | Translates RFID data on each component into unique business data | Equipment data gets updated with changes |

## Conclusion

The oilfield equipment supply chain is plagued by poor visibility of products and processes, operational inefficiencies and lack of collaboration amongst the players involved. Increasing pressure to improve operational efficiency and compliance is driving the need for an automatic identification technology. The Infosys solution, developed specially for equipment Track & Trace, enables automatic identification and provides mediated and direct integration of RFID technology with enterprise systems.

### About the authors

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