Flexible and Automated After-the-fact Processing in the Oil&Gas Industry – ERP Integration via xPHM

Applies to:

SAP for Oil&Gas, and Manufacturing Industries in general.

Summary

This article gives an overview over the Industry Composite xPHM. The composite is an easy to use application with high flexibility which enables the execution of process steps in an SAP ERP system, based on certain physical measurement data.

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Business problem

In the oil industry bulk movements are occurring physically after a long period of scheduling in which the actual volumes, dates and times are getting changed a lot. When the product is finally moved certain accounting steps have to be undertaken. The following “physical” scenarios for the move of product are possible:

- Load crude oil into a tanker in a harbor
- Extract refined oil from the pipeline into a terminal tank
- Pump gasoline from the truck into the service station tanks
- And many others…

For all of these physical scenarios you have to consider if a change of ownership is taking place. The ownership can change at the discharge of a ship, e.g. if the owning (and probably shipping) company sells the product to a customer in the destination port. It may also happen that no ownership at all takes place when pumping from the pipeline into a tank. This is then a simple transfer movement. So this means, along with the physical movement you also have to consider the change of ownership. Along with such a change of ownership there usually is a contract behind. In more generic terms this can be any kind of document linked to the movement, e.g. also a purchase contract, a sales order, etc.

So once the physical movement is taking place you have to make reference to such a document in order to trigger the accounting documents, and in more generic terms, all follow-up documents which need to be booked in the financial system.

In the oil business it is the work of accountants and clerks to make sure that movements which are getting pumped from a pipeline into a terminal, etc., are getting “executed”, i.e. booked in the right way in the accounting system. They have to assign the right contract (or any other referencing document) to the physical movement. This work can already be prepared by the operator on-site, who could do this assignment directly at the terminal, in the harbor, on the ship, etc.

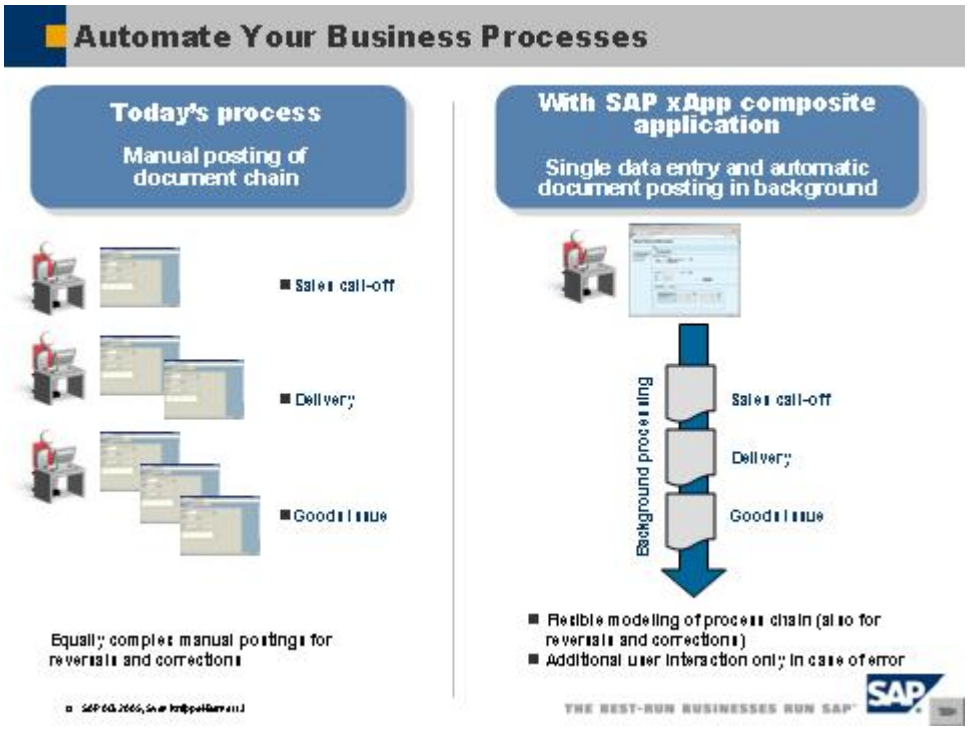
The goal of the composite “Physical Movement” xPHM s to enable clerks and operators to easily capture data after the product has been moved. We call this an **“after-the-fact” processing** of a given contract or any other given reference document.

The composite will have an easy to use UI for identifying the relevant reference (or predecessor) document such as but not only MM or SD contracts. A defaulting process of the correct booking scenario is based on the contract data. The actual quantity moved, together with the quantity Unit of Measure UoM and so-called QCI (Quantity Conversion Interface) parameters and additional UoM's, and the date and time are then entered. The composite will take the input and generate all relevant documents in the ERP backend system. Since there may be errors like locking issues, the system needs to monitor the process and must be able to get restarted. Since the quantities are sometimes not final, updates are entered at a later stage (Correction scenario), thus it will be required to reverse the previous postings and process the updated data. A document flow will report all documents which are created in the follow-up processing. The system will run the document posting process in foreground, in background, or in automatic (background) mode.

Solution overview

The composite xPHM provides a UI where the user enters the main data related to a physical movement, like quantity, UoM, date, time. He also can enter a reference document, like a sales contract. Based on certain data a movement scenario is identified which relates one-to-one to a certain sequence of document postings. These documents are then created in the ERP backend system, while the user can already enter the next movement data set. Once an error occurs in the booking steps this is visualized in the worklist, and the process can again be taken up. Also, in case some data need to be corrected the whole sequence of booked documents is corrected in one go. A reversal process can roll back all documents of the sequence.

In the following figure two different solutions are compared to each other. On the left side we see the "traditional" ERP process, where several users are entering very similar data, based on the physical movement data, at different stages of the process flow. On the right side we see how only one user enters the physical movement data once and then initiates the follow-up process.



Functional Scope and Value Proposition

The following two scenarios are part of the composite:

No.	Short name	Reference document	Follow-up documents
1	Sales	Sales contract	• Call-off (SO) • Delivery • Goods issue (GI)
2	Purchase	Purchase contract	• PO • Goods receipt (GR)

For each of these scenarios a corresponding correction and reversal scenario is provided.

- ***Sales scenario***

  A movement is posted with reference to a sales contract. The sales contract usually contains a customer, delivery location, material, quantity, date range, price, and certain other conditions (like incoterm, etc.).

  Usually an oil producing company has some “big” sales contracts (which may run over several years) with each of their customers. Such a sales contract is linked to the transport when a ship is getting loaded and moved to the customer. Once the ship is getting discharged such a contract is again referenced. Of course such a contract assignment is also necessary in order to track how much product has already been called off from the contract during the current year or month. In this way it is possible to tell the system on which contract a sales call-off needs to be done. This of course will determine the price.

- ***Purchase scenario***

  A movement is posted with reference to a purchase contract. The purchase contract usually contains a vendor, a loading location, material, quantity, date range, price, and certain other conditions (like incoterm, etc.).

  This is the same scenario as the above sales scenario, but from the perspective of the buying party. So the buyer has got a contract to buy a certain amount of a certain material / quality grade per year from a vendor. This contract needs to be identified when posting a movement in the system.

The composite xPHM has been driven mainly be the Oil&Gas industry. In the Oil&Gas industry there is a strong dependence of physically moved quantities on the ambient temperature and pressure. Therefore, the composite contains interfaces and functionality regarding the QCI (Quantity Conversion Interface).

The following are some benefits and objectives of the composite:

- Flexibility: Be able to configure new movement scenarios by an administrator, incl. follow-up document service calls and custom specific & movement scenario specific logic
- Automation: Automatic processing of the follow-up document chain, according to the above configuration
- User friendly UI: Easy access by the clerk through a portal screen
- Error reduction: Easy restart and correction & reversal processing
- Easy error handling, workflow: Possibility to forward errors to experts via the workflow logic (Unified worklist)
- Scenario defaulting

Feature	Value Proposition
Simple User interface	Quickly enter only the most relevant data
Define processing steps via Guided Procedures	Full flexibility to model new scenarios or to change existing ones
Error handling via processing steps	Keep control over the status of each processed message. Reduce erroneous bookings.
Background processing	Fast data entry
Automated inbound data	Fully automated inbound processing, no manual work necessary
Corrections and Reversals for each business scenario	Massive reduction of manual work

Technology Overview

- User friendly, easy-to-use and configurable UI by using Visual Composer
- Flexible modeling of processing steps via Guided Procedures
- CAF core for Business logic and error handling
- Enterprise services (eSOA) for ERP connectivity

Related Content

- xPHM Overview presentation

Copyright