SAP OIL&GAS Trading - Challenges in the Oil Markets and Solution Overview

Applies to:

SAP for Oil&Gas Supply, Transmission, and Trading

Summary

SAP offers eSOA interfaces specifically designed for the integration of 3rd party commodity trading / risk management solutions into the SAP for Oil&Gas and TSW system landscape. Technically, this is enabled by the open and standardized SAP NetWeaver infrastructure. All necessary physical and paper trading activities are supported in such a framework. Especially the necessary hydrocarbon conversions and other Oil&Gas specific properties are fully supported.

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Author Bio

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Introduction

With Oil&Gas Trading SAP delivers a scenario that meets the business requirements of traders in the Oil & Gas industry. Traders need to work with easy-to-use screens, showing most of the necessary information at one sight. Both traders and schedulers need to access the same real-time data (e.g. inventory / valuation), they need to have the same pricing information (markets, material, freight, etc.) and need to have insight into the same relevant company data. Besides oil traders there are the oil schedulers, who are managing the transportation of all oil material. Scheduling and trading activities usually are closely linked to each other and therefore would ideally need to run in the same integrated ERP system, and possibly on the same technical integration platform.

As the ERP system, SAP offers SAP ERP 6.0 (Enhancement Pack 3), and the technical integration platform is SAP NetWeaver with SAP eSOA (Enterprise Service Oriented Architecture). With SAP eSOA, SAP Oil&Gas Trading integrates the oil trading front office into the scheduling operations (mid office) and the SAP ERP execution (back-end) system (back office).

SAP TSW (Trader's & Scheduler's Workbench) is already considered as a leader in the field of integrated bulk scheduling software applications, running in national, regional and global oil companies across the globe. With the SAP Oil&Gas Trading scenario SAP opens up their enterprise and scheduling application to any external trading software vendors. SAP Oil&Gas Trading is mainly a set of eSOA services and additional logic implemented in SAP for Oil&Gas and TSW.

Business Challenges

The main business challenge is the handling of a physical and financial (risk) position. This has become increasingly important for two reasons: the substantial rise in oil & gas prices together with very strong oil price fluctuations, and new accounting standards.

Today, two major economical drivers affect oil companies: the so-called China-effect and the opening of new markets. The term "China-effect" refers to the enormous growth in demand of oil, gas and energy in Asia, namely China or India, due to the huge economical growth. Shortages in the supply affect the economical growth already partially. China has experienced around 11% economic growth over the last year, whilst India is only just behind at about 9%. These are massive increases and have a huge impact on the energy demands in such countries both now and into the long-term future.

Overall, the market environment is rather unstable. Just in today's business the market is fluctuating rapidly, together with recessions, war risks, and embargoes, which make the forecast of oil prices unpredictable. Oil traders need to ensure an oil trading program that mitigates this price risk exposure, mainly through the hedging of these exposures with financial derivative positions (e.g. futures, options). Overall, this again adds to the oil prices, by what the traders call "risk premium", an additional risk factor per barrel of oil. Also, refinery capacities are still exhibiting a shortfall versus increasing demand, which increases the market insecurity and volatility (see the article in IHT in section References).
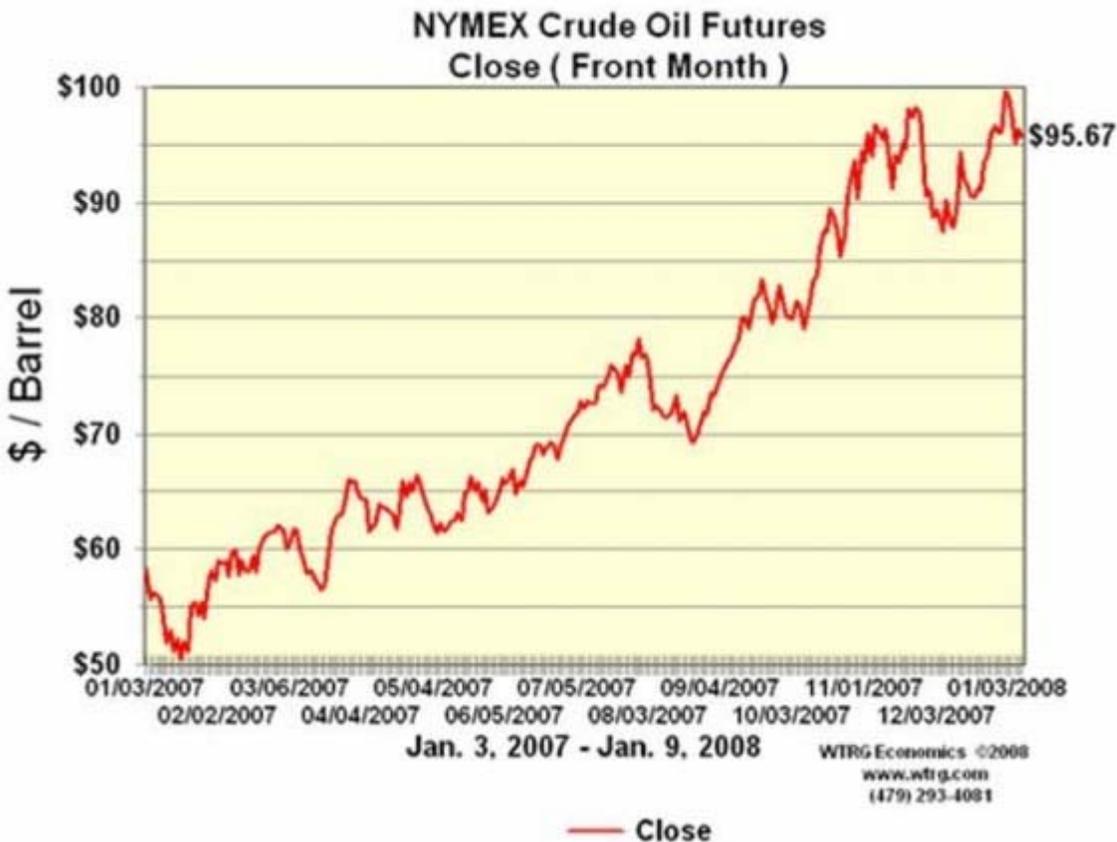
Figure 1: The development of NYMEX crude oil futures in the recent months. Source: WTRG, 2008.

A second important economical driver is the opening of new markets and the rise of formerly underdeveloped countries to industrialized countries. New trading exchanges are opening their doors in formerly closed markets (China, Iran, etc.). Then there is a typical behavior in so-called hyper-competitive markets (e.g. U.S., Europe). The optimization of prices and the optimized use of various complex hedging tools are increasingly important in modern and highly competitive markets. See the SAP Oil&Gas ITL (Industry Though Leadership) (© SAP AG 2007) document on this.

Important drivers from the legal side are accounting regulations: In order to keep financial gains or losses of paper-deals from the profit and loss sheet, it is necessary to show how financial paper transactions are linked to a physical deal and prove the effectiveness of the hedge under IAS 39 or the FAS 133 regulations. These accounting standards are rather new as well: The IAS 39 "Financial Instruments: Recognition and Measurement" was issued in December 2003 and is applicable for annual periods beginning on or after 1 January 2005. In addition to this regulation pressure there is the environmental pressure which is forcing companies to turn into transparent companies, e.g. by FERC (Federal Energy Regulatory Commission) in the U.S. See the link to FERC under **Error! Reference source not found.**.

Additionally, there are different trends within the larger oil companies. After a phase of mergers there is a phase of continuous consolidation taking place, along with a reduction of business silos in the companies, both affecting largely the IT strategies of these companies. The IT departments need to be able to quickly adapt to changes, as the result e.g. from acquisitions or mergers. The CIO's are keen on reducing the TCO (Total Cost of Ownership) of their system landscape and therefore are looking even more towards replacing their home grown infrastructure by integrated and well maintained out-of-the-box systems.

On the other hand we observe a phase of strong competition. The so-called super-majors are increasingly competing with the big nationals, not only in the exploration and production but more often when delivering to their customer base, which often is common to several of them. So although there is the need for lower TCO and an integrated system landscape the companies need to stay competitive. This can either be done by being able to freely select a 3rd party software and plugging it into the company's SAP service-enabled

infrastructure, or by developing or modifying a cross-application (xApp) around the existing SAP services. A prerequisite for the former is that the 3rd party software is capable of working with the SAP Technology Platform of SAPNetWeaver, a status that is proven through a certified as "Powered by NetWeaver" program offered by SAP. In such a framework highly specialized software vendors are becoming increasingly important.

Finally, there are the traders themselves who drive the oil market prices and by themselves increase their volatility. See the article in the Daily Telegraph in section **Error! Reference source not found.**. Speculators are betting on high (and even higher) oil prices via futures and derivative instruments. This even leads to the fact that the oil traders are holding back oil reserves in order to sell it later at a higher profit. Still, nobody knows the exact amount that speculation is contributing to the total oil price. The article in CNN News in section **Error! Reference source not found.** gives a good overview over the situation.

Business Needs

Resulting from the above challenges we can formulate three main business needs for the oil companies. First, their IT landscape needs to provide a consistent set of data of overall company positions, thus resulting in a reliable decision support basis. Only if traders and schedulers have access to the same real-time data can they make correct and timely decisions. Second, the systems need to support legal requirements and the needs for transparency. Any violation to legal requirements or environmental rules can have very negative effects on the company's public perception and the shareholder value and can even lead to bankruptcy. Third, the oil companies require an open, standardized and flexible ecosystem, where any compatible 3rd party software can easily be incorporated. Such an open service-oriented landscape is the prerequisite for undisrupted and flexible growth.

The following figure illustrates the need for the complete visibility of all necessary data along the whole supply chain. The effects of the changing global hydrocarbon markets described in the section above affect all parts of the primary oil supply chain. Therefore, any software system used to manage the trading and scheduling activities of an oil company needs to get real-time and consistent data from each part of the supply chain.
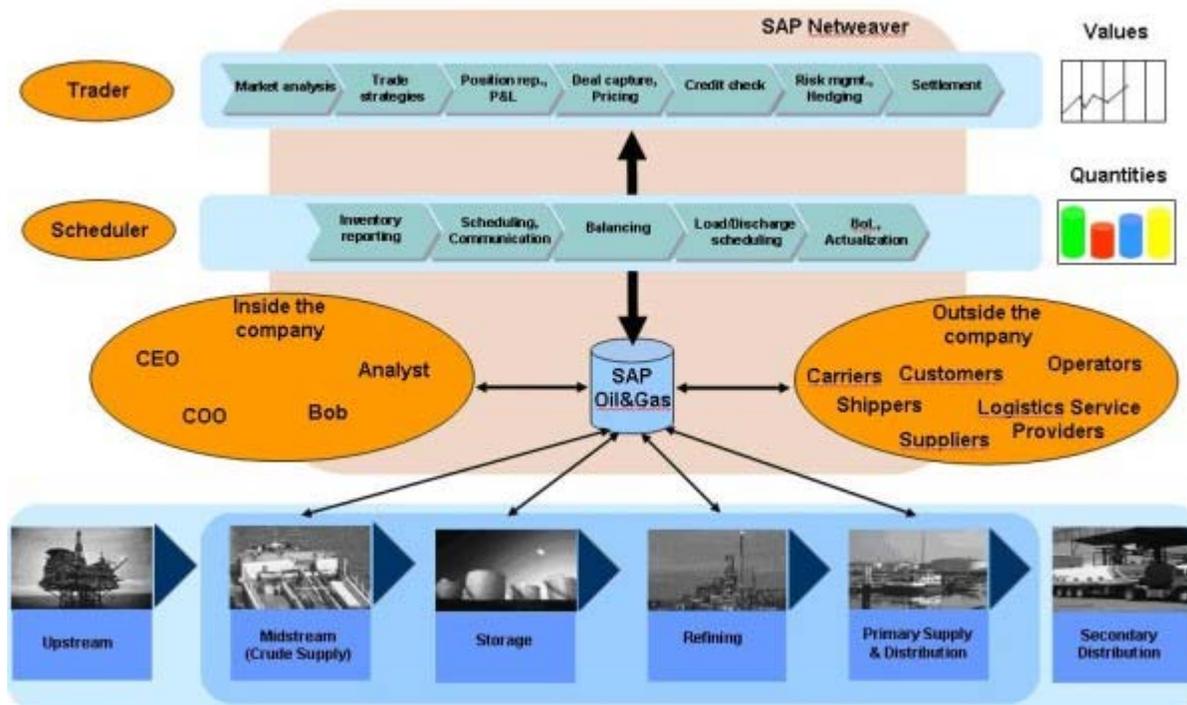

Figure 2: Traders and Schedulers need to access the same data, along the whole supply chain.

The SAP Solution

With the integration of a commodity trading & risk management system SAP will be able to offer the common platform for a trader's front office system integrated with the financial & accounting back-end system, as well as with the oil movement scheduling system.

SAP Oil&Gas Trading is designed and developed to meet the above challenges and needs. Its biggest advantage compared to other stand-alone trading software applications is the full integration into SAP's ERP system. The overall solution covers two systems, SAP for the financial backend, with SAP TSW for the operational bulk scheduling, and the external trading and risk management software for all trading and risk related functions. SAP will delivers the logic within SAP and the SAP-sided interfaces in the form of SAP eSOA services. So we can group the available or required functions into three main parts: SAP for Oil&Gas and TSW, SAP eSOA Services, and the Trading and Risk management software itself.

- Main Oil Trading & Scheduling related functions in SAP for Oil&Gas and TSW, in the commodity trading context:
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  - Financial backend
  - Bulk scheduling and planning
  - Inventory reporting
  - Schedule optimization
  - Balancing across a network
  - Load / discharge scheduling (Marine scheduling)
  - Custody Transfer Document processing and Actualization
  - Paper deals, Hedge accounting etc.
- SAP eSOA Services:
  - Inbound contracts
  - Inbound pricing (commodity pricing)
  - Outbound costs (secondary costs, expenses)
  - Outbound nomination
  - Outbound goods movement
  - Inbound paper deals

The following is a list of functions which would reside in the 3rd party front-office trading and risk management application. Variations to this may be possible and depend on the individual trading solution.

  - Market analysis
  - Trade strategies
  - Position reporting
  - Profit & Loss
  - Deal capture
  - Pricing, Market prices
  - Risk management
  - Hedging
  - Others.

An overall architecture is given in Figure 3: Overview over the SAP Oil&Gas landscape and the open eSOA architecture On the SAP side there are two main parts: SAP for Oil&Gas with the financial, logistics and operational parts (mid-office and back-office), and SAP TSW with the operational scheduling processing. All relevant components are opened-up within SAP's eSOA eco-system, indicated by the orange circles. A Trading & Risk Management system certified as PBNW (Powered by NetWeaver) can be plugged into this framework with minimal implementation and almost zero maintenance efforts for the interfaces.
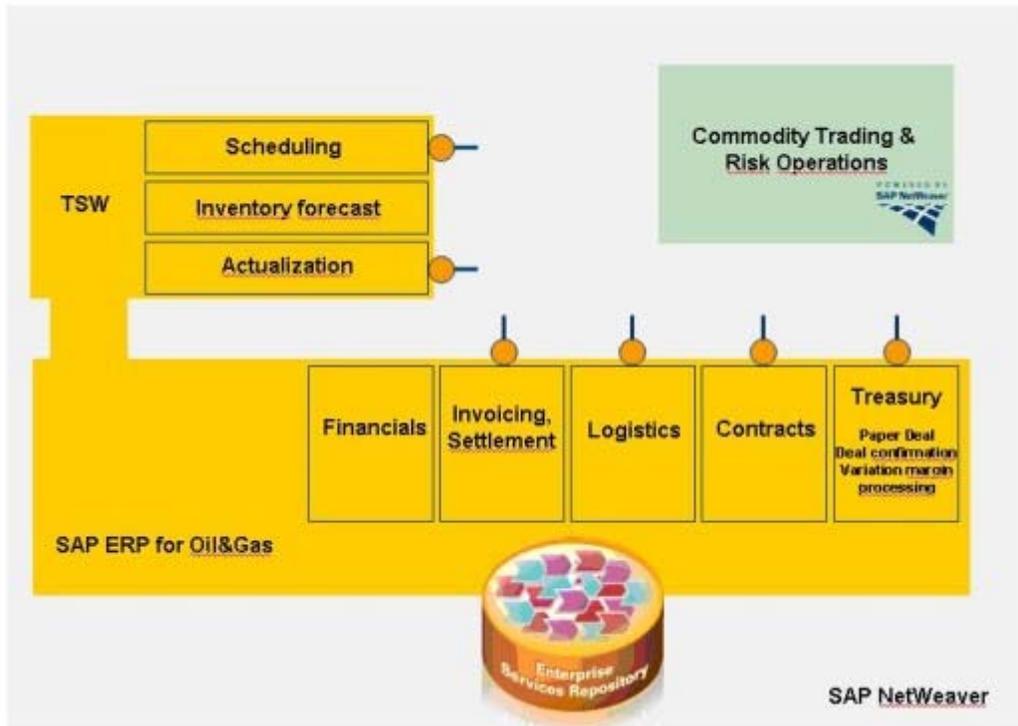
Figure 3: Overview over the SAP Oil&Gas landscape and the open eSOA architecture

SAP is the leading system for all master data, like plants, vendors, and customers. They are mirrored into the trading application when implementing the integrated solution. Pricing may be handled completely outside SAP, from a market price and risk analysis point of view. The most up-to-date prices are part of the inbound SAP contracts, including formula and status. Before actualizing a movement the most recent price should be fetched by SAP out of the trading application. Specifically for oil movements the Hydrocarbon quantity conversion needs to be taken into account when costing documents are generated and sent to the trading application, or quantities in multiple units of measure are sent out of SAP. Both Quantity conversion and multiple Units of measure are considered in the available eSOA Trading interfaces, and are hereby compatible with SAP for Oil&Gas, which became a quasi-standard ERP system in the oil industry.

Figure 4 gives an overview over the necessary system landscape. SAP NetWeaver PI (Process Integration) is used as the integration or middle-layer. PI includes message control capabilities. Any message triggered by a service, whether in- or outbound, includes a confirmation message and can be tracked in the PI monitor. The SAP APO (SAP SCM) and the SAP BI (Business Intelligence) systems are optional. Also, a possible interface from SAP SCM into the trading application is optional. It would feed demand planning data into the trading application and would create proposals for deals which then could be transferred into "real" deals by the trader.
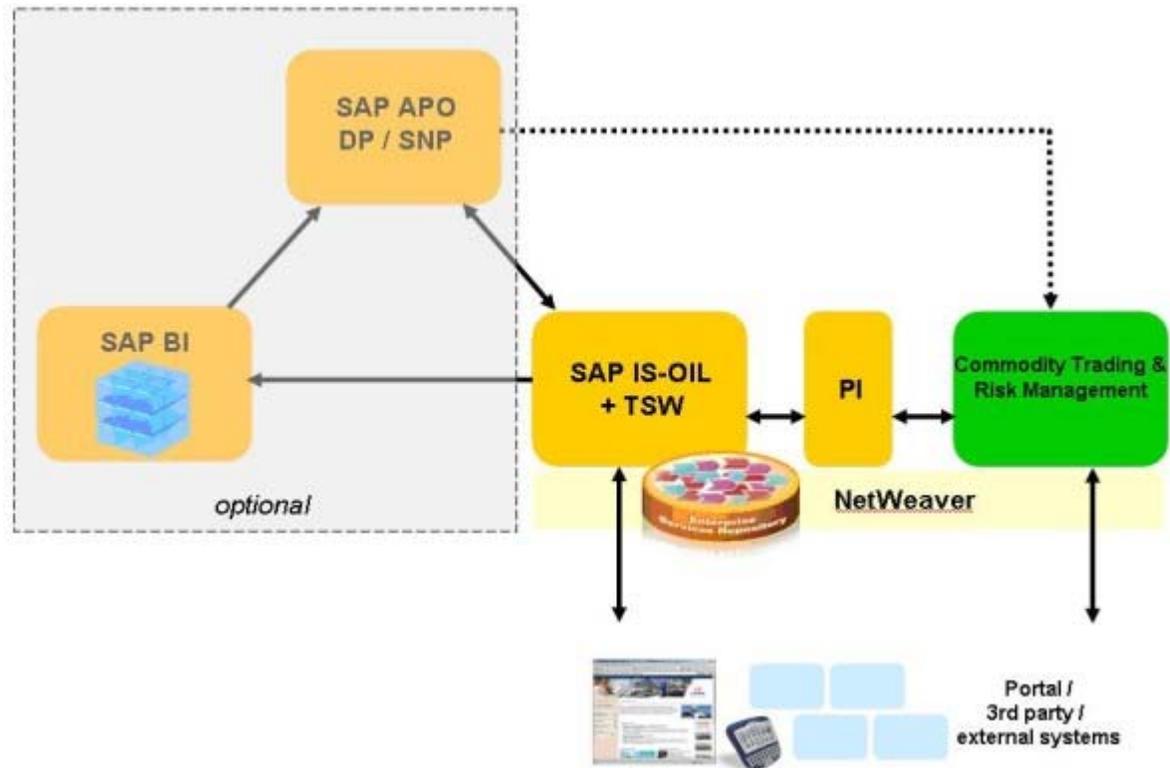
Figure 4: The recommended system landscapes - SAP APO (SAP SCM) and SAP BI - are optional in this context

Availability

SAP Oil&Gas Trading is available on ERP 6.0 with EhP3 (Enhancement Package 3) and SAP NetWeaver 7.0 (previously known as NetWeaver 2004s).

Related Content

1. IHT article: http://www.iht.com/articles/2007/10/30/business/oil.php
2. FERC: http://www.ferc.gov/industries/oil.asp
3. Daily Telegraph article:
   http://www.telegraph.co.uk/money/main.jhtml?xml=/money/2007/10/26/cnoil126.xml
4. CNN News

   http://money.cnn.com/2007/11/27/markets/oil_speculation/index.htm?postversion=2008010212

Important links

- BPX for Oil&Gas: https://www.sdn.sap.com/irj/sdn/bpx-oilgas

- ES Oil&Gas Bundles WIKI:
  https://www.sdn.sap.com/irj/sdn/wiki?path=/display/ESpackages/Trade+and+Commodity+Managem
  ent&
- SDN: Explore ES: https://www.sdn.sap.com/irj/sdn/explore-es
- eSOA WIKI: https://wiki.sdn.sap.com/wiki/x/LQ0
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