



# Collaborative software meets petroleum trading

**S**econd only to water on the list of the world's consumables, petroleum is bought, sold, traded, exchanged, and transported to the tune of millions of barrels per day. It is estimated that the oil industry as a whole spends more than \$150 billion annually on transportation, associated logistics, and transaction fees.

Petroleum trading is changing—subtly, but surely. New patterns are arising, as many refiners and marketers, looking to companies like Houston-based Enron Corp. and Tulsa (Okla.)-based Williams Energy, begin to regard trading as a potential source of additional revenue and become more aggressive about it. Industry consolidation has reduced market liquidity, but relentless demand for crude oil and refined petroleum products is forcing the remaining traders to become more efficient.

Many companies also see value in a more flexible operating plan, so they can seize unexpected market

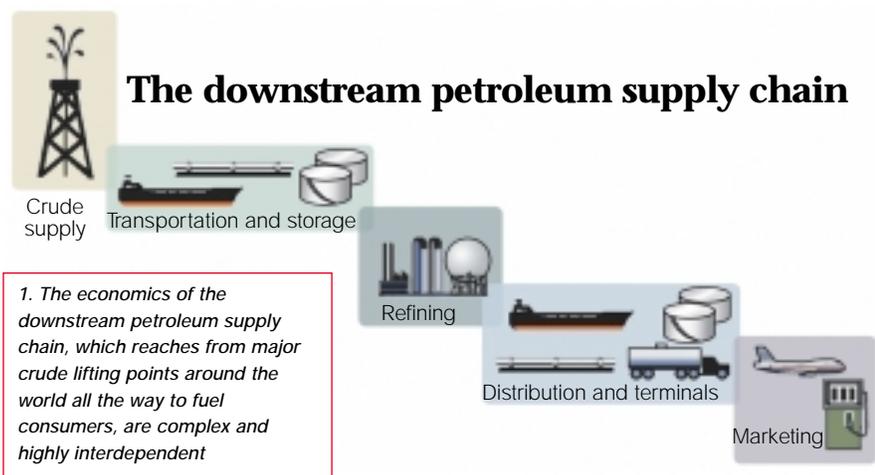
The trading of oil and oil products is being transformed by software and the Internet. New vertical applications are improving traders' confidence about their decisions involving inventory and the petroleum supply chain, and improving their companies' profits on deals. Because those applications are Net-enabled, they make communications among the parties to a deal more efficient and faster than using a phone or fax

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opportunities—such as the sudden availability of a distressed cargo. And changing environmental regulations for fuels continue to create new opportunities and challenges for product traders as demand for “boutique” fuels and special-order blends rises. Given the complexity of regional market inter-relationships, traditional

arbitrage trading has given way to more complex arbitrage opportunities that simultaneously hold the promise of greater margin and the threat of higher costs.

The result of these new patterns and their requirements is a tightening of the integration between refining operations and trading and logistics



activities at oil companies. A growing number of integrated oil companies are recognizing that *netback* margin—the value of products minus feedstock, total operating, and freight costs—is a far more significant metric than *trading* margin. This realization makes a trader's decision-making process more and more complex, because it must now take into account refinery economics, changing crude slates, environmental regulations, and transportation, shipping, and storage costs.

But decisions still need to be made rapidly to capture available market opportunities. The complexity and urgency of the process have led traders to search for tools that enable them to make more accurate decisions. Most traders now rely on spreadsheets to boost their confidence in the decisions they and their superiors make.

To buy back some of the additional time consumed by more convoluted decision-making processes, buyers and sellers have begun to use instant messaging. But instant messaging poses one significant problem: it's neither private nor secure.

There are many chagrined CIOs whose traders are negotiating million-dollar deals over a non-secure medium simply because it's convenient and more efficient than phone or fax.

### The opportunity

The complexity of the petroleum supply chain and the enormity of the investments in it make two things clear: To be truly profitable, trading must take place in a secure communications environment; and decision-making processes must be supported by accurate, responsive, and accessible tools. To be effective, the trading environment will have to have more capabilities than those provided by "homegrown" spreadsheets, today's energy marketplaces, and consumer products—such as instant messaging. Ultimately, Internet-based software solutions will become the tools with which oil companies can improve trading margins, save millions of dollars in supply-chain operating costs, and reduce low-level administrative costs.

This article examines traditional petroleum trading B2B approaches and the reasons that they have failed

to address the requirements of the true economic drivers of the petroleum industry. After presenting these deficiencies, it goes on to examine some of the ways in which more focused software solutions can help improve the quality and speed of decision-making and foster real-time collaboration among all the parties in the petroleum supply chain.

### Why oil exchanges are failing

Over the past three years, many Internet-based approaches to improving petroleum trading have reached market. Most have taken the form of exchanges or marketplaces; examples include Altra Energy, Houston Street, Red Meteor, FuelSpot, FuelQuest, Downstream Energy, and Pepex. Each establishes a public bulletin board that makes it easy for buyers and sellers to find each other, and claims to improve the transparency of the prices they negotiate.

The value proposition that exchanges and marketplaces pitch to participants has three elements: lower transaction fees (by eliminating brokers), faster product and price discovery (through aggregation on the trade floor), and lower administrative costs (by tying into the customer's back-office system). But now many of these exchanges and marketplaces are substantially downsizing, possibly getting ready to shut their virtual doors—victims of low customer adoption rates, retreating venture capital, and too much competition.

The reason that today's on-line petroleum exchanges and marketplaces are failing is simple: Their fundamental business assumptions do not reflect the realities of today's petroleum trading world. Here are four things they did wrong:

**1. On-line petroleum marketplaces addressed an issue that was neither a problem nor an opportunity.** They saw themselves in the broker business of matching buyers and sellers, creating volume and price transparency. With the benefit of 20/20 hindsight, though, we

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know that this is not how the real world works. Equity traders, for example, mostly deal with each other on a one-on-one basis, and privately—rather than in some trading pit or on some bulletin board. They already know the 30 or so potential buyers of their crude because they've dealt with them in the past and established a certain level of camaraderie and trust in working with them.

**2. Public marketplaces cited greater price transparency as one of their major benefits**—and in the case of equipment like a pump or a drill bit, this is certainly true. In crude oil and refined product markets, however, there is already a high degree of price transparency, thanks to organizations such as Platts, Nymex, and IPE.

**3. On-line marketplaces underestimated the complexity of physical crude or product trading.** Petroleum trading involves not only traders, but also many other participants in the value chain: inspection companies, vessel owners and brokers, terminal operators, logistics personnel, planners, schedulers, cash brokers, and credit and accounting personnel. Dollars saved on a seemingly good transaction can easily be lost if supply planning, transportation, and logistics implications are not fully considered.

Technology isn't the issue. Whether a trade is executed via a phone call or a mouse click is less critical than the tasks of evaluating and selecting the right crude, and ensuring the most cost-effective transportation to the refinery at the right time. The same applies to the product side, where making the right product and making trading and transportation decisions to ensure that it gets to regional markets just as cost-effectively are crucial to the overall success and profitability of the company.

**4. On-line marketplaces underestimated the value of existing business relationships between traders and brokers.** They assumed that brokers owe their existence only to imperfections in the value chain, and

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can therefore be replaced by a more efficient and less expensive electronic bulletin board. Brokers, however, play the more valuable role of providing market intelligence to traders. In addition, the business of physical brokers is based on customer relationships, most of which are built on years of trust, camaraderie, and give and take.

These fundamental assumptions shared by first-generation energy exchanges are at the root of the twin problems of low customer adoption rate and lack of liquidity. Today's energy marketplaces are failing because they do little more than replace brokers' fees with transaction fees. Although the latter may be lower, they do not fundamentally alter a company's supply-chain cost structure.

By contrast, if a company invests in software tools that improve its analytic and collaborative capabilities, it can address both revenue structure (effective and profitable market entry and exit) and cost structure (transportation costs, operating inventory, and demurrage fees) at a fundamental level. If this is done on the front lines, where the decisions are being made, it can significantly improve that company's competitive position.

This analysis would not be complete without talking about EnronOnline and the Intercontinental Exchange, two examples of successful exchanges in the energy space. EnronOnline is less a marketplace than it is a proprietary e-storefront (one to many) for Enron's already successful, high-volume energy trading business. By making it convenient for their customers, Enron has successfully transitioned phone volume to EnronOnline. Intercontinental Exchange (ICE) is a marketplace for trading of over-the-counter (OTC) derivatives for such commodities as precious metals and

energy products, and is not focused on physical crude oil and products.

In the OTC market, where one is dealing with derivatives rather than the physical barrel, brokerage costs are a large portion of the overall transaction costs (handling and clearing costs make up the rest). Contrast this with physical crude and product trading, where brokerage costs are a small part of the portion. From the customer's perspective, it would seem that they would get a reasonable return on their investment by joining an exchange, such as ICE, for their OTC derivatives business. However, for physical crude and product trading, customers seem to be demanding more, which should be expected, given the major difference in cost structures.

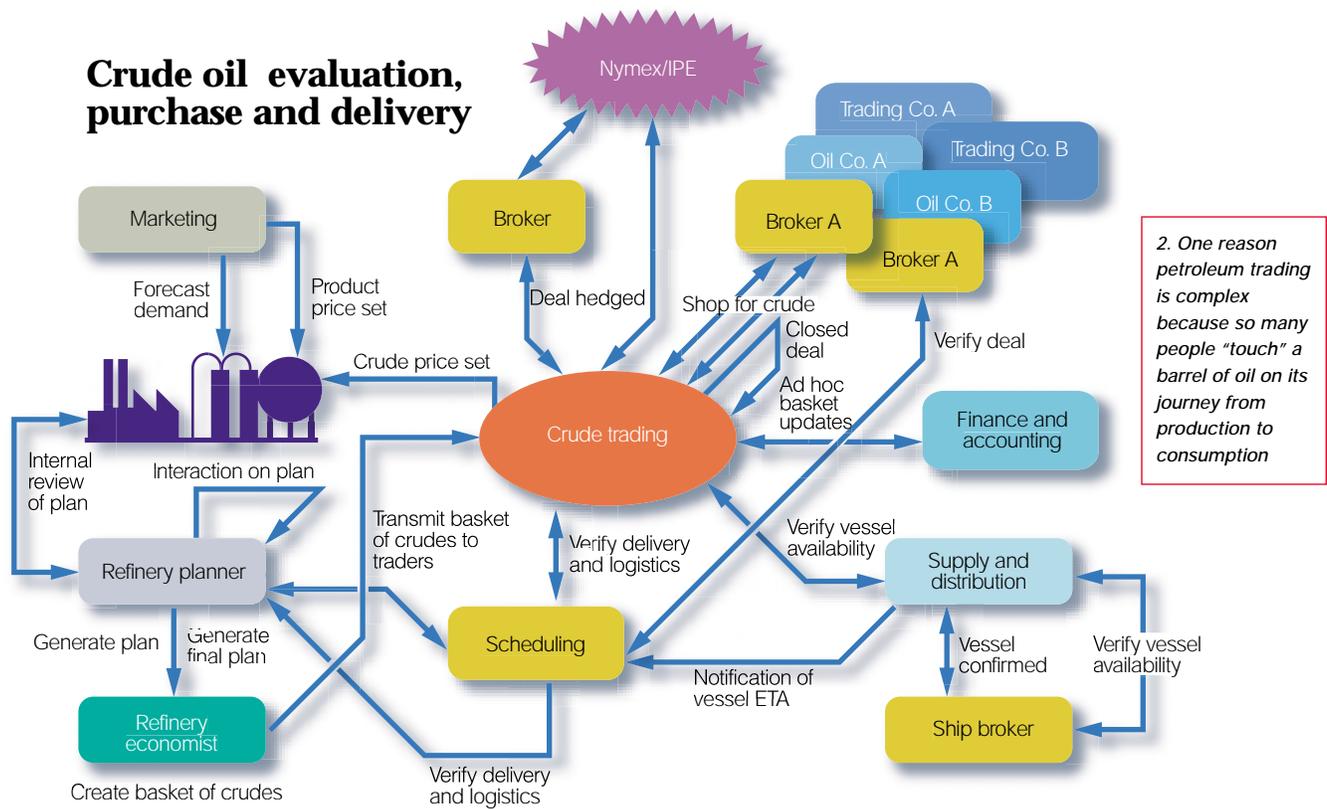
### The economics of trading and logistics

The economics of the downstream petroleum supply chain, which reaches from major crude lifting points around the world all the way to fuel consumers—and includes all the refining, transportation, storage, and trading activities that take place in between—are complex and highly interdependent (Fig. 1).

For example, deciding which crude to buy for a refinery necessitates knowing how much it will cost to transport it there, what kinds of products the refinery is set up to produce, and prevailing volumes of and prices for the product in retail, commercial, and unbranded channels. Another consideration is how much it will cost to move the refined product(s) to market. Options for trading, swapping, and exchanging crudes, intermediates, and products all along the chain only add to the complexity of economic evaluation.

Petroleum trading is also complex

**Crude oil evaluation, purchase and delivery**



2. One reason petroleum trading is complex because so many people “touch” a barrel of oil on its journey from production to consumption

because so many people “touch” a barrel of oil on its journey from production to consumption (Fig. 2). A typical shipment can involve 15 to 20 individuals from different companies and different countries, require 20 to 30 phone calls, and take as long as two days.

**Putting profits first**

As each barrel of crude oil or petroleum product moves along the supply chain, the trading and logistics decisions that are made about it have a huge impact on its owner’s profitability. PetroVantage believes that to make this impact a positive one, oil companies must recognize that—from their perspective—the petroleum supply chain has two key economic drivers: extraction of maximum profit from each trade, and minimization of supply chain operating costs.

To understand the relationship between trading and logistics decisions and the first driver, it helps to remember how much profits depend on the timeliness and reliability of supply. How often, for example, is profitability affected because the crude pro-

vided is not the best for meeting the required product slate? How often are crudes sourced and delivered late, or delivered with higher than optimal costs? How often have breakdowns in the supply chain (caused by weather, mechanical problems, market conditions, or refinery upsets) affected the bottom line because no coordinated action was taken in time? How many opportunities to enter (or exit) markets weren’t taken because the information wasn’t available, or the tools to make rapid decisions weren’t in place?

The second driver is just as important. Under its umbrella are the costs of shipping product by tanker, barge, pipeline, rail, and truck; using terminals and storage facilities; inspections and associated logistics services; demurrage; and—of course, maintaining operating inventory. Coordinating and synchronizing the workflow, and making the trading and logistics decisions that get the right product to the right place at the right time at the lowest cost, are tremendously complex processes. But their very complexity creates myriad oppor-

tunities to improve efficiency.

The costs and opportunities associated with operating inventory illustrate this point. A company carries inventory for two reasons: to achieve and maintain a desired position to leverage anticipated market dynamics, or to accommodate uncertainties in supply chain operations. But in either context, carrying too much operating inventory is an inefficient and uneconomic practice. Nonetheless, it’s common industry practice; by some estimates, there are over seven billion barrels of crude oil in inventory, with one billion on the sea alone. Profit opportunities exist for companies who can leverage market dynamics by accurately anticipating market directions, clearly identifying when those dynamics are going to occur, and, most important, effectively seizing the opportunity by entering or exiting markets.

Uncertainties in the supply chain, however, represent a significant cost that cannot be leveraged to create profit. For this reason, it’s becoming more and more important to reduce their impact as much as possible. In

the case of operating inventory, for example, greater visibility into the workings of the supply chain allows companies to lower the amount of unprofitable “buffer stock” they hold. Improved supply chain visibility also allows them to reduce their transportation and demurrage fees, which can total millions of dollars per year. Some of these costs are unavoidable, of course, but many are simply the consequences of poor coordination and lack of supply chain visibility.

### Software for playing hardball

Given that petroleum trading typically involves many people from many companies in many countries, one might conclude that any attempt by an oil company to optimize its trading and logistics processes will fall short of perfection. But resignation is a poor substitute for acting to improve a bad situation. In fact, an emerging generation of collaborative software tools promises to enable merchants of petroleum products to leverage market dynamics to raise their profits and increase their supply chain visibility.

These tools allow petroleum industry professionals to:

**1. Evaluate opportunities quickly.** Traders and logistics personnel require a set of decision support tools that give them the confidence they need to aggressively pursue market opportunities.

**2. Collaborate in real time.** Collaboration among all players, both within and outside the company, improves workflow coordination and synchronization and enhances the company’s ability to respond to unanticipated events.

**3. Negotiate and manage deals more efficiently.** An effective deal negotiation system leverages the power of the Internet, provides a secure and private environment, and allows integration with mid- and back-office systems—improving productivity in the process.

Here’s a hypothetical example that illustrates how collaborative software might improve the profitabil-

## Collaborative software solutions that include advanced decision support tools give companies the supply chain visibility required for agility

ity and decision-making of a company that makes and sells blended gasolines. In the U.S., stringent environmental regulations for gasoline differ from state to state and require blenders to follow strict recipes. To capitalize on these niche-market opportunities, the product trader must be able to make quick, accurate decisions about blend stocks, availabilities, product specifications, transportation, and storage—such as when to acquire or dispose of a blend component and when to enter or exit a market.

Today, these decisions are made with the help of spreadsheets whose inventory numbers are entered manually. These spreadsheets are typically rudimentary and approximate, and usually exist in several different forms throughout the company. Any IT manager will testify to the difficulty of managing the quality and consistency of such “homegrown” solutions.

The shortcomings of the process don’t end there. After the spreadsheet calculations are approved and the appropriate blending decisions made, the trader must then notify the counterparty, the terminal and storage people, inspectors, barge owners, and brokers—usually by telephone, fax, or e-mail—and coordinate their responses. Clearly, this situation has great potential for loss of cost control if anything goes awry.

The benefits of putting this process under the control of a dedicated software application are obvious. Because all the blend specifications have already been preloaded into the package, and it receives updated market prices from Platts, Nymex, or IPE continuously, all the trader has to do is upload his inventory data and possibly run another blending application, and he is in business. The trader can

now instantly answer several key “what if” questions, such as: What are the economics of buying components A and B, transporting them to the company’s storage facilities 200 miles east, and then blending with on-hand inventory in tanks C and D? Can the company meet the customer’s special requirements profitably and on time?

Once these scenarios have been run and a plan has been established, a collaborative, Internet-based work process involving all parties can be triggered. Monitoring and tracking of all subsequent activities can then occur on line in coordinated and synchronized fashion. Within the company, the trader and higher-ups can monitor progress on line and drill down on tasks and process elements—such as inspection reports, and terminal and storage schedules.

### The bottom line

In today’s business environment—in which there are more opportunities to buy, sell, trade, and exchange petroleum and petroleum products than ever—the companies that are the most agile and make the best decisions will reap the highest rewards. Collaborative software solutions that include advanced decision support tools give companies the supply chain visibility required for agility. More important, such solutions also enable companies to increase the profitability of their business processes associated with trading and logistics. ■

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