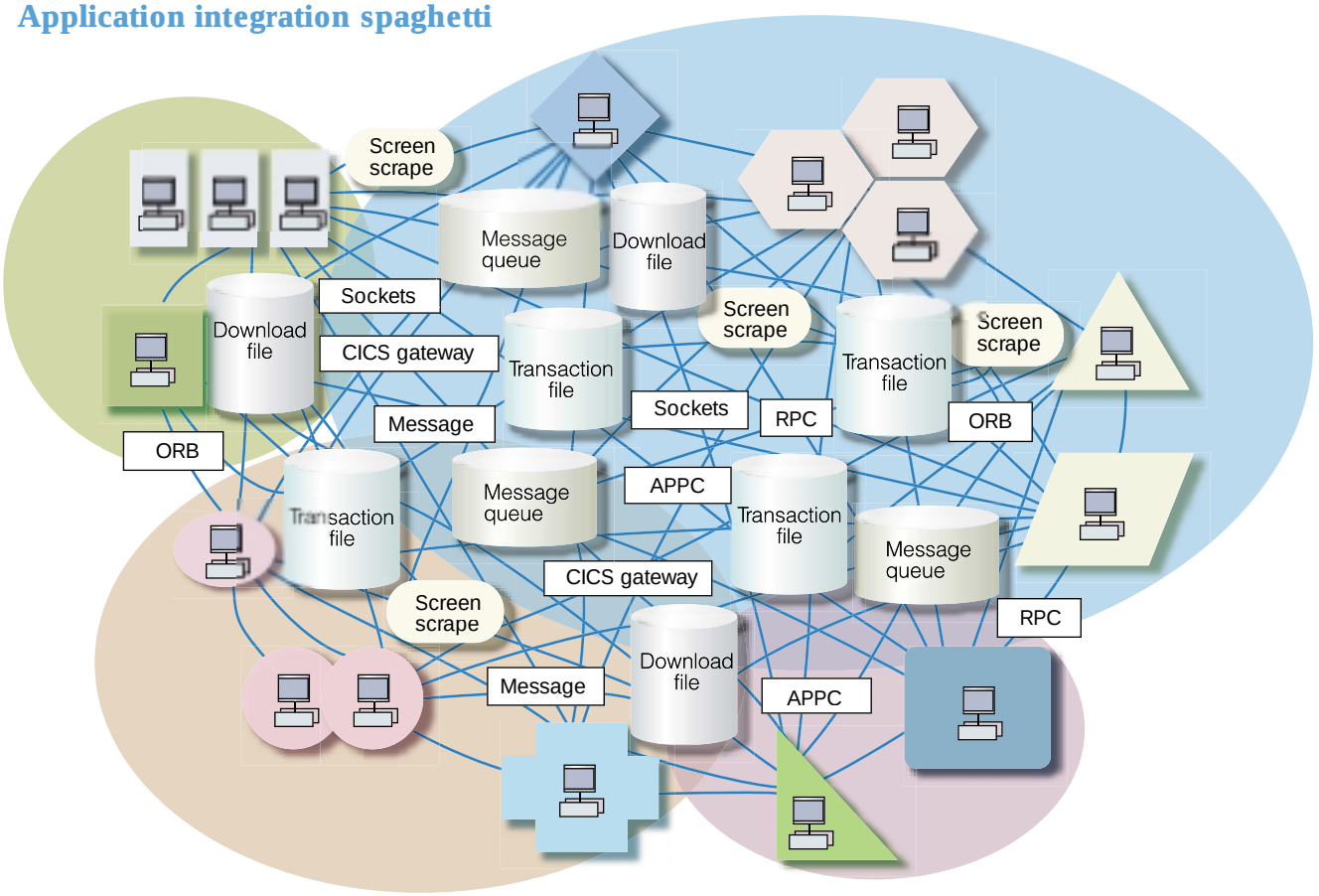
Application integration spaghetti



Source: Roy Schulte, Gartner Symposium *ITEXPO 2000*, "Insight for the Connected World"

Thinking through integration—and STP

At energy trading companies, the term straight-through processing refers to an integrated trading system's ability to process transaction data in real time from one end to the other—with no human intervention. Although the technologies for integrating front-, mid-, and back-office systems are available now, the jury is still out on whether the benefits of STP justify its considerable cost

Judging from the sheer number of integration solutions providers targeting the energy industry, one might conclude that all energy companies are—or are least considering—integrating their information systems.

However, a remark by a speaker at a recent industry conference draws a more accurate picture of how much integration is actually taking place at energy trading firms. It went like this: "Teenagers and sex: They're all talking about it, but few are having it—and those that are having it aren't doing it very well."

Substitute energy traders for teenagers, and integration for sex, and you get the picture: Integration is nowhere near as widespread among energy traders as the companies that sell integration services would have you believe. What's also lacking is the ability of integrated systems to deliver the productivity benefits they promise. That capability is called straight-through processing (STP).

STP enables energy trading sys-

Integration terminology

Term	Description	Vendors, Consultants *
A2A	Application-to-application integration within an enterprise. Sometimes called "internal integration." May involve applications running on the same computer, disparate computers within the same data center, or computers on a network	Original broker vendors Active (webMethods), Cross Worlds, HIE (healthcare.com), IBM, TSI (Mercator), NEON, Sopra, STC, Tibco, and Vitria
B2B	Business-to-business between different companies, also known as "external integration" or "external data exchange." May involve applications and systems running in different enterprises, including desktop browsers and mobile computing devices	Server-to-server Web integration services (WISs) emerged in 1997 to support B2B, focusing on XML and HTTP technology. WIS: Arkona, Bluestone, IPNet, NetFish, Object Design, Scriptics, SunDog, webMethods
STP	Straight-through processing focuses on automating asynchronous interactions. It eliminates manual handoffs of documents and therefore human error and improves control of multi-step business processes spanning departments or companies. Also known as "flow-through provisioning," "lights-out business," and "paperless processing"	Popular goal in finance, utilities, and transaction-based industries such as energy trading. Integration consultants, in-house efforts, integration infrastructure technology offerings

* Not a complete list.

Source: Adapted from a presentation by Roy Schulte at a Gartner Group symposium at *ITEXPO 2000* called "Insight for the Connected World"

tems to pass transaction data from the front office all the way through to the back office—that is, from the point at which deals are entered to where they are settled and accounted for—with no additional human intervention. STP should completely eliminate opportunities for introducing human error at various points in the process. To energy traders, the benefits of STP are especially compelling because transaction processing is a multi-step procedure, and a mistake at any point could cost a firm millions of dollars.

Additional proof that neither end-to-end integration nor STP are widespread at energy trading firms can be gleaned by surveying their executives off the record. On the record, many say they are taking a "wait-and-see" approach. But what's telling is that few energy traders are willing to discuss—for attribution—their successes or failures at implementing and achieving STP.

STP from one user's perspective

One vice president of a large American energy trading firm was willing to talk. Confirming that her company has an integration project in progress, she said that its main goal is to enable the firm's trading volume to grow.

This executive also confirmed that when the integration is complete, it will indeed support STP. By investing in STP, she added, the firm hopes to not only cut down on human errors in transaction data processing, but also to get a better handle on its physical and financial positions in increasingly volatile energy markets. Today, she explained, the physical aspects of energy trading are much more complicated than the financial; every transaction requires a lot of administrative work, including manual reconciliation, scheduling, and documentation. Through STP, the firm hopes to reduce the need for reconciling multiple areas of deal entry, and increase up-front deal ownership and accountability as well.

In conclusion, the trading executive said she believes that the success of the integration effort will depend on two things: building integration expertise in-house, and getting user buy-in. To do this, her firm is trying to rely less on the integration expertise of consultants, and more on the business expertise of its trading professionals. The users that have volunteered to get involved in the project, she explained, say they view their involvement as a career stepping-stone.

The success of the integration effort will depend on two things: building integration expertise in-house, and getting users to buy in

Integration and STP: Supply-side view

Naturally, consultants and vendors involved in this industry niche are much more forthcoming about integration and STP. One is Claudio Casarotti, a senior consultant at Accenture's Trading and Risk Management practice. He says, "The concept of integration is as old as that of communications. To communicate—or integrate—someone must send a message, someone must receive it, and both must speak the same language. To eliminate the spaghetti network [that typically enables applications integration in the energy and other information-intensive industries], a communications standard must be established both within the industry and within companies that are part of it" (see figure).

Asked to comment specifically about integration in energy trading, Dr. Gary Vasey, president of the Houston-based strategic marketing firm VasMark Group, explains that energy traders want to integrate their physical and financial systems so they can hedge more effectively and match their different portfolios more efficiently. "Multiple commodity integration," he says, "is also important for companies wishing to better determine their total energy position. But," he adds, "although some vendors offer STP, I

Efforts to standardize integration of energy trading systems

ETSG: Nine companies, led by Caminus and HoustonStreet, announced the formation of the Energy Trading Standards Group in September 2000. Since then, another 30-plus companies—including some users—have expressed interest in participating in the initiative. The group's main objective is to establish a common standard for moving transaction data from energy trading platforms to transaction/risk management systems. At press time, a spokesperson for the group says that the effort is nearly complete, and that the Energy Product Markup Language Web site is posted on **www.epml.org.**

EDNA: Started at the end of last year, this initiative seeks to establish a standard protocol for the exchange of customer information data in Germany. Visit **www.edna-initiative.de** for information.

EDIFACT: Sponsored by the United Nations, the Electronic Data Interchange for Administration, Commerce, and Transport standard comprises a set of internationally agreed-to standards, directories, and guidelines for electronic interchange of structured data—particularly those related to computer-controlled trade in goods and services. Information can be found on several Web sites: **www.unece.org/trade/untdid/welcome.htm; www.edifact-wg.org; www.xml-edifact.org,ntrg.cs.tcd.ie/4ba2/edi/intro.html.**

GISB: Site of an ongoing effort sponsored by the natural gas industry standards board is at **www.gisb.org.**

don't think any offers all of these types of integration. In fact, most probably don't offer even two of them."

A third take on integration in general comes from Chuck Hanebuth, managing director of Enform Technology, also based in Houston. Enform provides customized IT solutions. Hanebuth reports that end-to-end integration appeals to many of his firm's energy-trading clients for the competitive edge it promises to provide. "As the volume of data involved in energy trading skyrockets, our clients are essentially being forced to raise the level of integration of their front-, mid-, and back-office systems not only with each other, but with systems in the outside world as well. Ensuring that the flow of data is consistent, accurate, and timely can add millions of dollars to an energy trading firm's bottom line."

Many systems, one interface

Aside from process efficiency, integration also promises the ease of use that traders expect from a single interface to multiple systems. Not long ago, energy traders were saying, "We've already done everything we can in the front office, including providing better analytics and real-time market information. To make more money, we need to improve efficiencies elsewhere." In other words, what traders are saying they want is the ideal, integrated trading system: one with the same interface on the front (trading) and back (accounting) ends. Such a system would process and provide access to transactions seamlessly.

The proliferation of on-line exchanges has only accentuated the need for a single interface. Vicki Barit, director of marketing for Houston-based on-line exchange and integrated solutions provider Altra Energy Technologies, says "traders can only have so many screens." Altra addresses the interface issue with its latest technology, which is built on messaging systems, and Java scripting, and delivered over the Internet.

Tradewell Systems, a provider of integration infrastructure technology also based in Houston, takes a different approach to the problem. It puts information from different on-line exchanges into an Excel spreadsheet, with which traders are quite familiar. With this, traders no longer have to worry about copying and pasting data from different exchanges. Tradewell Systems' offering—called Excellerator—uses their object-oriented integration infrastructure technology called Enyware. This Java-based technology supports application to application (A2A) and business to business (B2B) integration on the same platform (see box, p. 68).

Rather than buying software to interface their transaction systems with one or more on-line exchanges, some energy trading companies are writing their own code. However, this is not a straightforward, one-off project.

Integration, change, and standards

Besides the multiple-interface problem, another obstacle to integrating trading systems and equipping them to do STP is the dynamism of the IT industry. Integration becomes a never-ending effort when the building blocks of a trading firm's systems—data bases, application modules, and the like—are constantly being upgraded by software suppliers. Incorporating a new release of a product often requires the user to rewrite that building block's interface with the rest of the trading system. For energy traders, one solution to this problem is to use an applications service provider (ASP).

However, the viability of that solution depends on geography. In the U.S., most energy trading firms took the "best of breed" approach to choosing applications early, and as a consequence, they are now integrating those applications as they consider whether to commit to STP. Their decisions were made prior to the birth of the ASP industry. In Europe, by contrast, such decisions by energy trading firms have come later, giving them more options, including whether to take the best-of-breed or integrat-

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ed-suite approach to applications, and whether to use an ASP.

Matt Frye, chief marketing officer for integrated trading software provider TradeCapture, Stamford, Conn., foresees the use of ASP modules for all energy trading functions—including STP—becoming not just commonplace, but essential. But that will require standards. Frye sees parallels between the development of standards for energy trading and the development of standards for the Internet. "First there was TCP/IP, now there's XML, and soon there will be standards for energy trading as the industry migrates toward Internet-based trading platforms." In this vein, several industry-led efforts to develop standards related to energy trading systems integration are under way (see box, p. 70).

To integrate or interface?

In the broader world of enterprise computing, IT strategists at companies in information-intensive industries—including the energy industry—have begun to question whether tightly integrating information systems is really such a good thing. Advocates of looser integration say that if systems are too closely coupled, their flexibility will be compromised, and changing anything in one system will necessitate changes in all the systems with which it communicates.

Interfacing systems—for example, through the use of application programming interfaces (APIs)—rather than integrating them, is one example of the "looser" approach. The word integration implies a more "holistic" approach.

Asked to explain the difference between integration and interfacing, Jim Baker, managing director of Houston-based energy risk management systems provider OpenLink Energy, summed it up in just four words. "Interfacing is much simpler,"

Interfacing and integration levels and methodologies

If a new system needs to be interfaced or integrated with existing systems, the compatibility between new and old systems will determine the complexity of the process. The connection can be made to support many different levels of communications, ranging from simple transactions passing between applications (interfacing) to complete data sharing among the applications (integration). The following details three of the levels:

Transaction passing. Transactional data from one system ("deals," work orders, etc.) are passed either in one or both directions to/from another system. If this is the only level of integration between systems, much work must be done to keep all referential data in sync between the two systems. When two systems need to share transaction data, it is often best to determine which system will be the "master" and which will be the "slave." The master system will allow transactions to be entered and updated, while the slave simply responds to the new or updated transactions. This master/slave configuration is simpler than bidirectional interfaces, which often require complex rules in both systems to determine how to accommodate edits from either system.

Reference synchronization. Different systems must be in "sync" to share common referential data. One way to achieve this is by requiring that a single system be the master for referential data. All reference additions and updates are then transmitted to the other systems through an interface. Another way is to use bidirectional interfaces to allow references to be added or updated to any of the related systems.

Data sharing. One or all systems have been modified to use the same data tables, thereby eliminating the need for interfaces among systems. This is often the most difficult form of integration since the disparate systems rarely "see" the data the same way. Extensive modifications of one or all systems may be required to alter the internal table structure to match the final common structure of the data. The benefit of this approach, however, is that complex interfaces are eliminated and the "feel" of seamless integration may be accomplished.

It is rare that the purchaser of systems from two different vendors will achieve or even attempt the data-sharing level of integration since this requires access to the vendors' source code and possibly nullification of the vendors' support and maintenance agreements. More often, clients will choose to pass transactions between systems. Sometimes they will even attempt to perform reference synchronization.

Interfacing methodologies

External adapters. One way to pass data between systems is to have an external program that senses when data are changed in an application, extracts the information required in the second system, and passes the information to the system. This can be done with a product like TIB Rendezvous—if the source system publishes the information to TIB and the other systems subscribe to the information stream. Another "integration technology" system is Vitria.

Triggers. Another method is to add "triggers" to the master data base that sense when data are added or updated and then pass the information to another data base, to an external adapter, or directly to the related systems.

Flat files. Often, vendors and clients build flat-file interfaces between systems. These are usually batch-oriented (as opposed to real-time) methods where transactional or referential data for a given time period are exported from one system through a manual or timed process and then imported by the other applications that need access to the data.

Source: OpenLink Energy

he said. Elaborating, he added that "Interfacing allows data to be transmitted between two systems that do not normally share the same database tables. Integration requires modifying systems to work together in seamless fashion" (see box, p. 71).

William Rabson, executive vice president of best-of-breed power trading and scheduling software provider PowerTrade, also based in Houston, compared interfacing to cobbling software together. Giving an example, he explained that Lotus Smart Suite doesn't work as well as competitive products designed to run on an integrated system on a single platform, such as Microsoft Office Suite. In addition, Rabson reports that his customers are concerned about whether the end-to-end systems they are considering were originally designed as an integrated system. Many of these so-called "integrated" systems are merely an interfaced collage of separate systems that have a hard time communicating with each other.

A third perspective on the interfacing/integration issue comes from Enform Technology's Chuck Hanebuth. He says that he's noticed a strong trend among energy traders away from traditional "interface" programs, and toward more middleware-centric architectures. Such architectures provide a variety of benefits that traditional approaches cannot deliver, including queue technology, guaranteed delivery, rule-based data transformation, and store and forward capabilities. The use of middleware also provides a consistent and consolidated pooling point for organizational data, allowing the writing of "contracts" between publishers and subscribers of data.

Middleware refers to the component layer that sits between the client and the server. It covers all distributed software needed to support interactions between clients and servers, serving to "glue" them together. In multi-tiered environments, middleware encompasses pipes (RPC, MOM, ORB) and platforms (TCP/IP, NETBIOS, TIBCO). According to International Data Corp., the worldwide market for middleware in 1999 was $2.7 billion.

For energy trading firms that decide to integrate rather than interface their systems, the question then becomes: How to go about it? Complete Solutions, a Houston-based company that specializes in integration projects, advocates a 10-step approach (see box, above). The firm's Managing Director Addam Alderete and Director of IT Services Emilio Chemali report that many of their clients pursuing integration are building adaptors for Web-enabling their legacy applications, rather than rewriting their functionality. Although this approach permits them to migrate their systems—as opposed to taking the "big bang" approach—the hard part is the planning, which can take anywhere from 12 to 18 months.

Ten steps to integration

1. **Identify the business requirements** necessary to perform the integration. Some 80% the work should be done here, rather than on the actual integration. Without solid business requirements, the integration effort is usually partially successful or not at all, otherwise it will never really achieve full end-user buy in. This step is usually given the lowest priority, as the groups tend to concentrate more on the actual integration technology, which is a mistake. Without defining business requirements, integration does not solve any problems.
2. **Formulate business requirements** not only by business and data analysts, but the actual business end-users themselves, who will ultimately be the ones to certify if the integration solution actually works or not. This is an ideal time for all technology R&D to begin.
3. **Once completed,** do not allow the business requirements to become moving targets. If the requirements are constantly changing, integration development should wait until the requirements are stable and not changing too much. At this time, technical proofs of concept should be in development. Technology R&D needs to be complete at this step.
4. **Put in place infrastructure** for a development environment that includes development and test data bases and servers.
5. **At this time,** technology is ready to proceed with the information gathered from the proofs of concept.
6. **Testers to evaluate** the first revisions of the integration efforts and provide feedback to the developers and application architect.
7. **End-users to evaluate** the revisions of the integration after the testers and developers have substantially worked together to ensure that the integration works. End-users have an opportunity to provide feedback to the testers and developers.
8. **Conduct more testing.** Increase user involvement.
9. **Install and configure** software monitoring for the hardware infrastructure and the software and business transactions. The monitoring package will page infrastructure and application owners as needed.
10. **Release product** to staging and subsequently to production.

Source: Complete Solutions

Interfacing allows data to be transmitted between two systems that do not normally share the same database tables

The consensus on STP: Not yet, but soon

That STP is not a reality at energy trading firms can be deduced from two facts: Firms are still weighing the

'The cost and control benefits of STP are undeniable, but they can't be achieved unless you spend money up front . . . '

pros and cons of integration and interfacing, and the current lack of energy trading standards. But STP is already commonplace in other industries—such as finance and currency trading, and many of the cognoscenti say that it's only a matter of time before it becomes just as commonplace in energy trading. One member of that group is John Ashworth, the former CEO of a currency options software vendor and now the chief commercial officer of London-based commodities broker GFINET. He believes that it won't take long for energy trading companies to catch up.

When will STP arrive? Speaking at Adam Smith Institute's energy industry conference in Berlin this February, Tony Rijkers of Dutch on-line exchange software supplier and integrator Sema predicted that European energy traders will embrace STP in two or three years. Given that all European power exchanges have different interfaces, he said, "if you're trying to keep your head above water, integration is a luxury to think about now."

Rijkers added that national differences in transaction processing make moving to STP more difficult. For example, German energy traders continue to insist on manually signing a piece of paper to validate a deal. Equally tedious is the common practice of e-mailing power schedules as spreadsheet attachments to grid operators. Despite the flexibility of spreadsheets, this method of data communications lacks standards, raises issues of security and authenticity, and introduces the possibility of a manual error each time a file is opened and changed. "If Bill Gates knew that the entire industry is surviving on spreadsheets, he would surely charge more for Excel," said Rijkers.

To David Hanson, vice president of special projects for Altra Energy Technologies, the factor that will have the greatest impact on when STP becomes common at energy trading firms is cost. He says, "The cost and control benefits of STP are undeniable, but they can't be achieved unless you spend money up front to either buy a new system or modify your existing ones." However, Hanson thinks that those companies willing to make that up-front investment will make themselves the most efficient energy traders and "rule the world."

Andrew Bruce, CEO of Tradewell Systems, also views cost as a critical factor in how quickly STP proliferates in energy trading. Agreeing that it's not here yet, he offers a reason why end-to-end integration is still a rarity in the field. "I think many [energy traders] have bitten on the middleware silver bullet, and are now realizing how complex and expensive it is to build a one-off, in-house solution. Companies that we know of have spent tens of millions of dollars just to buy the licenses for tools needed to build the infrastructure required to support STP. Several have licensed middleware, but only use it to publish and disseminate prices within the company. To me, that's incredible overkill."

Continuing on that subject, Bruce added, "One company leading the charge in integration efforts told us that no firm would be willing to pay people to sit in a lab for the two to three years required to design and model the business layer to sit on middleware tools. As far as I'm aware, they are adding one application at a time, and have successfully connected two applications. The big problem is that you need an overall blueprint to build to, before you start. If you don't have a blueprint, then when you add the third and fourth applications, the model in the middle breaks. And you have to start all over again. Having said that, I hasten to add that the technology is ready, the business climate is pushing the requirements, and that the networking infrastructure can support the traffic and complexity. STP may not be here yet, but it is being attempted everywhere."

Peter Tebbenhoff, general manager for the energy industry at integration technology solutions provider Tibco Software, Palo Alto, Calif., also agrees that implementation of STP in the energy trading industry is two to three years out. He says, "During our market research, traders have said that although they feel today's technology is mature enough to support it, they simply don't see a significant enough return on investment to go ahead with STP projects."

The last word on STP goes to Chris Edmonds, chief operating officer of the Louisville-based on-line exchange, application software, and integration solutions provider True Quote. At Eyeforenergy's energy e-commerce conference in Amsterdam this March, he said that the biggest obstacle standing in the way of STP is getting users to buy in. Among the rhetorical questions he asked were: "How do you sell it to the human element?" and "How can you streamline business processes and yet convince people it works?" it

—Anne Ku

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