

# HARNESSING THE POWER OF WEB TECHNOLOGY AND E-BUSINESS

BUYERS, DISTRIBUTORS, AND MANUFACTURERS CAN USE PROVEN WEB TECHNOLOGY AND COLLABORATION SOFTWARE TO STREAMLINE THE SPECIFICATION, QUOTING, AND ORDERING OF VALVES, ACTUATORS, AND RELATED ACCESSORIES.

BY GODARD ABEL

**M**ore and more, the Internet is becoming a pervasive technology for consumers and businesses in the global economy. The hype of the dot.com boom was a few years ahead of its time, but now indicators show the tremendous impact the Internet is having on consumer behavior and a host of industries. For example:

- Google's stock has soared as its revenues and earnings growth have exceeded expectations.
- Amazon.com continues to grow and delivers profits every quarter.
- Internet advertising recently surpassed the peak it had initially set during the bubble, according to the *Wall Street Journal*.

According to IDC—a global market intelligence and advisory firm in the information technology and telecommunications industries—total IT spending, which shrank from 2000 through 2003, is growing again in 2004 and will continue to grow from \$900 billion to more than \$1.2 trillion by 2008.

Merrill Lynch analyst Steven Milunovich, as referenced by *The Economist* in its Oct. 30, 2004 issue, notes that the IT industry progresses in waves: "In the wave, which is beginning now, we are beginning to connect every gadget that employees might use to the Internet."



Clearly the Web has become a part of day-to-day life and as the technology matures, potential applications continue to grow. As the adoption of the Internet becomes ubiquitous around the globe, all industries—including the valve industry and users of valves—have the opportunity to benefit. In this article, we will discuss how valve buyers and manufacturers can take advantage of Web technology to transform slow, inefficient processes into streamlined, mistake-proof collaboration.

## Traditional Processes: Slow and Error-Prone

Today most valve users still use cumbersome, manual processes to specify and purchase valves. Based on process requirements, a valve user will start the purchasing process by creating detailed specifications that include the valve's operating conditions such as fluid properties, size, desired materials of construction, and connection type, as well as the actuator type and other related acces-

sories. Oftentimes, consulting engineers and contractors will be hired by the end user to help create these specifications.

These end-user specifications will then be sent by mail, fax, or sometimes email to valve distributors or manufacturers. The distributors and manufacturers will review the specifications and typically ask for clarifications and additional information. Then they will respond with a quote and associated technical documentation such as drawings and spec sheets, as well as commercial items such as price and delivery. Typically, on the distributor and/or manufacturer end, sales, application engineering, customer service, and manufacturing will all be involved in reviewing the specifications and preparing these quotes and technical documentation.

The end user will then review initial responses from the manufacturers and typically ask for further clarifications, additional information, and revisions as the overall project requirements evolve. Each request for information and revision must be forwarded from the distributors to sales to the factory, requiring multiple handoffs of information.

Once the end user has selected a valve supplier for the application, the buyer will issue a purchase order. This typically kicks off another cumbersome process of faxing information from distributor to manufacturer and back again. The manufacturer will then manually enter the order in its business system, often having to wait for clarifications and review of the final specification against the initial bid. The ordering process requires the valve buyer, distributor, and manufacturer to re-enter the same data in multiple systems, often replicating work that was already done during the bidding and quoting process.

As depicted graphically in Figure 1, this traditional process for specifying, quoting, and ordering valves requires too many manual steps and hand-offs among multiple parties. As a result, it may take several days or even weeks to get back to the valve end user with the right technical and commercial information. In short, the process takes too

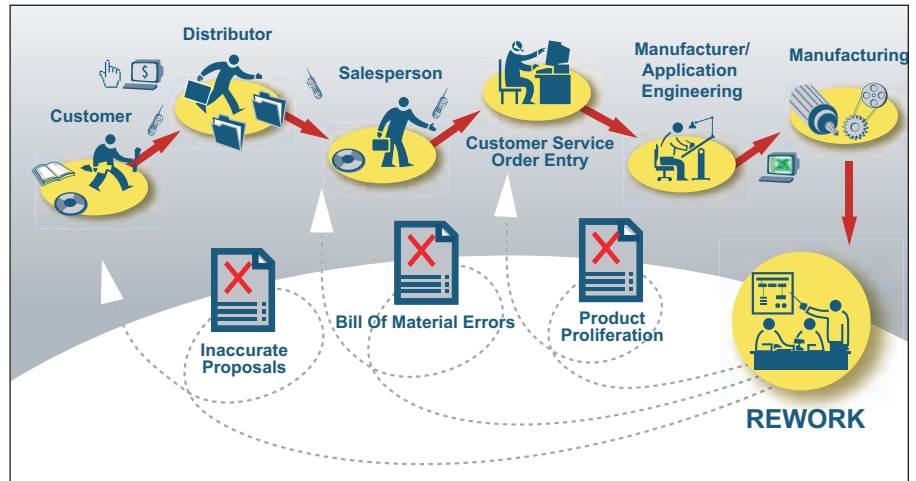


Figure 1. Traditional valve specification, quoting, and ordering process

long, creates too many errors, and costs too much money for both the buyer and manufacturer.

### Streamlining Specification, Bidding, and Ordering

The process for purchasing engineered products such as valves and related flow control equipment is inherently complex. Multiple companies, functions, and people have to be involved. In addition, the valve has to be correctly sized and configured to meet the customer's application requirements. This requires process and flow control technology know-how. In addition, the pricing and commercial terms can be quite complex as companies have multiple price lists and various channel and customer-specific pricing policies. Thus, any process improvement solution must be able to fulfill both the technical and commercial requirements, as well as facilitate efficient information flow and collaboration among all parties involved.

To improve cumbersome business processes, many companies deploy techniques such as lean and Six-Sigma to help eliminate waste. These techniques have been pioneered by companies such as Toyota, as documented in *The Machine That Changed the World*, by Womack and Jones, and by General Electric as Jack Welch described in his book, *Straight from the Gut*. Most companies have applied lean to help them

streamline their back-end operations. This same lean thinking can be applied to the valve specification, quoting, and ordering processes, by mapping the steps and identifying those that add value and those that are wasteful.

Examples of wasteful steps include:

- clarifying and checking prior work due to incomplete information flow
- re-entering order data multiple times in various systems
- fixing specification and engineering errors after an order has been placed
- re-work, warranty, and plant shut-down costs caused by faulty process and application engineering.

In addition to analyzing their current processes, companies need to analyze the tools and systems that support front-end information flow during these processes. Historically, most valve users and manufacturers have relied on a wide variety of paper-based tools such as catalogs, price books, and sizing tables, as well as homegrown software such as sizing CDs.

After analyzing their current state process and systems, companies can define a future state process that minimizes waste and speeds information flow. To achieve breakthrough improvements, however, it is advantageous to implement new systems technology, such as Web-based software that can automate and eliminate many manual steps. Without the automation provided by

advanced information systems, process improvement will be limited. Web-based software technology is especially powerful when information must flow between multiple, geographically dispersed parties across the globe, as is often the case in valve specification, purchasing, and distribution. As the industry becomes increasingly global, with more of the new projects in Asia, a Web-based tool is virtually imperative.

## Web Technology for Real-Time Collaboration

By harnessing Web technology, valve manufacturers, distributors, and their customers can interact much more efficiently to specify, quote, and order valves and flow control equipment. Since virtually all companies today have Internet access, it is now possible to move these front-end processes online to enable faster and more efficient collaboration. Using the Web, everyone can access the same information and tools from anywhere on the planet 24/7.

Some valve and flow control manufacturers are already setting up secure, password-protected Web-based solutions, such as corporate intranets or extranets, to help their sales teams, distributors, engineering firms, and qualified end users specify, quote, and order flow control systems online.

Several examples of how Web technology can be used to streamline the valve specification, quoting, and ordering processes include:

- **Browsing Catalogs.** Valve buyers can browse product catalogs and technical documentation on valve manufacturers' and distributors' websites. Typically, they can download technical datasheets, brochures, and basic drawings. A majority of valve manufacturers offer these capabilities today.
- **Sizing Valves.** Some manufacturers also provide online sizing tools that help an end user size the valve based on process requirements. Web-based sizing tools have an advantage over CD-ROMs in that they are always up-to-date and can be accessed without users having to install the latest pro-

gram on their PCs.

- **Configuring Valves.** A Web-based configurator helps users specify desired options such as end connection, body material, actuator type, seal type, and material. An online configurator can also dynamically generate figure numbers, bills of material, and drawings to help an engineer complete a plant design. In addition, the user can see how price, availability, and lead time change based on the options selected. Logic can be built into the configuration engine, so that the end user can only select options that are compatible with the process requirements and valid from a manufacturing standpoint.
- **Generating Specifications.** Based on the end user's application requirements and configuration, some Web tools enable users to automatically generate a specification that will meet specific application requirements.
- **Generating Proposals.** Manufacturers can set up Web tools to automatically generate proposals online, complete with all of the technical and commercial data the customer needs to evaluate the quotation. This can include cover letters, product descriptions, technical datasheets, performance graphs, drawings, and commercial terms and conditions.
- **Online Ordering.** End users can access information via the Internet 24 hours a day, 7 days a week. They can check stock and delivery availability for valves, receive a quote with applicable pricing, and enter an order directly. This order can then be ported directly into the manufacturer's MRP or ERP system, with automated confirmation to the customer and no intervention required on the part of sales engineers.
- **Generating Submittals.** If submittals are required for order approval, these too can be dynamically generated from an online configuration. This automates the time-consuming manual process of pulling together thick documentation packages with all the cut sheets and drawings and technical conditions that would be required.

- **Checking Order Status.** End users can go online to check the status of their orders and shipments 24/7. Customers may also be able to change orders online if required, based on rules established by the manufacturer.
- **Order Service and Troubleshooting.** If desired, valve manufacturers can provide technical information online to help customers troubleshoot their flow control equipment.

The screen shots in Figure 2 illustrate how one valve manufacturer has implemented these capabilities to help its sales team, distributors, and customers select, configure, quote, and order valves more efficiently. This system is set up as an extranet that can be accessed from anywhere in the world via a Web browser, secure password, and log-in.

## Web Services Integrate Systems

Web services involve software programs passing information and interacting with each other directly through the Web, without human intervention. For example, with Web services, a valve end user's ERP system could place a valve order by submitting an electronic order directly to a distributor's and/or manufacturer's ERP system.

In one futuristic Web-services scenario, the valve purchaser enters a purchase order in his or her business system. This automatically generates an electronic P.O. in XML-format that is sent to the vendor electronically in a secure XML-based data packet via the Internet. (XML, or Extensible Markup Language, is an Internet standard published by the World Wide Web Consortium, [www.w3c.org](http://www.w3c.org), that enables information to be intelligently exchanged among software systems.)

Once the vendor's business system receives the XML order, it reads the purchase order, validates the specifications and order configuration, processes the order, and sends instructions to the shop floor for building the product—all automatically. Technical and

commercial logic can be embedded in software rules so that only clean orders are processed automatically. Orders that violate technical or commercial constraints will not be processed and the end users will be notified.

Realistically, the valve industry is still several years away from true Web service transactions, due to the complexity of valve users, distributors, and manufacturers upgrading their own systems' infrastructures to handle XML-transactions via the Web.

In addition, a common XML format needs to be agreed upon for valves specifically to enable seamless data integration across multiple systems. In mid-2004, FIATECH announced the formation of a FIATECH AEX initiative to address this challenge of creating common XML formats or "schemas" that could be used to exchange information across capital equipment industries.

FIATECH is a non-profit consortium "focused on fast-track development and deployment of technologies to substantially improve how capital projects and facilities are designed, engineered, built, and maintained." The AEX Project was chartered to "provide the technology needed to enable both internal and external automated information exchanges among the multiple software systems and collaborating companies associated with design, procurement, fabrication, delivery, installation, operation, and maintenance of engineered equipment items."

The FIATECH AEX initiative will include the development of standard XML schemas for motors, air coolers, reciprocating compressors, pressure vessels, centrifugal fans, centrifugal compressors, control valves, storage tanks, relief valves, and transmitters. According to FIATECH AEX, "The schemas cover both project and technical information and are designed to be used to support multiparty collaboration work processes for the entire life cycle, including design, procurement, delivery, installation, operations, and maintenance of facility equipment."

Twenty-five leading companies are sponsoring this initiative, including Bechtel, DuPont Engineering, and the

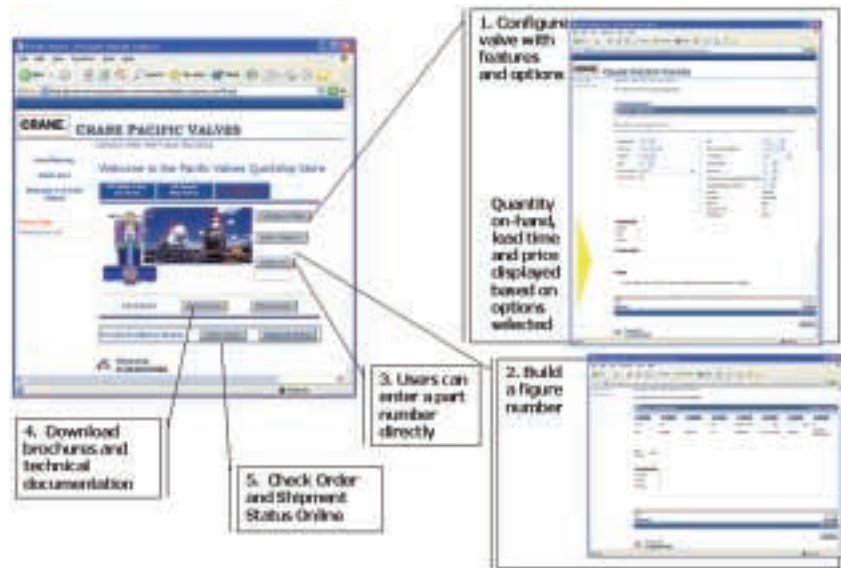


Figure 2. Valve manufacturer extranet for use by sales, distributors, and users

National Institute of Standards and Technology. The participation of these industry leaders indicates that long-term valve users and manufacturers will ultimately be able to deploy Web services to really streamline their collaboration.

"DuPont is involved with FIATECH and the AEX Project in particular because we believe it is time to move beyond talking about problems and take action," explains James B. Porter, Jr., vice president, DuPont Engineering and Operations. "The AEX Project, with the release of these schemas, has responded to an industry-wide challenge regarding standards and interoperability, providing the means whereby owners like DuPont can work with contractors and technology developers to 'find a problem and fix it.'"

### Everyone Benefits from e-Business

Valve users, distributors, and manufacturers can all benefit tremendously from using the Web to collaborate across the globe. With information flowing faster and more efficiently throughout the valve specification, bidding, ordering, and service processes, users will get the information and equipment they need much more rapidly. Valve manufacturers and distributors will be able to sell their products more effectively—and can significantly

extend their marketing reach. Clearly, the Internet is here to stay and doing business over the Web is opening up a whole new era of efficient collaboration for the valve industry. **VM**

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