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Point of View

Making Sense of Silence

How the Energy Industry can use Silent Commerce for enhanced Business Performance

Imagine a pipeline that can notify an engineer of corrosion that is about to create a leak. Or workers' clothing that can play an active role in monitoring safety conditions. It is possible, with the technologies that are enabling what Accenture calls Silent Commerce.

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Silent Commerce makes ordinary objects intelligent and interactive. Combining advanced tags and sensors with wireless communication and other emerging technologies, Silent Commerce enables objects to communicate directly with customers, suppliers, employees and even each other. Almost any physical item can be embedded with electronic tags and sensors that support a unique and verifiable identity, store a wealth of information and sense changes in the environment.

But what exactly does the emergence of Silent Commerce mean for the energy industry? For starters, it can mean better asset management—from construction through maintenance—and improved worker safety. As the technologies continue to evolve, it could lead to better business performance across the board.

The Basics of Silent Commerce

Silent Commerce creates a new arena in which objects can take an active role in helping manage themselves and their environments. There are three key enabling technologies: radio frequency identification tags, sensors, and the enhanced ability to collect and analyze data.

Radio frequency identification (RFID) tags are the primary force behind Silent Commerce today. An evolution from the bar code concept, RFID uses wireless, electronic radio frequency communications to label and identify objects (see sidebar on the next page). RFID tags can store up to eight kilobytes of data and be overwritten many times, meaning they can be used repeatedly.

The energy industry has been using RFID technology for several years, with ExxonMobil's introduction of Speedpass in the late 1990s. Millions of consumers use RFID tags integrated into key chains, car window decals—even wristwatches—to purchase gas, retail items, even food at McDonald's restaurants. According to ExxonMobil's research, Speedpass customers make additional retail purchases because of the convenience of the quick transaction.¹

While RFID technology helps objects announce what they are and where they have been, sensors enable objects to sense changes in the environment around them. The ability of sensors

to record, communicate or even react to events, helps them actively protect assets and people. At their most basic, sensors translate a physical property—such as temperature, light, vibration and velocity—into an electronic signal. Embedding sensors into an object lets you monitor where and how it is being used. Building a network of sensors provides enhanced capabilities, as the sensors can communicate with each other, build consensus on changing conditions and trigger action when appropriate.

Sensors are both available and in use today—your home thermostat uses a sensor, as does the airbag in your car—but widespread proliferation in everything from paint on a bridge to oil moving through a pipeline depends upon their miniaturization. The University of California at Berkeley is working on inexpensive, autonomous sensors that will be 1–2 cubic millimeters, able to fit on the head of a pin. This Smart Dust, as it is called, will have countless uses across industries, from the military to agriculture.

As the objects around us become increasingly able to communicate, reason and act, they will also generate an increasing amount of data. The final component that enables Silent Commerce is the more powerful computing infrastructure that can now handle the explosion of data that RFID tags and sensors could spark.

We believe that advances in computing and storage technologies—as well as the ability of Web services and XML to communicate across disparate systems within and between companies—have recently come together to provide the technical infrastructure necessary to manage the information overload. In addition, current generation enterprise resource planning (ERP) and supply chain systems can be used to process the data from RFID tags to automatically manage and improve operations. This is good news for companies seeking to leverage existing investments.



RFID tags vs. bar codes

The Silent Commerce trend is perhaps attributable firstly to the emergence of bar codes. Now, though, RFID tags represent a giant leap in technology that will move Silent Commerce off store shelves and into every part of commerce and industry.

RFID tags have many advantages over bar codes:

- They are easily affixed to containers or they can be built right into packaging materials.
- They do not require a clear line of sight between tags and readers.
- Dirt, frost and other substances that would prevent a bar code from being scanned accurately don't interfere with RFID readability. In fact, there is practically no wear and tear to the devices and no maintenance is required.
- Also, because RFID information is transmitted via radio waves, multiple tags can be read simultaneously from several feet away.

Some tags are active, possessing their own power source and sending a continuous signal. Active tags have a greater range than those that are passive, which means they rely on the reader's radio signal for the power to transmit their signals. Read-only RFID technology gives objects the ability to "say their own names"—for example, to communicate the unique product serial number that was written on the tag at the time of production; read-write tags allow products also to say where they've been—or have any kind of information written to them as they pass through the value chain. The tags vary in size (and price) according to their capacity and capabilities—from the size of a matchstick to the dimensions of a brick. While RFID tags range from about 40 cents for a basic version up to \$80 for more complex computing power, innovation continues to drive both the price and size down, giving enterprises more options for using them.

Silent Commerce Opportunities for Energy Companies

As sensor and RFID technologies advance, industries will undoubtedly find ways to apply these innovations to their ongoing operational challenges and for enhanced business performance. In the meantime, through our extensive R&D in this area, we have identified a number of ways for energy companies to benefit from Silent Commerce.

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Construction

Assembling an oil pipeline or an offshore drilling platform is a huge capital project involving countless components that may look similar, but have highly specific functions. Similarly, putting scaffolding together quickly and correctly is vitally important, especially when a pipe or part of a drilling platform needs repair.

RFID readers and tags on each component can make it much simpler and safer to find and assemble the right pieces in the right order. RFID tags can also capture the maintenance history of each component, so engineers can go along a pipeline and track when each piece was made and installed. Hydratight Sweeney successfully uses RFID tags on its offshore flanges, joints and bolts to reduce hydrocarbon leaks. RFID assists with preventative maintenance of its pipeline joints by tracking repair history and helping to ensure each joint's integrity.²

RFID tags can smooth processes along the construction supply chain as well. As different suppliers get involved from provisioning through building and maintenance, RFID tags can track each component used in construction and drive efficiencies up and down the supply chain.

Product & Pipeline Monitoring

Pipeline integrity is most often compromised by corrosion and third-party digging damage. Energy companies today use various tools to monitor pipelines, including flow monitoring, aerial surveillance, cathodic test stations and close interval surveys. RFID tags and sensors could strengthen these efforts considerably. Silent Commerce technology can be used to track and confirm the state and environmental conditions of a product as it moves through a value chain—or a pipeline. By providing automatic self-monitoring capabilities, these

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technologies enable products to issue alert signals when certain thresholds are reached.

Today, pipes could be fitted with sensors to monitor the flow of oil as it passes through each section of a pipeline. Tomorrow, they could be added to the oil itself. As sensors get smaller, they could also play a key role in reservoir monitoring by tracking flow characteristics and ultimately enabling quicker completion of an oil field. Even increasing completion by 3 to 5 percent could boost revenues by hundreds of millions of dollars.

While some of these capabilities may seem futuristic, given the current direction of innovation, they are clearly within the realm of possibility.

Maintenance & Worker Safety

From field workers to plant maintenance engineers, Silent Commerce can provide accurate information at the point of need to become a contributing participant in any maintenance efforts.

Pipeline workers need to have a variety of information at their fingertips, from repair history and operating conditions to authorized vendors of replacement parts and part serial numbers. Equipping pipeline workers with mobile devices is one way to help deliver that information at the point of need; storing relevant data in RFID tags on each component of a pipeline is another. In either case, the worker can connect to the pipeline of information as he is focusing on the immediate needs of the virtual pipeline.

RFID and sensors can become active participants in the maintenance process as well. Installed on pumps, motors, valves and safety equipment,

RFID tags confirm that operators perform procedures properly on the correct pieces of equipment, in the right order and with the appropriate tools. Tagging the tools themselves can help workers keep track of their equipment, which is often very expensive.

Again, energy companies are already taking steps to leverage these innovations. ExxonMobil recently piloted a program that used RFID tags to track relief valves as they were taken off-line for testing and recertification. The tags reduced paperwork and helped return the valves to service more quickly.³

Embedded tags and sensors can be used in a variety of ways to alert workers to unsafe conditions. These alerts may range from issuing a simple warning to cutting the power to specific machinery to help reduce the chance of an accident. In addition, each employee's clothing can be tagged and monitored to track their precise location in case of emergency situations as well as the type of protective gear they are wearing.

Turning Silent Commerce into a Silent Innovation

For energy companies, Silent Commerce presents opportunities to transform processes throughout the industry, from exploration through retail. As mentioned, some industry leaders are already finding ways to integrate current technology tools with promising results. As these leaders continue to embrace emerging technologies, the challenge is for the rest of the industry to keep pace with innovation.

For companies interested in employing Silent Commerce technologies, Accenture's industry specialists and our R&D team in the Accenture Technology Labs work with companies as they explore ways to leverage the technologies that drive Silent Commerce.

Accenture recommends three steps to get started and stay ahead of your competition.

Step 1: Target Value – Accenture offers tools and experience to help identify Silent Commerce opportunities and benefits for your entire value chain, estimate costs of implementation and calculate return on investment.

Step 2: Build Pilots – Pilot applications are essential to test hypotheses about benefits, costs and work processes. Pilots offer companies insight into both incremental change and fundamental transformation. Pilots also identify requirements for integrating Silent Commerce technologies with legacy applications and processes.

Step 3: Scale Deployment of the Solution – Following a successful pilot, Accenture helps you tailor the RFID application to help meet your organization's needs and, as appropriate, scale deployment with flexibility in mind so you can accommodate key buyers and suppliers in the future and ultimately enhance your business performance.

Act Now

The Silent Commerce revolution is under way. To become a high-performance business, energy companies should act now to achieve competitive superiority based on technology innovation. A pioneering force in Silent Commerce, Accenture is breaking new ground with original RFID-based solutions, collaborating with influential organizations to establish affordable, global standards, and investigating the business impact of the next generation of technologies. Accenture's Silent Commerce practice combines RFID research, development capabilities, and industry expertise to help companies grasp the potential of Silent Commerce, act on it, and maximize the return on investment. Through our broader technology capabilities, including enterprise integration, SAP implementation and infrastructure services around the world, Accenture leverages its entire organization to deliver comprehensive end-to-end RFID solutions that enhance the performance of our clients and achieve bankable results. For more information, visit www.accenture.com/silentcommerce

About Accenture Technology Labs

Accenture Technology Labs, the technology research and development (R&D) organization within Accenture, has a 16-year track record of turning technology innovation into business results. The Labs create a vision of how technology will shape the future and invent the next wave of cutting-edge business solutions. Working closely with Accenture's global network of specialists, Accenture Technology Labs helps clients innovate to enhance business performance. The Labs are located in Chicago, Illinois; Palo Alto, California; and Sophia Antipolis, France.

For more information, please visit our website at www.accenture.com/accenturetechlabs

About Accenture

Accenture is a global management consulting, technology services and outsourcing company. Committed to delivering innovation, Accenture collaborates with its clients to help them become high-performance businesses and governments. With deep industry and business process expertise, broad global resources and a proven track record, Accenture can mobilize the right people, skills and technologies to help clients improve their performance. With approximately 86,000 people in 48 countries, the company generated net revenues of US\$11.8 billion for the fiscal year ended August 31, 2003. Its home page is www.accenture.com.

1. <http://www.speedpass.com>
2. <http://www.hydratight.com/news/news.htm> (Towards a Leakfree Future, September 2000)
3. http://construction-institute.org/cpi2000/cpi2000_proc.pdf

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