

# Accenture's Top 10 Technology Trends in Energy

IT innovations that can help drive high performance  
in the oil and gas industry



>  
**accenture**

*High performance. Delivered.*

• Consulting • Technology • Outsourcing

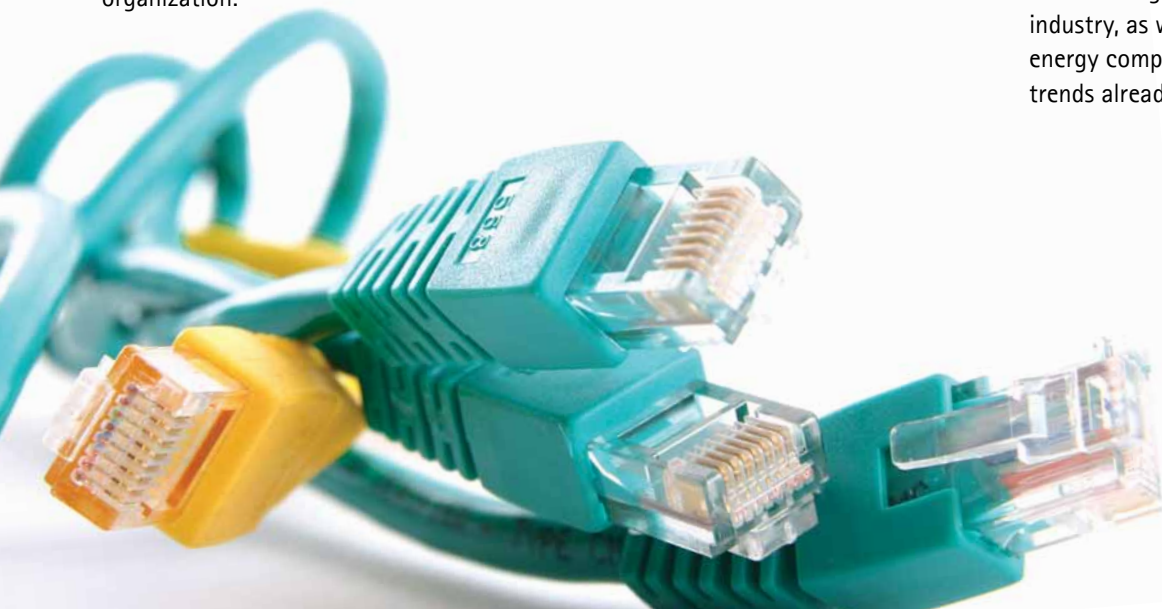
Upstream and downstream energy companies face the likelihood of significant changes over the next 20 to 30 years. There will be greater demand for more and different types of energy sources from consumers and governments alike. As renewables and alternative transport fuels come on line, oil and gas companies will face higher capital costs to transform operations to meet the new energy mix, causing a corresponding shift in industry operating models and ongoing investments in new computing technologies.

Information technology (IT) will continue to benefit oil and gas companies in supporting the transition to a new energy era. Companies are more readily investing in accelerating the use of computing innovations beyond the early adopters, as they clearly see the business benefits of doing so. The key going forward is to filter through technology developments and target the ones that will deliver the greatest value to the organization.

Accenture believes 10 technology trends have significant potential to support energy companies in their evolution to a new energy era. These are trends we see developing in our everyday work and research, and in working with strategic business partners such as Microsoft and Oracle Corporation, as well as key industry providers such as Honeywell, OSIsoft and others.

In a recent Accenture survey, we found that less than 25 percent of energy IT executives, managers and staff believe their companies have embraced many of these trends and innovations, such as service-oriented architecture (SOA), cloud computing and shared services, yet these are the technology innovations that will drive high performance.<sup>1</sup>

This paper outlines our high-level view of technology's future in the energy industry, as well as how we see some energy companies harnessing these trends already.



# Accenture's Top 10 Technology Trends in Energy

1. Greater consolidation of applications
2. Greater industry collaboration
3. Better business intelligence
4. Rise of the private cloud
5. Rise of the public cloud
6. More shared service organizations
7. Increased wireless networking
8. Increased use of service-oriented architecture
9. More integrated operations
10. Better IT security for industrial control systems

The critical question for the energy executive:  
Which of the top 10 trends represent the best  
opportunities for your company to leverage  
technology for increased competitive advantage?

1.

## Greater consolidation of applications

Across the energy industry, companies are eliminating redundant software and using fewer applications to do more. Overall, application portfolios of companies have typically grown haphazardly, making them redundant in functionality, cost and support requirements. Individual operating units often run their own IT-supported business processes in isolation, which can diminish opportunities to collaborate for better economies of scale and industry leading practices. As a result, energy companies cite issues of having difficulty in capturing and archiving data, being unable to find data trapped in individual repositories, or having too much redundant and/or unnecessary data available.<sup>2</sup>

According to Accenture experience, many of the energy supermajors have undertaken initiatives to reduce their number of applications—in some cases by as much as 50 to 70 percent.

Companies are also now deploying vertical and horizontal enterprise applications to replace nonintegrated custom software, improve visibility and standardize process control on a global basis. For example, we have seen one oil and gas company reduce its number of applications from more than 6,000 down to 2,000 over a six-year period. The benefits most often cited from this type of greater consolidation of applications include easier access to more accurate information and enhanced collaboration, which leads to the next trend.



## 2.

### Greater industry collaboration

In the past, IT organizations tried to achieve integration by modifying their existing applications and adding more functionality. Today, however, there are smaller, more specialized tools available in the marketplace with open interfaces that companies can use to integrate with other systems and increase collaboration, both across the enterprise and outside the four walls of the organization with other market stakeholders. According to the *Accenture and Microsoft Oil and Gas Collaboration Survey 2011*, oil and gas professionals are working together more than ever, with 34 percent reporting that they are collaborating more with other stakeholders in 2010 than in 2009.<sup>3</sup>

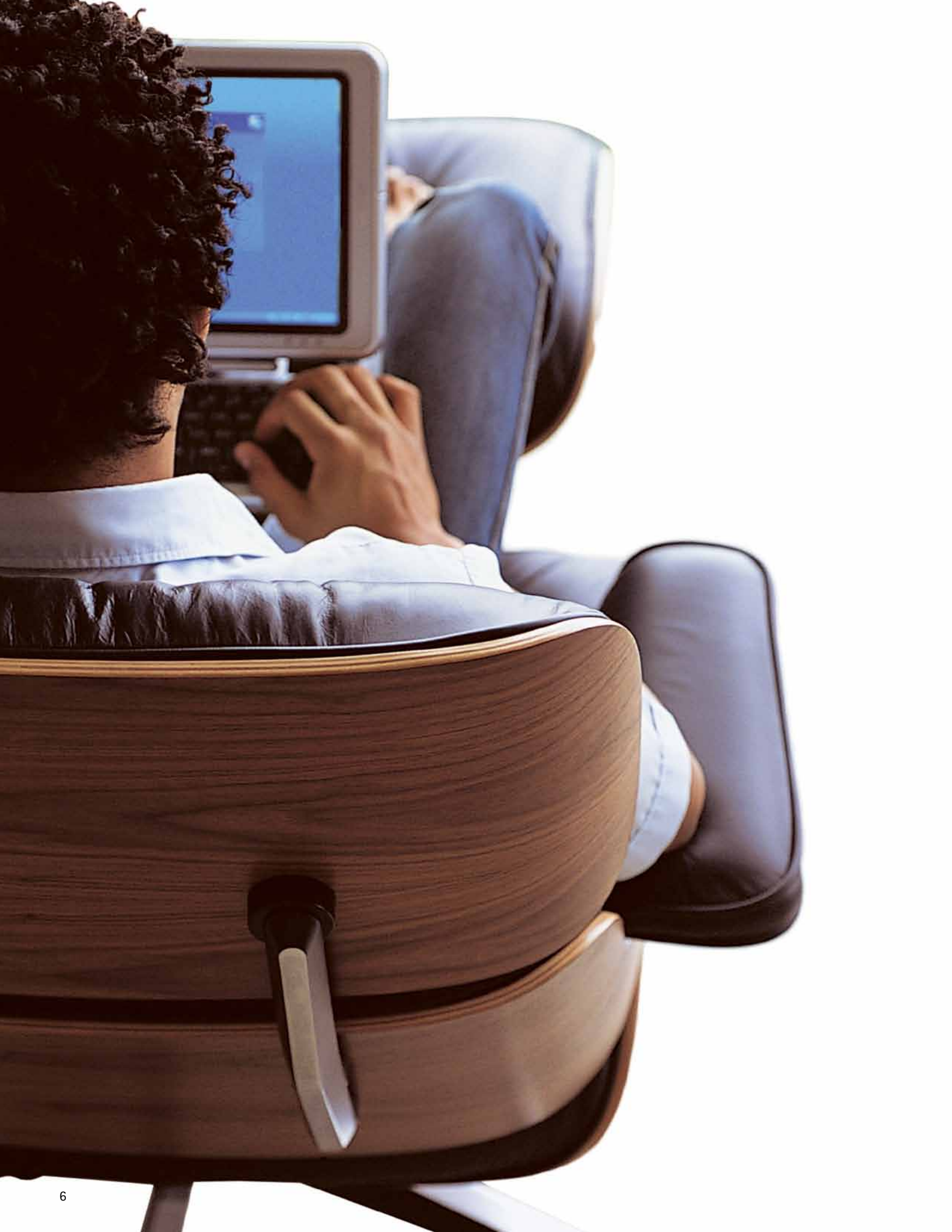
Such collaboration comes in many forms, including:

- Creation of simple, web-based workflows or applications that allow users to manipulate or manage data better than with manual filing or e-mail. For example, the field workforce can use a mobile data entry screen to enter instrument readings, which are then automatically uploaded into a centralized system.
- Implementation of electronic forms to standardize and/or automate data collection and processing.

In fact, more than one third of the respondents who participated in the *Accenture and Microsoft Oil and Gas Collaboration Survey 2011* cited industrywide collaboration among key players as most likely to bring about needed improvements.<sup>4</sup>

As industry professionals collaborate more, they are more motivated to integrate operating principles, standards and information management more tightly, both within the enterprise and among various industry players.

Oil and gas professionals are working together more than ever, with 34 percent reporting that they are collaborating more with other stakeholders in 2010 than in 2009.<sup>3</sup>



# 3.

## Better business intelligence

IT energy executives often cite the problem of how information is isolated within individual business units, in databases and with process owners, causing their companies to have multiple versions of the "truth" about their operations. To address this problem, energy companies have turned to business intelligence (BI) solutions to enable better decision making.

Business intelligence ranked number five on the list of the top 10 technology priorities for chief information officers (CIOs) in 2011, according to Gartner's annual global CIO survey published January 2011.<sup>5</sup>

Companies are increasingly integrating BI more directly into business processes and decision making to shift from simply measuring "what happened" (historical data) to making more accurate forecasts of what **will** happen.

Adopting BI, however, has been more difficult than many IT and business professionals had expected, even though it has been at the top of the CIO agenda. A move to more open systems and simpler data structures, in which business users can use self-service tools to consolidate and analyze data, will help improve BI's adoptability and success.

In addition, successful BI solutions are those that keep the business user in mind, go for the "low-hanging fruit" and move companies forward in small steps, rather than trying to solve all problems at once. For example, Eastern European oil and gas company MOL started its BI initiative with operations reporting at just one refinery.<sup>6</sup> Over time, the company centralized more sites and data sources to create a **single** reference for different types of data—such as shop floor, supply chain, finance, and health and safety.



# 4.

## Rise of the private cloud

As computing has become more of a commodity, energy companies are striving to simplify their hardware and software into more common environments. Standardization has gone the way of cloud computing as companies virtualize hardware (servers), software (software-as-a-service) and processing power outside the four walls of their organizations into dedicated environments (private clouds).

Private clouds are already a known quantity and a proven approach at some energy companies. Rapidly increasing amounts of data and a growing requirement for real-time access to that data, however, are accelerating this shift.

A recent Accenture industry study reveals that CIOs are finding real cost savings from cloud computing, and we estimate energy IT organizations could save up to 50 percent in hosting costs annually with cloud computing.<sup>7</sup>

In addition to reaping these significant savings, many major energy companies are moving to cloud computing to increase asset utilization, go "green" and free up internal resources. For example, ExxonMobil Upstream is building a new cloud-based infrastructure service with IceWeb to deliver geo-imagery to land exploration workers wherever they are.<sup>8</sup>

We estimate energy IT organizations could save up to 50 percent in hosting costs annually with cloud computing.<sup>7</sup>





# 5.

## Rise of the public cloud

Virtualization has grown even more in the public domain to support back-office and other critical but noncore functions, in standardized applications hosted and offered to entire industries. Public clouds extend a company's data center capabilities by enabling the provision of IT services from third-party providers over a network. Many companies are using software-as-a-service (SaaS) to replace legacy software, while others are using it to deploy **new software** in support of business processes that previously were not very software driven.

The savings from eliminating the cost of hardware, software, maintenance and IT labor, along with the benefits of replacing a capital expense with a pay-as-you-go utility, make public clouds even more appealing. For example, Google offers its e-mail service at only \$50 per user per year. Contrast this with the costs of running internal mail systems, which can typically be \$250 per user per year.<sup>9</sup>

Smaller energy companies, especially, have discovered the benefits of SaaS for web-based and vendor-hosted solutions, for functions ranging from maintenance management, to HR management, to collaboration and file exchange in capital expenditure projects. Some energy companies also deploy SaaS for front-office applications, such as Salesforce.com, to help assimilate acquired companies and consolidate operations across business units.



# 6.

## More shared service organizations

Individual plants sometimes struggle to find sufficient resources and skills to support their IT operations full time. With separate IT shops, CIOs lose the opportunity to leverage economies of scale and leading practices.

A shared service organization (SSO) offers a one-to-many model to help centralize operations, standardize computing, control costs and deliver more reliable, consistent service to all users.

While a more distributed environment characterizes the global nature of the energy business, companies that consolidate computing power and resources can also achieve more control over exactly how they will source specific services—e.g., internal SSO, partnered SSO and outsourcing. For example, we have seen one energy company develop its IT support organization as a stand-alone business, turning “users” into “customers.” This new model employs specialized managers to interface between IT and the business owners and own the responsibility for all IT delivery and support.

Often, moving to a shared service model can mean full outsourcing. For example, Talisman Energy chose to outsource back-office finance operations by transferring select finance and accounting processes to Accenture’s delivery center in Bangalore, India. The entire transition was completed within five weeks, and the partnership has delivered numerous innovations via more than 60 key performance indicators.<sup>11</sup>



# 7.

## Increased wireless networking

The growth and ubiquity of safe, fast and reliable wireless communications can now provide access to data in any part of the plant. Operators can interact in real time through all manners of mobile devices—from "traditional" notebooks, to tablets, to smart phones—to exchange voice, video, photos and data without the need to install expensive networking infrastructure.

More specifically, wireless technology adds business value by improving process quality, BI and regulatory compliance. Wireless sensors feed continuous data on business processes to BI specialists who can analyze and report on the data back to internal and external stakeholders—all in real time. Such capabilities help a company manage cost, risk and performance.

For example, until recently, technology has limited the industry's ability to prepare for and respond to emergencies. However, with the advent of new wireless systems, made possible by the integration of existing standard technologies, oil and gas companies are improving safety. Location-based technology can now determine the whereabouts of employees, while also collecting data on gas levels from multiple sources to raise alarms or to alert nearby workers of any incidents.

Marathon Oil is using a wireless-enabled gas detection system that helps protect workers in potentially hazardous environments. The solution combines WiFi and location-based technologies with gas detectors to allow companies to remotely monitor incidents in locations previously not suited for wireless networks.<sup>12</sup>

HONG KONG

PARIS

SYDNEY



BUENOS AIRES

TEL AVIV

LISBON

# 8.

## Increased use of service-oriented architecture

While service-oriented architecture (SOA) has been on the CIO agenda for several years, the technology has really materialized in the past three years, as most software vendors have now adopted it as standard, even for vertical applications in the energy industry. SOA replaces the typical client-server architecture with multiple levels of functionality that include foundational applications, such as enterprise resource planning (ERP), a web services repository and a business process management system (BPMS).

Most energy companies have already established SOA as the standard for interfaces, though there are exceptions in which SOA is not appropriate—such as for real-time communication from distributed control systems (DCS) or supervisory control and data acquisition (SCADA) systems. SOA is most appropriate where it makes sense for business managers to design and alter a software-driven business process without specialized software programming skills. In such cases, the system links business users' requests with the right applications and relevant functionality/systems, from which point web services do the rest. This method increases the ability of IT organizations to keep up with changing business demands.

While SOA can reduce overall costs, the less obvious but equally important benefit may be the flexibility SOA can deliver by helping the business to become more nimble.



TORONTO

BEIJING

BAN

VANCOUVER

# 9.

## More integrated operations

The term "integrated operations" refers to mixing onshore and offshore operational processing centers to standardize and automate critical business functions. With the growth in speed and bandwidth of network computing, IT professionals can more seamlessly collaborate by deploying uniform platforms, systems and procedures across the world in global delivery centers. As a result, companies can reduce operational and capital asset costs; accelerate production with 24/7 delivery; improve leading practices through greater collaboration; increase data access; and spread operational risk across the organization—all of which extend the life of oilfield operations.

Perhaps most important, integrated operations enable energy companies to move personnel further away from potentially unsafe operating environments in the field.

One survey of upstream oil and gas professionals showed 44 percent of respondents felt "the upstream data explosion has had a negative effect on their ability to get their work done," compounded by "the difficulty and time-consuming search of diverse systems to find information."<sup>13</sup> As a result, we have seen many oil companies adopt integrated operations under different programs using advanced technologies and real-time data to drive organizational change.

With integrated operations, companies can reduce operational and capital asset costs; accelerate production with 24/7 delivery; improve leading practices through greater collaboration; increase data access; spread operational risk across the organization; and move personnel further away from potentially unsafe operating environments in the field.



# 10.

## Better IT security for industrial control systems

New levels of interconnectedness have made industrial IT, especially distributed control systems (DCS), much more open and vulnerable than in the past. DCS and SCADA systems are no longer fully isolated from outside networks, systems and users. As a result, energy companies must work harder to find and deploy expensive and scarce resources to secure their data and legacy process control systems, which were originally conceived in a non-networked environment.

Today, these systems are linked to public networks, including the Internet. As a result, companies face more advanced threats from national or international attackers who seek to damage, control or monitor industrial systems. According to a Data Breach Investigations report from Verizon Business and the U.S. Secret Service, the relative proportion of critical infrastructure breaches that come from outsiders has more than doubled in the past decade.<sup>14</sup> Moreover, older DCS or SCADA systems often lack even basic security and safety features. For example, simple physical access to a terminal or network cable can provide user access to the entire system in some cases.

Advanced threats have accelerated the industry's trend to reevaluate security procedures and infrastructure, which can include a wide range of safety measures, such as restrictions of physical access, intrusion detection software, more sophisticated network segmentation with firewalls and sourcing security to external providers. To be more proactive, security organizations must be able to actively visualize protocols, applications, content and users over all ports, in real time, to gain the situational awareness required to see and stop advanced threats before they get inside the network.

# Conclusion

The 10 trends presented in this paper are driving energy companies to improve the way they operate in the ever-changing energy industry. As the technology landscape moves toward more flexible infrastructure and more open systems and processes, industry CIOs are becoming service integrators who must become more involved with internal business users and external stakeholders to keep pace with technology developments. Today's IT services are a utility that, at a minimum, should make energy companies more efficient—through less time and less cost—and at the bleeding edge of innovation, make companies more market effective, with better business outcomes. Accenture believes the IT trends and innovations presented here will provide energy companies with opportunities to reduce costs, improve competitiveness and increase focus on their core business and, ultimately, achieve high performance.

## Endnotes

1 Accenture and Microsoft Upstream Oil and Gas Computing Trends Survey 2010, [www.accenture.com/us-en/Pages/insight-upstream-oil-gas-trend-survey-2010-summary.aspx](http://www.accenture.com/us-en/Pages/insight-upstream-oil-gas-trend-survey-2010-summary.aspx).

2 Ibid.

3 Accenture and Microsoft Oil and Gas Collaboration Survey 2011, [www.accenture.com/us-en/Pages/insight-microsoft-oil-gas-collaboration-survey-2011-summary.aspx](http://www.accenture.com/us-en/Pages/insight-microsoft-oil-gas-collaboration-survey-2011-summary.aspx).

4 Ibid.

5 "Gartner Forecasts Global Business Intelligence Market to Grow 9.7 Percent in 2011," February 18, 2011, Gartner press release, [www.gartner.com/it/page.jsp?id=1553215](http://www.gartner.com/it/page.jsp?id=1553215).

6 SEMAFOR—Operational Performance Monitoring System in MOL Refining, Workshop, March 2010. [www.mol.hu/hu/a\\_molrol/mediaszoba/kiadvanyok/](http://www.mol.hu/hu/a_molrol/mediaszoba/kiadvanyok/)

[szakmai\\_tudomanyos\\_kozlemenyek/muhely/semafor\\_\\_\\_ndash\\_\\_\\_operational\\_performance\\_monitoring\\_system\\_in\\_mol\\_refining](http://www.mol.hu/hu/a_molrol/mediaszoba/kiadvanyok/szakmai_tudomanyos_kozlemenyek/muhely/semafor___ndash___operational_performance_monitoring_system_in_mol_refining).

7 Six Questions Every Executive in the Energy Industry Should Ask About Cloud Computing, 2010, Accenture, [www.accenture.com/us-en/Pages/insight-six-questions-energy-executives-cloud-computing-summary.aspx](http://www.accenture.com/us-en/Pages/insight-six-questions-energy-executives-cloud-computing-summary.aspx).

8 Ibid.

9 Ibid.

10 Ibid.

11 Case Study: Talisman Energy UK: Finance and Accounting Outsourcing, [www.accenture.com/SiteCollection/Documents/PDF/Accenture\\_Talisman\\_Energy\\_UK\\_Achieves\\_High\\_Performance\\_Through\\_Outsourcing\\_Finance\\_and\\_Accountingpd.pdf](http://www.accenture.com/SiteCollection/Documents/PDF/Accenture_Talisman_Energy_UK_Achieves_High_Performance_Through_Outsourcing_Finance_and_Accountingpd.pdf).

12 "Accenture Life Safety Solution Brings Wireless Technology to Heavy Industrial Locations," March 3, 2010, Accenture press release, <http://newsroom.accenture.com/news/accenture+life+safety+solution+brings+wireless+technology+to+heavy+industrial+locations.htm>.

13 "From Digital to Integrated Oilfields," January 2011, *The Petroleum Review*, reprinted by permission of the Energy Institute, 61 New Cavendish Street, London W1G 7AR, [www.accenture.com/us-en/Pages/insight-digital-integrated-oilfields.aspx](http://www.accenture.com/us-en/Pages/insight-digital-integrated-oilfields.aspx).

14 "2010 Data Breach Report From Verizon Business, U.S. Secret Service Offers New Cybercrime Insights," July 28, 2010, Verizon press release, <http://newscenter.verizon.com/press-releases/verizon/2010/2010-data-breach-report-from.html>.

## About the authors

**Stefan Plogmann** is a senior manager in the Accenture Energy industry group. Mr. Plogmann is focused on IT strategy development and application portfolio optimization for companies in the oil and gas industry. Over the years he has been working with executives of major and smaller clients globally to define their future roadmap for information management.  
stefan.plogmann@accenture.com

**Hemme Battjes** is a business analyst in the Accenture Energy industry group. He works on application portfolio analysis and IT due diligence in the downstream energy segment.  
hemme.battjes@accenture.com

**Neale Johnson** is senior director and the production optimization lead for Accenture Plant and Automation Solutions. Mr. Johnson has 18 years of downstream energy experience including 13 years of consulting experience in refining. During this time he worked with many of the supermajors developing strategies ranging from key performance indicator development, to procurement improvement, to strategy development, and detailed control systems.  
neale.johnson@accenture.com

## Contact us

We invite you to learn more about how Accenture works with energy companies to help drive high performance. For more information, visit us at [www.accenture.com](http://www.accenture.com) or call us at +1 312 737 7909, or toll-free in the United States and Canada at +1 888 688 7909.

---

Copyright © 2011 Accenture  
All rights reserved.

Accenture, its logo, and  
High Performance Delivered  
are trademarks of Accenture.

## About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with more than 223,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US\$21.6 billion for the fiscal year ended Aug. 31, 2010. Its home page is [www.accenture.com](http://www.accenture.com).