Achieving high performance with integrated oilfield solutions

Accenture Plant and Automation Solutions

High performance. Delivered.
Upstream businesses face major challenges—can technology help?

The oil and gas industry continues to face a number of major business challenges. Cost, technology and talent are all under pressure. To help upstream businesses address these issues and ultimately achieve high performance, Accenture has developed integrated oilfield solutions, a suite of business processes and IT solutions that can help businesses maximize the efficiency and effectiveness of their upstream assets.

Integrated oilfield solutions provide a comprehensive solution framework based on leading-edge, event-driven workflows, real-time information architecture and technical solutions (see Figure 1). Accenture recognizes that for integrated operations to be truly effective and deliver genuinely collaborative capabilities, they have to be embedded deep within the organizational design.

Did you know?
Accenture has offices, a business presence or delivery centers in many energy-relevant geographies including Aberdeen, Abu Dhabi, Bangalore, Beijing, Calgary, Doha, Houston, Jakarta, Kuwait City, Lagos, London, Luanda, Moscow, Perth, Rio de Janeiro, Seoul and Stavanger.

Figure 1. Accenture’s integrated oilfield solutions for the digital oilfield, incorporating leading practices.
Why Accenture?

• Accenture’s approach draws on 10 years of experience and thought leadership in the integrated operations arena.

• Accumulated deep knowledge of operational processes and workflow drives our solutions, and our effective approach to change management helps businesses achieve lasting performance improvement.

• Our technology architecture integrates the key elements of data, applications, workflows and interfaces while assuring that people and operational considerations inform a practical, real-world approach, allowing businesses to build up solution components with a robust framework in place.

• Our solutions are based on a core foundation, taking a modular approach to real-world oilfield business scenarios.

• Integrated oilfield solutions modules are selected and prioritized according to their relative importance and value to each asset.

• Real-time data flows and appropriate analytical capabilities will increasingly differentiate performance. Accenture’s solutions are designed to reflect and accommodate the development of next-generation technology and capabilities as they come onstream.

Achieving high performance with integrated oilfield solutions

Today, upstream oil and gas companies find themselves with a number of stubborn, growing challenges. They have to find ways to access reserves that are now almost routinely more difficult and technically complex to exploit. They need to enhance their ability to manage complex new projects on a global basis, and try to increase production from their assets all over the world. Their ability to meet these challenges is hampered by rising costs, demand for more investment in a tight finance market, greater regulatory oversight and a shortage of the right talent. Streamlining upstream production and exploration assets is key to driving superior business performance.

Accenture’s integrated oilfield solutions can help upstream companies improve operational performance by providing a new approach to asset management. This approach sweeps away the traditional barriers between siloed vertical disciplines working in isolation. That fragmented structure is replaced with an integrated, holistic approach to asset management based on IT architecture and solutions that facilitate common data, standards and processes, and real-time information flows.

What are Accenture’s integrated oilfield solutions?

Accenture’s integrated oilfield solutions comprise a suite of business processes and IT solutions developed specifically for the oilfield. They are designed to reduce business operating costs and increase production through integrated decision making supported by more accurate, timely and comprehensive information. By drawing on real-time data and innovative collaboration technologies, our integrated oilfield solutions help executives improve their decision making for asset management and business performance.
Integration and collaboration
Integration and collaboration are fundamental to achieve this new approach. If the solutions are to deliver real value, consistent information and processes must be introduced and utilized across the whole enterprise.

A consistent information service provided by high-quality, easy-to-use tools and technologies (to analyze that data and information) is essential for successful operations. Information, however, is only one element required for success. Efficient workflows are at the heart of improving asset performance.

To achieve integration and collaboration, processes must flow across discipline and functional boundaries. For this reason, integrated oilfield solutions are not explicitly aimed at changing a company’s organizational structure. Rather, they specifically target the asset domains (reservoirs, wells and facilities) as the operational areas where value can most readily be found.

Our integrated oilfield solutions specifically focus on:
• Optimizing reservoir performance.
• Optimizing well performance.
• Optimizing facility performance.
• Operating the asset.
• Optimizing overall asset performance.
• Managing health, safety and environment.

Consistent architecture
Driving value from implementing integrated oilfield solutions to key assets requires introducing a consistent solution architecture into each asset. As a result, effective information workflows and processes can be quickly and efficiently replicated across all assets.

Our solutions become integral elements of an organization’s structure (rather than a discrete program) and compose a core upstream capability requiring dedicated personnel with specific training and development.

Digital oilfield technologies have reached a maturity level that demands the support of a world-class reference architecture. Use of such architecture significantly enhances an enterprise’s ability to deliver solutions efficiently to the many assets they operate.

Accenture’s integrated oilfield solutions reference architecture is a comprehensive framework in the integrated operations marketplace and is based on 10 years of experience in the field. It provides a set of tools and capabilities to help exploration and production companies quickly enter the market or upgrade their competencies to prepare for future operational excellence.

This integrated oilfield solutions platform delivers on a number of key requirements for an integrated operations reference architecture, including data reliability, platform manageability, performance, adaptability, repeatability and scalability.

Proven technology
One of the key attributes of Accenture’s integrated oilfield solutions reference architecture is its reliance on proven technologies and products requiring no customization. Specific care has been taken to implement the architecture as a loosely coupled model, enhancing the ability to tailor solutions to a specific deployment.

This approach, blended with Accenture’s knowledge of the oil and gas industry, provides solutions that support all domains and can be uniformly and quickly deployed across any upstream enterprise.

Did you know?
Through innovative thinking and cutting-edge research, the Accenture Energy industry group helps clients understand the energy industry landscape—what it looks like, what the future will look like and what they need to do to succeed. A sample of our industry research and perspective papers includes:
• “Biofuels’ Time of Transition: Achieving High Performance in a World of Increasing Fuel Diversity”
• “The Changing Role of Mergers and Acquisitions in the Energy Industry”
• “Developing Local Content Programs: Insights for Global Players to Achieve High Performance in Today’s Competitive Energy Landscape”
• “The National Oil Company: Transforming the Competitive Landscape for Global Energy”
• “Securing Your Talent Reserves: An Accenture Perspective on Building Strategic Talent Management Capabilities in the Energy Industry”
Building an architecture that is capable of monitoring assets’ performance requires a number of key elements to deliver the right functionality (see Figure 2).

**Integrated oilfield solutions service bus: the key to process integration**

An enterprise service bus, at the heart of the integrated oilfield solutions architecture, provides a flexible approach to the integration of processes. It achieves this approach by creating the ability to manage and execute processes, and offering a pluggable platform to connect services and applications. These include integrated oilfield solutions business processes which group all business scenarios such as well test optimization or rotating equipment surveillance; foundation processes which group the mechanisms to integrate foundation capabilities with external services; and platform services which extend to support additional platform services such as external data sources.

To support these processes, the integrated oilfield solutions service bus deploys components that provide canonical data services, business activity monitoring, orchestration, routing and transformation.

**Pluggable architecture: the key to flexibility**

The service bus supports a wide variety of interfaces. These interfaces include:

- Services adapters to provide the most flexible approach for integrating processes using appropriate standards where they are available.

- Application adapters that allow applications that do not offer a services layer to be plugged into the services bus.

The architecture uses canonical data for internal processes, but also offers transformation services to interact with service bus clients utilizing industry standards such as PRODML, ISO 15926, ISA95, or MIMOSA. The service bus plugs into a variety of consumers or service providers that are implemented in Microsoft .NET Windows Communication Foundation (WCF). These are exposed by the integrated oilfield solutions engine for interaction with all foundation functionalities, domain services (wells, facilities and reservoir), and data services, including model synchronization, simulator services, and asset model services.

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**Figure 2. Integrated oilfield solutions architectural areas.**
Data integration: the key to adaptability
The integrated oilfield solutions data hub hosts extract, transform and load (ETL) packages that use the services of the data resolver. In tandem with the data services capability, the data resolver is responsible for identifying where external data should be stored. The hub adapts to the specific requirements of a site by using an exchange zone, allowing data interfaces to be split into data half-flows.

The data hub also provides the standard services expected from an integration platform, such as a scheduling service, which allows highly granular control over data integration schedules.

The concept of a data hub encompasses many of the functionalities that enable the solution to work on any site, with any external data stores and with leading business intelligence tools. Thus, the data hub allows integration between data services and stores of internal data, company application data and asset data.

Asset and model management: The key to data integrity
An example of the integrated oilfield solutions data hub in action is the management of asset models. Using an external simulator to produce valuable business information requires appropriate metadata to be sent with information to adequately describe them.

For example, if the simulator expects a particular pressure value for a well, the value sent by integrated oilfield solutions for this parameter must correspond to the appropriate well, describe the pressure appropriately (e.g., bottom-hole pressure or well-head pressure) and use appropriate units of measure. This helps the asset model align with the simulator model, bringing more certainty that the system is providing reliable analyses.

Accenture's integrated oilfield solutions fulfill this key requirement with the help of the data hub, which is responsible for synchronizing the internal asset model with other asset-based data stores utilizing functions such as replication, transformation, reliable exchange, reference data model integration and master data services.

Real-time data management: the key to responsiveness and insight
The catalyst of change that has enabled the development of the digital oilfield has been the introduction of real-time data to everyday processes taking place outside the control-room environment. This change has revolutionized the ability to respond to changes quickly and to see more deeply into the physical attributes of assets, revealing previously unseen levels of insight into performance.

However, these capabilities are irrelevant if the quality of this measured real-time data is inadequate. Measured data suffers from many problems, not the least of which is poor data quality caused by faulty or erratic sensors, interference, communications problems and other factors.

For these reasons, the integrated oilfield solutions framework pays special attention to data quality and data processing and incorporates functionalities to deliver data validation and reconciliation techniques, filters, calculations, performance indicators, event detection and notification capabilities.

Information sharing: the key to collaboration
Finally, and critically, all of this information must be presented in an easily consumable way. The integrated oilfield solutions framework includes a significant focus on the presentation and information-sharing capabilities required to make all this technology effective. This technology includes the use of role-based portals, delivery of all functionality into a consistent and configurable applet model, and the integration of everyday productivity tools. It also includes business-intelligence, analytic and reporting tools, all presented in a way that enhances the collaboration between disciplines and supports collaborative processes.

Did you know?
The Accenture Energy industry group serves more than 150 oil and gas clients globally many of which are in the Oil & Gas Journal 100.

Accenture was among the top 20 highest performing tech company in the 2008 BusinessWeek's Info Tech 100 for a third straight year (2006-08).
Conclusion

Achieving high performance in the upstream is complicated by issues of growth, technical complexity and cost. Integrated oilfield solutions go to the heart of these challenges by using a specific, easy-to-implement architecture. This architecture enables Accenture to help businesses focus on driving out value from their assets, by specifically targeting the very operations that drive cash flow.

Did you know?
Accenture extends its technology and business capabilities through a powerful alliance network of more than 150 market leaders and innovators.

Contact us
For more information about how Accenture’s integrated oilfield solutions can help your business achieve high performance, please contact:

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Accenture’s integrated oilfield solutions and Microsoft
As a result of the strong partner relationship between Microsoft and Accenture, a close collaboration was undertaken to help ensure alignment between the upstream oil and gas reference architecture developed by Microsoft and Accenture’s integrated oilfield solutions for digital oilfields. Accenture’s target integrated oilfield solutions and underlying reference architecture is based on a Microsoft product set and adds detail and enrichment to the Microsoft Upstream Reference Architecture.

Accenture’s integrated oilfield solutions and Avanade
As the winner of the Microsoft 2009 Enterprise Alliance Partner of the Year, Avanade brings its deep technical knowledge and innovation capabilities required to build integrated systems capable of bringing together industrial and the enterprise systems within upstream companies. Accenture and Avanade are experienced at successfully delivering complex projects with contributions from the Accenture Delivery Centers in India. To fulfill its technological leading-edge role, Avanade brings together its deep expertise on industry-leading products from its partner, Microsoft, and an ecosystem of partners like OSIsoft, with strong integration experience on real-life projects now in production.
About Accenture Plant and Automation Solutions

Accenture Plant and Automation Solutions is a suite of offerings designed for asset-intensive companies across industries such as metals and mining, chemical, pulp and paper, oil and gas, and utilities. Our offering comprises solutions for engineering, project and data management; core plant operations; environment, health and safety; enabling services; and, industrial and automation capabilities. We combine our extensive industry experience with our innovative, vendor-neutral solutions to help you build and operate plants and assets in a reliable, safe and cost-effective manner.

About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with more than 181,000 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$21.58 billion for the fiscal year ended Aug. 31, 2009. Its home page is www.accenture.com.

About Avanade

Avanade provides business technology services that connect insight, innovation and expertise in Microsoft® technologies to help customers realize results. Avanade’s services and solutions help improve performance, productivity and sales for organizations in all industries. The company applies Microsoft expertise from its global network of consultants, drawing on the right mix of onshore, offshore and nearshore skills, which together are designed to help deliver results faster, at lower cost and with less risk. Avanade, which is majority owned by Accenture, was founded in 2000 by Accenture and Microsoft Corporation and serves customers in more than 20 countries worldwide with 9,100 professionals. Additional information can be found at www.avanade.com.

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