Shaping the future of the oil and gas industry with smarter cloud computing

Build a strong cloud foundation to support unique industry-specific needs
Introduction

If there’s one factor that doesn’t change in the always-dynamic oil and gas industry, it is that change itself is rapid and inevitable. Hit or miss exploration methods, inefficient refining and manufacturing practices, and disconnected supply chains can—and do—impact the price and availability of petroleum products. In addition, oil and gas companies must maintain a focus on environmental responsibility and employee safety. All of this means that they must be able to act quickly and with confidence, in a business landscape that continues to grow more complex by the day.

Not surprisingly, the unique challenges of this industry greatly influence oil and gas companies’ IT choices. One of the biggest issues comes from the ever-increasing security threats that cause slow growth of industry-specific solutions delivered through cloud technologies. As a result, the need to secure data is of paramount importance.

For example, real-time information from oilfields and drilling platforms must be readily accessible so that experts can collaborate, analyze and make quick decisions about production, or instruct the geographic spread of upstream and downstream petroleum operations—from oil rigs in the deep sea, to difficult terrain, to large and complex refineries in developing countries. But the transmission of critical, real-time information is difficult without investing heavily in the IT infrastructure. At the same time, information regarding oil-well exploration, development and production is highly classified and affected by government regulations. Traditionally, to create an IT environment secure enough to enable the necessary remote application access, oil and gas companies would need to make incredibly large investments—putting such a solution out of reach for some.

Changes in the demand and supply of oil and gas routinely cause fluctuating profits. This means that oil and gas companies need to go beyond traditional IT solutions to adopt more flexible production and distribution strategies—and they need to do it economically. In order to meet industry-specific challenges, oil and gas companies require highly automated, dynamic alternatives for the acquisition and delivery of IT services. They need collaboration capabilities that can work within their organizations and across partner ecosystems. They must have the ability to quickly deploy new services. They need to be able to easily scale up and down, without procuring new assets. All of these capabilities, in fact, should come with minimal capital investments. This would seem an almost insurmountable task, were it not for the growing prevalence of cloud technologies.

In the complex and demanding oil and gas industry, choosing the right technologies and functions to help improve efficiency, reduce costs and enable new capabilities can be vital to profitability and growth. A case in point is the role cloud computing technologies can play in facilitating partnerships and joint ventures between oil and gas companies. IBM delivers a comprehensive cloud-computing approach that aligns well with this industry—an approach that is resilient to changing business needs and that enables choice and flexibility, enterprise-class services, and improved insight and decision making—with minimal impact to the bottom line.

Cloud computing: A smart choice for oil and gas

Cloud computing technologies are particularly well-suited for oil and gas companies looking for a proactive approach to meeting industry challenges, including the need for better workforce collaboration within global organizations and with industry
partners, and the need to improve production operations in high-risk drilling locations. At the same time, oil and gas exploration continues to grow more expensive, while companies must meet ever-changing security, availability and compliance requirements.

In adopting the cloud computing model, individual organizations must first determine whether their IT infrastructures would be better served through private, hybrid or even public cloud capabilities. Unlike most cloud providers, who offer solutions for one or two options, IBM provides solutions for all three—so users can benefit from capabilities suited to whichever cloud model they choose.

Security is a major concern for oil and gas companies considering cloud computing, as it is for any technology user. Risks to reliability, data security and compliance are the common—and the external nature of public clouds brings additional concerns about sharing data outside the corporate firewall. These concerns can be mitigated, however, by determining the appropriate cloud computing environment or specific business and IT functions and by taking the time to identify the data and workloads that require a greater degree of resiliency, isolation and control. Clearly, private clouds reduce risk by keeping cloud services in house.

**Realizing the benefits of cloud computing**
Implementing a cloud can help oil and gas organizations reinvent how they go to market and how they innovate—while providing economical operations. A truly effective cloud environment must be compatible with heterogeneous hypervisor environments and enable users to easily expand their cloud to include other applications. It should also be scalable enough to support the size of user environments, both today and into the future. In addition, the cloud should be an open, standards-based environment in order to reduce interoperability and security issues, including increased security threats. Oil and gas companies will prefer to use cloud technologies only if the cost advantage is more than the security concerns. Finally, an effective cloud should provide an end-to-end, fully integrated, tested solution comprising hardware and software. This will enable cloud services to reach a critical number of oil and gas organizations, which is not the case today.

The most effective cloud-computing solutions take high-cost workloads and move them to low-cost environments that can be dynamically configured and provisioned on demand. And since oil and gas companies are so tightly regulated, their cloud implementations also must be able to store structured operations information and correspondence securely.

**Acquiring and delivering IT services through the cloud**
As oil and gas companies rethink how they operate in order to keep up with industry changes, they must also re-examine how they acquire and use IT resources. Industry-specific needs require that they go a step further, moving beyond virtualization in order to accelerate the delivery of higher-value products and services in the midst of a dynamic and volatile competitive landscape. Companies must have the virtualization management
capabilities in place that enable them to deliver quality services while, at the same time, helping them to control costs and manage risk.

Cloud computing provides a highly automated, dynamic alternative for the acquisition and delivery of IT services. It provides massive scalability and collaboration capabilities, enabling users to deploy new services with greater speed and without additional capital investment. Virtualization, standardization and other fundamental features of cloud computing have the potential to lower the cost of IT, simplify service management and accelerate service delivery. Cloud-computing technologies designed for IT service delivery can enable oil and gas companies to gain competitive advantages and maximize their returns on investment.

**The IBM approach to private and hybrid clouds: IBM SmartCloud Foundation**

With these needs in mind, IBM provides a multifaceted, heterogeneous approach to cloud computing that can:

- Deliver IT without boundaries—Unlock the value of IT processes that break down silos, simplify access to information, and connect people and functions across the ecosystem
- Improve speed and dexterity—Optimize and accelerate the delivery of IT computing resources and services to manage both peak and off-peak utilization
- Transform the economics of IT—Speed delivery of new offers and services to capture new business value while improving availability and reducing IT expense and complexity
- Build enduring customer relationships—Gain customer insight for use in improving and marketing products and services, and for fostering customer trust and loyalty

These capabilities and their benefits are evident in the IBM® SmartCloud™ Foundation, a family of offerings that can help oil and gas companies easily build and rapidly scale private and hybrid clouds—with unparalleled time to market, integration and management capabilities. The IBM SmartCloud Foundation enables an IT delivery model that helps organizations shift from a limited focus on the technology efficiencies of virtualization to providing the flexibility to support end-user productivity, business agility and greater IT business value.

**Leveraging a solid cloud foundation to transform IT**

Companies in the oil and gas industry are looking for effective—and preferably, simple—IT solutions to handle complex industry requirements. The IBM SmartCloud Foundation portfolio fits the bill, providing a broader, more holistic strategy for cloud computing that includes robust functionality and rich underlying Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS) technologies. It offers a full range of compute offerings along with investment protection to enable true portability between traditional and cloud computing. These features help transform IT by reducing the complexity of IT operations. This simplification then enables IT to redirect its focus to what is most important: innovation.

**Delivering an effective cloud development platform**

Cloud-delivered development resources can help bridge the gap between the value of new development applications and the cost of procuring and then deploying required IT assets. This is particularly relevant in the oil and gas industry, where change is constant and new development is key to staying ahead of competitors.

The IBM SmartCloud Foundation portfolio can address even the most rigorous development and test requirements. This holistic approach combines compute resources and tools to deliver an extremely effective cloud development platform. These offerings support an agnostic development model that integrates with common development environments, while providing software license portability and facilitating secure code sharing within organizations. These capabilities are especially valuable to globally distributed development teams, such as those
common in this industry. In addition, the IBM SmartCloud Foundation portfolio delivers the transparency necessary to effectively manage often-complex development processes within cloud environments.

**IBM SmartCloud Foundation: Capabilities and offerings**

The IBM SmartCloud Foundation was designed to be resilient to the velocity of changing business needs—which makes it an ideal fit for an industry as dynamic as oil and gas. Comprising a broad spectrum of PaaS and IaaS technologies, the IBM SmartCloud Foundation enables choice and flexibility in all types of cloud environments. The capabilities and cloud-ready solutions it offers include enterprise-class, workload-aware services and the built-in analytics necessary to provide oil and gas companies with much-needed insight and more informed decision making.

**Platform-as-a-Service technologies**

- **Lifecycle**—The IBM SmartCloud Foundation includes solutions that provide a collaborative approach to application development. One example is IBM SmartCloud Continuous Delivery, which can help oil and gas companies improve quality across their operations, development and test teams by providing low costs, speeding time to market and improving quality of service.

- **Resources**—Designed to simplify cloud application delivery by enabling shared services, these solutions include databases, data streams and message-routing capabilities.
Shaping the future of the oil and gas industry with smarter cloud computing

- **Environments**—Oil and gas organizations need solutions that can accelerate application delivery with purpose-built services. The IBM SmartCloud Foundation includes offerings such as:
  - **IBM PureApplication™ System**—Operates in a traditional private cloud environment, designed specifically for transactional web and database applications—which oil and gas organizations can leverage to strengthen their IT environments
  - **IBM Workload Deployer**—Speeds application deployments to cloud and virtualized environments

- **Management**—The IBM SmartCloud Foundation enables oil and gas organizations to save costs with solutions that help optimize the deployment and management of third-party and in-house applications—enabling them to make the most out of what they own, versus requiring “rip-and-replace” implementations.

- **Integration**—The IBM SmartCloud Foundation includes solutions to help organizations manage and integrate traditional, hybrid, private or public cloud services. An example is IBM WebSphere® Cast Iron® Cloud Integration, which connects on-premises and cloud applications to enable dynamic, interconnected processes and highly effective application infrastructures.

---

**Improved enterprise architecture governance, greater flexibility**

One of the biggest oil companies in Sweden needed to improve its architectural governance and strengthen its IT policies. The company enlisted IBM to conduct IT risk analyses to pinpoint issues with their IT delivery quality, costs and flexibility. IBM also developed a meta-model for the company’s first enterprise architecture framework, focusing on business, information, application, technology and realization domains. With the help of IBM, the company gained a custom-made enterprise architecture governance solution that operates with greater flexibility, efficiency and reliability by leveraging IBM cloud computing capabilities.

---

**Infrastructure-as-a-Service technologies**

- **Security**—The IBM SmartCloud Foundation addresses security issues with offerings that protect cloud services and data against threats and that help oil and gas organizations maintain compliance with the multiple mandates they face. IBM Security Virtual Server Protection for VMware, for example, offers threat protection for every layer of the virtual infrastructure, helping to secure data from Internet attacks.

- **Infrastructure**—The IBM SmartCloud Foundation can help improve the utilization, cost and performance of an organization’s server, storage and networking assets. Capabilities include unified server, storage and network management; virtual machine mobility and management; energy consumption monitoring and management; and workload-optimized platforms—all important and ongoing issues within the oil and gas industry. The IBM SmartCloud Virtual Storage Center, for example, acts as a hypervisor to help IT storage managers migrate to agile, cloud-based storage environments.

- **Management**—The IBM SmartCloud Foundation offers solutions with command centers that enable flexible, automated cloud service delivery. Oil and gas companies can benefit from offerings such as:
  - **IBM SmartCloud Provisioning**—Combines infrastructure and platform capabilities to deliver elastic workload management, image lifecycle management and resilient, high-scale provisioning on heterogeneous hypervisor and hardware platforms
  - **IBM SmartCloud Control Desk**—Improves time to value by unifying the automation of service and asset process management across the entire scope of the enterprise
  - **IBM SmartCloud Workload Automation**—Reduces cost of ownership by automating and synchronizing tasks that support business service delivery and provides a dynamic environment for running unattended workloads and applications in the cloud
- **Availability**—These offerings help users see and understand the quality-of-service metrics so they can work toward continuously improving them. Specific solutions include:
  - IBM SmartCloud Monitoring—Improves service availability and performance in virtualized environments
  - IBM Tivoli® Storage Manager for Virtual Environments—Provides backup and recovery support for virtual environments, which is especially important in the highly regulated oil and gas industry
  - IBM SmartCloud Application Performance Management—Manages and optimizes the performance of critical applications across dynamic cloud and shared infrastructures
- **Usage**—These solutions are designed to help users understand cloud services and resource usage and manage these against financial metrics. For example, IBM SmartCloud Cost Management helps organizations better manage service delivery in order to drive down costs. It also helps deliver cost transparency so that users can track, manage and allocate IT resource usage accurately.

**Conclusion**

With its unmatched depth and breadth of capabilities across cloud delivery models, IBM can provide the right solutions for oil and gas organizations—no matter which stage of cloud adoption they are in—to help move them beyond virtualization to higher-value stages of cloud computing. IBM helps oil and gas organizations around the world increase the adoption of cloud computing and leverage the cost savings of virtualization, which is crucial due to ever-increasing upstream and downstream petroleum costs.

The IBM SmartCloud Foundation delivers higher levels of efficiency, cost effectiveness, security and control across complex cloud implementations. These offerings can improve the speed and efficiency with which oil and gas organizations deliver services tailored to meet customer needs and enhance visibility and collaboration across their ecosystems. IBM SmartCloud solutions help organizations improve their productivity; speed their innovation and delivery capabilities; and lower their capital costs. And these solutions can dramatically enhance the value cloud provides to the business—and to the customer—by driving new levels of innovation.

Using cloud computing to deploy IT will continue to be a key to success in years to come. In particular, it can help oil and gas companies address the very real challenges they face today, along with the trends that will shape their future.

**For more information**

To learn more about the IBM SmartCloud Foundation, contact your IBM representative or IBM Business Partner, or visit: [ibm.com/software/products/us/en/smarworkauto/](http://ibm.com/software/products/us/en/smarworkauto/)
Additionally, IBM Global Financing can help you acquire the software capabilities that your business needs in the most cost-effective and strategic way possible. We’ll partner with credit-qualified clients to customize a financing solution to suit your business and development goals, enable effective cash management, and improve your total cost of ownership. Fund your critical IT investment and propel your business forward with IBM Global Financing. For more information, visit: ibm.com/financing