Create Operational Flexibility with Cost-Effective Cloud Computing

IBM

Executive summary

Even for an industry that manages difficult environments well, the pace of change in global energy is creating some substantive challenges for chemicals and petroleum companies. These organizations seek ways to act quickly and with confidence in a business landscape that continues to grow more complex by the day. IBM® believes that cloud computing technologies are particularly well-suited for organizations that seek to build a proactive approach to meeting the challenges of this dynamic new age.

This paper provides a view of cloud computing for the chemicals and petroleum industry and describes the technologies and functions that can help them improve efficiency, reduce costs and enable new capabilities. Guidance is provided to help you determine which applications, services and technologies should be considered for development and deployment "in the cloud" to meet the goals of your extended enterprise.

At play: New locations, new demands

The chemicals and petroleum industry is facing a period of dramatic change. The Energy Information Administration projects total world consumption of energy to increase by 49 percent by 2035. Hit-or-miss exploration methods, inefficient refining and manufacturing practices and disconnected supply chains can (and do) impact the price and availability of chemical and petroleum products. Furthermore, against the backdrop of supply and demand pressures, the focus on environmental responsibility and employee safety continues to grow.

Meeting the challenge: Improving production operations

A smarter approach to managing operations can help chemical and petroleum companies address these complex challenges. By integrating data from instrumented operations with data from external sources, companies can gain real-time visibility into all of their systems. This increased visibility can be used to find and exploit previously inaccessible oil and gas reserves, improve asset utilization, improve manufacturing and refining efficiency and reduce costs and risks.

Meeting the challenge: Managing cost effectively

Chemicals and petroleum companies are among the most asset-intensive in the world, so getting the most from every asset is critical for success. But many of today's companies have grown over time through acquisition, which has resulted in disconnected operations, disparate types of assets and isolated systems—all of which create serious inefficiencies that affect production and increase costs. A smarter approach to asset acquisition and utilization, along with optimized operations and data storage, can help companies in this industry reign in spiraling costs.

Meeting the challenge: Improving workforce collaboration

As the complexity and scope of corporate operations spreads, the transmission of information creates new challenges. It becomes extremely difficult to make the most accurate and informed business decisions when confronted with a multiplicity of systems, a labyrinth of non-standard procedures and an inability to interact collaboratively on important issues such as computation, evaluation and analysis. Making the most of new forms of collaboration, such as social networking, without adding additional systems and applications that need to be managed, can help chemical and petroleum companies improve workforce collaboration.

Meeting the challenge: Managing information technology

Reduced complexity and integrated operations can be accomplished using information technology. However, the management of information technology (IT) investments represents a challenge in its own right, particularly in regard to managing ongoing operational costs. These areas have been a target for cost reduction and efficiency improvement for some time.

IBM strongly believes that using cloud computing to deploy IT will be a key to success over the next decade. In particular, it can help the chemicals and petroleum industry address the very real challenges it faces today, along with the trends that will shape its future.

Cloud computing is particularly well-suited for companies that want to build a proactive approach to meeting the challenges of this dynamic new age.

Cloud computing: A smarter way to work

Technology is transforming chemicals and petroleum companies. The business processes involved in the exploration, development and production of oil fields along with the manufacturing and selling of the products are being digitized and infused with speed, capacity and intelligence. Chemicals and petroleum companies are having to rethink how they operate to keep up, and this includes how they acquire and use IT.

Cloud computing is one answer, providing a highly automated, dynamic alternative for the acquisition and delivery of IT services. Companies are making the most of the massive scalability and collaboration capabilities that cloud computing provides and deploying new services with greater speed and without additional capital investment. And as IT budgets continue to shrink, cloud computing can enable business leaders to do more with less. Virtualization, standardization and other fundamental features of cloud computing have the potential to lower the cost of IT, simplifying service management and accelerating service delivery.

Cloud computing architecture enables flexibility, using a highly virtualized, automated and service-oriented design. Companies gain rapid, on-demand access to vast computing power, storage and applications. In the process, they are able to develop and deploy new applications quickly.

When your need is to integrate your operations, a cloud computing delivery model offers many benefits. Enable instant access to key data concerning oilfield assets, measurements and documents—and do so in a consistent and intuitive format.

Basically, cloud computing helps companies work more efficiently and more profitably. Technology is more affordable and easier to use. Users can request hardware, software and applications from an online catalog. Self-managing, autonomic systems make it possible for capacity, provisioning and other IT service management decisions to be made dynamically, without human intervention or increased administrative costs.

Companies can scale computing resources up or down to fulfill changing needs without service interruption. Cloud computing also offers resilient and secure applications, with an underlying infrastructure capable of meeting expected levels of availability, reliability and integrity. A standardized environment facilitates simultaneous service deployment and upgrades for all users, no matter where they are.

Getting started with cloud computing

Using cloud computing technologies for IT service delivery provides chemicals and petroleum companies with the opportunity to gain competitive advantage and maximize return on investment. The best cloud computing solution is one that will take high-cost workloads and move them to low-cost environments that can be dynamically configured and provisioned on demand.

IBM cloud offerings are effective tools for bringing about efficiency in the chemicals and petroleum industry. These can bring the power of real-time collaboration to mission-critical tasks and provide access to scalable high-power computing required in the upstream, downstream and chemicals business. At the same time, these solutions help reduce infrastructure costs and investments.

IBM cloud solutions

IBM cloud offerings for the chemicals and petroleum industry include:

- IBM Smart Business Storage Cloud
- IBM Smart Business Development and Test on the IBM Cloud
- IBM Smart Business Desktop Cloud
- IBM Smart Business Compute Cloud
- IBM LotusLive™
- IBM CloudBurst™
- IBM Cloud Consulting Services

Large-scale storage in the cloud: IBM Smart Business Storage Cloud

Raw storage growth is being driven by the widespread use of email, the need for instant file access for business reasons and the need to capture more detailed business data structures to meet regulatory requirements. Moreover, demands for redundancy and high availability can easily triple the size of an enterprise data storage set. Chemicals and petroleum companies operate in a very regulated environment, and it is imperative that they store structured operations information and correspondence economically.

For example, they must maintain records of reserves, basis of estimation, engineering data, equipment, site, seismic data (for evaluation of the best rig exploration) and development plans. As a result, they struggle with ever-increasing storage requirements and the need for technological advancements in storage solutions. Supporting efficient and cost-effective access to data becomes more difficult, with users experiencing outages and reduced performance.

Successfully meeting these challenges can involve significant investments in upgrades to storage infrastructure and the dedication of resources to managing data centers. However, there is an alternative. *IBM Smart Business Storage Cloud* can help chemicals and petroleum companies successfully deploy a high-performance, scalable storage virtualization solution to facilitate growth and innovation at lower operational costs. By taking advantage of data storage in the cloud, chemicals and petroleum companies can handle growing data volumes and complex file formats.

IBM Smart Business Storage Cloud is a storage virtualization solution in the cloud that supports storage optimization efforts. It enables rapid implementation of a scalable, global file storage system with flexible deployment and management options. A unified management platform helps reduce outages and storage management labor demands and costs while advanced data replication provides cost-effective business continuity and disaster recovery.

Improve time-to-market on high-technology applications: IBM Smart Business Development and Test on the IBM Cloud

Chemicals and petroleum companies are under pressure to innovate constantly, employing IT solutions to integrate information. Business needs are changing, and the Internet is the primary driver of this change. Today's business revolves around creating systems and processes that have a focus on the web interface between suppliers, customers and other functions.

Applications developed some time ago must be upgraded to reflect the changing business environment. The costly brick-and-mortar model is giving way to the highly efficient Internet model that enables customers to access product information with a click of the mouse to complete their transactions and place their orders. Amid this transformation, developers are being pressed to update applications with the latest business rules and to incorporate new programming language and software—all as rapidly as possible.

Relying on traditional development and testing environments to meet these demands poses several challenges, including:

- High labor and capital cost.
- Long development cycles
- Greater risk for configuration errors

Developers are now finding ways to meet these challenges using cloud computing.

IBM Smart Business Development and Test on the IBM Cloud provides developers with rapid access to a security-rich, cloud-based, enterprise-class development and test environment. The standardized development and test environment on the IBM Cloud can help chemical and petroleum companies realize faster application deployment with reduced capital and operational costs. There is virtually no infrastructure to maintain, and companies benefit from pay-as-you-go pricing for development and testing resources. In addition, companies can set up more accurate test environments in minutes, as opposed to the weeks required when standardized configurations are used.

Desktop virtualization: IBM Smart Business Desktop Cloud

The chemicals and petroleum industry is very dynamic; changes in demand and supply of the products expose companies in the industry to fluctuating profits and force them to adopt a flexible production and distribution strategy. This means that real-time information from oilfields and drilling platforms must be accessible so that experts can collaborate, analyze and make decisions about production and instruction The geographic spread of chemicals and petroleum operations—from oil rigs in the deep sea and difficult terrain to large and complex refineries in developing countries—makes transmission of information difficult unless organizations invest heavily in building the IT infrastructure.

At the same time, information relating to the exploration, development and production from the oil wells is highly classified and regulated, so the creation of a secure IT environment for accessing the relevant applications remotely would require a huge investment and enormous resources. At times it might not even be feasible.

For chemicals and petroleum organizations that need to provide simplified, secure access to information and reduce costs, *IBM Smart Business Desktop Cloud* helps provide "anytime, anywhere" access to applications, information and resources. A desktop virtualization solution, IBM Smart Business Desktop Cloud centralizes a distributed client environment, helps safeguard data and applications and helps increase business flexibility. It can also help reduce the cost of desktop hardware and management while integrating hardware, software and services.

Engineering and scientific computing – IBM Smart Business Compute Cloud

Billions of dollars are spent in the exploration and development of oilfields, and the decision to make such investments is based on complex engineering and financial simulation results. Information about seismic, geological, engineering and technological parameters is needed when companies are studying the potential of the oilfield, the recoverability of the oil reserve and the cost involved in developing the asset. The information about all the variables is then processed by a high-performance computing server that uses complex algorithms, and the multidimensional data is analyzed and shared with the experts who run the simulations and predict the outcomes. High performance computing resources are very expensive to manage and difficult to operate at high utilization rates.

With cloud computing, you can use information to create a proactive and action-oriented environment. Act as events occur, with alerts and events triggered or activated by KPIs.

IBM Smart Business Compute Cloud can help chemicals and petroleum companies handle their fluctuating computing needs. IBM Smart Business Compute Cloud members tap into a security-rich supercomputing environment that can be used as if it were in-house hardware, but without the capital commitment. If computing demands exceed in-house capacity, the company can shift the excess workload to IBM Smart Business Compute Cloud and use the processors there to meet that demand. With IBM Smart Business Compute Cloud, companies can get the extra power they need while paying for only the capacity that they use.

Prepackaged private cloud solution: IBM CloudBurst

Security is a major concern for chemicals and petroleum companies considering cloud computing, as it is for any technology. Reliability, data security and compliance are the most frequently discussed risks. The external nature of public clouds brings additional concerns about sharing data outside the corporate firewall. These concerns can be mitigated by determining the appropriate cloud computing environment or specific business and IT functions and by taking the time 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.

IBM Cloudburst is a prepackaged, self-contained cloud service delivery platform that chemicals and petroleum companies can easily and quickly implement in a data center. With IBM Cloudburst, organizations can pilot and prove a cloud computing model or extend cloud offerings into production at a faster speed. CloudBurst provides high level of flexibility with faster time to result. Installation time can be as little as 5 days, depending on the scenario. In addition, CloudBurst can be expanded to include heterogeneous infrastructure and custom components.

Change is possible. The tools exist today

Work with IBM to take advantage of today's cloud technology to build tomorrow's solutions and begin to reap these benefits:

- *Visualization of contextual oilfield information*. View the entire oilfield in an intuitive graphical interface that presents data from every sensor and machine in clickable, hierarchical levels of detail — ready for analysis and decision making.
- *Strong visualization and manufacturing intelligence features*. Monitor operations data, including the process efficiency and product quality. Track the variations and automate the corrective actions.
- *Improved decision making using sophisticated measurement and predictive analysis*. Perform more detailed and more sophisticated analysis of oilfield production, viewing all KPIs and measurements in the proper business context, for both real-time decision making and operational planning.
- *Intelligent alerts and event management*. Work with intelligent, predictive, sophisticated alerts that drive information and action to both human and system participants.
- *Optimized automation and integration*. Provide an open enterprise data and process integration framework for existing and new manufacturing applications.
- *Enterprise connectivity with ERP and other systems*. Share critical operational information with other enterprise applications, such as procurement and ERP, so other business users can better plan, forecast and respond to business imperatives.
- *Integration and inclusion*. Add value in new ways with extra-enterprise businesses and market-facing business units.

Why IBM: Cloud consulting services serve as a stepping stone

IBM cloud consulting services serve as a stepping stone to our portfolio of cloud computing services and products. IBM cloud consulting services can help chemicals and petroleum companies develop a business-based cloud strategy that integrates cloud computing into their business. Some of the questions our cloud consulting services can help chemicals and petroleum companies answer include:

- Where in my enterprise does it make sense to use cloud computing?
- What kinds of tasks and processes are suited to cloud?
- How much will it cost, and when is the right time to implement cloud?

Powered by best practices, methodologies and tools from all over IBM, including IBM Research, and by experience from hundreds of client engagements, these consulting services can help you begin or accelerate your adoption of cloud computing, while minimizing your risk and investment. Our expert advisory services span the business — from applications to infrastructure — covering network, data center and security to help you overcome any challenges in employing cloud computing for improved results.

Some of our cloud consulting services focus on the business impact of cloud—how, when and where you should adopt cloud to enter new markets and deliver new service, and how best to integrate cloud computing services into your overall business and technology strategy. We can also evaluate your test environment, estimate return on investment and help you build a business case for moving testing to a virtualized environment. We also offer services focused on development and implementation of cloud-delivered applications.

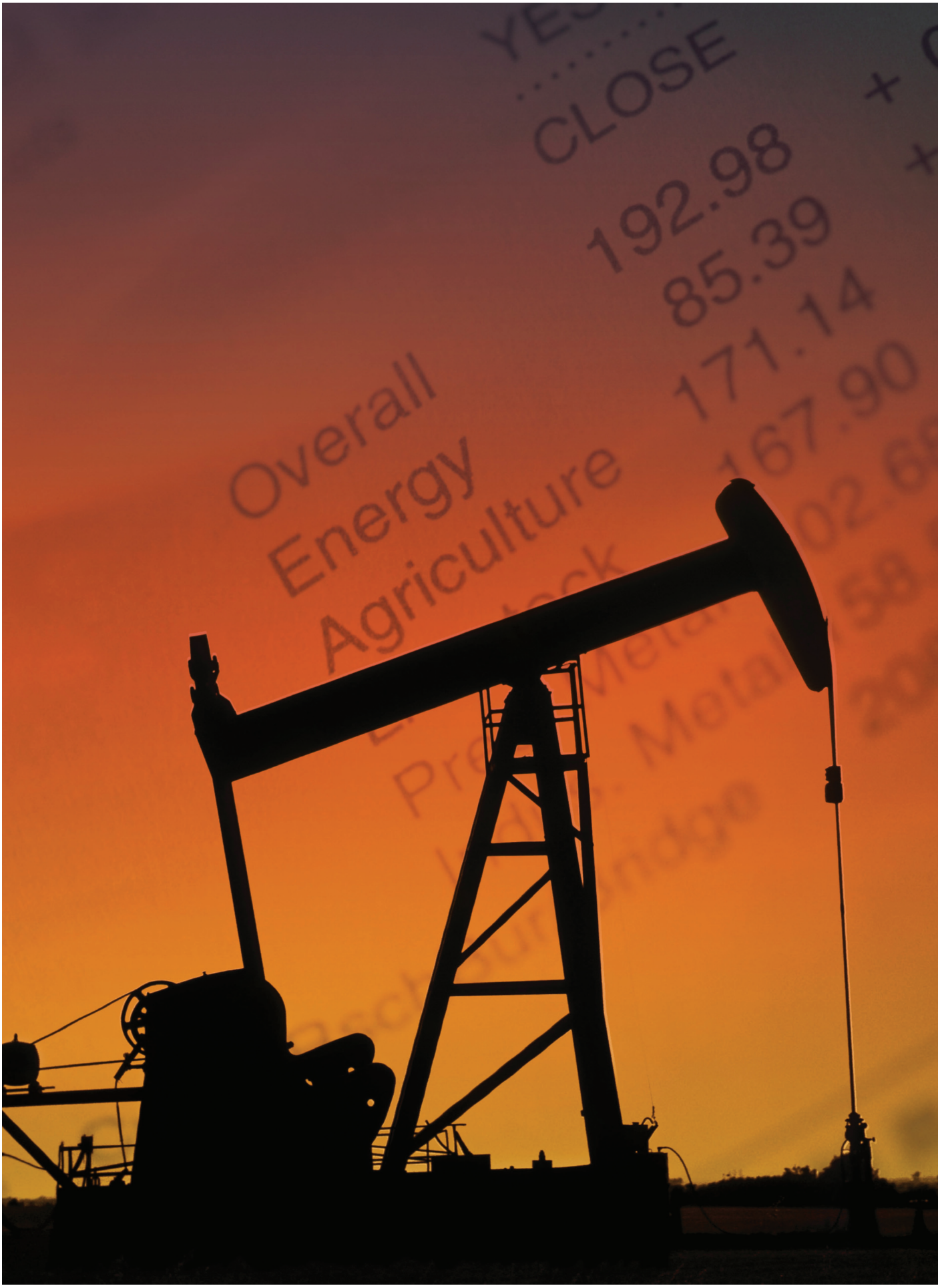
A new vision for operational leadership transforms how site supervisors use information to draw improved efficiency and increased production from oilfield assets.

If you've decided to transform your IT and computing delivery to provide services from the cloud (or to use cloud computing to augment your IT delivery), our cloud consulting services can help you assess your readiness and create a cloud implementation road map to maximize your return on investment. IBM has easy-to-use tools that analyze your existing infrastructure, workloads and costs in detail. The information we glean helps us develop a road map that provides a prioritized list of cloud migration activities to help you achieve rapid and high return while minimizing risk to your operations and to your organization.

Even if you are already using cloud computing, IBM provides IT transformation, optimization and resiliency consulting to ensure that you are maximizing utilization of your computing environment and providing the best possible user experience.

Develop your strategy to make the most of cloud computing. Your IBM cloud computing road map speeds time-to-value and lets you take action in the smartest way possible.

For more information about IBM and our chemicals and petroleum industry solutions, please visit us at:
ibm.com/chemicalspetroleum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Produced in the United States of America
January 2011

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GIW03004-USEN-00