

The sky's the limit for digital oil fields in the cloud

Cloud computing is a relatively new concept for the oil and gas industry, but its role is growing because it is ideal for E&P information delivery, decision-support, and collaboration

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In the early days of corporate computer networking, the Internet was depicted on many network diagrams with a cloud-shaped icon. Everything on a company's network was connected to this cloud. Given certain assumptions and conventions about how information would be handled in the cloud, it was generally understood that "things would just work," that data transmitted into the cloud would arrive at its destination.

The cloud today

Cloud-shaped icons are still used to depict the Internet on corporate network diagrams, however, the role and capabilities of that cloud have evolved. The evolution of the Internet enables information technology traditionally relegated to on-premises data centers to move online. Applications, data storage, and raw computing power are commodities of the cloud.

The location where data or apps are stored is becoming less important than how they are used. Cloud computing expands that idea by enabling companies to view IT as a utility to be drawn on as needed without cost of ownership. It just works — like turning on a light bulb.

The pervasiveness of on-premises data centers, IT infrastructure, legacy systems, and applications across the industry is saddling E&P companies with high total cost of ownership, mounting overhead, and diminishing returns. At the same

time, the disposition of information technology and data management burdens petroleum companies with both physical and digital information sprawl. E&P knowledge workers must wade through a flood of disjointed and poorly organized data, impairing their ability to make timely decisions.

The new cloud computing service model is liberating petroleum companies from the vast IT footprint while empowering them to evolve the next generation of applications and decision-support tools that are business focused instead of IT-centric.

Cloud computing in upstream

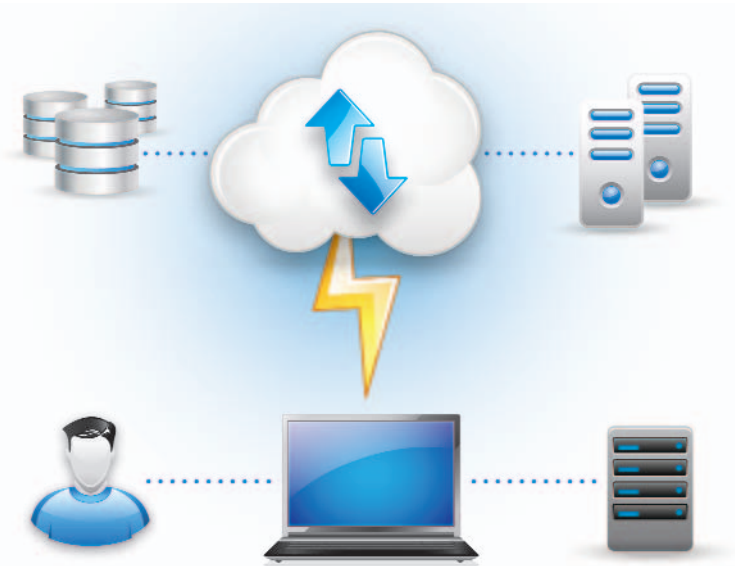
If IT and cloud-based services are considered as utilities similar to those provided by an electricity company, then Microsoft, Salesforce, Amazon, and IBM are the IT utility providers. All have committed substantially to cloud computing with development of their own platforms. For example, the Windows Azure Services platform consists of mul-

Cloud computing delivers on-demand data storage and computational power to a corporate network over the Internet. (Images courtesy of The Information Store)

iple worldwide data centers employing Microsoft's cloud operating system, which dynamically provisions resources to subscribers.

Given certain conventions about application software, data storage, and compute power, subscribers no longer manage the hardware, server software, or bandwidth as they did with traditional application hosting or co-located servers. If more bandwidth is required, it is allocated; if more disk space or CPU cycles are needed to meet demand, they are immediately provisioned. Conversely, if resources are not being used, they are re-allocated. The upshot for all subscribers is reliable performance and availability without having to manage servers or pay for excess capacity.

As with most innovations, cloud computing evolved from foundational tech-



nologies, including data centers, application hosting, broadband networks, load-balancing, and server virtualization. It might be argued that cloud computing has existed as long as such technologies have been combined to form “private” clouds built and maintained by individual companies. Yet the emergence of service-oriented or “public” clouds has clearly defined the potential of cloud computing through a paradigm-shifting economic model.

Cloud is especially relevant to the upstream industry where there is a legacy of gradual information technology accretion. E&P companies have accumulated a war chest of IT assets with an ever increasing total cost of ownership. Add into the mix the evolution of G&G applications and engineering software as well as the arrival of the Information Age, the Internet, and the telecommunications revolution, and most upstream petroleum organizations begin to look and feel more like IT service providers.

Upstream companies are not in the IT business. Finding, producing, and maximizing reserves should drive operations and budgets. Yet the decades of information technology buildup — legacy systems, applications, and data — often shape the business instead of the other way around. As IT investments increase and overhead mounts, dividends fall flat as knowledge workers spend more time adapting to new technology and finding and managing information.

Cloud assists upstream companies by providing a pay-as-you go service model that helps drive down management and ownership costs for data storage, applications, and information sharing without sacrificing security or availability. Cloud computing is ideal for delivering the benefits of the digital oilfield more cost-effectively while bringing the value of improved efficiency and productivity to a larger number of upstream businesses.

Data management opportunity

With cloud computing, risks associated with managing IT are shifted to the

cloud. Service providers assume responsibility for maintaining infrastructure, system updates, data backups, and 24/7 operations. The economy of scale and elasticity offered by cloud are compelling.

Some may not be willing to entrust sensitive E&P data to the cloud until convinced that it is safe. Given the global nature of today’s industry, however, the IT footprint of many companies already extends to offsite data centers for regional availability and disaster recovery. Workers manage data via virtual private networks (VPN) and secure extranets, all of which happens over the Internet. Companies that have outsourced e-mail services are likely already using cloud computing.



The cloud computing service delivery model connects data, software, and devices irrespective of location.

Cloud offers many security options and often can be seamlessly integrated with a company’s existing network without exposing data any more than a VPN would.

Adopting cloud computing may be more rapid for smaller producers that typically have fewer legacy systems to consider. Cloud empowers independents with affordable technology formerly out of reach, enabling them to embark on digital oilfield initiatives.

E&P software evolution

Through its service delivery model,

cloud computing enables subscribers to access data and run applications from nearly anywhere. Data stored in the cloud can be seamlessly used by G&G or engineering staff within a company. Conversely, cloud enables petroleum companies to leverage existing data from where it is stored and managed by securely accessing it from cloud-based applications and mobile devices.

The ubiquity of broadband technology, the need to manage IT costs, and the demand from business stakeholders for rapidly deployable decision-support tools that meet specific E&P requirements are fueling a software revolution. An increasingly significant percentage of all software will be delivered as a service in the next few years with cloud computing as the service delivery platform.

Software as a Service (SaaS) is a subscription Web-based application that provides functionality similar to desktop or server software without the expense of managing hardware or paying license fees.

SaaS may not replace reservoir simulation or seismic processing workstations in the near future; however, there is vast potential for evolving the digital oil field through low-cost high performance computing. Over the next few years, it will become increasingly difficult to distinguish between Web-based applications, desktop, and server-based software as SaaS offerings continue to blur the lines.

The emergence of digital oilfield SaaS helps the upstream industry drive down IT costs. At the same time, the cloud’s economy of scale, elastic computing, and scalable data storage are enabling large organizations to reduce IT complexity and focus information technology on the business of finding and producing hydrocarbons. Most importantly, cloud and SaaS bring the benefits of digital oilfield technology — increased asset performance, reduced cycle time, improved safety, and enhanced business intelligence — to supermajors and independents alike, leveling the playing field and contributing to greater business efficiency and optimization of energy production across the board. **E&P**