JOURNEY TO THE PRIVATE CLOUD IN THE OIL AND GAS INDUSTRY

A three-phased approach to moving IT from a support function to a strategic business enabler

EMC PERSPECTIVE

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Whether it's upstream drilling decisions, refinery product decisions, or inventory optimization in retail, ready access to data translates into company profits. For that reason, IT investments have moved to the forefront of management thinking in the oil and gas industry.

Tight alignment between IT and the business units can provide a significant competitive advantage for a company operating in the global marketplace. Investments in applications to manage business, legal, and financial risks make a difference. To optimize profitability and keep projects on track, deployment of new functionality or provisioning of new capacity must be accomplished efficiently. In addition, massive amounts of data must be kept online or near-line so that information is available when needed. As business complexity increases, streamlined IT operations and optimized data management become even more important.

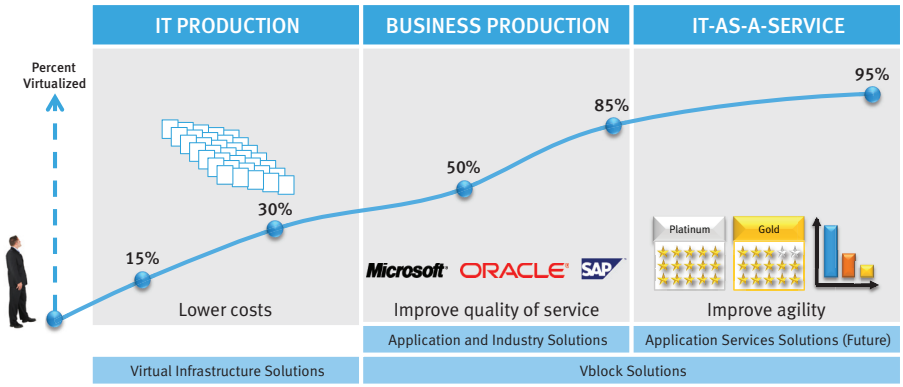
That is where virtualization and cloud computing come in to play. Cloud computing enables a more dynamic flow of information. Virtualization technology breaks the tie between the application and the physical infrastructure, enabling IT to leverage pooled resources—compute, network, and storage—to accommodate performance and availability requirements.

Cloud computing encompasses two main models:

- Public cloud services refer to computing services provided by an entity to augment the internal capabilities of multiple external customers. This model enables IT to take advantage of economies of scale offered by public cloud providers. However, it may not provide the level of control and security that the business requires.
- Private cloud is a virtual IT infrastructure that is securely controlled and operated by the organization. Private cloud computing offers the controls and security of today's data center with the agility required for business innovation. In addition, private cloud can span data centers and organizational boundaries.

Private cloud computing enables IT to focus less on the physical assets it is managing and more on the services it is providing to the business. Advanced automation, provisioning, and virtualization technologies enable users, via any device, to access the information and applications they need, while ensuring that information governance is not compromised. Regardless of where the resources are located, IT continues to control the information, ensuring governance, compliance, and security. At the same time, private cloud computing transforms IT, changing the IT cost model, streamlining workflows, automating processes, and consolidating assets to deliver more value at lower operating cost.

EMC recommends a well-planned, three-phased journey to the private cloud.



Phases in the journey to the private cloud

The first phase focuses on efficiency, and primarily yields substantial cost savings for IT. The key activities of this phase are rationalization and consolidation. The applications portfolio is rationalized to simplify IT management, enabling the business to deploy additional capacity easily and quickly. Lower tier applications are virtualized and consolidated onto fewer servers to improve resource utilization and reduce cost and complexity. As the organization gains experience with the virtualization platform, test/development environments can be virtualized to accelerate test/development cycles.

The second phase, which involves the virtualization of mission-critical applications, improves the quality of services that IT can deliver to the business. In this phase, the organization can leverage new technology to improve application performance, security, dynamic scaling, and disaster recovery. The application owners benefit from rapid implementation of new functionality as well as from higher SLAs.

The final phase transforms the IT organization into a strategic business asset as it improves agility and promotes new business initiatives. Self-service portals enable departments to provision their own resources, supported by chargeback mechanisms based on SLAs. Policy-based automation frees IT staff for higher value tasks.

A phased approach to cloud deployment enables IT to use cost savings from early phases to help fund needed strategic IT investments in later phases.

PHASE 1: STANDARDIZING AND CONSOLIDATING

In many cases, IT resources in one area are underutilized, while those in another area are stretched to capacity. Virtualization helps solve this problem by dynamically allocating pooled resources when they are needed by an application. Virtualization, combined with consolidation of server, network, and storage resources, improves utilization and frees up resources for higher value initiatives.

Africa-based Engen Petroleum Ltd. achieved 3:1 server consolidation, reduced new server deployment time by 95 percent, and reduced maintenance costs by 50 percent with a VMware® virtual infrastructure.

www.vmware.com/pdf/engen.pdf

Standardization itself adds value in this phase. Standardizing applications onto a single platform provides the flexibility needed to deploy additional capacity quickly where it is needed. When on-boarding a drilling operation on the other side of the world, this standardization can really pay off. Both business risk and operating costs can benefit.

Cloud computing opens a new conversation between IT and the business units it serves. An important part of that conversation is the validation of requirements in a service catalog. This catalog can serve as a contract between IT and its customers—a contract which evolves as requirements change.

The service catalog should include explicit conditions for information security and compliance to meet business requirements. In this way, IT can develop an architecture that is appropriate for sharing and protecting information in the private cloud model of the future. In the catalog, performance and availability requirements are explicit and the costs associated with providing various tiers of service can be made clear. This sets the stage for chargeback schemes should the company choose to adopt them in later phases.

This stage also presents an opportunity for standardizing policies across IT operations if this has not been done in the past. The increasing scale and complexity of environments, coupled with the high rate of change, make manual approaches to operations less and less viable over time. Process rationalization during Phase 1 ensures consistent adherence to best practices, and sets the stage for automation which further improves efficiency.

When beginning the journey, it is important to look ahead to the needs of the mission-critical applications that will become the focus of Phase 2. Virtualization offers many benefits. However, before jumping in with both feet, it's important to understand that virtualization carries with it implications for how IT organizations conceptualize, design, architect, deploy, and manage the infrastructure.

Virtualization solutions will offer varying degrees of performance and reliability, along with a range of management tools and disaster recovery options. Because many virtual machines will run on a single server, deficiencies may appear to be compounded in a virtualized environment. That's why it's so important to plan ahead. Unless longer term business needs are matched with the functionality and scale offered by various vendors, costly migration from one platform to another may be required.

To begin, the IT architect must look at the entire environment: the servers, network, storage, and virtualization platform. The components must be balanced so that improved utilization in one area does not introduce a bottleneck in another.

PHASE 2: ARCHITECTING FOR MISSION-CRITICAL APPLICATIONS IN THE CLOUD

Phase one sets the stage and enables IT to develop skills in managing a virtualized environment. The work begins to pay off as mission-critical applications are moved to a new infrastructure. While consolidation ratios may not be as high as those achieved with Tier 2 applications, significant consolidation is possible, and business benefits are obvious.

One company achieved a better than 3:1 server consolidation ratio after virtualizing its SAP environment, and can now provision a new test/development instance in just 30 minutes.

www.emc.com/collateral/emc-perspective/h6738-callaway-golf-ep.pdf

Virtualization touches every domain—server, network, storage, and application—and can complicate root-cause analysis, service availability, and performance troubleshooting. These typically labor-intensive processes must be automated to achieve efficiencies in a virtualized setting. Phase 2 presents an opportunity to automate operational processes as well as a chance to revisit backup methods, implement advanced security technologies, and improve application performance.

In tests of the EMC DD460 Restorer for Capacity Optimized Storage, Swiss energy company Axpo saw data compression ratios of 44:1 when backing up its SAP database.

www.emc.com/collateral/customer-profiles/datadomain-axpo-cp.pdf

With the ability to move applications as easily as files across a network, virtualization technologies offer improved availability and ensure disaster recovery. Additional capacity can be provisioned quickly and easily as business units grow. In many cases, secondary virtualized data centers help balance workloads and serve as failover sites for primary centers.

Of course, every organization must develop a roadmap for virtualizing applications, as it may be better to leave some applications in a physical environment. Phase 2 provides an opportunity to improve quality of service in the physical environment as well.

For example, disaster recovery and operational backup are critical. Enterprise IT shops know this and have well-proven architectures already in place to address these needs. However,

backup and recovery systems have not kept pace with the overall transformation which has been occurring in IT over the past few years. In many ways, cloud computing provides the opportunity to evolve the architecture to encompass newer capabilities which better serve the business. Both data deduplication and data compression can improve backup processes and reduce the overall demand for storage. In a data-intensive business like oil and gas, this can have far-reaching implications.

EMC® Upstream Application Accelerator provides a significant boost in performance for applications such as Landmark's SeisWorks 3D and Schlumberger's Petrel.

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Matching data with the right storage option can make a big difference in seismic application environments. Given the volume of data amassed over time, it is not pragmatic to maintain all of it on primary storage. Yet valuable geoscientist time is lost when archived data has to be loaded from tape. New archive solutions are available to address this challenge for even the most data-intensive area of a business. These solutions keep data available online and reclaim primary storage for the data in current use.

New storage technologies can automatically move data to the storage tier which best meets the performance demands of users. Automated storage tiering means data that is infrequently accessed can move to lower cost storage while the highest performing disks handle the data currently in use. This improves application performance and lowers overall storage costs, while reducing the burden on IT staff.

Other new storage technologies also improve application performance. Pre-fetch algorithms can improve throughput of data-intensive applications and reduce response times for users.

All of these technologies are worth a second look as the IT organization is continually pressured to deliver more value to the business.

PHASE 3: OFFERING OIL AND GAS IT-AS-A-SERVICE

Cloud computing is the realization of the National Institute of Standards and Technology (NIST) vision of IT as a service-oriented organization, able to dynamically allocate resources to meet the changing needs of the business. The third phase is a transition to service-centric IT. In this phase, resources are pooled based on usage patterns. IT-as-a-Service can minimize the challenges associated with locally-installed, legacy client/server systems. Chargebacks are based on tiered levels of service associated with applications and users. Governance becomes policy-based so that data residing anywhere in the cloud is subject to appropriate controls.

EMC is leading the journey to private cloud computing with oil and gas industry expertise and with technologies to help lower costs, improve availability and performance of mission-critical applications, and achieve the IT agility needed to better support the business—all while you maintain control of your data.

An agile infrastructure enables dynamic scaling of resources as the needs of the organization change. What this means for IT is that organizational resources are freed up to undertake more critical initiatives. New systems are implemented in shorter time frames, and with cost models well-understood, decisions can be made about moving additional services to a cloud strategy as deemed appropriate to the business. Individual departments are no longer waiting for IT to provision additional resources, but can self-provision as the needs of a department change. Privacy and security of data is incorporated as encryption and access controls are leveraged across the cloud.

In addition, cloud implementation enables an organization to share information and resources with an extended environment. In new drilling operations, as joint ventures are used to spread business risk, private cloud enables companies to cooperate as if they were in a single IT environment. In fact, the private cloud may become the competitive advantage for operating in such an environment.

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