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The Catalyst to Virtualization: Virtual Consolidation

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Many companies today aggressively install large, inexpensive computers and software to service ever-growing demand. This path eventually will dead-end if it cannot deliver fundamental change in—rather than a mere acceleration of—the way we work. In information systems, as in sports cars, piecemeal assembly of components cannot create an optimized experience. High-performance systems are not accidents, but rather are the intentional, balanced combination of optimized systems, created with care and focused to fit the purpose.

The energy industry, majors and independents alike, requires fundamental work-process change to accommodate the growing virtualization of multinationals, a phenomenon typified by a highly decentralized work force, an exceptionally challenging technical demographic, an increasingly distributed work process, a step-function explosion of new data, and expectations of ever-more-competitive financial performance from investors. While existing systems are fast and affordable, they fall short in the scalability and real-time flexibility that will be the fundamentals of the next generation of information systems.

The business thus presents a new challenge: to accommodate a geographically dispersed work force seamlessly and efficiently while retaining the cost benefits of a centralized company in order to best support advanced reservoir management and field optimization, along with outsource-heavy data management, computing, and analysis. Exploration and production will benefit from this union, simplifying and streamlining data management and access, interlocking the experience of regionally disparate workers, saturating investment and operational decisions with both data and knowledge, and delivering breakthroughs in cost containment and financial performance.

Virtual Consolidation is the next-generation information system. Unlike many of today's systems, which put businesses in the position of adapting to the technology, Virtual Consolidation adapts to the needs of businesses at a rate that the market dictates. Such systems must face and convincingly conquer the reality that the rate of real change in technology is measured in years, while the rate of change of business can be as short as mere months. Technologies that may be perfect for today but not adaptable for tomorrow will transform seemingly overnight into severe encumbrances to business growth and performance. Computing companies can address this through several strategies, such as extensible, flexible, adaptable systems; acceleration of microprocessor and system-architecture innovation; or leveraging of the innovations of third-party providers embedded into proprietary innovations. The best companies will do all three.

Businesses trapped by inflexible systems will have but two choices: either wait for their business needs to regress to the capabilities of their suddenly inappropriate information systems, or replace those systems wholesale with something new and more appropriate. While neither choice offers near-term relief, only the second offers a path forward—and, at that, only if the choice is flexibility, extensibility, scalability, and adaptability. Otherwise, the new system risks coming on line just in time to vie for "most obsolete" against the very one it just replaced. In this time of continued and even accelerated consolidation, the need for flexible, extensible, scalable, and adaptable systems is more important than ever. Companies can neither afford the inefficiencies of their existing information systems as they restructure their business nor bear the expense of installing interim systems with no affordable path to adapt them to the future state. Corporate consolidation will be an evolutionary process moving through many phases, each identifying inefficiencies cloaked by previous iterations. Virtualizing the infrastructure to match the virtual company will be essential.

Virtual Consolidation is a simple concept. Data, storage, applications, computational servers, graphical servers, people, processes, and services are distributed according to distribution of the business and are redistributed at the rate of change of the business. As assets mature, or are acquired, sold, or reinvigorated, or as the finances of the business change through reduction in operating costs, incentives from governments, increase in low-cost capital, or increase in commodity pricing, the information systems that support them must adapt in real time. While the system, like a living, breathing organism, adapts, responds, and performs, the

view to the enterprise is a static snapshot, a system contained in a single instance. This means that every user sees a single file system, can access all computational servers with high-speed data access, can connect to real-time high-performance visualization, and can participate in realistic collaboration and be provided instant service regardless of his or her location or desktop device. System administrators can manage the enterprise from anywhere.

One of the key goals of Virtual Consolidation is collaboration on demand, which transforms it from being an "event" for exploration and data processing (i.e., project reviews or consultations) to being a "platform" for production. This can be of special benefit in situations in which the high project change rate demands interaction and updates of data from the field (real-time reservoir management) and access to any application, applet, analytical function, data element, or collaborator from any machine, anywhere, anytime to produce a common palette for data fusion and collaborative analysis. It is well established that the combination of experience, skills, and background brought together to address complex multidimensional problems always results in a better, more constrained, and more fully understood decision.

When millions or billions of dollars of cost and billions or even trillions of dollars of benefit are under consideration, one can hardly afford to exclude the best available talent from the discussion regardless of their location or schedule. Separation by oceans and time zones of the right skills from data and decisions cannot be an excuse for project suboptimization or even failure when information systems exist to connect them together. It is the confluence of people, process, and data that creates the core values of energy companies, and the rate at which data can be consumed and transformed into knowledge, decisions, and action is the gating factor to financial performance. One can think of this as Velocity to Insight, and it can be measured both for individuals and for organizational entities. Higher Insight Velocity equates to higher efficiency of the use of capital and, by extension, to improved bottom-line performance. Virtualization of the enterprise is a key architectural design to create the infrastructure to maximize Insight Velocity in a highly distributed and dynamic technical organization.

From the information technology manager's perspective, the business benefit of Virtual Consolidation is an environment that supports the business need to distribute people, data, and work process along with their supporting technical computing infrastructure, all without losing the economic benefits of a centralized, standardized, integrated environment. Companies need to adapt rapidly to changing business environments with little cost or effort and with confidence that the system can scale seamlessly.

Historically, major hardware or software infrastructure changes have been painful, costly, and extremely disruptive. Fortunately, until now, they occurred highly infrequently. Virtual Consolidation puts everything back into its natural order. It insists that businesses not be slaves to technology but rather that technology dynamically enable business success and readily adapt to changes demanded by the market. Since technology, especially hardware, has traditionally, by its very nature,

been highly inflexible, new approaches are required in order to deliver the cost savings that come with inflexibility with the benefits of flexibility. This flexibility, extensibility, adaptability, and scalability must be designed independently into both hardware and software. Typically, it is not possible to easily or inexpensively retrofit existing systems to accomplish this goal. This capability must be anticipated in the design phase, lest critical subsystems be omitted.

There are three major design elements of Virtual Consolidation connecting the technical computing infrastructure to the business process:

1. Data.
2. Analysis.
3. Decision.

The data and analysis layers are accessed via secure, shared, and extended resources that include business partners, service providers, and independent expert consultants, while the decision space remains dominated by internal resources with access to secure extended resources on demand. The software and hardware infrastructure to enable this should adapt quickly to a rapidly changing work process, extending and upgrading existing systems as assets change or as the cost of capital changes. This is in contrast to today's typical environments, in which the work process must remain locked to retain compatibility with the limits of the infrastructure.

Distributed access to data, analysis, and decisions also will be fueled by new application service provider businesses offered by the major software companies, which supply access not only to robust, secure, multidisciplinary databases, but also to the applications that transform the data into value. User companies still will require the flexible infrastructures enabling Virtual Consolidation, but its extent and impact on the business process will be accentuated through access to these new capabilities.

Companies need only remember these basic keys to successful implantation of Virtual Consolidation:

1. A broadly distributed architecture.
2. Always on, anywhere accessibility.
3. Unbreakable security.
4. Flexibility.
5. Scalability.
6. Interoperability.
7. Stability.
8. Speed.

Regionally distributed work process based on Virtual Consolidation connected to the corporate office for rapid decision making has been a difficult goal to achieve despite being pursued for more than a decade by the major oil companies. During this period, most companies elected to create autonomous offices that independently

managed their own, isolated infrastructure in the context of the corporate intranet. Virtual Consolidation is the new platform that is shrinking this rapidly expanding business world, consolidating data and graphics views first, computational capacity second, and, by extension, the people, process, and data that are core to value creation.

But concepts do not add to the bottom line until they become deployed and efficient solutions. Leading the charge are insightful companies servicing a cross section of global industries that over the past several years have sown the seeds of Virtual Consolidation. These seeds have sprouted into new, unprecedented capabilities that will materially change the way we work and the performance of our assets. Adoption and deployment of these systems is beginning in companies with the most pressing needs, but as in past revolutions, while the early adopters are deploying, many more are planning. Companies today are discovering that the Virtual Company is the vehicle, and Virtual Consolidation is the engine.