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Enabling the Digital Asset - A Real Time Collaborative Environment to Model, Measure and Optimize the Asset

E&P companies face increasing challenges. Accumulations are smaller and more challenging to develop. They are becoming more complex, deep and sour with higher pressures and temperatures. Increasingly, they are located in remote areas that challenge efficient operations. For producers, finding more proven reserves while meeting these challenges requires flawless execution, reduced NPT, and fewer unplanned events.

To deliver value, the industry must manage conflicting trends. How will companies find and produce more energy than the world uses yet keep costs in check? How will they manage risk while developing new reserves? How will they marshal the resources to arrest falling production in mature fields? Halliburton believes many of the answers to these questions can be found in the Digital Asset.

The Digital Asset

The Digital Asset is a real-time collaborative environment to model, measure and optimize the asset. It enables fewer experts to cover more ground, work in complex environments like deep water and HPHT more effectively, develop unconventional hydrocarbons, including heavy oil, economically, and exploit smaller accumulations more efficiently. Many parts of the Digital Asset are available today. And, many more new innovative workflows that let people collaborate more closely and execute faster with more accuracy are in the pipeline.

Developing new and better technologies is the key to economically exploiting smaller accumulations, unconventional reserves and older fields. Major advances in modeling and planning techniques increase the number of asset development scenarios that can be simulated. When executing the plan, the challenge becomes measuring progress against it as new and sometimes conflicting information becomes available – then adjusting the plan in real time to optimize the asset as data and assumptions are validated. But the information to do that often proves elusive– hidden within silos or discrete processes.

New technologies and the workflows they enable redefine the rules so that cycle time to overcome conflicting constraints can



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Related Information

- ▶ [Production Optimization](#)
- ▶ [DMS™ \(Decision Management System\)](#)
- ▶ [DecisionSpace® for Production™](#)
- ▶ [DecisionSpace® Production™](#)
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be reduced. For example, they enable clients to achieve higher accuracy in less time and greater speed with less NPT.



With the Digital Asset, not only can you achieve higher accuracy in less time, but the higher accuracy also reduces risk, NPT and ultimately costs. This concept is illustrated in the graphic consisting of four diamonds in a row, each having two attributes (above).

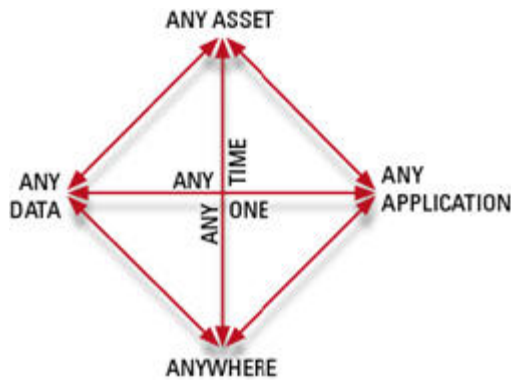
Think of the eight attributes as a 3-D diamond in which top and bottom halves can rotate against the other.



No one will ever be able to control all elements of conflicting constraints. But, Halliburton can assist its customers in overcoming many of them. New technologies can greatly affect finding, lifting and operational costs to improve profit per barrel of oil equivalent. Likewise, we can radically reduce the risk and uncertainty associated with exploration, drilling and field development.

The Digital Asset is accomplished through real-time collaboration in which basin and technical information are collected and then used to model, measure and optimize the asset. Then, "lessons learned" are shared with customers. The goal is to ensure that any qualified person can access:

- *Any data* – through open platforms, industry-standard databases, real-time technologies, hosting centers and enterprise-level archiving tools
- *Any application* – through software development kits and the integration capabilities of the DecisionSpace® environment
- *Any asset* – through development of more Real Time Operations Centers and capabilities
- *Anywhere* – through systems that work within or around the infrastructure limitations of most E&P projects
- *Anytime* – through a worldwide network of 24/7/365 hosting and Real Time Operations Centers.



Halliburton is committed to enabling the Digital Asset for our clients. We are confident we can achieve that end not only because each of our Product Service Lines have enabling technologies, but also because they are all working together to solve a customer problem in a collaborative manner.

Landmark's Contribution to the Digital Asset

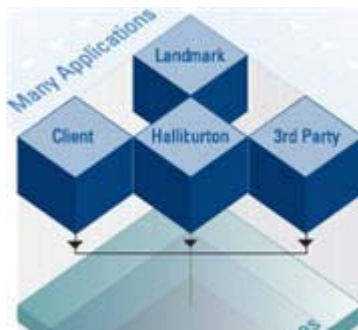
Landmark enables the Digital Asset by providing software that interprets data to provide insight. The company also provides tools to model, measure, and optimize, the digital environment for integration, and the expertise to improve execution. Our consultants team up with clients' asset teams to improve performance of their assets through their life cycle, and share their expertise on basins all over the world. In addition, new digital workflows are being developed that improve collaboration and efficiency between Halliburton and its clients.

For example, the company's software helps Halliburton's Production Optimization group automatically and remotely optimize well completions in real time. Also, the software can continuously update and refine customers' earth models in real time.

These and other Landmark technologies are enabling operators to fully harness the power of their Digital Asset to create optimum wells that more fully exploit their reservoirs. And, it is this optimization that ultimately allows operators to fully achieve their business objectives.

The DecisionSpace® Environment

The key enabler of the Digital Asset from Landmark is the unique DecisionSpace® environment, which facilitates collaboration among Halliburton, clients and suppliers. The environment provides the industry's widest framework for multi-



disciplinary application and data integration which accelerates workflows. Classic, client and third party applications can run side-by-side with new high-performance applications optimized for this environment.

To shorten cycle times, reduce finding costs and enhance production, Landmark has unveiled new integrated workflows as part of the first synchronous release of DecisionSpace components and key applications. They bring prestack data to interpreters' desktops, link geophysical, geological and engineering data, and model the surface, subsurface and economics together across an entire reservoir or asset.

For example, with Landmark's Geoscience Desktop of the Future, geologists and geophysicists can now correlate prestack, surface and multi-volume seismic with geological data and models in one common viewing environment. Clicking on an interesting seismic feature enables professionals to see the underlying lithology data immediately in order to quickly validate or disprove prospects.

Also, Decision Management System™ (DMS™) software shows how much time can be saved by applications optimized for the DecisionSpace environment. DMS software can reduce cycle time for project planning from months to weeks. And, it is the first such system to integrate all aspects of an E&P asset and generate real field development scenarios. DMS software can evaluate thousands of alternatives in less time than it previously took to evaluate one or two.

Connecting People, Processes and Technologies

In order to enable the Digital Asset, people, processes and technologies must be connected. Therefore, Landmark provides digital asset solutions that form workflows that break down the silos between people, groups and functions. Landmark's consulting and services group supplement the clients' teams with their vast knowledge on basins all over the world, addressing the people shortage issue in the industry. From the technology and process point, included among the solutions are a Drill to the Earth Model (sm) service and real-time production optimization technology.

Drill to the Earth ModelSM Service

A collaboration between Landmark and Sperry Drilling Services offers asset teams a joint service that will continuously update and refine a customer's earth model in real time using data from LWD sensors. During drilling, models based on surface seismic (usually accurate to 80 feet) are updated with LWD data accurate to six inches or less. This allows operators to gain new levels of understanding and adjust well paths in real time as information becomes available.

This unique technology creates optimum wells that more fully exploit reservoirs. The iterative refinement of the operator's earth model also helps place future wells more precisely to improve drilling economics and reservoir recovery rates.

Production Optimization Technology

A team workflow solution created by integrating software from WellDynamics and Landmark has resulted in the creation of a continuous "closed-loop" optimization process. The software monitors the real-time downhole data, then models and predicts the optimal control settings for the well. Remotely controlled chokes and valves in the completions can then open or close individual sections of wells to optimize the network continuously – also in real time to help maximize profitability.

The completions give engineers the flexibility to respond to changing reservoir conditions. For instance, they can isolate a leg of a multilateral well that suddenly starts producing water. Likewise, if water levels rise in a reservoir, the technology can be used to shut off the lower zone while the well continues to produce oil from the upper zone.

Landmark offers key enabling technologies, provides domain and area experts to supplement asset teams, and collaborates with its sister PSLs to help our clients deliver their Digital Asset.