THE AMERICAN OIL & GAS REPORTER®
NOVEMBER 2011
The "Better Business" Publication Serving the Exploration / Drilling / Production Industry

Technologies Providing New Solutions

By Kari Johnson
Special Correspondent

Oil and gas operations present several challenges to mobile computing hardware and software, ranging from the types and volumes of data, to the simple fact that mobile devices have to be able to tolerate extreme conditions. A shiny off-the-shelf commercial tablet probably would have a very limited life expectancy on a busy drilling rig or production site, and the mobile applications written for the typical consumer likely would be grossly inadequate for oil and gas, given the complex nature of the workflows.

However, the basic hardware and software components to make mobile and cloud computing a reality in exploration and production are rapidly coming to market, with new devices and application options available seemingly by the day. A case in point is a variety of purpose-engineered ruggedized tablets that are designed to withstand the elements present in even the world's harshest operating extremes, including Arctic climates and hazardous environments.

Cloud Solutions

The hardware is only part of the picture, of course. Longer term, cloud computing solutions are expected to play a central role in allowing mobile computing to reach its full potential in upstream oil and gas. One of the most appealing aspects of cloud computing is also what makes the concept so difficult for potential oil and gas users to wrap their heads around, according to Barbara Murphy, chief marketing officer at Panasas.

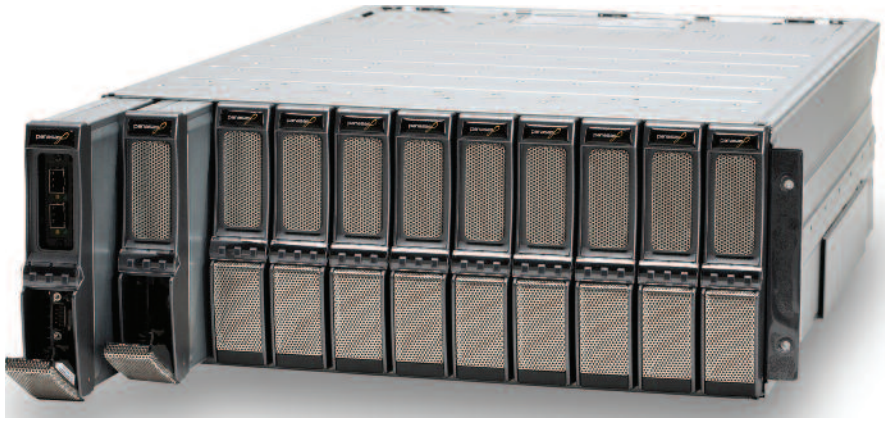
"It seems that the cloud is whatever you want it to be," she states. "Clouds are engineered to provide accessibility anywhere on demand, and are both highly scalable and highly virtualized. These key attributes are consistent between public and private cloud definitions. In fact, the difference between public and private is almost irrelevant to users."

From the Panasas perspective, the value driver for the oil and gas industry is in cloud computing's potential to bring together massive compute and storage power for far better performance and efficiency. "In this industry, we have to design for peak loads. Many smaller independent compute clusters, each designed for peak load, can never be as economical as one centralized resource," Murphy explains.

In computing circles, the oil and gas industry is synonymous with massive data processing, storage and visualization requirements, according to Murphy. While storage is certainly a key part of the cost equation, she says the biggest price tag is associated with the cost of the CPUs.

"In a typical high-performance cluster environment with 10,000-30,000 cores, storage is about 25 percent of the total system cost, while compute cores can be closer to 50 percent," notes Murphy. "One of the major drivers behind private clouds is the desire to make the most efficient use of the cores, which represent the majority of the capital investment in high-performance clusters. If you can improve the utilization of compute resources from 40 to 80 percent across a company while still delivering superior performance, the savings are tremendous."

Private clouds also enable consolidation. Murphy gives the example of Leicester University, which had multiple individual departments managing smaller high-performance computing systems for



Cloud computing offers the potential to bring together massive compute and storage power for improved performance and efficiency in the oil and gas industry. Private clouds implemented behind a company's firewall can provide tremendous savings by improving the utilization of computing and storage resources across the organization while still delivering superior performance.

scientific applications. By aggregating them into a single managed resource, it allowed the university to gain enormous efficiencies and significant cost savings, she says.

Two other trends impacting private cloud computing are segregating high- and low-value computing jobs, in which the highest-value hardware and software are deployed to the highest-value jobs, and "parallelization" of applications to complete computational-intensive tasks significantly faster. "Both of these trends are driven by the desire to solve complex big data computing problems faster and more cost efficiently," Murphy details. "The next generation of computing will be all about parallelism, in particular."

As far as the public cloud, Murphy says users primarily are looking for cost efficiencies for general purpose computing and data storage capacity. "At the same time, they are very clear about not wanting to process massive data sets or sensitive data in the public cloud," she observes. "Not only are they concerned about security, but data sets that are tens to hundreds of terabytes in size simply cannot move across a wide-area network in a cost-effective manner. More importantly, applications with a high data-to-compute ratio remain a challenge for public clouds, since they cannot deliver the performance required."

Storage systems serving a high-performance private cloud must have several key characteristics, starting with a dedicated high-bandwidth connection between the compute resources and the storage system, Murphy advices. Storage also must be continuously available and have the ability to scale out seamlessly without ever going offline.

"For budgeting assistance and planning, tools are available to manage user quotas so that costs can be allocated based on usage rather than simple head count. This quota system should be a soft allocation, so that users do not hit a limit that stops work," she suggests. "Good management tools are also essential. It takes a lot of thought on how the user experience will actually manifest itself. The storage management systems must be both a billing department and a police department against potential security threats." ❐