

HITTING THE HIGH-PERFORMANCE SEAS

Geotrace accelerates delivery of data to customer by two months with an ocean-bound HPC cluster using Dell blade servers



- SOLUTIONS**
- HPC
 - POWER & COOLING



Geotrace

CUSTOMER PROFILE

COUNTRY: Houston, TX (USA)

INDUSTRY: Data Processing

FOUNDED: 1979

NUMBER OF EMPLOYEES: 300

WEB ADDRESS:

www.geotrace.com

CHALLENGE

Geotrace wanted to eliminate a two-month delay between offshore data acquisition and onshore analysis to help its customers be more competitive.

SOLUTION

By placing a high performance computing (HPC) cluster directly on its customer's boat, Geotrace engineers now analyze the seismic data at sea, as soon as it is gathered.

BENEFITS

GET IT FASTER

- 256 servers delivered with no out-of-box failures

RUN IT BETTER

- Delivery of results to customer accelerated by at least 2 months
- Intel® Xeon® processors deliver 2x better performance per watt compared to previous generations
- Up to 4x better performance on some data flows

GROW IT SMARTER

- Able to meet strict power and cooling constraints
- 256-node cluster fits into 4 racks

DELL

As oil and gas resources become more and more scarce, energy exploration companies are increasingly turning to supplies that are located in remote or inconvenient areas, often at sea. Making critical decisions about where, if and how to extract these resources means analyzing a serious amount of seismic data—and the faster those numbers are crunched, the more competitive the business can be.

“BY PUTTING THE DELL BLADE CLUSTER ONBOARD THE ENDEAVOUR, WE’VE ELIMINATED AT LEAST TWO MONTHS OF WAIT TIME FOR THE CUSTOMER.”

Matt Gaskamp, data center operations manager, Geotrace

Geotrace is a privately owned, Houston-based company that helps geophysical services companies worldwide maximize the potential of their reservoirs by processing and integrating data gathered during seismic surveys. In the past, data gathered offshore had to be brought back onshore via tape to Geotrace’s high-performance computing cluster for analysis—until the company decided that instead of bringing the data to the cluster, it would bring the cluster to the data.

CHIPS AHOY

Geotrace’s client, Wavefield Inseis ASA, a Norwegian company that owns and operates ships dedicated to offshore seismic exploration, needed a faster turnaround time to enhance service to its customers, which include some of the largest energy companies in the world. Geotrace responded by using Dell blade server technology to put a new HPC cluster—and seismic data analysis experts—onboard the ship itself.

“Our goal was to get as many processor cores as possible into the limited data center space available on the ship,

which is currently deployed off the coast of Libya,” says Matt Gaskamp, data center operations manager at Geotrace’s Houston headquarters. “Wavefield is doing the seismic survey, and our geophysical experts are now onboard the ship, doing the data processing almost simultaneously.”

Sixteen fully-loaded Dell M1000e modular blade enclosures connected by Dell PowerConnect M6220 Ethernet switches house a total of 256 Dell M600 blade servers running CentOS Linux. Each server features two Intel Xeon processors that offer up to 2x better performance per watt compared to previous processor generations.¹ That means a total of 2,048 cores provide the compute power Geotrace needs to keep pace with Wavefield engineers onboard the aptly named Geowave Endeavour. Dell’s strict quality control did not go unnoticed. “None of the 256 servers failed out of the box,” says Gaskamp.

SPEEDING DELIVERY BY 2 MONTHS

By eliminating the wait time between data acquisition at sea and after-the-fact processing onshore, Geotrace is helping Wavefield thrive in an

HOW IT WORKS

HARDWARE

- Dell™ PowerEdge™ M1000e modular blade enclosures
- Dell PowerEdge M600 blade servers with Intel® Xeon® L5420 processors
- Dell PowerConnect™ M6220 Ethernet switches
- Dell Precision™ T3400 workstations with Intel Core™ 2 Duo processors
- Dell Remote Access Controllers (DRAC)

SOFTWARE

- Dell OpenManage™ Server Administrator
- CentOS Linux

SERVICES

- Dell Support

“WE’VE SEEN UP TO FOUR TIMES BETTER PERFORMANCE ON SOME OF OUR FLOWS WITH THE NEW DELL BLADES. THE FASTER INTEL CHIPS REALLY MAKE A DIFFERENCE.”

Matt Gaskamp, data center operations manager, Geotrace

increasingly competitive industry.

“We’re able to process each phase of acquisition as soon as they get the data in,” says Gaskamp. “By putting the Dell blade cluster onboard the Endeavour, we’ve eliminated at least two months of wait time for the customer.”

Although Geotrace also considered blade solutions from two other vendors, Dell was able to get evaluation units onsite faster. With 60 percent greater density than traditional 1U servers, the efficient design of the Dell M600 blades helped Geotrace meet its customer’s requirements for the cluster.²

“We had some pretty tight space, cooling and electrical constraints that we had to work within,” says Gaskamp. “Wavefield gave us four standard racks of space with a certain amount of power and cooling that we could utilize in that footprint. Obviously, blades were the key component in providing the number of CPUs that we needed to get our work done. When it came down to getting the power and cooling requirements to where we needed them to be, Dell was definitely the leader.”

The M600 blade server is indeed one of the most energy-efficient blade servers on the market, consuming up to 19 percent less power and delivering up to 25 percent better performance per watt than the HP BladeSystem c-Class and IBM BladeCenter H.³

SIMPLIFIED POWER MANAGEMENT

Using Dell Remote Access Controllers and Dell OpenManage Server

Administrator software, Geotrace can manage the blades remotely, from the Houston data center, if necessary.

“Granted, it’s over a satellite link, so it’s very slow, but we do have that capability,” says Gaskamp. “Usually, for the sake of speed, we just instant message back-and-forth and our people onboard the ship handle the administration locally. Dell OpenManage is very easy to use, so you don’t have to be an expert to check the status of the servers and figure out what’s going on.”

Dell OpenManage Server Administrator provides power management tools that let administrators easily configure maximum power thresholds by server or server group. Alerts based on the Simple Network Management Protocol (SNMP) are generated and recorded in hardware logs when readings cross the defined thresholds. Peak consumption times are also reported, and Geotrace administrators can reset peak observed watts/amps and cumulative power if necessary.

When Geotrace initially configured the cluster, the power monitoring capabilities of OpenManage helped the company maximize the cluster’s core density by identifying the need to use low-voltage Intel Xeon L5420 processors. “We had a fairly low power number per chassis that we were shooting for,” says Gaskamp. “Dell’s power management tools were very useful for getting things up and running quickly. We were able to easily see how much power each node was pulling and

what the overall power consumption was. And we were able to use those figures to make sure that once we sent this cluster out to the boat, we were going to have enough power and resources to keep everything stable and working properly.”

UP TO 4X BETTER PERFORMANCE

Geotrace has seen improved performance from its seafaring cluster when compared to its previous, land-based systems. “We’ve seen up to four times better performance on some of our flows with the new Dell blades,” says Gaskamp. “The faster Intel chips really make a difference.”

Aboard the Endeavour, Geotrace engineers use high-performance Dell Precision T3400 workstations with Intel Core 2 Duo processors to aid with fast data analysis. Of course, when at sea, the crew keeps spare hard drives and other parts on hand, ready to swap out in case any components should fail.

A RECORD-BREAKING ACHIEVEMENT

The Geowave Endeavour acquired 4,911 sail kilometers on its first mission with the Dell blades, setting a new production record for any seismic vessel.⁴ With the Endeavour’s towing configuration, that means 2,456 square kilometers of seismic data to analyze—which is no small task, and a testament to the efficiency of the Dell cluster.

Gaskamp is also pleased with the support Geotrace receives from Dell. “We get top-of-the-line service and

support, and that's one of the reasons we stay with Dell," he says. "The resources that Dell provided were a big help in getting everything scoped out prior to purchasing and sending that volume of equipment out to a project of this magnitude. Our Dell account engineer did a fantastic job of getting us the technical specs, electrical requirements and answers to specific questions that we needed to make the right choices in a timely fashion."

1. Intel measured results as of Aug. 22, 2007. Performance comparisons made using an internal virtualization workload on Intel Xeon X5365 Series Processor running at 2.66GHz/1333/2X4MB L2, 16GB memory and Intel Xeon X7350 Series Processor running at 2.93GHz/1066/2X4MB L2, 32GB memory. Actual performance may vary. See <http://www.intel.com/business/xeon/index.htm>

2, 3. Based on Principled Technologies, "SPECjbb2005 performance and power consumption on Dell, HP, and IBM blade servers" December 2007 test report commissioned by Dell. See http://www.dell.com/downloads/global/products/pedge/en/pe_blades_specjbb2005.pdf

4. M/V Geowave Endeavour Shatters World Record for 3D Seismic Production, <http://www.wavefield-inseis.com/news/newsitem.php?nid=213>

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Geotrace



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April 2009

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