

Runtime Improvements Achieved with Landmark SeisSpace® ProMAX® and Cray® CS400™ Cluster

Cray for Seismic Processing

- Expertise in high-performance application engineering
- Accelerated application runtimes
- Configuration planning and support
- System design and optimization
- Industry-leading partner collaboration

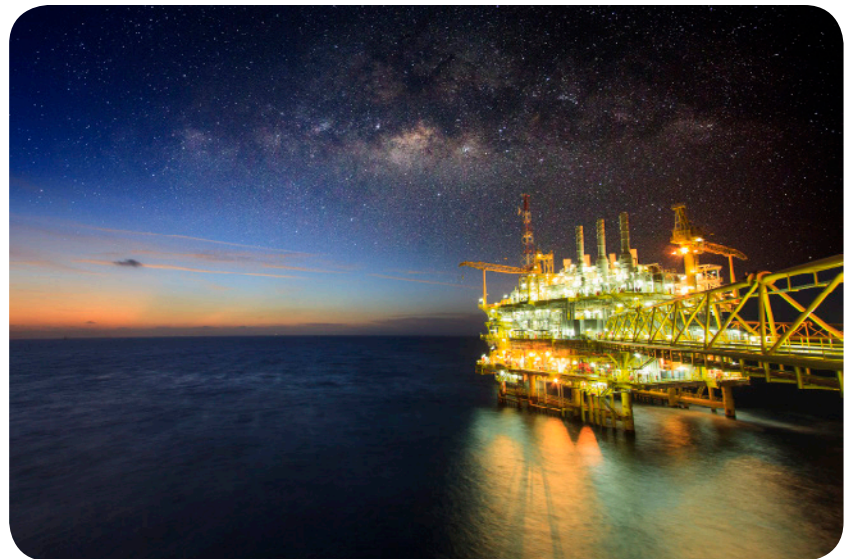
About Cray

Cray provides highly advanced systems and solutions that help organizations of all types solve their most difficult computing, storage and data analytics challenges. The company's comprehensive portfolio includes expertly optimized cluster systems, extremely scalable, powerful supercomputers, advanced storage systems, and high-performance data analytics and discovery platforms. Founded in 1972, Cray has focused exclusively on developing, building and supporting supercomputing technologies for over 40 years.

Overview

With the ever-increasing complexity in seismic field geometries and acquisition techniques, the quantity of seismic data required to provide high-fidelity sub-surface images for exploration is growing exponentially. Processing requirements for spectral algorithms and techniques are stretching the capacity and capability of current infrastructures.

Landmark and Cray have joined forces to qualify and optimize SeisSpace® ProMAX® on a Cray cluster system. Cray's expertise in performance engineering provides crucial insights into performance profiling and optimization on our way to exascale computing.



Fully Qualified for Production

Landmark and Cray qualified the Cray® CS400™ infrastructure and environment for running SeisSpace in a production setting. This gives Landmark and their customers an optimal choice for infrastructure when using SeisSpace ProMAX for oil & gas exploration. As part of this integration work, Landmark and Cray:

- Installed and configured SeisSpace depth-imaging software in a Cray-managed partner facility to qualify and test performance characteristics on a Cray CS400 cluster infrastructure.
- Identified areas within SeisSpace and associated scientific libraries where Cray performance engineers could enhance application runtimes.
- Successfully executed and tested the application runtime environment of SeisSpace ProMAX in RHEL 7.1.

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Solution Highlights

Cray and Landmark demonstrated that SeisSpace ProMAX and its associated modules perform extremely well on Cray’s CS400 cluster architecture and are now qualified to run in a production environment. Highlights include:

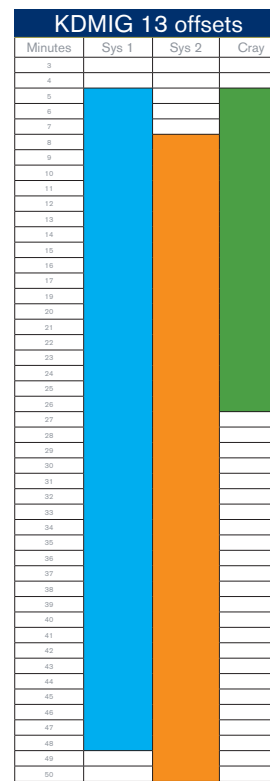
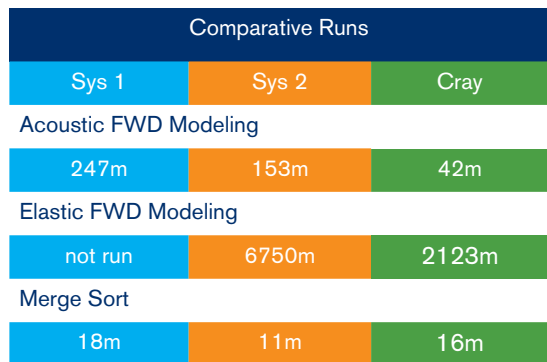
- Proven performance gains in application runtimes for RTM (LDI and Tierra), Kirchhoff Prestack depth migration, merge and sort, and acoustic and elastic forward modeling.
- The use of TCP/IP over Omni-Path is a tested and supported option. It puts the customer one step closer to taking advantage of a high-performance network and one step closer to Cray’s Aries™ interconnect when maximum throughput and low latency are required.
- Primary and secondary storage operated at theoretical maximums for a single filesystem. I/O performance analysis and reference configurations are part of an ongoing effort to optimize file systems for production.

Technical Details

The qualification was performed on a Cray CS400 cluster system that contained more than 70 compute nodes of 32 cores and 128 GB of memory each, with one management node of the same configuration and network attached disk. We used 10 gigabit Ethernet for node connectivity. A single Lustre® file system was attached to the test environment for both primary and secondary storage. For job management we used SLURM, which is new for SeisSpace.

The current SeisSpace 5000.10.0.0 with the 10.0.2 patch supports SLURM, Torque, PBS and SGE.

Runtime Results



For more information

- Read about Cray energy solutions: www.cray.com/energy
- Request more information: www.cray.com/contact/connect-with-an-expert