High Performance Computing, Storage and Data Analytics Solutions for the Oil and Gas Industry

Cray Solutions

Computing
Solutions range from the optimized and customizable Cray® CS™ series cluster systems to the extremely adaptive and scalable Cray® XC™ series capability supercomputer.

Storage & Data Management
Storage solutions include the integrated Cray® Sonexion® scale-out Lustre® storage system and the Cray Tiered Adaptive Storage (TAS) open archive and tiered storage system for supercomputing and big data.

Data Analytics
Cray technologies deliver massive analytic processing power. Solutions include the Urika-XA™ pre-integrated platform for big data analytics and the Urika-GD™ data discovery appliance for performing real-time analytics on big data graph problems.

Use Cases
• Seismic Acquisition
• Seismic Processing/Imaging
• Reservoir Characterization/Simulation
• Production Optimization

Cray Energy Customers
• Large integrated oil companies
• International service companies
• National Energy Research Scientific Computing Center (NERSC)
• Oak Ridge National Laboratory (ORNL)
• U.S. Department of Energy

How Cray Can Help E&P Companies Meet the Demand for More Energy
Oil and gas (O&G) may be the highest stakes industry on the planet. With the demand for energy surging and its globe-spanning impact, exploration and production (E&P) companies face tremendous pressure.

As known supplies diminish and the cost and complexity of tapping remaining reserves increases, E&P companies need a high performance computing (HPC) partner with the industry experience and innovative technologies to help them keep pace. While the industry has long used HPC, the dramatic increase in algorithmic complexity and data volume and resolution is necessitating the adoption of new technologies including capability computing, parallel file systems, programming models, management processes, power efficiencies and more.

Cray brings over 40 years of HPC leadership to every product and solution. Since day one, we have focused solely on supercomputing, honing tools, platforms and operational efficiencies in the HPC marketplace. This experience, proven by our record of successful production deployments, uniquely positions us to help you find and produce hydrocarbons faster, more safely and more efficiently.

We offer a complete range of capability and capacity computing systems, high-performance storage solutions, and data analytics platforms designed and optimized to work together, making it seamless to integrate our leading technology into your workflow and derive immediate value.

Computing Solutions
Dramatic increases in algorithmic complexity and data volume and resolution are driving massive new compute requirements — and placing unprecedented demands on the scalability, manageability, supportability and efficiency of existing systems.

Cray’s computing solutions are built for the world’s most difficult capability and capacity computing challenges. And they’ve been tested and proven in the world’s most demanding compute environments. What’s more, Cray’s flexible system designs deliver maximum value by making it easy to customize and upgrade your solution.

Cray XC® Series™ Supercomputer
The performance-optimized Cray XC series supercomputer brings transformational capabilities to the intensifying requirements of seismic processing and seismic imaging. Among its key features, the Cray® XC40™ system’s intelligent Aries interconnect helps deliver unsurpassed performance and scalability on advanced algorithms such as
Reverse Time Migration and Full Waveform Inversion by accelerating many-to-many communication. **Cray DataWarp™** I/O accelerator technology reduces or eliminates I/O wait for compute resources, reduces total storage requirements and supports greater levels of I/O scalability. Additionally, features such as a comprehensive software development environment and a highly adaptive system design translate to industry-leading productivity and value. A standout feature for the oil and gas industry is the XC40 system’s outstanding GPU flexibility. The system accommodates Intel® Xeon Phi™ coprocessors or NVIDIA® GPU accelerators for the many-core scalability required of seismic processing and imaging codes.

**Cray CS™ Series Cluster Supercomputers**
For capacity computing needs, the Cray CS™ series cluster supercomputers offer industry standards-based, highly customizable and reliable high performance computing designed to handle the broadest range of medium- to large-scale workloads.

The **Cray CS-Storm** cluster is our high-density accelerator compute system. Designed for massively parallel computing workloads, it consists of multiple high-density multi-GPU server nodes. Featuring up to eight NVIDIA® Tesla® GPU accelerators and a peak performance of more than 11 teraflops per node, the CS-Storm system brings the most dense GPU configurations available today. With an integrated hardware and software stack, productive developer tools, and efficient power and cooling all proven at scale, the CS-Storm system delivers immediate time to value.

Components on all CS series systems have been selected, optimized and integrated to create a powerful HPC environment. Flexible node configurations featuring the latest processor and interconnect technologies are easily tailored to specific needs — from an all-purpose cluster to one suited for shared memory, large memory or accelerator-based tasks. Innovations in packaging, power, cooling and density translate to superior energy efficiency and compelling price/performance. Expertly engineered system management software instantly boosts productivity by simplifying system administration and maintenance.

**Storage & Data Management Solutions**
We provide an end-to-end storage architecture that address all aspects of data-intensive workflows — from high-performance storage to deep tape archive — and optimizes seismic processing/imaging workflows. Our holistic knowledge of parallel file systems, storage networking, storage systems and archiving means you solve your most challenging problems faster — reducing time-to-results by up to 24 times — while preserving all that data.

**Cray Tiered Adaptive Storage (TAS)**, our open archive and tiered storage system, includes everything for migrating, delivering and sustaining archives now and into the future. The **Cray Sonexion® scale-out Lustre® storage system** is our integrated, modular and compact storage system. It offers simplified deployment and management, precision performance, and balanced scalability. It scales large I/O performance incrementally from 5 GB/s to 1 TB/s in a single file system. **Cray Cluster Connect (C3)** is a complete Lustre storage solution for x86 Linux® clusters. Use your Linux compute environment of choice through the Lustre Client by Cray and choose options for data and storage management.

**Data Analytics Solutions**
Big data analytics are factoring more and more in the E&P workflow. We offer a portfolio of products suited for analytics problems in production optimization, seismic processing and imaging, and well planning and drilling.

**Cray Urika-XA™ Extreme Analytics Platform**
The Urika-XA extreme analytics platform provides the most scalable, reliable platform for data analytics, including real-time processing and correlations to improve drilling, completions and overall well productivity. This turnkey architecture comes pre-integrated with Apache Hadoop® and Apache Spark™ frameworks to bring instant analytic value to seismic data. At the same time, the platform is versatile enough to support next-generation environments. Optimized for compute-heavy, memory-centric analytics, the Urika-XA platform delivers excellent performance on the widest range of analytics applications.

**Cray Urika-GD™ Data Discovery Appliance**
Our Urika-GD data discovery appliance can find hidden and unknown relationships within massive amounts of data. Featuring a massive shared memory, the Urika-GD platform enables highly complex graphs with unparalleled real-world performance. It delivers this power of real-time data discovery in an enterprise-ready package that delivers rapid time-to-value on big data solutions.