CUSTOM ENGINEERING DEDICATED TO YOUR MISSION

As a global leader in supercomputing, Cray provides highly advanced supercomputers and world-class services and support to government, industry and academia. Cray technology enables scientists and engineers to achieve remarkable breakthroughs by accelerating performance, improving efficiency and extending the capabilities of their most demanding applications. Cray’s Adaptive Supercomputing vision will result in innovative next-generation products that integrate diverse processing technologies into a unified architecture, allowing customers to surpass today’s limitations and meeting the market’s continued demand for realized performance. More information can be found at: www.cray.com

Consistent with Cray’s commitment to providing world class High Performance Computing (HPC) hardware and software, the company has also a focused “Custom Engineering” division. Cray Custom Engineering leverages Cray’s outstanding presence in nearly all of DoD’s High Performance Computing Modernization programs, DOE labs and has a deep presence within US classified program activities.

This new Cray discipline is dedicated to delivering technology lead services “where off the shelf does not compute”. Focus segments include: Custom Engineered Devices, Consulting, Site Engineering, Data Management Solutions, and Knowledge Management. Cray leverages more than 25 years of supercomputing experience to support customers with a range of services in diverse areas of computing, from problem analysis to solution implementation. For the first time in the history of Cray, customers have deep access to the company’s Intellectual Property, talent pool of engineers and scientists and innovative partnerships. Cray customers are now afforded the ability to address any high performance computing needs regardless of form factor or application. Cray is committed to moving “High Performance Computing” out of the laboratory environment and closer to the end user or war fighter; to that end, “Custom Engineering” is standing by to support your emerging high density computing needs, revolutionize commercial and scientific applications.

Data Management Solutions
Cray data management solutions address the specialized storage needs of the HPC customer. Customer services and solutions are available for both the Cray environment and other data center environments. A component of this is external services, including external file systems using Lustre, external Lustre data backup and external login.

Consulting
Cray scientists and engineers provide unmatched expertise in the design, implementation, and optimization of high-performance computing solutions. Cray consulting services enable customers to leverage Cray resources as expert partners in analyzing and solving the most challenging problems in HPC environments.

Site Engineering
Going green makes both good business and good environmental sense. Cray site engineering services complement computing technology with experienced site planning and system implementation experts to optimize the operational environment. Cray site engineering experts capture customer-specific computing requirements, translate them into comprehensive work plans and provide complete site engineering solutions.

Devices / SPO’s
Cray offers Custom Engineered solutions to government agencies, commercial customers, and systems integrators to address computer requirements not met through standard products. Cray leverages extensive knowledge and intellectual property relating to supercomputer system design to provide a full suite of unique and leading-edge solutions and services.

Knowledge Management
The Knowledge Management practice offers custom solutions to meet the growing demand of large scale data analysis and mining. We work with our clients to tailor our rich portfolio of technology to meet their knowledge discovery and management needs. The Cray XMT™ system is designed for large scale data analysis using an extreme low power custom processor with custom tools from Cray.
Cray Custom Engineering Expanded Discussion:
Supporting high performance computing requirements not met through standard products.

- Leveraging extensive knowledge and IP relating to supercomputer system designs; consulting in:
  - System architectures, including vector, multi-threaded, scalar, FPGA and hybrid systems.
  - Design, development and implementation of system software
  - Operating systems
  - Hardware supervisory systems
  - Programming environments
  - Compilers.
  - Design and production of system hardware, including cabinet design, power & cooling and printed circuit board design.
  - End-to-end system implementation, system prototyping, manufacturing, and site integration.

- Leveraging innovation and technology gained from more than 25 years of designing cutting-edge supercomputers

Example Cray Custom Engineering Technologies:
- Intercooling: A cooling technology that uses evaporative phase-changes to efficiently remove, in a self-regulated fashion, large amounts of heat from an air flow. The system permits extreme processor densities (192 processors a two-foot wide cabinet today) using intercoolers between chassis that can remove over 70KW per cabinet without increasing ambient room temperature.

- Packaging: A hierarchy of packaging technologies that spans chips, compute blades, router cards, chassis enclosures and cabinets – with integrated power and cooling technologies.

- Power Management: Hardware and software Power Aware Design (PAD) strategies to reduce and manage the overall system power without adversely affecting system performance.

- The Hardware Supervisory System (HSS): An independent system of microprocessors on a dedicated network that manages system power and monitors the system environment. HSS includes cabinet controllers, blade controllers and numerous sensor microcontrollers. Most of the management controllers are based on a common, single-board-computer (SBC) design and run embedded Linux.

- Vector and Multithreaded Processors: Alternative processing architectures (as opposed to x86 scalar processors) capable of delivering tremendous performance advantages across a number of applications. Cray pioneered vector technology over 30 years ago and began pioneering multithreading technology nearly 20 years ago.

- High-radix Routers: A router architecture capable of scaling to large numbers of ports with flexible routing, providing a number of advanced performance and reliability features, such as automatic load balancing and automatic link degradation in the face of hard lane faults.

- Hybrid Networks: A flexible set of network building blocks, based on the high-radix router architecture, that allow varied network topologies, with different cost and performance trade-offs and interoperability between multiple compute blades and network generations.

- dpFBAvanced Signaling Technology: High-speed, low power, area-efficient SerDes signaling technology allowing hundreds of bidirectional, 20 Gbps communications lanes per ASIC.

- Optics: 16-way 20 Gbps/wavelength division multiplexing (WDM) optical technology providing 320 Gbps per fiber, which allows our 20 Gbps signals to be carried over distances of multiple meters.

- “Containerized” High Performance Computing offerings supporting forward deployments in DoD and or Commercial applications. Offerings to include: computer hardware, switch gear, software, unique code algorithm solutions, integrated or external cooling, power management, UPS equipment and network interconnect to include wireless sat/com connectivity and more.

- High Density Packaging and Extreme Miniaturization and innovative cooling for High Performance Computing technology demonstrators for fielding applications

- Acceleration technologies embracing: GPU, FPGA, Compliers and Hybrid offerings