Smarter Clusters from the Supercomputer Experts
Flexible Computing Performance

All HPC problems are not created equal. You need fast results and reliable computing tools matched to your workloads.

That’s why we tailor the CS500™ cluster supercomputer to your requirements.

The CS500 system is customizable, easy to manage, and based on industry standards. It can handle the broadest range of simulations and data-intensive workloads. And we’ll configure it to meet your needs.

We optimize components and integrate them into a powerful high-performance compute environment that can scale to over 11,000 nodes and 60+ peak PF. Flexible node configurations feature the latest processors and interconnect technology. Expertly engineered software simplifies system administration and maintenance.

Designed for Your Workload

Choose from a wide range of flexible configurations with the latest processors and accelerators from Intel, NVIDIA and AMD. We optimize industry-standard server nodes and components and pair them with a comprehensive software stack. What you get is a unified HPC system that excels at capacity- and data-intensive workloads.

Select your chassis, blades, nodes, interconnect topology, storage, and system management capabilities — for a high-performance system designed, installed and supported by Cray supercomputing experts.

Reliable and Energy Efficient

Reliability starts with careful board and component selection, testing and validation. We add multiple layers of redundancy and fault tolerance to boost your uptime. Your CS500 cluster has redundant power, cooling, management servers and networks, all with failover capabilities. Each system is backed by our team of experts.

Options to increase energy savings include high-efficiency, load-balancing power supplies; liquid-cooled rack rear-door heat exchangers and chillers; and, for some configurations, a choice of power options that can reduce energy loss and total cost of ownership.

Expert Cray Support

We’re dedicated to delivering outstanding support for the users, organizations and businesses that depend on Cray technology.

Mission-critical systems around the globe rely on our service teams for world-class support. Cray support engineers, field engineers and field analysts are experienced, highly trained, and backed by subject matter experts. We can program, install, troubleshoot, maintain and administer your system, and optimize your applications. Plus you get access to product support groups and in-house systems to help with diagnostics.

CS500 Configuration Options

- Cray rackmount servers
- Intel® Xeon®, Intel® Xeon Phi™, Intel® Xeon® Scalable processors, AMD EPYC™ processors, and NVIDIA® Tesla® GPU accelerators
- Multiple interconnect options: 3D torus/fat tree, single/dual rail, QDR/FDR InfiniBand™, Intel® Omni-Path Architecture
- Local hard drives in each server
- Choice of network-attached file systems and parallel file systems
- Server management options
Scalable Configurations

The CS500 cluster supercomputer can be customized for multiple uses — from an all-purpose, massively parallel HPC system to a cluster optimized for hybrid compute- and data-intensive workloads.

Each system has compute nodes, which run parallel MPI and OpenMP tasks with maximum efficiency, and management nodes, which provide I/O connectivity, function as login nodes, and can be configured for unique workloads requiring large memory configurations. Cray rackmount servers are highly configurable in an HPC-optimized, industry-standard package. Each configuration can be replicated to create a reliable and powerful large-scale system. Choices include:

- Cray 3211 rackmount servers with Intel Xeon processors for traditional HPC environments
- Cray 1211 rackmount servers with Intel Xeon processors and NVIDIA GPU accelerator support
- Cray 3112 rackmount servers with Intel Xeon Phi manycore processors for accelerated parallel application performance
- Cray CS500 rackmount AMD servers with compute blades based on AMD EPYC 7000 processors

Comprehensive HPC & Deep Learning Environment

Our complete software environment lets you develop and optimize applications and efficiently monitor system resources. The CS500 system's customizable software stack is compatible with most open-source and commercial applications. It includes key Cray-authored components, popular open-source software, and industry-leading applications from Cray partners. You get:

- Red Hat® Enterprise Linux® or CentOS
- The Cray Programming Environment, a complete, fully integrated suite of HPC-optimized compilers, libraries, and tools for programming, debugging, performance analysis, workload management, environment setup and more
- Your choice of Bright Cluster Manager for HPC or Cray's Advanced Cluster Engine (ACE) for system management
- Bright for Deep Learning, a comprehensive deep learning environment that includes a choice of machine learning frameworks including Caffe, Torch, Tensorflow, and Theano; and machine learning libraries including MLPython, NVIDIA CUDA Deep Neural Network library (cuDNN), Deep Learning GPU Training System (DIGITS), and CaffeOnSpark

Intel® Xeon® Processor E5-2600 Product Family

Built on Intel's industry-leading microarchitecture, the Intel Xeon processor supports high-speed DDR4 memory technology with increased bandwidth, larger density and lower voltage over previous generations. Intel support for PCI Express (PCIe) 3.0 ports improves I/O bandwidth, offering extra capacity and flexibility for storage and networking connections. The processor delivers energy efficiency and performance that adapts to the most complex and demanding workloads.

AMD EPYC™ Balanced Architecture for Optimum Performance

With up to 64 cores, 4 TB of memory, and 128 lanes of PCIe® connectivity, 2-socket servers built with the AMD EPYC SoC have the flexibility, performance and security to efficiently support the most demanding workloads.

Intel® Xeon Phi™ Coprocessor for Parallel Workloads

Intel Xeon Phi processors are based on Intel's Many Integrated Core (MIC) architecture, offering an alternative performance/power configuration to Intel Xeon processor products. Fields of smaller and lower-power cores can provide parallelism and power efficiencies on many demanding HPC applications.

NVIDIA® Tesla® K40 GPU Computing Accelerator

GPU-accelerated computing boosts application performance by offloading compute-intensive portions of the application to the GPU. The NVIDIA Tesla K40 GPU accelerator features 2,880 cores and the industry’s highest single- and double-precision peak floating point performance. Equipped with 12 GB of GPU accelerator memory, these accelerators are well suited for big data analytics and large-scale scientific computations. They outperform CPUs by up to 10 times and deliver additional performance with NVIDIA’s GPUBoost feature.
## Cray CS500 Specifications

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<tr>
<th>Component</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Architecture</strong></td>
<td>Air cooled, up to 72 nodes per rack cabinet</td>
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| **Processors and Accelerators** | Support for 64-bit Intel® Xeon® Scalable processors and AMD EPYC™ processors  
Optional support for Intel® Xeon Phi™ processors and NVIDIA® Tesla® GPU computing accelerators |
| **Memory**                    | 768 GB up to 1,536 GB depending on processor SKU  
Up to 2 TB memory capacity per node |
| **Interconnect and Networks** | FDR or EDR InfiniBand® with Connect-IB®, Intel® Omni-Path Host Fabric Interface  
Options for single- or dual-rail fat tree or 3D torus (configurations vary by chassis)  
1 GbE and 10 GbE for management  
Redundant networks (InfiniBand, 1 GbE and 10 GbE) with failover |
| **System Management**         | Bright Cluster Manager for HPC (optional)                                                                                                   |
| **Reliable, Available, Serviceable (RAS)** | Redundant power, cooling and management servers with failover capabilities  
All critical components easily accessible |
| **File System**               | Cray® ClusterStor™, NFS, Local FS (Ext3, Ext4 XFS), Lustre®, GPFS and Panasas® PanFS® available as global file systems |
| **Disk Storage**              | Full line of FC-attached disk arrays with support for FC, SATA disk drives and SSDs                                                                 |
| **Operating System**          | Red Hat, SUSE or CentOS available on compute nodes  
ACE Management Servers delivered with Red Hat Linux®                                                                                   |
| **Performance Monitoring Tools** | Open source packages such as HPCC, Perfctr, IOR, PAPI/IPM, netperf                                                                                                                                 |
Optional: PGI compiler, Intel Cluster Toolkit, NVIDIA CUDA®, CUSA C/C++, OpenCL™, Direct Compute Toolkits, OFED programming tools, Open MPI, MVAPICH2, Intel MPI and IBM® Platform MPI |
| **Power**                     | Optional 480V power distribution with a choice of 208V or 277V three-phase power supplies                                                                 |
| **Cooling Features**          | Air cooled  
Airflow: up to 3,000 cfm in densest configuration; Intake: front; Exhaust: back  
Optional passive or active chilled cooling rear door heat exchangers |
| **Cabinet Dimensions (HxWxD)** | 42U/19": 78.39” (1,991 mm) x 23.62” (600 mm) x 47.24” (1,200 mm) standard rack cabinet                                                   |
| **Cabinet Weight**            | 42U/19": up to 1,856.3 lbs.; 232 lbs./sq. ft. per cabinet                                                                                     |
| **Support and Services**      | Turnkey installation services with worldwide support and service options                                                                           |