



Cray® XC40-AC™ Supercomputer



Cooling Without Liquid — Air Only

The Cray® XC40-AC™ air-cooled supercomputer is designed from the ground up to be adaptive. A holistic approach optimizes the entire system to deliver sustained real-world performance and extreme scalability across the tight integration of all HPC hardware, networking and software.

Economical Supercomputing for Technical Enterprise Markets and Price Points

Cray is a leader in high-end supercomputing. Our systems are among the most scalable, best-performing supercomputers in HPC and include many of the biggest and fastest machines in the world. The Cray XC40-AC system leverages the innovations of the top-line Cray XC technology while economizing packaging, networking, cooling and power options to provide users with the optimal balance of features and footprint to meet their unique price/performance requirements. This air-cooled series provides slightly smaller and less dense supercomputing cabinets with no requirement for liquid coolants or extra blower cabinets. A reduced network topology lowers costs and the systems are completely compatible with the compute technology, OS, ISV and software stack support of the high-end Cray systems.

Common Interconnect and Networking

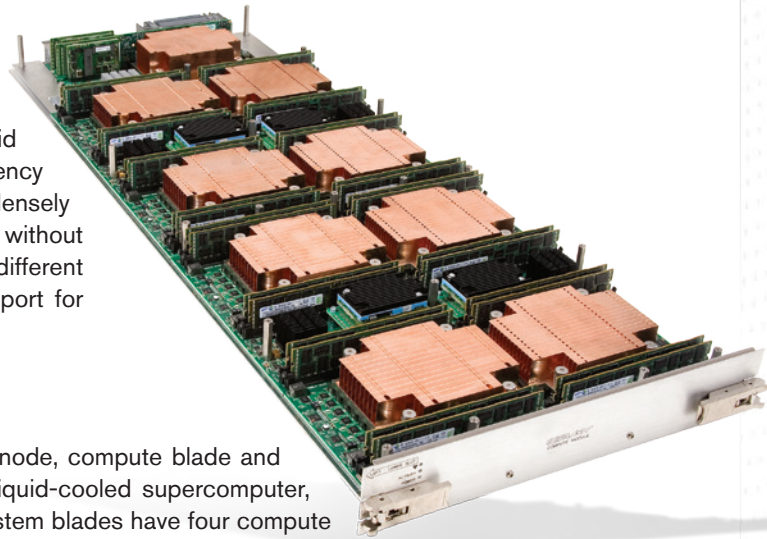
The Cray XC40-AC supercomputer utilizes the same performance-optimized Aries™ interconnect technology on the compute blades as our flagship XC systems, and it takes advantage of the two ranks of Dragonfly network topology. Individual, single-cabinet configurations connect the compute blades via a rank 1 backplane and eliminate the need for external cables. For 2- to 8-cabinet configurations, the Cray XC40-AC system implements a second rank of a passive electrical (copper) cable network to connect compute chassis in different cabinets. By comparison, the high-end Cray XC40 supercomputer can utilize an additional third rank option of active optical cables to drive communication for much larger system configurations.

Efficient Power and Cooling Alternatives

To provide streamlined, cost-reduced solutions for technical enterprise environments, the air-cooled Cray XC40-AC system makes each cabinet independent of requirements for fluid infrastructure or additional blower enclosures. A single high-efficiency fan per cabinet blows bottom-to-top airflow to keep these less densely populated configurations cool. Technical enterprise datacenters without raised floors or plumbing for liquid cooling systems may also have different power requirements, so the Cray XC40-AC system provides support for common computer room options like 480V and 208V.

Cray XC40-AC Compute Blade

The Cray XC40-AC supercomputer leverages the same compute node, compute blade and processor daughter card (PDC) architecture as the Cray XC40 liquid-cooled supercomputer, amortizing R&D expenses and reducing total cost of ownership. System blades have four compute nodes of two processor engines each, the same as the Cray XC40 system. Compute blades stack vertically in a chassis of 16 blades per cabinet and the systems can be configured from one to eight cabinets each, enabling up to 1,024 sockets.



Learn more about Cray XC series technology, software, and processor daughter cards at www.cray.com.



Cray® XC40-AC™ Specifications

Processor	64-bit Intel® Xeon® processor E5 family, up to 128 per cabinet
Memory	64-256 GB per node Memory bandwidth: up to 153 GB/s per node
Compute Cabinet	Up to 128 sockets per cabinet, upgradeable with processors of varying core counts Peak performance: initially up to 99 TF per system cabinet
Interconnect	1 Aries routing and communications ASIC per 4 compute nodes 48 switch ports per Aries chip (500 GB/s switching capacity per chip) Dragonfly interconnect: low-latency, high-bandwidth topology
System Administration	Cray System Management Workstation (SMW) Single system view for system administration System software rollback capability
Reliability Features (Hardware)	Integrated Cray Hardware Supervisory System (HSS) Independent, out-of-band management network Full ECC protection of all packet traffic in the Aries network Redundant power supplies; redundant voltage regulator modules Redundant paths to all system RAID (configuration-dependent) Hot swap power supplies and compute blades Integrated pressure and temperature sensors
Reliability Features (Software)	HSS system monitors operation of all operating system kernels Lustre® file system object storage target failover; Lustre metadata server failover Software failover for critical system services including system database, system logger and batch subsystems NodeKARE™ (Node Knowledge and Reconfiguration)
Operating System	Cray Linux® Environment (includes SUSE Linux SLES11, HSS and SMW software) Extreme Scalability Mode (ESM) and Cluster Compatibility Mode (CCM)
Compilers, Libraries & Tools	Cray Compiling Environment, Intel compiler, PGI compiler, GNU compiler Support for the ISO Fortran standard (2008) including parallel programming using coarrays, C/C++ and UPC MPI 3.0 Cray SHMEM, other standard MPI libraries using CCM; Cray Apprentice and CrayPAT™ performance tools; Intel Parallel Studio Development Suite (option)
Job Management	PBS Professional job management system Moab® Adaptive Computing Suite job management system SLURM – Simple Linux Unified Resource Manager
External I/O Interface	Infiniband, 40 and 10 Gigabit Ethernet, Fibre Channel (FC) and Ethernet
Parallel File System	Full line of FC, SAS, and IB-based disk arrays with support for FC and SATA disk drives, ClusterStor™ data storage Lustre®, Data Virtualization Service (DVS) allows support for NFS, external Lustre and other file systems
Power	30 kW per compute cabinet, maximum configuration (three-phase or single-phase) Support for 480, 400, 230, 208 and 200 VAC computer rooms
Cooling	Air cooled with bottom to top airflow: 3,000 cfm intake
Dimensions (Cabinet)	H 80.75" x W 27.65" x D 64.00"
Weight (Cabinet)	1,500 lbs maximum operational 1,800 lbs maximum shipping
Regulatory Compliance	EMC: FCC Part 15 Subpart B, CE Mark, CISPR 22 & 24, ICES-003, C-tick, VCCI Safety: IEC 60950-1, TUV SUD America CB Report Acoustic: ISO 7779, ISO 9296