supercomputing in tight spaces

hp AlphaServer sc20

invent

hp AlphaServer sc20 highlights...

- Double to triple the density of other supercomputing systems, with 120 peak GFLOPS per rack, 21 GFLOPS/ft^2.
- With the excellent proven HP AlphaServer SC performance, ease of use, message-passing speed, fast global I/O, and extensive application catalogue.
- Small entry-level systems (eight processors).
- Large highly-scaled systems (256 processors or more).
- Large I/O: Can use large SC45 nodes for I/O servers for scalable storage capacity and I/O bandwidth.
- Up to 32 processors (53 GFLOPS) in a single-cabinet system.

The HP AlphaServer SC20 systems deliver the high scalability of the field-proven SC45 HPC technical supercomputers in a package that uses one third of the floor space; this is double to triple the sustained performance density of competing scalable systems, for memory bandwidth-intensive HPTC applications. You get record-setting performance per square foot, with a single-system image configuration that is uncommonly easy to use and manage. Because it uses proven, high-volume commodity parts, it ensures rock-solid reliability at a highly competitive price.

Good things come in small packages: the super-dense HP AlphaServer SC20 systems offer superior supercomputing capabilities for analyzing today's most challenging parallel, scalable, scientific and engineering applications. Individual nodes provide excellent sustained per-processor application performance, enabled by fast memory bandwidth per processor. The ultra-fast message-passing interconnect delivers highly efficient message-passing scaling. The single-system-image (SSI) features present a unified-system image for shared-parallel IO, parallel-job management, and scalable administration. Installation and upgrades are easy. HP AlphaServer SC20 systems are pre-staged with special burn-in procedures to ensure rapid on-site installation with a rapid scale-up to production-level supercomputing.

The HP AlphaServer SC20 is the clear choice, when scalable supercomputing speed in a SSI HPC system can't be compromised—even by limited floor space.

density by design - without sacrificing standard-setting scalability

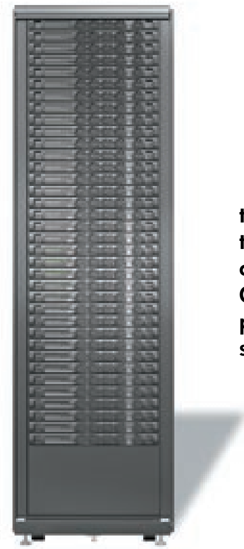
Scalable supercomputing demands the ability to link many high performance processors in parallel to improve time-to-solution for a wide range of applications. The HP AlphaServer SC20 accomplishes this using new ultra-dense HP AlphaServer compute nodes that can pack over 120 GFLOPS in a single 19" cabinet. Standard SC20 systems scale from eight to 256 processors (13 to 426 GFLOPS) with larger systems available on demand. This system follows in the footsteps of the many terascale HP AlphaServer SC45 systems working in the field, using the same binary-compatible scalable infrastructure and software on more densely engineered HP AlphaServer DS20L compute nodes.

accessible and affordable

The ability to build and manage supercomputer configurations cannot imply blank-check budgeting. The HP AlphaServer SC20 uses low-cost dual-processor COTS HP AlphaServer DS20L nodes. This dramatically lowers the cost of the entry-level SC configurations. A system can start with eight Alpha processors and scale to 256 (or more) processors, while shrinking the entry-level footprint to a single 19" rack that can hold up to 32 processors. The maximum standard footprint for 256 Alpha processors does not exceed six 19" racks—an unprecedented small space for such a large computational capability.

Because of its affordability and long-range True Cost of Ownership advantages (HP is recognized throughout the industry for its TCO leadership), HP AlphaServer technology puts the power of supercomputing within the reach of more cost-conscious organizations. This allows the fast-track development of solutions to large-scale problems in geographic info systems, weather and climate modeling, material sciences, energy management, high-end film and video, basic research, national security, and similar high-demand disciplines.

take an inside look



the unique advantages of the hp AlphaServer sc series come from carefully engineering COTS technology into a scalable, powerful and dense single-system-image supercomputer

sc interconnects are optimized for demanding distributed-scalable applications

HP AlphaServer SC20 systems use the proven message-passing SC interconnect, from Quadrics, common to the entire SC family. Its 200+ MBs of message-passing bandwidth per node delivers the best low-latency, scalable bandwidth and I/O available, enabling a wide range of applications to scale efficiently across tens or hundreds of processors. The super-low five microsecond latency enables incredibly fast interactions and efficient scaling of a wide range of applications over a large number of processors. The HP AlphaServer SC interconnect, in combination with SC file system software, also delivers high-bandwidth and scalable I/O from the distributed-scalable processors to common-shared file systems.

system-software single-image control and productivity

HP AlphaServer SC20 systems use the proven HP AlphaServer SC single-system image (SSI) software based on Tru64™ UNIX - the world's best UNIX for enterprise applications. Administrators and users see and manage a single integrated system, not just a loosely connected cluster. For ease of administration, single commands will install and update software across the entire system. LSF job scheduling and the high-bandwidth global SC file system allow scientists and engineers to use the system as a single, integrated unit. Since the SC systems are widely used, they include a complete range of applications and development software tools. Programmers and users net greater productivity and can maintain the efficiency of the system as it scales to meet demand. All of the system's features combine to reduce the amount of management and training time, programming effort and cost, significantly lowering the Total Cost of Ownership (TCO).

hp AlphaServer sc20 specific features:

The new HP AlphaServer SC20 systems share the architecture, interconnects, system software, programming tools, and applications of the industry-leading HP AlphaServer SC45 systems. The following features are specific to the SC20 product line:

- Two 833 MHz Alpha EV68 processors and 2 GB of memory per node in single rack unit (2P in 1U). This is triple the density of SC45 systems, with up to 72 processors per rack.
- A 4 MB cache per processor and 2.6 GB/s of memory bandwidth per 2P1U node.
- 100 MB/s per processor for the SC message-passing interconnect with five microsecond MPI latency.
- Two 64-bit, 33 MHz PCI slots per node (one used by the SC interconnect).
- SC20 scalability from eight to 256 (or more) processors (13 to 426 GFLOPS); the SC45 systems scale to multiple TFLOPS.
- Integration with SC45 servers for large I/O server nodes (huge I/O bandwidth and capacity).

take the next step

To find out more about the HP AlphaServer SC Series of supercomputers, contact HP at www.hp.com/solutions/hptc or send e-mail to highperformance@hp.com

facts and features

product families

Customers may choose HP AlphaServer SC45 or HP AlphaServer SC20 configurations. HP AlphaServer SC45 systems use HP AlphaServer ES45 components with 1 GHz processors and up to 32 GB of memory per node. HP AlphaServer SC20 configurations use HP AlphaServer DS20L components with 833 MHz processors and up to 2 GB of memory per node. HP AlphaServer SC20 systems integrate with ES45 nodes for large memory, high storage capacity, and high bandwidth I/O nodes. The 2P1U DS20L nodes have triple the compute density of the ES45 nodes.

HP AlphaServer SC systems are integrated combinations of an interconnect building block, compute building block(s) and storage building block(s). See the QuickSpecs at www.hp.com/solutions/hptc for detailed SC20 and SC45 configuration specifications.

hp AlphaServer sc20 configuration summary:

- Two Alpha EV68 833 MHz processors per node (2P1U)
- Up to 72 processors per compute building block rack
- 4 MB cache per processor
- 2 GB memory per node
- Scalability of eight to 256 (or more) processors per system
- 72 GB storage per DS20L node
- 2.3 TB storage per compute building block
- 4.5 TB storage per I/O rack (scalable across multiple racks)
- Standard 19" racks (RETMA 2.0 M tall)
- 532 MB/s IO per node on two 64-bit PCI slots (2/3 length) 0-1 available
- Compatibility with ES45 nodes for larger memory size, faster I/O bandwidth, more I/O slots, and larger storage capacity

features: Auto reboot, thermal management, remote system management, RAID, memory failover, ECC memory, ECC cache, ECC system bus, SMP CPU failover, error logging, optional Uninterruptible Power Supply (UPS), redundant file-service with auto failover, redundant management server available, pre-staged with additional burn-in at the factory

IO options: Fast Ethernet, Gigabit Ethernet, RAID, Ultra2SCSI, Ultra3SCSI, Fibre Channel

software: Tru64 UNIX 5.1a HP AlphaServer SC system software, including Cluster File System, Parallel File System, and Platform LSF

warranty

- 1-year on-site, 9-hour x 5-day warranty with next-business-day response
- Optional service plans for up to 24 x 7, 2-hour, same-day response time are available, as well as a complete portfolio of worldwide service offerings to maximize the uptime of your critical system environment

service and support

The HP AlphaServer SC includes staging, integration and installation of the interconnect building block, compute building block(s) and storage building block(s). A QuickStart service is included, with three to five days of on-site support and training from Global Services to customize the configuration, set up accounts, and otherwise train and prepare the system and administrators for a smooth launch into production use and maintenance. Three days are supplied for 16-way switch configurations and five days for 128-way switch configurations.

Additional training courses are available for an additional charge. Optional integration and installation are available for quotation on options not included in the interconnect, compute or storage building blocks.

Optional custom site planning, custom freight arrangements, VIS engineering team on-site installation of HP AlphaServer SC and tailored customer configuration documentation are also available for quotation.

hp system software

HP AlphaServer SC system software is included and provides utilities and libraries necessary for the operation and management of the HP AlphaServer SC20. HP AlphaServer SC Development Software is a highly recommended option, which includes FORTRAN, C++, and the Developer's Toolkit for each node.

performance

For the latest performance numbers, visit www.hp.com/solutions/hptc

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