



Compaq AlphaServer PS160 and PS320

Product brief



Supercomputer power in a scalable parallel server.

It's not supposed to be this easy..

The *Compaq AlphaServer PS160* and *PS320* systems at a glance:

- Configured and tuned for High-Performance Technical Computing (HPTC) with the *Compaq Tru64 UNIX* operating system
- Scalable performance, memory, bandwidth, I/O, storage
- Choice of 16 CPU (PS160) or 32 CPU systems (PS320), featuring new generation 500 MHz *Alpha 21264* processors — the fastest on the planet
- Based on 4 CPU building blocks using revolutionary Compaq cross-bar switch technology for maximum SMP performance and scalability
- Integrated high-performance System Area Network based on high bandwidth, low latency, *Memory Channel II* 8-way cross-bar technology, single or dual-railed, for optimal multi-job throughput or to apply all 16 or 32 CPUs to a single large parallel job
- Simplified system management software allows you to configure, manage and maintain the PS160 or PS320 system from a single management workstation
- Starting at 8 GB of ECC memory in the PS160 system, upgradable to 64 GB, and 16 GBs in the PS320 system, upgradable to 128 GB

COMPAQ

Better answers

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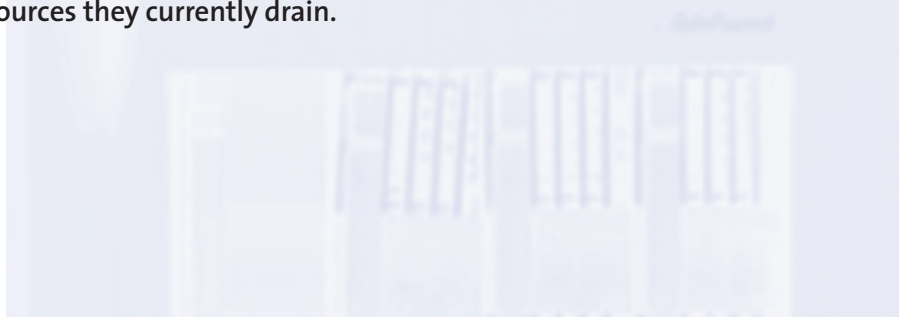
Introducing supercomputer power in a scalable parallel server from Compaq — this is getting good.

In a move that solidifies Compaq's dominating position in the High-Performance Technical Computing (HPTC) market — we are number one in HPTC market share and revenue according to IDC's *High Performance Technical Computing Market: Review and Forecast, 1997 – 2002* (Aug, 1998) — we are delivering supercomputer power in a stable, mature architecture at a fraction of the price of a traditional supercomputer.

Introducing parallel servers from Compaq — the PS160 and PS320 *AlphaServer* systems.

We've based our parallel servers on the industry-leading *Compaq AlphaServer* ES40 systems — quad-processor systems powered by the *Tru64 UNIX* OS and the new generation *Alpha 21264* processors with revolutionary new cross-bar switch architecture. The ES40 system is balanced for HPTC applications, matching memory, I/O bandwidth, and capacity to the 64-bit *Alpha 21264* CPUs to give optimal scaling and throughput for single CPU and SMP jobs.

The PS160 system combines four ES40 building blocks, for a total of 16 processors, integrated into a single parallel server with a high-bandwidth, low-latency, *Memory Channel II* cross-bar switch. The PS320 server combines eight ES40 building blocks, for a total of 32 processors, with one or two *Memory Channel II* cross-bar switches for maximum performance and scalability for multi-job throughput, or for large distributed memory parallel jobs. Now that is the kind of power that thrives on crunch time, no matter how tough your applications are, or how many resources they currently drain.





The CPU performance of *Alpha* is undeniable. But how does the cross-bar architecture work?

Compaq engineers have pioneered advanced cross-bar switching capabilities that provide multiple parallel data paths between the CPUs, memory, and I/O within each ES40 system building block. A second cross-bar switch provides multiple parallel data paths between the building blocks via the *Memory Channel II* System Area Network. This breakthrough cross-bar technology provides maximum data bandwidth while eliminating the contention for system resources that can artificially limit application performance.

Address scalability.

Like all *AlphaServer* systems, the PS160 and PS320 servers are engineered with an eye toward the future. Both the PS160 and PS320 servers are configured in Compaq rackmounted cabinets, so working on your system is easy and convenient. Any upgrade you need will be simple.

We also included one-half GB of ECC memory per processor on the PS160 system for a total of 8 GB, and on the PS320 system for a total of 16 GB, upgradable to 64 GB and 128 GB, respectively. This keeps the price down today, but allows you to upgrade whenever business conditions demand it.

Scalable storage is provided with the *Compaq StorageWorks* product family, including standard internal storage in each ES40 system building block, with the ability to add additional internal storage or external storage arrays.

In the future, you can upgrade to the exciting *AlphaServer SuperComputer (SC)* systems that will scale to the TFLOPS and beyond.

Sounds like that kind of horsepower could benefit a wide range of businesses.

Wherever and whenever a business or institution needs a high-end computational platform, the PS160 and PS320 systems with *Compaq Tru64 UNIX* OS will make a massive difference. Here are just some of the types of applications that are benefiting greatly from Compaq's leadership HPTC position:

- *Government, Academic, and Military R&D*
- *Mechanical Engineering Simulation (MCAE)*
- *Biological and Chemical Sciences*
- *Geographic Information Systems*
- *Electrical Engineering Simulation*
- *Geosciences/Oil & Gas*
- *Financial Simulation, Including Risk Analysis*
- *Weather Forecasting*
- *Digital Content Creation*
- *Satellite Image Processing*

You say your parallel servers are easy to manage. Tell me more about that.

Compaq's Parallel Server Management Utility, included at no additional charge, gives you a single window to view, manage, and maintain your PS160 or PS320 system. Moreover, significant advances in these critical tools help you avoid the repetitive tasks so common to older clustering solutions.

So when it comes time to create and manage new user accounts, or install an application

upgrade, a license key, or UNIX updates, you won't be starting from scratch, rebuilding the wheel for each ES40 system building block. You do it once... set it... forget it... and move on.

But it's the *Memory Channel II* System Area Network that ties it all together?

Yes, and *Memory Channel II* is supported as part of Compaq *TruCluster* software, so all of the many tools and applications available for *TruClusters* will run on the PS160 and PS320 system. Everything from parallel technical applications based on Compaq's optimized PVM and MPI products and third-party tools such as LSF, Codine, Totalview, VAMPIR, to high-availability applications based on RDBMSs such as Oracle.

And with the next release, *TruCluster* software adds support for a cluster-wide file system and single-system image, so the management of a parallel server will get even easier.

Tell me more about development tools.

Compaq understands that you need to harness the power of your PS160 or PS320 system to divide and conquer the unique problems you face. That's why Compaq's leading edge development tools are available for parallel servers, including:

- *Fortran, C, C++ (Compilers)*
- *Code Management*
- *Debuggers*
- *Performance Monitoring, Analysis, and Optimization Tools*
- *Distributed Memory Libraries: Compaq's Optimized MPI and PVM Products*



What kind of warranty are we talking about?

The *Compaq AlphaServer* PS160 and PS320 systems come standard with a three-year hardware warranty. If your system should need service during the full three years after purchase, you can count on Compaq to be there with one of the most highly acclaimed worldwide services organizations in the industry.

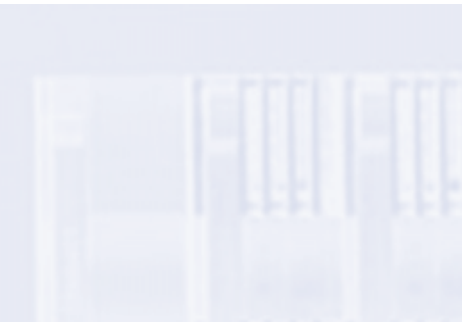
So what's my next step?

Whether you want more information, or you want to order your *Compaq AlphaServer* PS160 and PS320 systems right away, you can:

- *Visit our AlphaServer Web sites at www.compaq.com/alphaserver and www.compaq.com/hpc*
- *Call us at 1-800-344-4825 via touch-tone phone in the U.S. or Canada*
- *Call 00-1-978-506-3777 from other countries*
- *Call your local reseller/Compaq representative*

What's more, Compaq engineers have designed everything about your supercomputer system to work together seamlessly and flawlessly. From the advanced *Memory Channel II* System Area Network, to simplified system management software that we include standard, your system is built to virtually run itself. You can even configure, manage, and maintain the system from a single management workstation.

And with standards-based development tools and the most advanced UNIX on the market providing a rock-solid base for you to build your solutions around, supercomputing is in many ways becoming simpler than ever.



Compaq AlphaServer PS160 and PS320 systems

Form Factor	Rackmount, choice of single-rack 16 CPU systems (PS160) or dual-rack 32 CPU systems (PS320)
Processor/Cache	Choice of 16 or 32 500 MHz <i>Alpha</i> 21264 CPUs; with 64 KB L-cache, 64 KB D-cache on chip, and 4 MB per CPU L2 cache
Memory	8 GB (PS160) or 16 GB (PS320), ECC, 4-way interleaved industry-standard DIMM memory, expandable to 64 or 128 GB, respectively.
System Architecture	Four or eight 4 CPU SMP building blocks (ES40) with advanced dual 256-bit wide memory datapaths and cross-bar switch technology providing 5.2 GB/sec (peak) memory bandwidth; dual 64-bit PCI buses providing 532 MB/s I/O throughput. These are tied together with a <i>Memory Channel II</i> System Area Network, providing 95 MB/s bandwidth per rail, one or two rails per building block. A <i>Compaq Professional Workstation XP1000</i> is optionally provided as the system management console.
Performance	*For the latest performance numbers visit www.compaq.com/hpc
Internal Expansion	10 64-bit PCI slots, in two PCI buses, per building block, for a total of up to 80 PCI slots (PS320)
Storage Controllers	Integrated single-channel Ultra2-SCSI, Fast SCSI-2 FW SCSI-2 FWD SCSI-2; Ultra SCSI Raid, CI, DSSI in each building block
Network Controllers	10/100 Fast Ethernet, Token Ring, FDDI, asynchronous communication. Dedicated 100 Mb system management LAN.
Drive Bays	In each building block: up to 12 internal hot-swap Compaq drives in the system drawer, implemented using two internal Ultra-2 SCSI cages each supporting either four 1.6" drives or six 1" drives. Three removable media bays per building block: one 3.5" bay for diskette drive; one 5.25" for CD-ROM; and one open FH 5.25" bay for tape or hard disk drives. Additional external <i>StorageWorks</i> ' drive bays or storage arrays can be added.
Power Supply	Up to three hot-swap 750-watt N+1 power supplies per building block: one standard, two optional
Cooling	Six hot-swap redundant variable speed fans per building block
Interfaces	Two serial, one parallel, keyboard, mouse per building block. One serial connection from each building block tied to a terminal concentrator for use by the Parallel Server Management Utility.
High-Availability	Server management software, hot-swap redundant power and cooling, auto reboot, thermal management software, remote system management, RAID, hot-swap drives, memory failover, ECC memory, ECC cache, SMP CPU failover, error logging, optional Uninterruptible Power Supply (UPS), and UPS Power Management Software
Clustering Options	<i>Compaq Tru64 UNIX OS</i> , <i>TruCluster Available Server</i> , and <i>TruCluster Production Server</i>
Service and Support	Compaq provides a 3-year on-site, 5 day x 9 hour warranty with 24-hour response. Optional service for up to 4-hour same-day response time are available.
Operating Systems	<i>Tru64 UNIX OS 4.0F</i>
Standard Software	Pre-installed <i>Tru64 UNIX OS</i> and the Parallel Server Management Utility. Additional server management software and Internet-Energized software are standard on the ES40 building blocks.



www.compaq.com/alphaserver
and www.compaq.com/hpc

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