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Compaq Alpha Systems Performance in e-Business and Technical Computing

Abstract: Compaq Alpha systems are the fastest in all of the important tests — for business performance such as online transaction processing (OLTP) and analysis (OLAP) with popular business software such as SAP R/3 and SAS.

At 400 SAP R/3 SD users, the *AlphaServer* ES40 system is way ahead of Sun's result of 190. At 30,738 transactions per minute (TPC-C), the same system is way better than HP's 22422 for their L2000. And the performance for SPECweb and SPECjvm (Java) also lead the industry, making Compaq's *AlphaServer* systems best for the new Internet-driven economy.

Finally, in technical applications such as design and research, Alpha systems remain in the lead.

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Compaq Alpha Systems Performance in eBusiness and Technical Computing

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Why are Compaq Alpha systems so fast?

Compaq Alpha systems are able to deliver superior business and technical performance for many reasons:

- high clock speeds
- advanced processor architecture techniques that process multiple instructions with each cycle
- wide data paths
- use of memory-to-CPU switch technology (rather than buses)
- large memory up to 32 GB in the new Compaq *AlphaServer*[™] and *AlphaStation*[™] ES40 systems, use of 64-bit PCI I/O buses
- use of 64-bit operating systems: Compaq *Tru64*[™] UNIX, Compaq *OpenVMS*[™], and Linux

The 21264 EV6-based Alpha systems delivered up to twice the performance of the previous generation. Now, the new 21264A EV67-based systems are performing up to 60% improvement in benchmarks and up to double the performance in actual customer environments.

The “Alpha systems 21264A Technical White Paper” at www.compaq.com/alphaserver contains more information on the technology under the hood of the new Alpha systems.

How well do benchmarks predict performance?

Our customers tell us that they find better performance from their Compaq Alpha systems than most of the standard benchmarks infer. They tell us that they look at the standard measurements to see what systems they should consider, so Compaq continues to be committed to running all the important tests for business and technical computing. Interestingly, *AlphaServer* performance on application benchmarks such as SAP R/3 Supply/Distribution leads the competition even more than our TPC numbers do.

When the Alpha family of servers and workstations dominates a wide range of benchmarks, and does so over a considerable period of time, this indicates a solid track record that our customers have come to expect. Now, the new 21264A EV67 processor again is widening the gap between Alpha systems and the competition. In the age of the Internet, this means that your computers can keep up with the demands of the dynamic and unpredictable World Wide Web; it also means tasks are done faster, costs are lower, and most importantly customers are more satisfied.

In fact, customers have reported that with Alpha systems they are now able to tackle problems that could not possibly have been solved before. For example, Celera Genomics, who are mapping the human genome: *AlphaServer* systems are the backbone of their computing environment! Others include Amazon.com, EarthLink, MIT, Caltech, Sandia Labs, Monsanto, U.S. Dept. of the Census, PurchasePro.com, Novartis, AOL, AltaVista, Best Western, Osram, and many others. They all need and deserve the best products, and having the best benchmark performance is an indication to them that these are the best products in the industry.

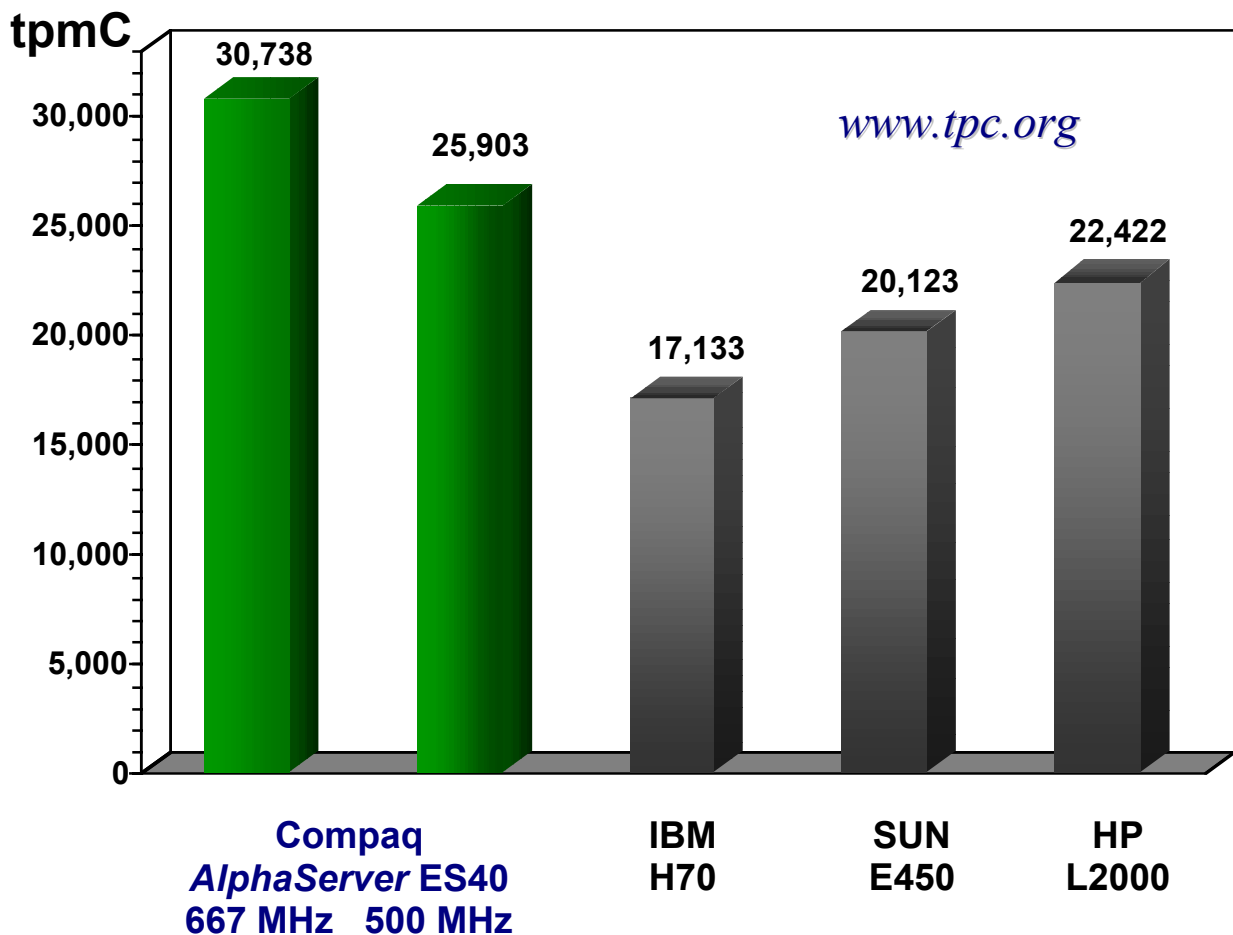
Business applications

Successful business computing in the Internet economy has come to mean not only great database and online transaction and analysis capabilities, but also great Web service. Our customers tell us they are only a click away from losing a sale, so good Web transaction capability is key these days. The Compaq Alpha systems have demonstrated a significant performance leadership in all of these business sectors.

Online Transaction Processing (OLTP)

With OLTP, speed is critical. Whether purchasing a plane ticket, a book, or an auto part, customers have come to expect quick transactions.

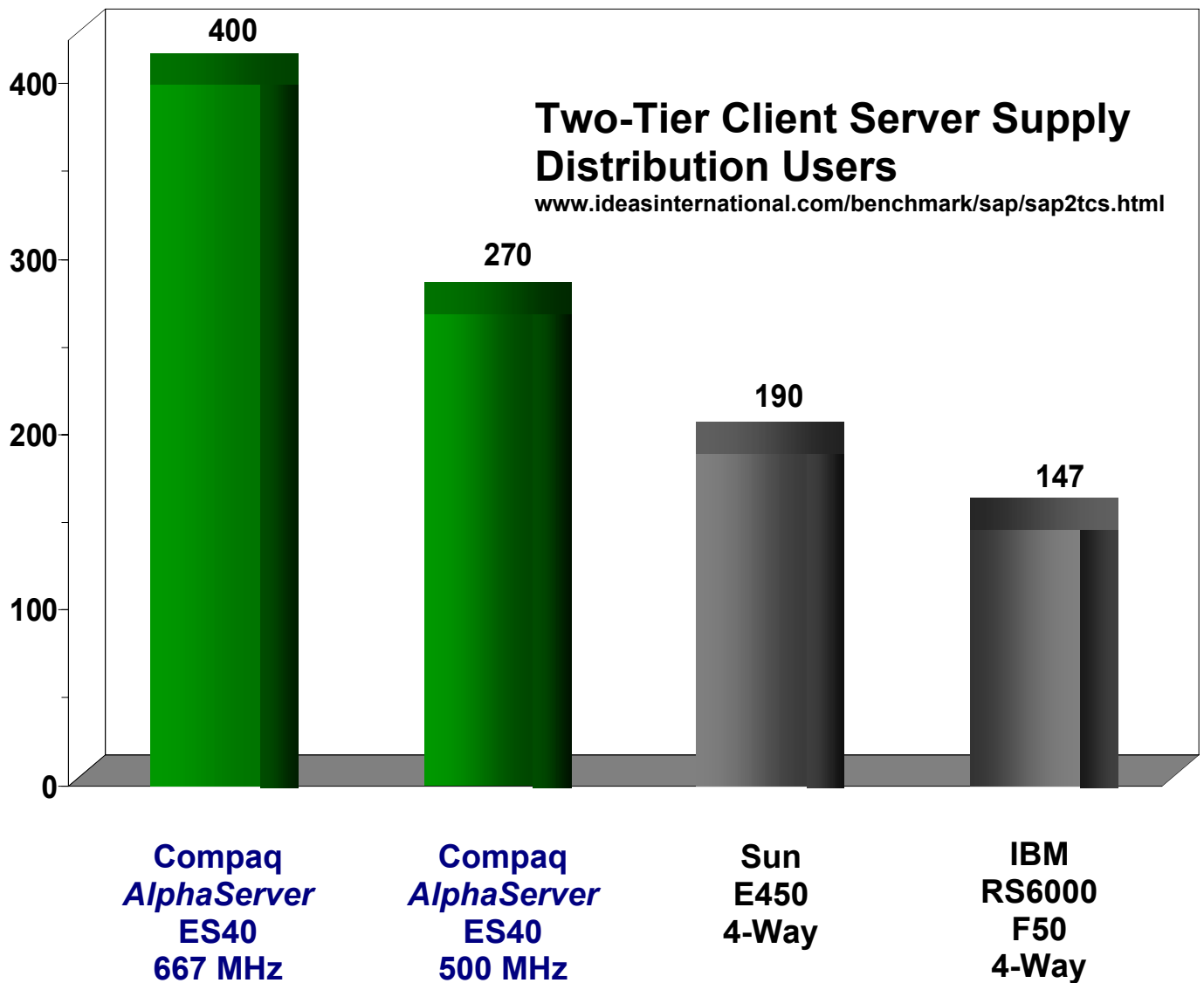
AlphaServer ES40 TPC leadership



The key performance benchmark here is TPC-C, which simulates an order entry environment and measures transactions per minute. In February 2000, continuing a tradition of leadership performance, the Compaq *AlphaServer* ES40 system posted the fastest results, 30,738 tpmC, of any RISC/UNIX machine, outperforming its nearest competition, the HP9000 L2000, by 40%. In cost, similar to HP and Sun, and dramatically less than IBM.

An even better predictor of superb business performance is SAP's set of benchmark tests. The SAP R/3 Supply and Distribution test is particularly popular with customers looking for the best business application performance. The quad-processor *AlphaServer* ES40 system achieves the highest performance in this test.

***AlphaServer* ES40 SAP leadership**



Compute-Intensive Tests	Compaq <i>Tru64</i> UNIX on <i>AlphaServer</i> DS20E & ES40 systems	Solaris on E10000	Alpha faster than E10000
Test 1	4min:55sec	45min:45sec	9.29 times
Test 2	30min:14sec	1hr:52min:42sec	3.73 times
Test 3	3hr:40min:43sec	10hr:57min:37sec	2.98 times
Test 4	2min:30sec	7min:41sec	3.04 times
Test 5	:5.8sec	:18.5sec	3.19 times
Test 6	:40.8sec	2:21sec	3.46 times

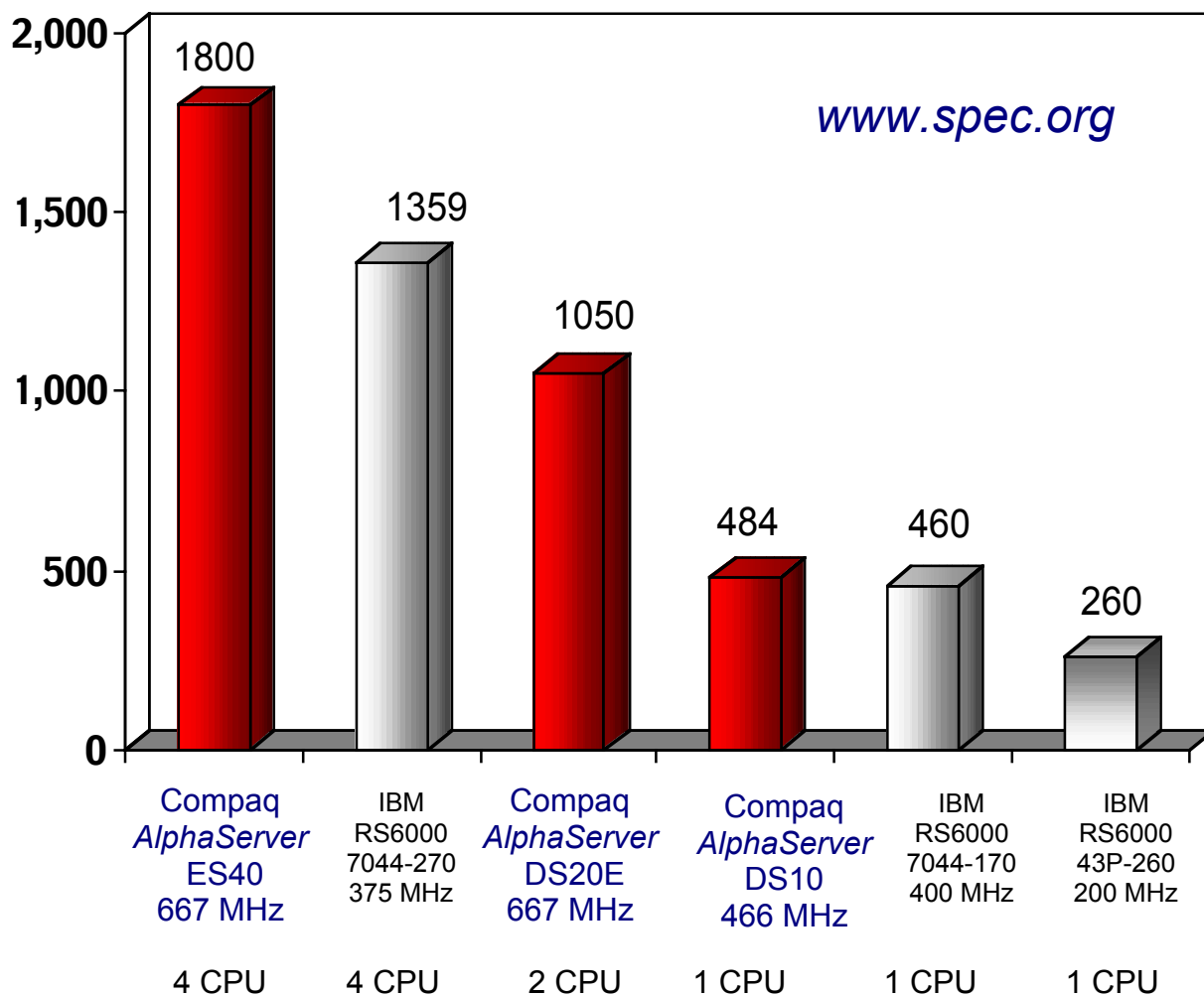
Analysis of business data in near-real time is also an important task for our customers. The Compaq *AlphaServer* DS20E and ES40 systems show dramatic performance on compute-intensive tasks in the popular analysis software from SAS compared to Sun E10000:

www.compaq.com/alphaserver/performance/sas.html

E-commerce/Internet

SPECweb99

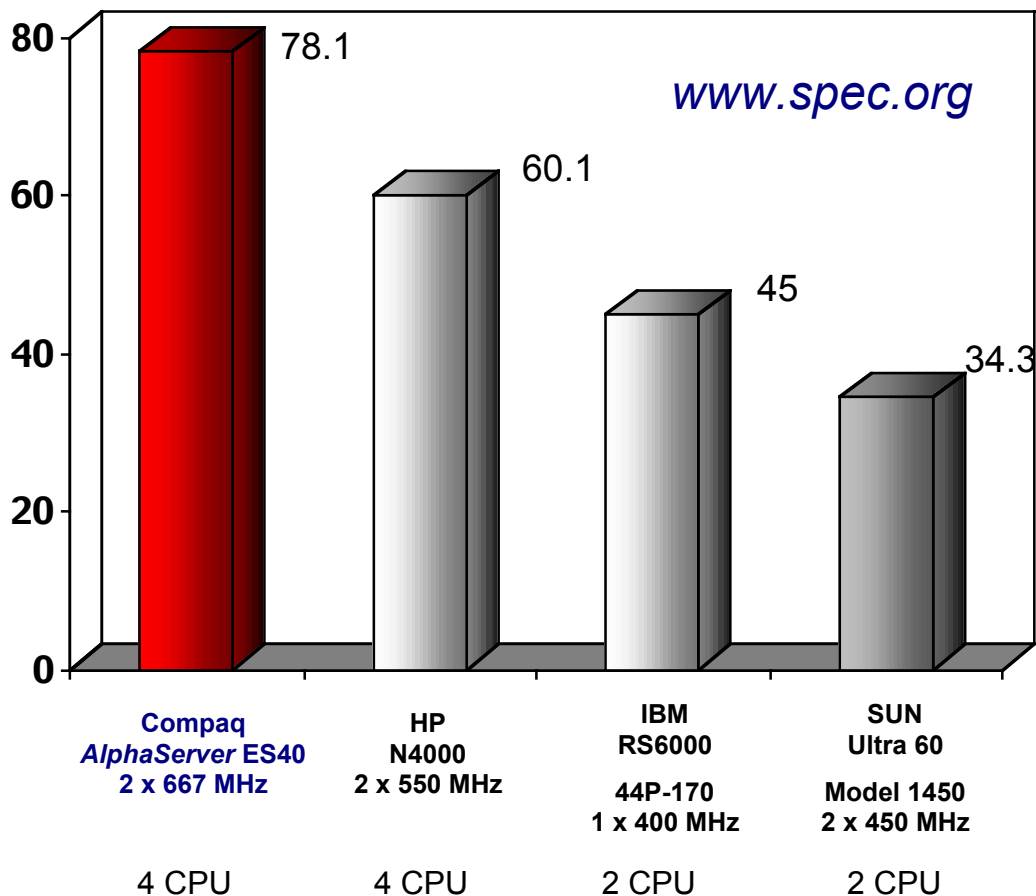
With Internet and e-commerce applications, the best measure of capacity is the SPECweb99 benchmark, which recently replaced SPECweb96. SPECweb99 measures the number of simultaneous connections enabled by different servers. A 4-CPU *AlphaServer* ES40 system is the current leader by a substantial margin, with 1,800 connections, 32% higher than the next best, a 4-CPU IBM RS6000.



SPECjvm98

The SPECjvm98 benchmark suite measures Java performance on eight different Java programs derived from real Java applications, including LZW compression, MPEG-3 decoding, ray tracing, data management, and language processing. The tests measure the time it takes to load the program, compile on the fly, and execute the test. The SPECjvm98 tests are the best industry-standard tests that are currently available for evaluating Java performance.

In the SPECjvm98 benchmark, which measures computer system performance for JVM client platforms, results show Compaq *AlphaServer* system way ahead of the competition. A dual-processor *AlphaServer* ES40 Model 6/667 systems outperformed the next fastest competitor, Hewlett Packard, by 30%, IBM by 72%, and Sun by 128%.

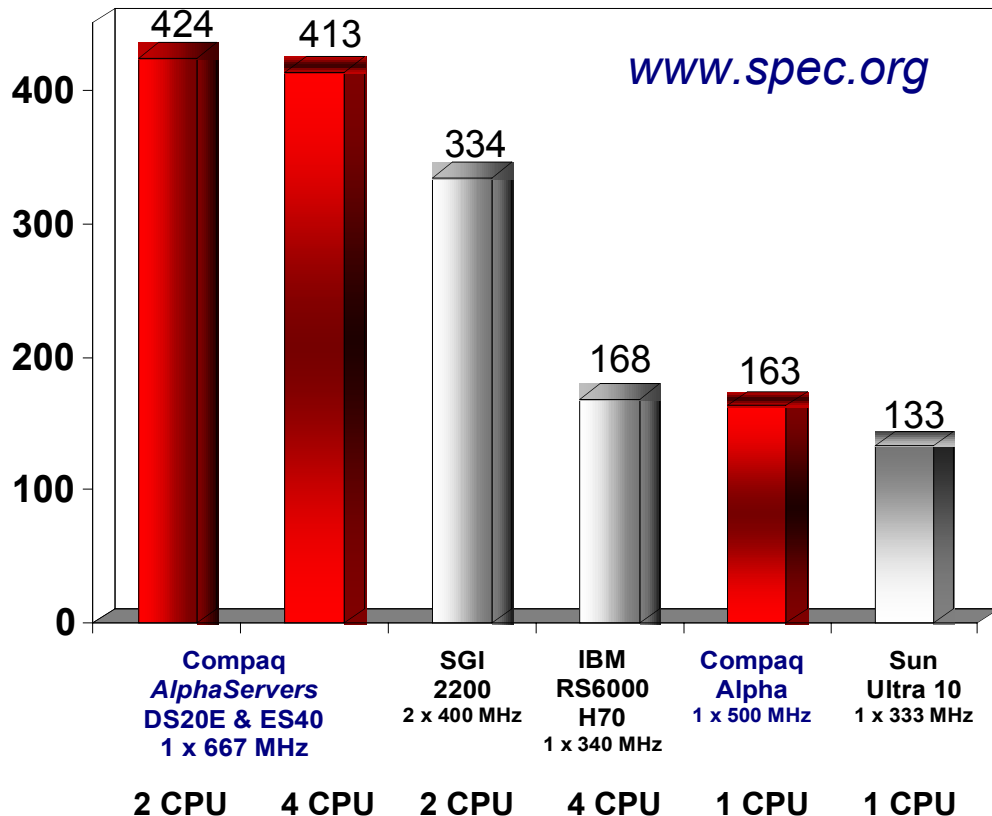


Industry-standard performance benchmarks

Among those industry-standard benchmarks relevant to a wide variety of industries and disciplines, Alpha is the leader by a substantial margin in three of the primary SPEC benchmarks.

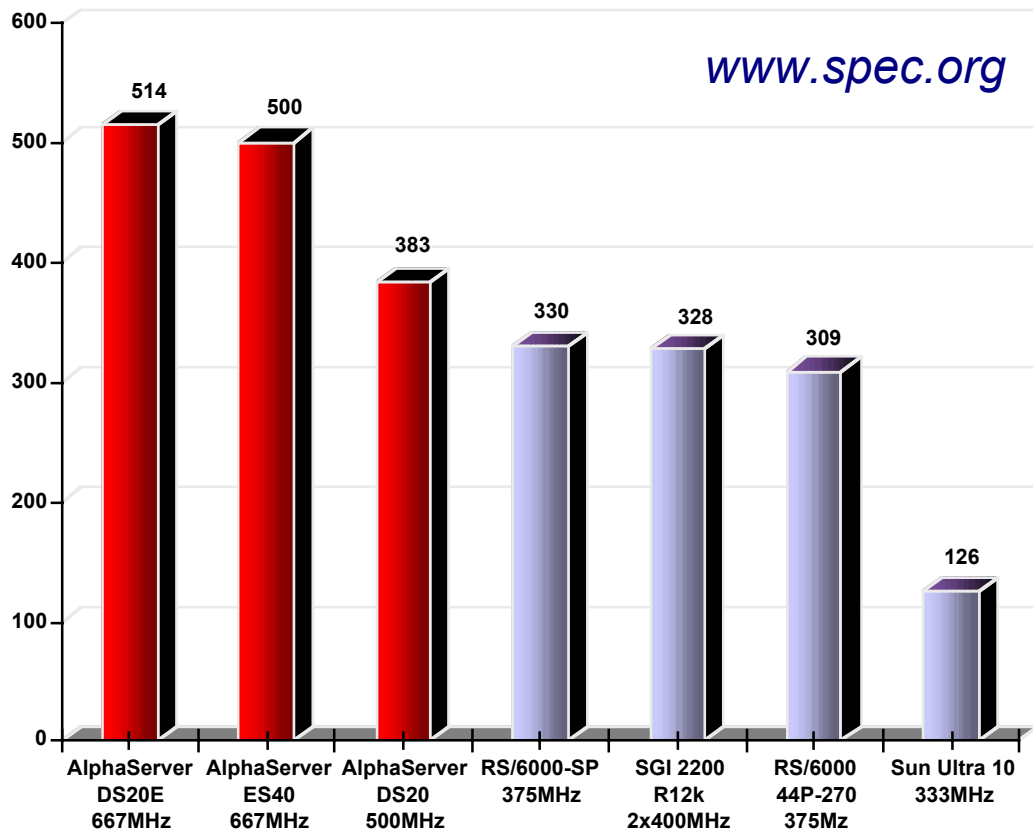
SPECint2000

SPECint2000 measures the compute-intensive integer performance of the computer's processor, memory architecture, and compiler by running applications for data compression, CAD, combinatorial optimization, chess, group theory, perl, gcc, and an object-oriented database. Both Compaq *AlphaServer* DS20E and ES40 systems, with the latest 21264a processor, hold a 20% performance edge over their nearest competitor, the Intel PIII, and surpass the IBM RS6000 H70 and Sun entry by a factor of 2.5.



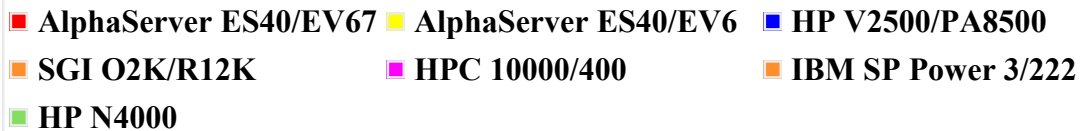
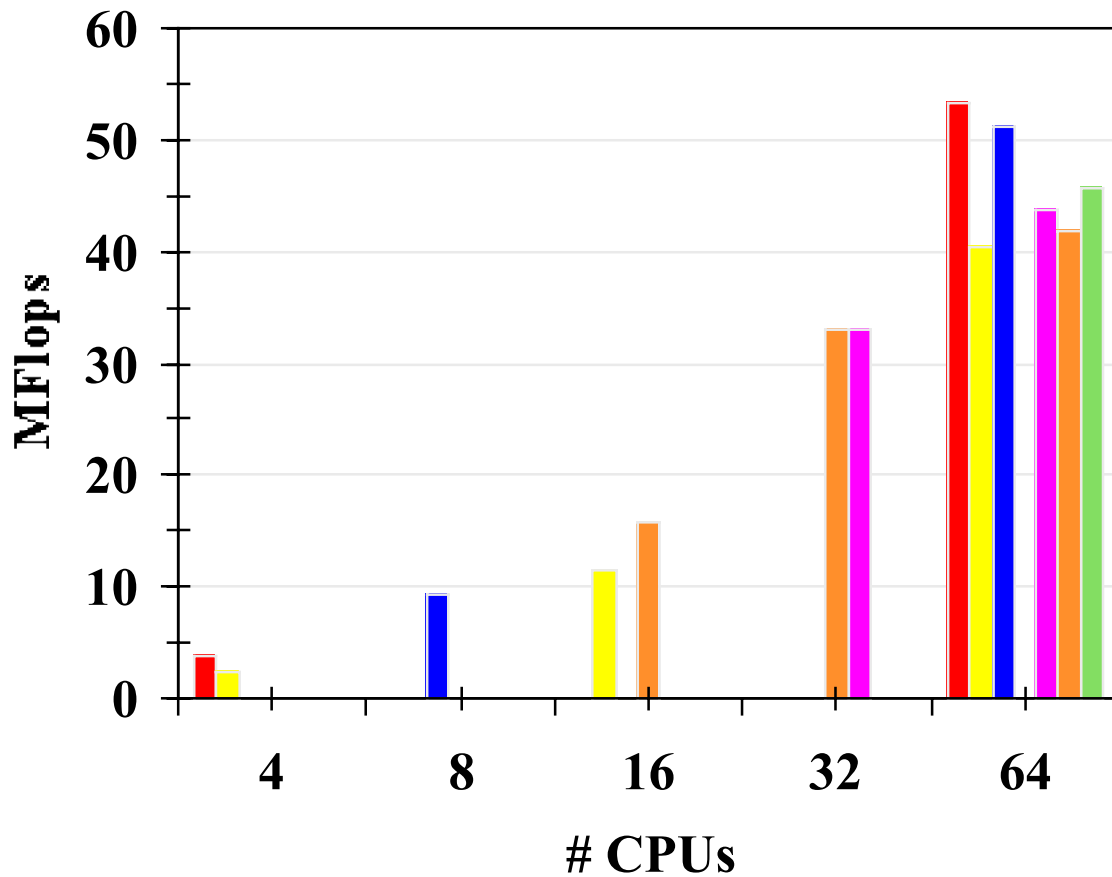
SPECfp2000

SPECfp2000 measures the compute-intensive floating point performance of processor, memory architecture, and compiler by running applications from physics, chemistry, meteorology, fluid dynamics, image recognition, earthquake modeling, number theory, crash simulation, and 3-D graphics. Results show both the *AlphaServer 21264* and *21264a (EV67)* processors with the highest floating point performance by a considerable margin. Three different *AlphaServer* systems topped the list, with the EV67 version of the *AlphaServer DS20E* and *ES40* systems 1.56 times faster than the latest IBM Power3-II chip, 1.85 times faster than the HP9000 N4000, and 3.9 times faster than the Sun entry.



Linpack

The Linpack benchmark, which measures floating point performance and memory bandwidth. The Compaq *AlphaServer* ES40 EV67 system is the highest performing system, beating even much bigger and expensive systems.



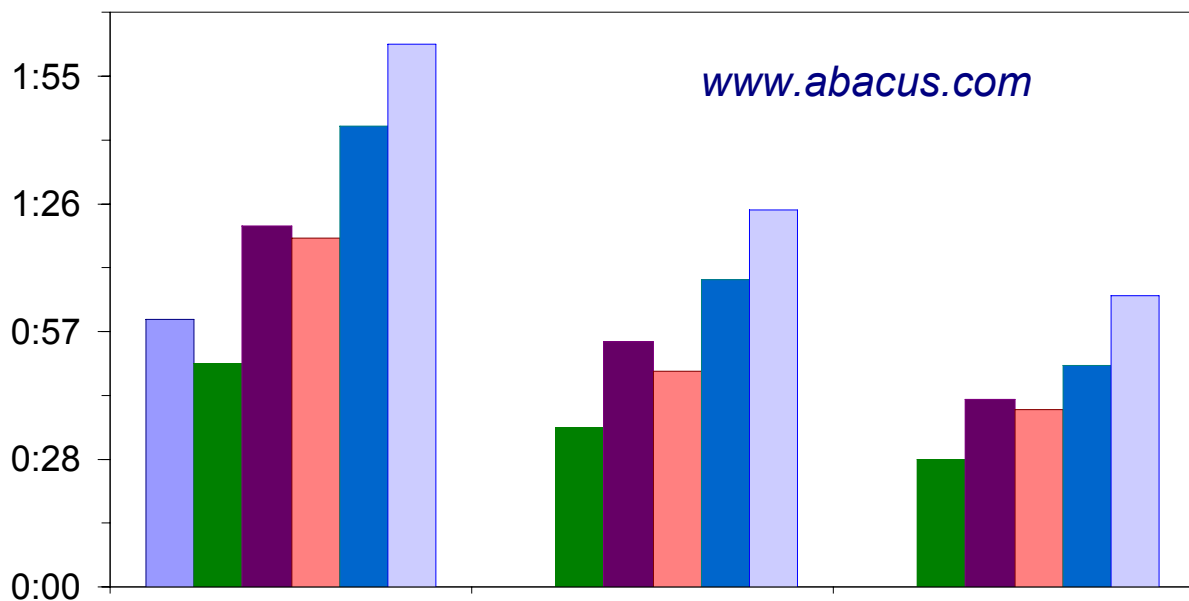
Technical computing

This broad sector includes scientific and applied research, finance, design, and manufacturing, covering a wide range of tasks from CAD modeling, computation, and programming to fluid dynamics, image recognition, and graphics.

Benchmarks abound here, but in nearly every case, Alpha systems have posted the leading results, beginning with the SPEC benchmarks noted earlier and continuing across a range of HPTC application benchmarks, which include:

ABAQUS/Explicit

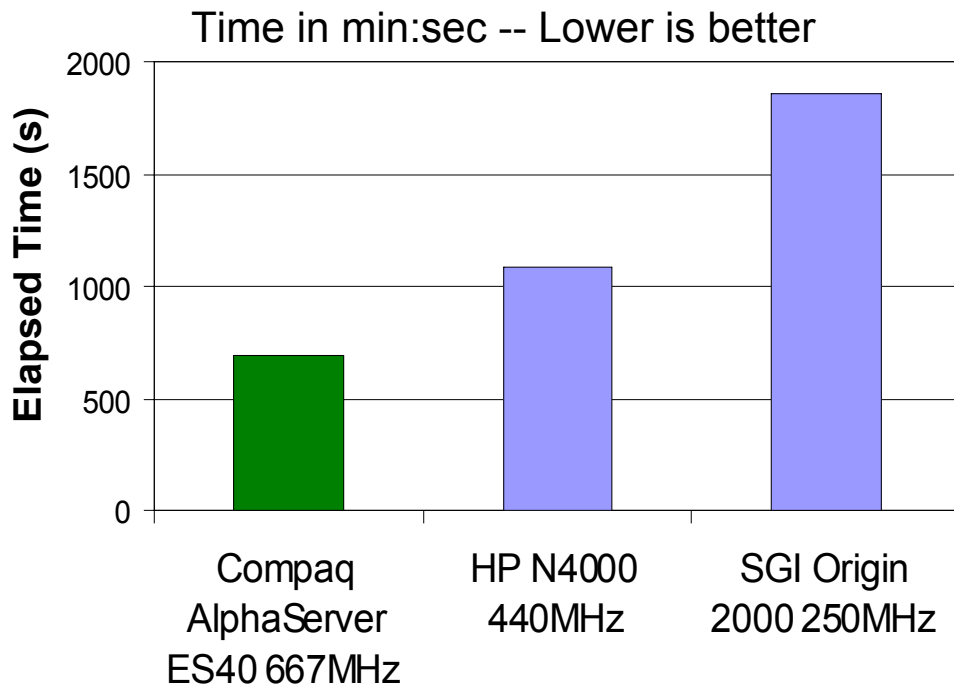
The ABAQUS/Explicit V5.8 benchmark measures speed in running one of the most widely used Finite Element Analysis MCAE applications. The Compaq *AlphaServer* ES40 system 667 MHz using the 21264a EV67 processor is 36 percent faster than the new 375 MHz IBM Power3 and 38 percent faster than the 440 MHz HP N4000. Also, running four simultaneous job streams provides virtually no degradation in performance.



- AlphaStation XP1000 (667MHz)
- AlphaServer ES40 (667MHz)
- HP9000 N4000 (440 MHz)
- IBM RS/6000 SP/POWER3 (375MHz)
- SGI Origin2000 (300MHz)
- Sun Enterprise E4500 (400 MHz)

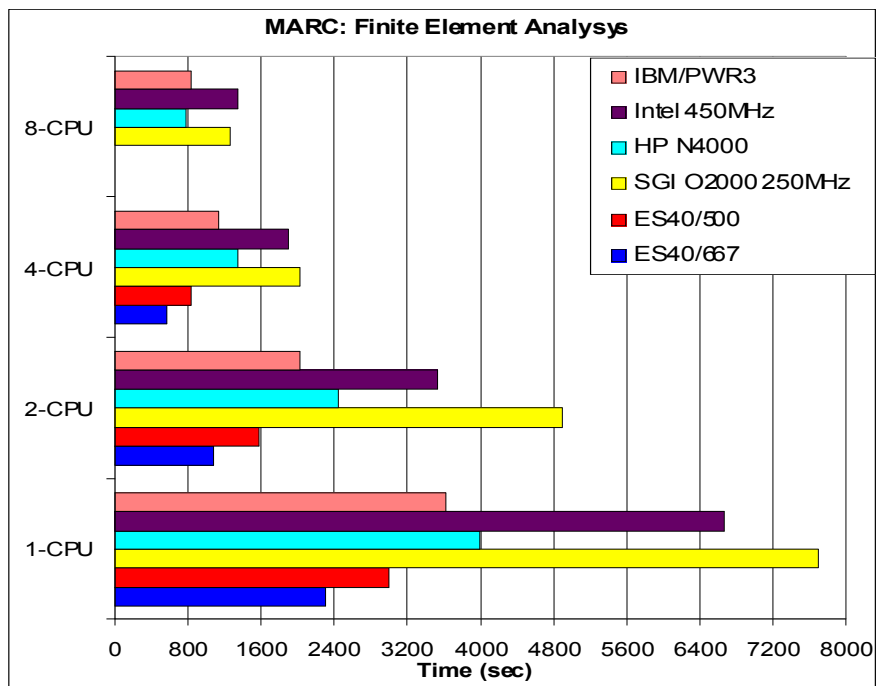
LS-DYNA

LS-DYNA is a popular Finite Element Analysis application for which the *AlphaServer* ES40 667 MHz EV67 system is the leader vs. HP and SGI. This helps car designers simulate crashes and other product designers simulated dropping the product for impact analysis. Being faster means that the product may be brought to market sooner!



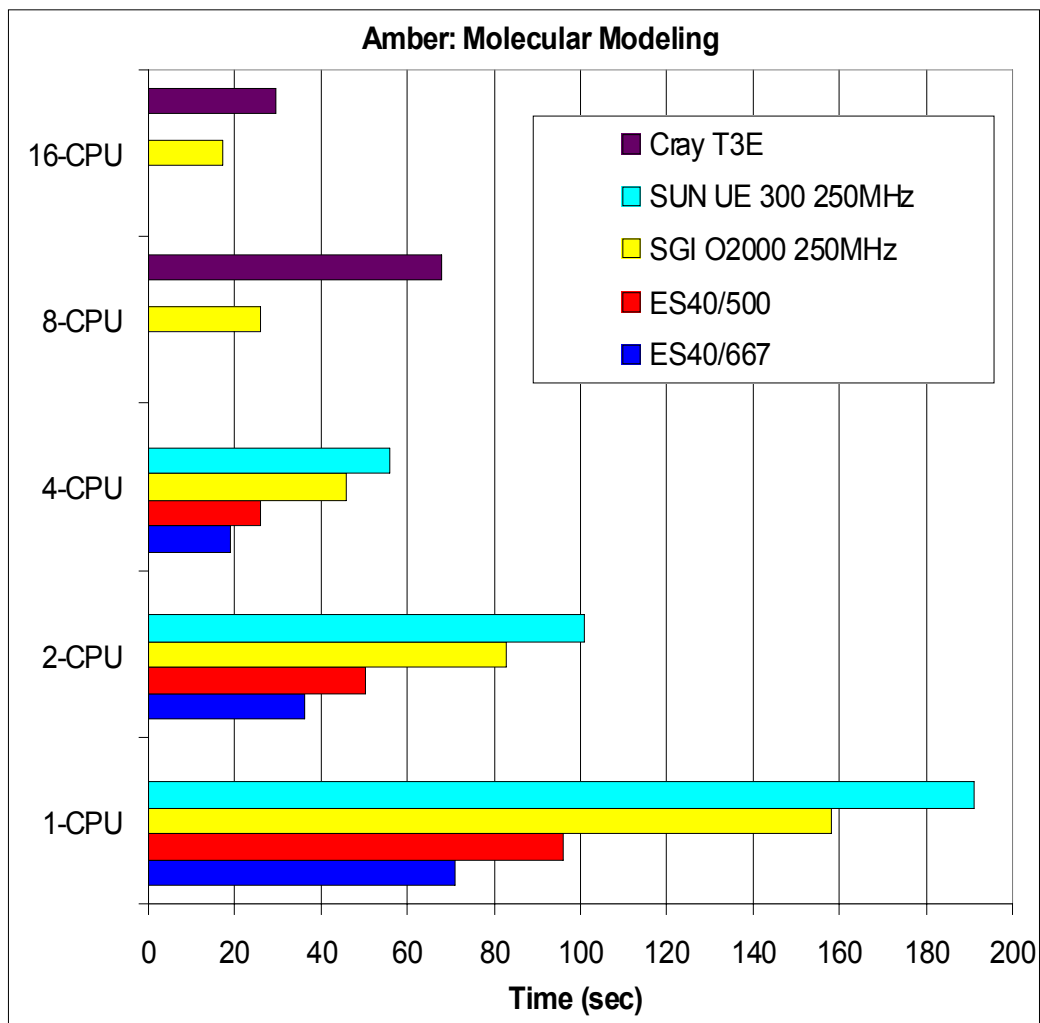
MARC

MARC K7.3 is another Finite Element Analysis application used in design. The Compaq *AlphaServer* ES40 systems (500 and 667) provide significant performance leadership. It is 70% faster than NP4000 when both systems have one processor, 2.4x faster when both have four processors. It is 50% and 2x faster than the IBM SP Power3 200 MHz, 2.4x to 3.3x faster than the Intel Pentium-II Xeon 450 MHz, and 2.2x to 3.3x faster than the SGI Origin 2000 250 MHz.



AMBER

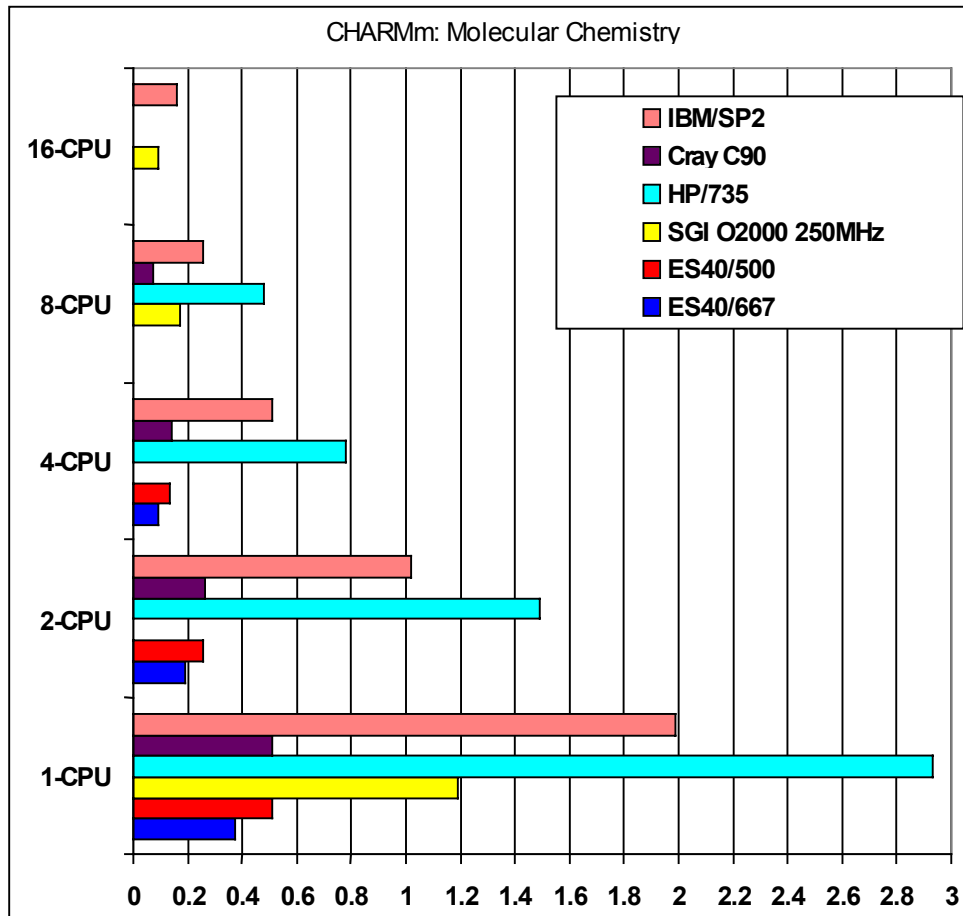
In the AMBER benchmark, which measures the speed of molecular modeling, the Compaq *AlphaServer* ES40 667 MHz is 2.2 to 2.4 times faster than the SGI Origin 2000 and 2.7 to 3 times faster than the Sun Enterprise 3000.



CHARMm

CHARMm is the Chemistry at Harvard (University) Macromolecular Mechanics application. Here the *AlphaServer* ES40 667 system with four CPUs is faster than the Cray C90, the 8-CPU Origin 2000 and HP SPP 735, and the 16-CPU IBM SP2, all much bigger and more expensive systems!

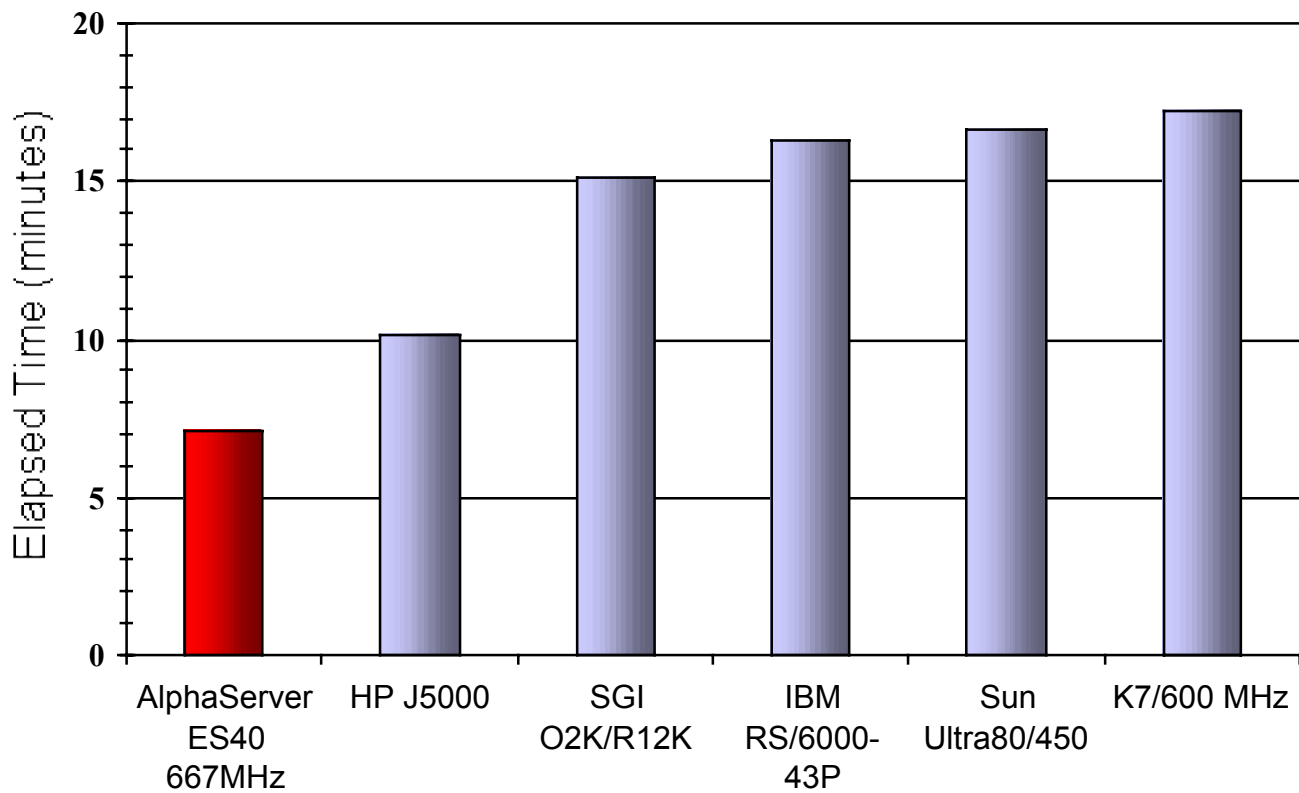
Shorter bars are best



GAMESs

In the GAMESs UK, which measures quantum chemistry calculations, the *AlphaServer* ES40 EV67 system is nearly 40% faster than the new HP system PA9000/J5000 and more than 50% faster than other competitive systems.

Shorter bars represent faster performance



MM5: Weather Prediction

MM5: Weather Prediction models developed by Penn State and National Oceanic and Atmospheric Administration run best on *AlphaServer* system, as the data show here. The *AlphaServer* ES40 667 MHz EV67 system is over 2x the SGI Origin 2000 and 5x the Sun E4000 and Intel PII.

Shorter bars represent faster performance

