

<http://www.top500.org/>

TOP 500[®]

SUPERCOMPUTER SITES

NOVEMBER 2004

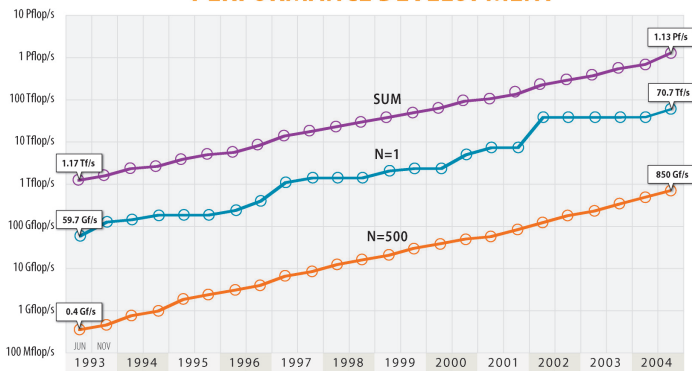
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<http://www.uni-mannheim.de/english/>

ICL UT
 INNOVATIVE COMPUTING LABORATORY
<http://icl.cs.utk.edu/>

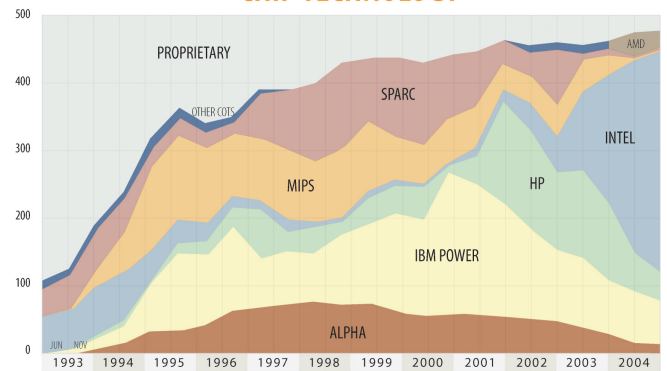
NERSC
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TOP 5	MANUFACTURER	COMPUTER	LOCATION	COUNTRY	R _{MAX} (GFLOP/S)	PROCESSORS
1	IBM	BlueGene/L DD2 beta-System	DOE/IBM-Rochester	USA	70720	32768
2	SGI	SGI Altix w/Infiniband	NASA Ames	USA	51870	10160
3	NEC	Earth Simulator	Earth Simulator Center	Japan	35860	5120
4	IBM	IBM eServer BladeCenter JS20 w/Myrinet	Barcelona Supercomputer Center	Spain	20530	3564
5	California Digital	Intel Itanium2 Tiger4 w/Quadrics	Lawrence Livermore National Lab	USA	19940	4096

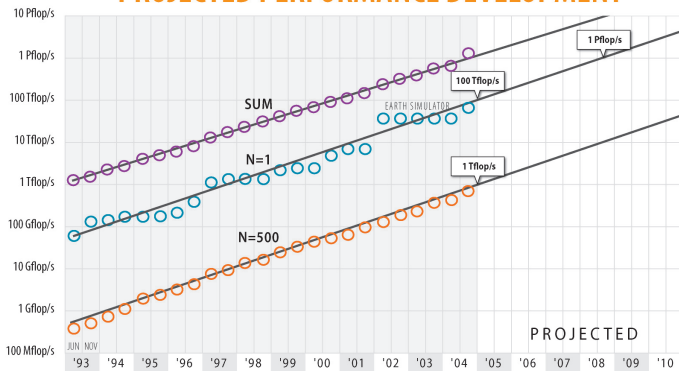
PERFORMANCE DEVELOPMENT



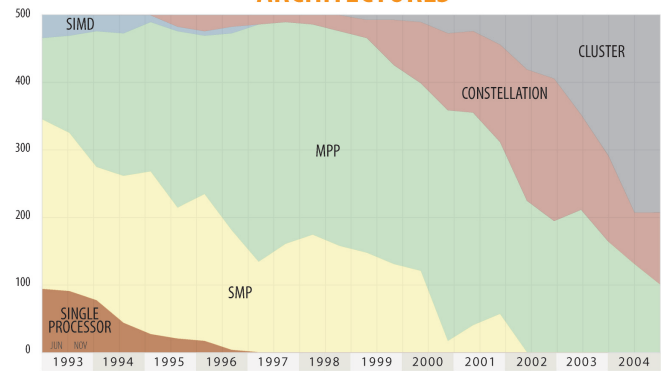
CHIP TECHNOLOGY



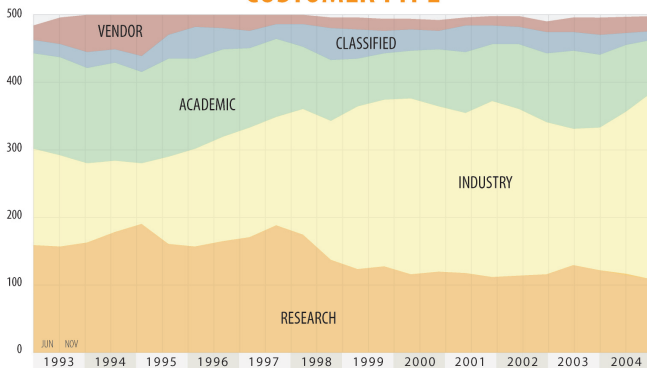
PROJECTED PERFORMANCE DEVELOPMENT



ARCHITECTURES



CUSTOMER TYPE



HPLINPACK

A PORTABLE IMPLEMENTATION OF THE HIGH PERFORMANCE LINPACK BENCHMARK FOR DISTRIBUTED MEMORY COMPUTERS

Algorithm: recursive panel factorizations, multiple lookahead depths, bandwidth reducing swapping

Easy to install, only needs MPI + BLAS or VSIBL

Highly scalable and efficient from the smallest cluster to the largest supercomputers in the world

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All changes are from June 2004 to November 2004

For the first time, in 1993, a list of the TOP500 supercomputer sites worldwide was made available. Every year since, the TOP500 list has been published bi-annually. The best LINPACK Benchmark performance is used as a performance measure in ranking the computers. The list allows a detailed and well-founded analysis of the state of high performance computing (HPC). Previously, data such as the number and geographical distribution of supercomputer installations were difficult to obtain and only a few analysts undertook such an effort by tracking press releases of dozens of vendors. Data for the TOP500 are submitted by manufacturers of high performance computing systems as well as from users and managers of sites owning such systems. With the TOP500 report now easily available, it is possible to present an analysis of the state of HPC.

Highlights from the Top 10:

- The list shows a major shake-up of the TOP10
- The new #1 is DOE's IBM BlueGene/L beta system currently assembled and tested at the IBM Rochester site with a Linpack performance of 70.72 TFlop/s. This system, once completed, will be moved to the DOE's Lawrence Livermore National Laboratory.
- The Columbia system at NASA/Ames built by SGI gained the #2 spot, with an equally impressive 51.87 Tflop/s.
- The Earth Simulator, built by NEC and which held the #1 spot for 5 lists, is now #3.
- The #4 spot was captured by the new MareNostrum system at the Barcelona Supercomputing Center. It is an IBM BladeCenter JS20 based system with a Myrinet connection network and achieved 20.53 Tflop/s.
- The "SuperMac" is also back. The upgraded X-System at Virginia Tech built using Apple's XServe based computer is at #7 now, with 12.25 Tflop/s performance.
- The entry level for the TOP10 approaches 10 Tflop/s - only one system with less than 10-TFlop/s Linpack performance is in the TOP10.

General highlights from the Top 500 since the last edition:

- The number of systems exceeding the 1 TFlop/s mark on the Linpack jumps from 242 to 399 and we expect that the next list in 6 months will only list systems exceeding 1 TFlop/s.
- The last system on the list -- with 850 Gflop/s -- would have been listed at position 310 in the last TOP500 just six months ago. This exemplifies the continuous rapid turnover of the TOP500.
- Total accumulated performance has for the first time exceeded the 1 Petaflop/s mark. It is now 1.127 PFlop/s, compared to 813 TFlop/s six months ago.
- Entry level is now 850.6 Gflop/s, compared to 624.3 Gflop/s six months ago.
- The entry point for the top 100 moved from 1.922 Gflop/s to 2.026 Tflop/s.
- A total of 320 systems are now using Intel processors. Six months ago there were 287 Intel-based systems on the list and one year ago only 189.
- The second most common processor family is the IBM Power processor (54 systems), ahead of PA Risc processors (48) and AMD processors (31).
- 296 systems are now labeled as clusters, making this the most common architecture in the TOP500.
- At present, IBM and Hewlett-Packard sell the bulk of systems at all performance levels of the TOP500.
- IBM remains the clear leader in the TOP500 list with 43.2% of systems and 49.3% of installed performance
- HP is second with 34.6% of systems and 21% of performance.
- No other manufacturer is able to capture more than 7% in any category.
- A new geographical trend, which started a few years ago, now emerges more clearly. The number of system in Asian countries other than Japan is rising quite steadily. In this list Japan is listed with 30 systems and all other Asian countries combined have an additional 57 systems. However Europe is still ahead of Asia, with 127 systems installed.
- 17 of the systems in Asia are installed in China -- up from 9 systems one year ago.
- The number of systems installed in the U.S. has also increased to 267 -- up from 247 one year ago.