TOP500®
NOVEMBER 2005
SUPERCOMPUTER SITES

TOP 5

	MANUFACTURER/COMPUTER	LOCATION		RMAX (GFLOP/S)	PROCESSORS
1	IBM eServer Blue Gene Solution / BlueGene/L	Lawrence Livermore National Lab	USA	280600	131072
2	IBM eServer Blue Gene Solution / BlueGene W	IBM Thomas J. Watson Research Center	USA	91290	40960
3	IBM eServer pSeries p5 575 / ASCI Purple	Lawrence Livermore National Lab	USA	63390	10240
4	SGI Altix w/Infiniband / Columbia	NASA Ames	USA	51870	10160
5	Dell PowerEdge 1850 w/Infiniband / Thunderbird	Sandia National Lab	USA	38270	8000

PERFORMANCE DEVELOPMENT
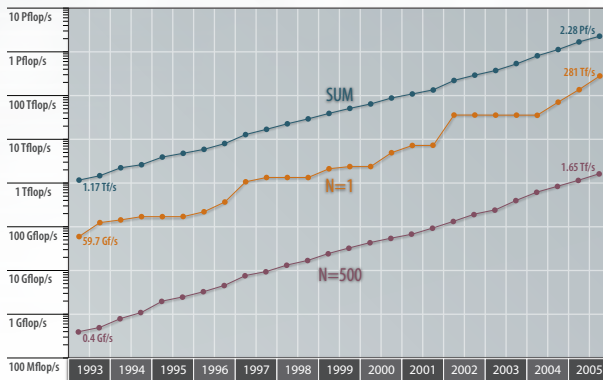
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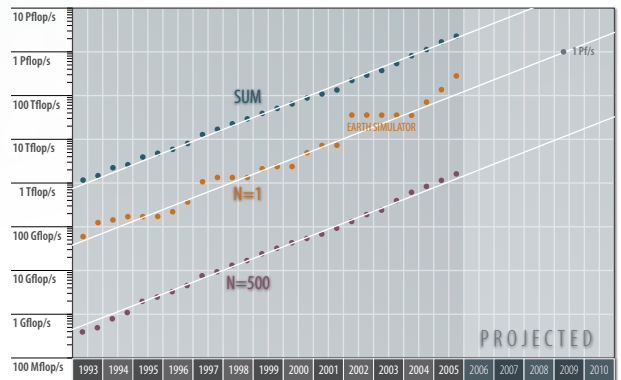
ARCHITECTURES
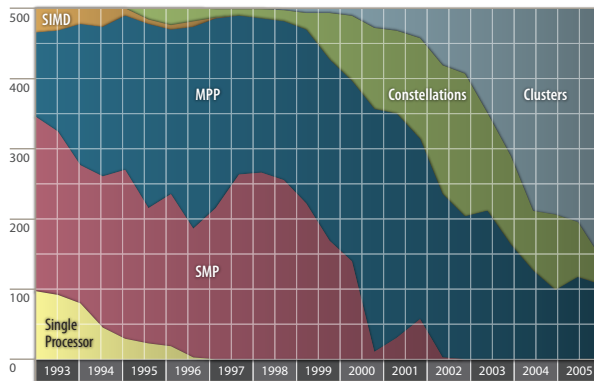
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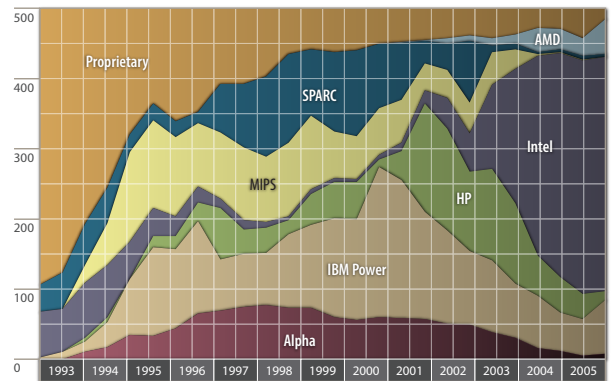
INSTALLATION TYPE

HPLINPACK
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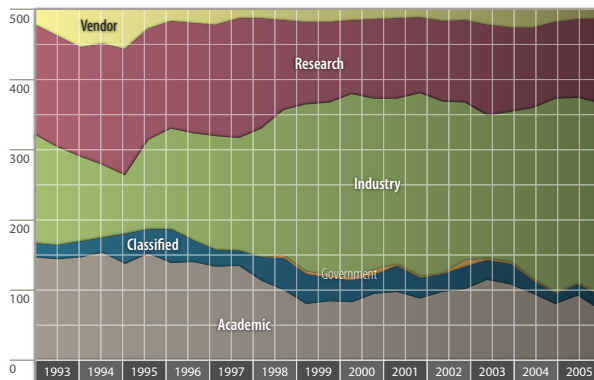
A Portable Implementation of the High Performance Linpack Benchmark for Distributed Memory Computers

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

Easy to install, only needs MPI + BLAS or VSIPL

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

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HIGHLIGHTS FROM THE TOP 10

- The list shows again a major shake-up of the TOP10

- Only six of the TOP10 systems from November 2004 are still large enough to hold on to a TOP10 position, four new systems entered the top tier.

- The new and previous No. 1 is DOE's IBM BlueGene/L system, installed at DOE's Lawrence Livermore National Laboratory (LLNL). It has doubled in size (again) and has now achieved a record Linpack performance of 280.6 TFlop/s. It is still the only system ever to exceed the 100 TFlop/s mark.

- The No. 2 is a similar but smaller IBM eServer Blue Gene Solution system, installed at IBM's Thomas Watson Research Center with 91.20 TFlop/s Linpack performance.

- The new No. 3 is the ASCI Purple system at LLNL, also built by IBM , but based on the pSeries 575 servers. It reached 63.4 TFlop/s.

- The Columbia system at NASA/Ames built by SGI slipped to the No. 4 spot, with a still equally impressive 51.87 TFlop/s.

- Two systems at DOE's Sandia National Laboratories occupy Nos. 5 and 6. A new PowerEdge-based Dell system outperformed the enlarged ASCI Red Storm system by a narrow margin with 36.10 Tflops/s versus 35.86 Tflop/s.

- The Earth Simulator, built by NEC, which held the No. 1 spot for five lists, has now slipped to No. 7.

- The No. 10 spot is occupied by a Cray XT3 system at DOE's Oak Ridge National Laboratory with 20.53 Tflop/s. This is also the new entry level for the TOP10, up from just under 10 TFlop/s Linpack performance one year ago.

GENERAL HIGHLIGHTS FROM THE TOP 500 SINCE THE LAST EDITION

- The entry level to the list moved up to the 1.646 TFlop/s mark on the Linpack benchmark, compared to 1.166 TFlop/s six months ago.

- The last system on the list would have been listed at position 279 in the last TOP500 just six months ago. This is a larger turnover than average for the TOP500.

- Total accumulated performance has grown to 2.30 PFlop/s, compared to 1.69 PFlop/s six months ago and 1.127 PFlop/s one year ago.

- The entry point for the top 100 increased in six months from 3.41 TFlop/s to 3.98 TFlop/s.

- A total of 333 systems are now using Intel processors, which is unchanged from six months ago.

- Intel's EM64T processors are well received in the HPC community and already 81 systems listed are based on them, well ahead of Itanium 2-based systems (46).

- The second most common processor family is the IBM Power processor (73 systems), ahead of the AMD Opteron processor (55 systemsm up from 25 six months ago). FiveOpteron-based systems use the new dual core chip version.

- 360 systems are labeled as clusters, making this the most common architecture in the TOP500.

- Half of the listed systems (249) are now using Gigabit Ethernet as the internal system interconnect technology, ahead of Myricoms Myrinet with 70 systems.

- 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 43.8 percent of systems (down from 51.8 percent) and 52.8 percent of installed performance (down from 57.9 percent).

- HP is second with 33.8 percent of systems (up from 26.2 percent) and 18.8 percent of performance (up from 13.3 percent).

- No other manufacturer is able to capture more than 7 percent in any category.

- The U.S. is clearly the leading consumer of HPC systems with 305 of the 500 systems.. The European (100 systems) and Asian share (66 systems) is slowly decreasing.

- The number of systems installed in the U.S. has increased to 305, up from 294 six months ago and 267 one year ago.

- Dominant countries in Asia are Japan with 21 systems (down from 23) and China with 17 systems (down from 19).

- In Europe, Germany lost the No. 1 spot again to the UK, with now 24 systems compared to 41. Six months ago, Germany was in the lead with 40 compared to the UK's 32 systems.

All changes are from June 2005 to November 2005