

It's a 'three-peat' for IBM's BlueGene/L in the Top 500 Supercomputers list

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Mannheim (Germany) - For the third consecutive time, an IBM supercomputer operated at Lawrence Livermore National Laboratories achieved the coveted #1 position on the semi-annual [Top 500 Supercomputers list](#) released today. Having assimilated a cluster of 131,072 massively parallel PowerPC 440 700 MHz processors and running CNK/Linux, BlueGene/L held on to the top slot and wouldn't let go, posting better than three times the performance of the #2 computer on the list, another BlueGene architecture computer dubbed "BGW" operated at IBM's Watson Research Center.



Bring it on. The PowerPC 440-based BlueGene/L supercomputer can out-Linpack any dense equation you can throw at it. (Courtesy Lawrence Livermore Labs)

In each list, published semi-annually by the University of Mannheim in association with Berkeley National Laboratory and the University of Tennessee, Knoxville, machines are ranked by their maximal observed performance in gigaflops per second (GFlops). As a matter of honor, they're also gauged by the theoretical peak performance of that computer - essentially, how well it does perform divided by how well it can perform - to obtain a relative "site efficiency" percentage; but despite all the formulas the universities publish, at the end of the day, rankings are based on observed performance (R_{Max}).

For this summer's list, BlueGene/L had an observed performance rating of **280,600** GFlops based on Linpack benchmarks, and a theoretical performance peak (R_{Peak}) of **367,000**. For its part, "BGW" can claim special special points for efficiency, with observed performance of **91,290** but a performance peak of **114,688**.

As usual, just about everybody with a brand name has a little victory of its own to claim. Twenty-four BlueGene computers running PowerPC 440 processors - which, incidentally, were introduced by IBM in 1999 - made the Top 500, landing the #1, #2, #8, #12, and #15 positions, among others. In all, Power architecture was the force behind 83 systems on the list- among them, 13 PowerPC 970 systems, including #11 "MareNostrum" from the Barcelona Supercomputer Center, as well as the lone "official" Macintosh, #468, from Bowie State University.

Unofficially, a Mac made the #21 spot on the list. Made from 3072 PowerPC processors and running Mac OS X, "MACH5" was built by a private consultancy called COLSA Corporation. It posted an observed performance of **16,180**. Not far down the list at #28 was a Mac OS X machine dubbed "System X," made from 2200 PowerPC 970s by the students of Virginia Tech. Of the five Macs on the supercomputer list, only the bottom one was actually manufactured by Apple.

Intel had good reason to shout, with 118 entrants running Xeon processors with EM64T architecture, 147 systems running 32-bit [Itanium](#) (IA-32) processors, and 37 systems running 64-bit Itanium 2 (IA-64) processors. An SGI-manufactured unit running 10,160 massively parallel Itanium 2s, made two years ago for NASA's Ames Research Center, seized the #4 spot. Not far behind, though, a [Dell PowerEdge](#) 1850 cluster of 38,270 3.6 GHz processors, dubbed "Thunderbird," grabbed the #6 position.

Still, AMD claimed victory, with 46 systems running on AMD64 Opteron processors - including #9, a Cray dubbed "Red Storm," running at Sandia National Labs - and 34 AMD64 Opteron dual-cores, including big #7, a Sun Fire grid cluster called "TSUBAME" at the Tokyo Institute of Technology. But for now, Intel has the supercomputer lead in x86 architecture.

Linux supporters know that, in terms of operating system rankings, the Top 500 list isn't even a contest any more. 391 systems on the list ran some variant of Linux, although a UNIX variant can claim #3: "ASC Purple," also from Livermore Labs. The highest-ranking supercomputer running Windows was #130, a Dell [PowerEdge](#) 1855 running a 900-processor cluster of Xeon CPUs, with a performance of **4106** GFlops. Credit NCSA - the institute that brought you the first great Web browser - with speeding up Windows. The only other Windows machine in the list is #470, another [PowerEdge 1855](#) running Windows Server 2003.