

For release 10 a.m. Central European Summer Time, Wednesday, June 18, 2008  
Contact: Erich Strohmaier, [erich@top500.org](mailto:erich@top500.org), 510-520-7769 (US)

### **31<sup>st</sup> TOP500 List of World's Most Powerful Supercomputers Topped by World's First Petaflop/s System**

MANNHEIM, Germany; BERKELEY, Calif. & KNOXVILLE, Tenn.—With the publication of the latest edition of the TOP500 list of the world's most powerful supercomputers today (Wednesday, June 18), the global high performance computing community has officially entered a new realm—a supercomputer with a peak performance of more than 1 petaflop/s (one quadrillion floating point operations per second).

The new No. 1 system, built by IBM for the U.S. Department of Energy's Los Alamos National Laboratory and named "Roadrunner," by LANL after the state bird of New Mexico achieved performance of 1.026 petaflop/s—becoming the first supercomputer ever to reach this milestone. At the same time, Roadrunner is also one of the most energy efficient systems on the TOP500.

The 31<sup>st</sup> edition of the TOP500 list was released at the International Supercomputing Conference in Dresden, Germany. Since 1993, the list has been produced twice a year and is the most extensive survey of trends and changes in the global supercomputing arena.

"Over the past few months, there were a number of rumors going around about whether Roadrunner would be ready in time to make the list, as well as whether other high-profile systems would submit performance numbers," said Erich Strohmaier, a computer scientist at Lawrence Berkeley National Laboratory and a founding editor of the TOP500 list. "So, as the reports came in during recent weeks, it's been both exciting and challenging to compile this edition."

The Roadrunner system is based on the IBM QS22 blades which are built with advanced versions of the processor in the Sony PlayStation 3, displaces the reigning IBM BlueGene/L system at DOE's Lawrence Livermore National Laboratory. Blue Gene/L, with a performance of 478.2 teraflop/s (trillions of floating point operations per second) is now ranked No. 2 after holding the top position since November 2004.

Rounding out the top five positions, all of which are in the U.S., are the new IBM BlueGene/P (450.3 teraflop/s) at DOE's Argonne National Laboratory, the new Sun SunBlade x6420 "Ranger" system (326 teraflop/s) at the Texas Advanced Computing Center at the University of Texas – Austin, and the upgraded Cray XT4 "Jaguar" (205 teraflop/s) at DOE's Oak Ridge National Laboratory.

Among all systems, Intel continues to power an increasing number, with Intel processors now found in 75 percent of the TOP500 supercomputers, up from 70.8 percent of the 30<sup>th</sup> list released last November.

Other highlights from the latest list include:

- Quad-core processor based systems have taken over the TOP500 quite rapidly. Already 283 systems are using them. Two hundred three systems are using dual-core processors, only eleven systems still use single core processors, and three systems use IBMs advanced Sony PlayStation 3 processor with 9 cores.
- The top industrial customer, at No. 10, is the French oil company: Total Exploration Production.
- IBM held on to its lead in systems with 210 systems (42 percent) over Hewlett Packard with 183 systems (36.6 percent). IBM had 232 systems (46.4 percent) six months ago, compared to HP with 166 systems (33.2 percent).
- IBM remains the clear leader in the TOP500 list in performance with 48 percent of installed total performance (up from 45), compared to HP with 22.4 percent (down from 23.9). In the system category Dell, SGI and Cray follow with 5.4 percent, 4.4 percent and 3.2 percent respectively.
- The last system on the list would have been listed at position 200 in the previous TOP500 just six months ago. This is the largest turnover rate in the 16-year history of the TOP500 project.

For the first time, the TOP500 list will also provide energy efficiency calculations for many of the computing systems and will continue tracking them in consistent manner.

- Most energy efficient supercomputers are based on
  - IBM QS22 Cell processor blades (up to 488 Mflop/s/Watt),
  - IBM BlueGene/P systems (up to 376 Mflop/s/Watt)
- Intel Harpertown quad-core blades are catching up fast:
  - IBM BladeCenter HS21 with low-power processors (up to 265 Mflop/s/Watt)
  - SGI Altix ICE 8200EX Xeon quad-core nodes, (up to 240 Mflop/s/Watt) ,
  - Hewlett-Packard Cluster Platform 3000 BL2x220 with double density blades (up to 227 Mflop/s/Watt)
- These systems are already ahead of BlueGene/L (up to 210 Mflop/s/Watt).

Rounding out the Top 10 systems are:

- The No. 6 system is the top system outside the U.S., installed in Germany at the Forschungszentrum Juelich (FZJ). It is an IBM BlueGene/P system and was measured at 180 Tflop/s.
- The No. 7 system is installed at a new center, the New Mexico Computing Applications Center (NMCAC) in Rio Rancho, NM. It is built by SGI and based on the Altix ICE 8200 model. It was measured at 133.2 Tflop/s.
- For the second time, India placed a system in the top10. The Computational Research Laboratories, a wholly owned subsidiary of Tata Sons Ltd. in Pune, India, installed a Hewlett-Packard Cluster Platform 3000 BL460c system. They integrated this system with their own innovative routing technology and achieved a performance of 132.8 Tflop/s which was sufficient for No. 8.

- The No. 9 system is a new BlueGene/P system installed at the Institut du Développement et des Ressources en Informatique Scientifique (IDRIS) in France, which was measured at 112.5 Tflop/s.
- The last new system in the TOP10 – at No. 10 – is also an SGI Altix ICE 8200 system. It is the biggest system installed at an industrial customer, Total Exploration Production. It was ranked based on a Linpack performance of 106.1 Tflop/s.

The U.S. is clearly the leading consumer of HPC systems with 257 of the 500 systems. The European share (184 systems – up from 149) is still rising and is again larger than the Asian share (48 – down from 58 systems).

Dominant countries in Asia are Japan with 22 systems (up from 20), China with 12 systems (up from 10), India with 6 systems (down from 9), and Taiwan with 3 (down from 11).

In Europe, UK remains the No. 1 with 53 systems (48 six months ago). Germany improved but is still in the No. 2 spot with 46 systems (31 six months ago).

The TOP500 list is compiled by Hans Meuer of the University of Mannheim, Germany; Erich Strohmaier and Horst Simon of NERSC/Lawrence Berkeley National Laboratory; and Jack Dongarra of the University of Tennessee, Knoxville.

###