



## China and the TOP500 List: Impressive Growth Suggests a Sector in Transition

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### IDC's Quick Take

The three main Chinese HPC vendors — Lenovo, Sugon, and Inspur — made an unprecedented strong showing in the newest [TOP500](#) list of the most powerful computers in the world released this week at [SC15](#) in Austin, Texas. The three vendors increased their presence from six systems on the June 2015 list to 82 of China's 109 systems on the current list, clearly establishing China as the second largest host nation of TOP500 HPC systems behind only the United States. A closer look at the numbers, however, reveals that the Chinese vendors are taking their HPC sector in a new direction as the bulk of these new sites are at Internet service firms or related telecommunication entities and only a few of the systems are installed at the sites involved in more traditional HPC-based technical computing.

### News Highlights

For the sixth-consecutive time, China's Tianhe-2, a supercomputer developed by China's National University of Defense Technology (NUDT), retained its position as the world's number 1 system. For its part, neither NUDT nor its commercial partner Inspur makes this world-class HPC technology available to the commercial sector. Overall, change at the top of the list was again minor, with only two new systems in the top 10. Movement at this highest level will need to wait for the next milestone in the global exascale race — the appearance of 100PF-class supercomputers in 2016–2017. IDC expects China to deploy two or three of these systems in that time frame, along with counterpart systems from the United States, Japan, and Europe.

Lenovo, which went from 0 systems on the list 6 month ago to 24 on the new list, relied heavily on server technology acquired from IBM for its TOP500 HPC entries this time around. Indeed, all were IBM-derived ThinkServer or NeXtScale servers. Of these 24, 21 went to either ISPs, Internet retail companies, or telecommunications firms — only 3 are installed at more traditional HPC research sites.

Sugon shipped 28 of its 49 HPC systems to ISPs or telecommunication firms, but it also benefitted from an aggressive Chinese government buying binge, placing 16 systems at various unspecified Chinese government facilities.

For its part, Inspur, which went from 1 to 15 entries on the list, installed 14 HPC systems at ISP sites in the past 6 months.

Finally, according to the list, Chinese firms placed only a handful of systems into the Chinese commercial sector, and collectively, they had one systems installed outside China, at a university in Denmark.

## IDC's Point of View

IDC believes that China's impressive enhanced presence on the most recent TOP500 list is admirable, but it does not yet make China a world leader in the development and use of HPC systems for established technical computing applications. That would require the Chinese vendors to gain market share in simulation-driven HPC vertical sectors such as aerospace, oil and gas, the financial sector, or even the growing high-performance data analytics market. These firms also need to boost their export potential, if for no other reason than to gain exposure to a strong base of international users that can help drive next-generation HPC architectures and requirements.

On the other hand, the Chinese vendors are clearly expanding high-potential proximity markets for HPC, notably the Internet and telecommunications sectors whose leading firms require large scale-out systems, and indeed, that these Chinese HPC vendors have made a strong initial foray into a major new growth market for HPC vendors worldwide. This development can only help their efforts to grow their businesses.

China may also be concentrating on driving HPC capabilities to the Internet and telecommunications spaces as a way to help support Beijing's ambitious Internet of Things agenda that will require large amounts of computational capabilities to support the collection and analysis of vast amounts of real-time and standing data for applications including food safety, healthcare, and pollution control.

Finally, these results raise some issues for the TOP500 benchmark, particularly its current emphasis on compute-centric performance and how it can best respond to some of the new designs and uses for HPC systems. For example, because the single HPL test used to determine rankings on the TOP500 does not stress memory subsystems, it does not recognize supercomputers that may be among the world's most powerful for I/O-intensive workloads in manufacturing, numerical weather prediction, and other important domains. Indeed, it is possible that some time in the near future the TOP500 list could be filled almost entirely with massive scale-out systems sold to Internet, telecommunications, and gaming companies. Ultimately, this new list underscores the need for a more comprehensive HPC benchmark suite that recognizes a wider range of HPC usage, embracing a range of compute and I/O-centric workloads, along with the raft of new applications coming from the rapidly growing high-performance data analytics world.

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