



Published on *The Green500* (<http://www.green500.org>)

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The Green500 List - June 2009

Welcome to the 5th edition of the Green500 List! As the list continues to grow and accumulate valuable data on the energy efficiency of supercomputers, trends in green supercomputing can be more readily tracked. Below are a few highlights from this edition of the list.

1. The overall efficiency of supercomputers continues to improve.
 - Average efficiency increased by 10% (98 MFlops/Watt --> 108 MFlops/Watt), which is of significant note given that the aggregate power of the list increased by 15% (200 MW --> 230 MW) over the previous release. In short, while the supercomputers on the Green500 are collectively consuming more power, they are using the power more efficiently than before.
 - More machines above 200 Mflops/Watt, fewer machines below 50 Mflops/Watt. As more powerful supercomputers supplant the less powerful, these new machines are performing their computations more energy efficiently.
- A self-made accelerator-based supercomputer catapults into the #5 spot on the Green500.
 - In addition to being highly energy efficient, the self-made GRAPE-DR is arguably the first Green500 supercomputer with more than a million processing elements: 2,097,152. Will this approach of aggregating many more less powerful processors for better overall performance be a trend to keep an eye on?
- Commodity processors continue to nip at the heels of previous-generation custom processors.
 - Four- and six-core commodity processors keep improving in energy efficiency (265 Mflops/Watt to 273 MFlops/Watt) and surpass previous-generation custom processors. Now, 20 of the top 50 energy-efficient supercomputers utilize commodity processors.
- For the first time, maximum energy efficiency remains the same, but three 500-Mflops/Watt supercomputers drop out of the Green500.
 - The three supercomputers that occupied the #2 spot on the November 2008 Green500 are no longer computationally powerful enough to be considered among the TOP500

- supercomputers in the world, thus providing further fuel to the argument for a "more inclusive" Green500. If the trend of performance doubling continues for the next list, the #1 machine on this Green500 is unlikely to make it to the November 2009 Green500 List.

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Source URL (retrieved on 09/22/2015 - 21:09): <http://www.green500.org/lists/green200906>