IBM Newsroom

IBM-Powered Supercomputers Lead Semi-Annual Rankings

Only Manufacturer with Multiple Systems in Top Ten of Top500 and Green500, Debuts World's Most Powerful Commercial Supercomputer

ARMONK, N.Y., June 18, 2019 /PRNewswire/ -- IBM (NYSE: IBM) today announced that it is the only vendor to have multiple systems in the Top 10 of the semi-annual Top500 and Green500 supercomputer lists. This includes the US Dept of Energy's Summit and Sierra supercomputers, the overall number one and number two most powerful supercomputers in the world, along with the Lassen Supercomputer built for Lawrence Livermore National Labs. IBM also teamed with Total, a global oil producer, for the world's most powerful commercial supercomputer that debuted on the Top500 list at #11.

IBM Highlights from this iteration of the Top500 list and Green500 list, rank systems by performance and energy efficiency, respectfully include:

- The number one overall aggregate performance score using 14x fewer systems than the number two overall
- Three Systems in the Top 10 of the Top 500, the most of any vendor
- Four Systems in the Top 10 of the Green500, the most of any vendor
- The only vendor to have multiple systems in the Top 10 of the both the Top500 and the Green500

"IBM was an early-adopter of data-centric design principles, and when we began developing POWER9 for the HPC industry we maintained that we wanted it to be measured by application performance," said IBM Vice President of Exascale Systems David Turek. "Our systems appearing in the top ranks for both performance and energy efficiency is a testament to our efforts. Also, seeing this technology now permeate into commercial systems is an important development for the industry as we evolve these workloads for both traditional and deep learning applications."

IBM POWER9's industry leading approach to memory bandwidth allows for 9.5x faster data transfer between the POWER9 processor and its attached accelerators vs compared x86[i]. IBM POWER9 systems are designed to move data throughout the system with fewer bottlenecks and improve energy efficiency.

As part of the OpenPOWER Foundation, IBM worked with NVIDIA to jointly develop the industry's only

CPU-to-GPU NVIDIA NVLink connection, which allows for 5.6x faster memory bandwidth between the IBM POWER9 CPU and NVIDIA Tesla V100 Tensorcore GPUs than compared x86-based systems[ii]. This allows for nearly a 4x reduction in AI model training[iii] versus the compared x86 based systems.

New on the Top500 list is Pangea III, a new supercomputer built by IBM for Total. Pangea III is being built using the same IBM POWER9, high-performance architecture as used in the U.S. Department of Energy's Summit and Sierra supercomputers, the world's smartest supercomputers. IBM POWER9 is designed to take advantage of attached accelerators, which can help clients not only improve performance but also improve energy efficiency in their HPC workloads.

For more information on how IBM POWER Systems are turbo-charging business computing, please visit: https://www.ibm.com/it-infrastructure/solutions/hpc

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[i] 9.5X is based on POWER9 and next-generation NVIDIA NVLink peak transfer rate is 150 GB/sec = 48 lanes x 3.2265625 GB/sec x 64 bit/66 bit encoding compared to x86 PCI Express 3.0 (x16) peak transfer rate is 15.75 GB/sec = 16 lanes X 1GB/sec/lane x 128 bit/130 bit encoding.

[ii] 5.6x I/O bandwidth claim based on NVIDIA measurement test conducted on a Xeon E5-2640 V4 +P100 vs Power9 + V100 (12 GB/s vs 68 GB/s rated)

[iii] Results are based IBM Internal Measurements running 1000 iterations of Enlarged GoogleNet model (mini-batch size=5) on Enlarged Imagenet Dataset (2560x2560) .
Power AC922; 40 cores (2 x 20c chips), POWER9 with NVLink 2.0; 2.25 GHz, 1024 GB memory, 4xTesla V100 GPU ; Red Hat Enterprise Linux 7.4 for Power Little Endian (POWER9) with CUDA 9.1/ CUDNN 7;.
Competitive stack: 2x Xeon E5-2640 v4; 20 cores (2 x 10c chips) / 40 threads; Intel Xeon E5-2640 v4; 2.4 GHz; 1024 GB memory, 4xTesla V100 GPU, Ubuntu 16.04. with CUDA .9.0/ CUDNN 7
Software: Chainverv3 /LMS/Out of Core with patches found at https://github.com/cupy/cupy/pull/694 and https://github.com/chainer/chainer/pull/3762

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