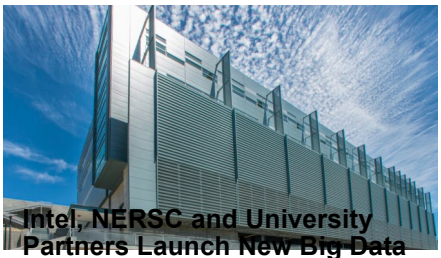

Intel, NERSC and University Partners Launch New Big Data Center

By Linda Barney

August 17, 2017

A collaboration between the Department of Energy's National Energy Research Scientific Computing Center (NERSC), Intel and five Intel Parallel Computing Centers (IPCCs) has resulted in a new Big Data Center (BDC) that will work both on code modernization and tackle real science challenges.

According to Prabhat, BDC Director and Group Lead for NERSC Data and Analytics and Services team, "The goal of the BDC is to solve DOE's leading data-intensive science problems at scale on the NERSC Cori supercomputer (http://www.nersc.gov/users/computational-systems/cori/). The BDC, in collaboration with Intel and the IPCCs, will test to see if the current HPC systems can support data-intensive workloads that require analysis of over 100 terabytes datasets on 100,000 cores or greater. The BDC will optimize and scale the production data analytics and management stack on Cori.

All BDC projects will run on the NERSC Cori supercomputer. Courtesy of NERSC.

"Our first task will be to identify capability applications in the DOE data science community, articulate analytics requirements and then develop scalable algorithms." Prabhat continued. "The key is in developing algorithms in the context of the production stack. Our multi-disciplinary team consisting of performance optimization and scaling experts is well positioned to enable capability applications on Cori. All the optimizations done at the BDC will be open source and made available to peer HPC centers as well as the broader HPC and data analytics communities."

Quincey Koziol, BDC co-director and principal data architect at NERSC, noted, "While data analytics is undoubtedly the rage at this point in time, scalable analytics fundamentally relies on a robust data management infrastructure. We

will be working on examining the performance of parallel I/O as exercised through modern data analytics languages (Python, R, Julia) and machine learning/deep learning libraries."

Joseph Curley, director for Intel's code modernization efforts, states, "We've combined the BDC goal of providing software stacks and access to HPC machines where the data driven methods can be developed with our IPCC program. We married the two ideas together by combining research members of the community with a program that we have for outreach.

"The objective of the Big Data Center (BDC) comes from a common desire in the industry to have software stacks that can help the NERSC user base, using data driven methods, to solve their largest problems at scale on the Cori supercomputer. So one of our main goals is to be able to use the supercomputer hardware to its fullest capability. Some underlying objectives at BDC are to build and harden the data analytics frameworks in the software stack so that developers and data scientists can use the Cori supercomputer in a productive way to get insights from their data. Our work with NERSC and the IPCCs will involve code modernization at scale as well as creating the software environment and software stack needed to meet these needs."

The five IPCCs who are part of the BDC program include the University of California-Berkeley, University of California-Davis, New York University (NYU), Oxford University and the University of Liverpool. Their initial BDC work includes this research:

- The University of California-Berkeley team is working on the Celeste project. Celeste aims on developing highly scalable inference methods for extracting a unified catalog of objects in the visible universe from all available astronomy data.
- The University of California-Davis group is working on development of computational mechanics techniques to extract patterns from climate simulation data. The techniques build upon techniques in information theory to achieve unsupervised pattern discovery.
- The New York University (NYU) team is working on extending deep learning to operate on irregular, graph-structured data. The techniques are being applied to problems in high-energy physics.
- The Oxford University group is developing a new class of methods called probabilistic programming and applying the methods to challenging pattern and anomaly detections in high-energy physics. The work combines probabilistic programming with deep learning to train large networks on Cori.
- The University of Liverpool team is working on developing topological methods to analyze climate datasets. The techniques are being used to extract stable, low-dimensional manifolds, and robust pattern descriptors for weather patterns.

The BDC work will also benefit the larger data analysis and HPC communities. Curley states, "In our IPCC program, we encourage system users to discover methods of solving problems on HPC systems, document what they did, and teach others how to follow their methods. This creates a beneficial cycle of new research, hardening the machine, developing new software stacks leading to research that is more productive—what we call a virtuous cycle.

"We are excited about the IPCCs working in conjunction with the BDC because there will be people working on problems we never could have anticipated and advancing human knowledge in ways we never could have guessed. If you can combine this with the BDC at NERSC that has a large machine like Cori and a diverse user group, you end up creating networks of knowledge and creating scientific results that are unpredictably wonderful."

About the Author

Linda Barney is the founder and owner of Barney and Associates, a technical/marketing writing, training and web design firm in Beaverton, OR.

Feature image: Berkeley Lab Shyh Wang Hall, home of NERSC

- COMSNETS 2018 Issues Call for Papers (https://www.hpcwire.com/off-the-wire/comsnets-2018-issues-call-papers/)
- Federal S&E Obligations to Universities Fell Two Percent Between 2014 and 2015 (https://www.hpcwire.com/off-the-wire/federal-se-obligations-universities-fell-two-percent-2014-2015/)
- PRACE MOOC: Discover and Learn More about Powerful Supercomputers (https://www.hpcwire.com/off-the-wire/prace-mooc-discover-learn-powerful-supercomputers/)
- NCSA Researcher Awarded SIGHPC/Intel Computational Data and Science Fellowship (https://www.hpcwire.com/off-the-wire/ncsa-researcher-awarded-sighpcintel-computational-data-science-fellowship/)
- Oak Ridge 'Summit' Facility Completes This Month, Says Design Firm (https://www.hpcwire.com/off-the-wire/oak-ridge-summit-facility-completes-month-says-design-firm/)

August 16, 2017

- ASRock Rack Launches C3000 Server Motherboards (https://www.hpcwire.com/off-the-wire/asrock-rack-launches-c3000-server-motherboards/)
- Out-of-this-World Science Project to be Featured as Keynote at SC17 (https://www.hpcwire.com/off-the-wire/world-science-project-featured-keynote-sc17/)
- HPC Researcher Moves to Georgia Tech (https://www.hpcwire.com/off-the-wire/hpc-researcher-moves-georgia-tech/)

August 15, 2017

- Microsoft Acquires Cycle Computing for Big Computing in the Cloud (https://www.hpcwire.com/off-the-wire/microsoft-acquires-cycle-computing-big-computing-cloud/)

August 14, 2017

- Mellanox to Present at Upcoming Investor Conference (https://www.hpcwire.com/off-the-wire/mellanox-present-upcoming-investor-conference/)

August 11, 2017

- YT Project Awarded NSF Grant to Expand to Multiple New Science Domains (https://www.hpcwire.com/off-the-wire/yt-project-awarded-nsf-grant-expand-multiple-new-science-domains/)

August 10, 2017

- Nvidia Records Record Revenue for Second Quarter Fiscal 2018 (https://www.hpcwire.com/off-the-wire/nvidia-records-record-revenue-second-quarter-fiscal-2018/)
- One Stop Systems Introduces the 4U Value Expansion System (https://www.hpcwire.com/off-the-wire/one-stop-systems-introduces-4u-value-expansion-system/)
- SIGCOMM 2017 Showcases Latest in Computer Networking (https://www.hpcwire.com/off-the-wire/sigcomm-2017-showcases-latest-computer-networking/)
- OSC Helps Researchers Unveil Most Accurate Map of the Invisible Universe (https://www.hpcwire.com/off-the-wire/osc-helps-researchers-

unveil-accurate-map-invisible-universe/)

- Cavium Announces Support for FC-NVMe Standard (https://www.hpcwire.com/off-the-wire/cavium-announces-support-fc-nvme-standard/)

August 9, 2017

- Galactic Winds Push Researchers to Probe Galaxies at Unprecedented Scale (https://www.hpcwire.com/off-the-wire/galactic-winds-push-researchers-probe-galaxies-unprecedented-scale/)
- Supermicro Previews 1U Petabyte NVMe Storage Supporting "Ruler" Form Factor for Intel SSDs at FMS (https://www.hpcwire.com/off-the-wire/supermicro-previews-1u-petabyte-nvme-storage-supporting-ruler-form-factor-intel-ssds-fms/)
- Flash Memory Summit 2017: Liqid Partners with One Stop Systems (https://www.hpcwire.com/off-the-wire/flash-memory-summit-2017-liqid

Geospatial Data Research Leverages GPUs

(https://www.hpcwire.com/2017/08/17/geospatial-data-research-leverages-gpus/)

August 17, 2017

MapD Technologies, the GPU-accelerated database specialist, said it is working with university researchers on leveraging graphics processors to advance geospatial analytics. The San Francisco-based company is collabor Read more… (https://www.hpcwire.com/2017/08/17/geospatial-data-research-leverages-gpus/)

By George Leopold

Intel, NERSC and University Partners Launch New Big Data Center

(https://www.hpcwire.com/2017/08/17/intel-nersc-university-partners-launch-new-big-data-center/)

August 17, 2017

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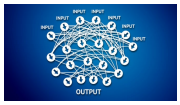
By Linda Barney



Google Releases Deeplearn.js to Further Democratize Machine Learning

(https://www.hpcwire.com/2017/08/17/google-releases-deeplearn-js-democratize-machine-learning/)

August 17, 2017

Spreading the use of machine learning tools is one of the goals of Google's PAIR (People + AI Research) initiative, which was introduced in early July. Last week the cloud giant released deeplearn.js as part of that in Read more… (https://www.hpcwire.com/2017/08/17/google-releases-deeplearn-js-democratize-machine-learning/)

By John Russell

Spoiler Alert: Glimpse Next Week's Solar Eclipse Via Simulation from TACC, SDSC, and NASA

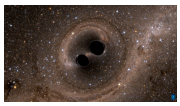
(https://www.hpcwire.com/2017/08/17/spoiler-alert-glimpse-next-weeks-solar-eclipse-via-simulation-tacc-sdsc-nasa/)

August 17, 2017

Can't wait to see next week's solar eclipse? You

can at least catch glimpses of what scientists expect it will look like. A team from Predictive Science Inc. (PSI), based in San Diego, working with Stampede2 at the Read more… (https://www.hpcwire.com/2017/08/17/spoiler-alert-glimpse-next-weeks-solar-eclipse-via-simulation-tacc-sdsc-nasa/)

By John Russell



Dell EMC will Build OzStar – Swinburne's New Supercomputer to Study Gravity

(https://www.hpcwire.com/2017/08/16/dell-emc-will-build-ozstar-swinburnes-new-supercomputer-study-gravity/)

August 16, 2017

Dell EMC announced yesterday it is building a new supercomputer – the OzStar – for the Swinburne University of Technology (Australia) in support the ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav). Read more… (https://www.hpcwire.com/2017/08/16/dell-emc-will-build-ozstar-swinburnes-new-supercomputer-study-gravity/)

By John Russell

HPC Job Bank

HPC Engineer - The HDF Group (http://careers.hpcwire.com/jobdetails.cfm?jid=2366)

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Microsoft Bolsters Azure With Cloud HPC Deal

(https://www.hpcwire.com/2017/08/15/microsoft-bolsters-azure-cloud-hpc-deal/)

August 15, 2017

Microsoft has acquired cloud computing software vendor Cycle Computing in a move designed to bring orchestration tools along with high-end computing access capabilities to the cloud. Terms of the acquisition were not disclosed. Read more… (https://www.hpcwire.com/2017/08/15/microsoft-bolsters-azure-cloud-hpc-deal/)

By George Leopold

(http://twitter.com/intent/tweet?status=Microsoft+Bolsters+Azure+With+Cloud+HPC+Deal+https%3A%2F%2Fwww.hpcwire.com%2F2017%2F08%2F15%2Fmicrosoft-bolsters-azure-cloud-hpc-deal%2F) (http://www.linkedin.com/shareArticle?mini=true&url=https%3A%2F%2Fwww.hpcwire.com%2F2017%2F08%2F15%2Fmicrosoft-bolsters-azure-cloud-hpc-deal%2F&title=Microsoft+Bolsters+Azure+With+Cloud+HPC+Deal&source=https%3A%2F%2Fwww.hpcwire.com/) (http://www.facebook.com/sharer/sharer.php?u=https%3A%2F%2Fwww.hpcwire.com%2F2017%2F08%2F15%2Fmicrosoft-bolsters-azure-cloud-hpc-deal%2F&title=Microsoft+Bolsters+Azure+With+Cloud+HPC+Deal/)

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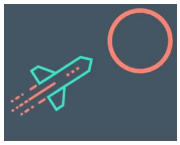

HPE Ships Supercomputer to Space Station, Final Destination Mars

(https://www.hpcwire.com/2017/08/14/hpe-ships-supercomputer-space-station-final-destination-mars/)

August 14, 2017

With a manned mission to Mars on the horizon, the demand for space-based supercomputing is at hand. Read more… (https://www.hpcwire.com/2017/08/14/hpe-ships-supercomputer-space-station-final-destination-mars/)

By Tiffany Trader

(http://twitter.com/intent/tweet?status=HPE+Ships+Supercomputer+to+Space+Station%2C+Final+Destination+Mars+https%3A%2F%2Fwww.hpcwire.com%2F2017%2F08%2F14%2Fhpe-ships-supercomputer-space-station-final-destination-mars%2F) (http://www.linkedin.com/shareArticle?mini=true&url=https%3A%2F%2Fwww.hpcwire.com%2F2017%2F08%2F14%2Fhpe-ships-supercomputer-space-station-final-destination-mars%2F&title=HPE+Ships+Supercomputer+to+Space+Station%2C+Final+Destination+Mars&source=https%3A%2F%2Fwww.hpcwire.com/) (http://www.facebook.com/sharer/sharer.php?u=https%3A%2F%2Fwww.hpcwire.com%2F2017%2F08%2F14%2Fhpe-ships-supercomputer-space-station-final-destination-mars%2F&title=HPE+Ships+Supercomputer+to+Space+Station%2C+Final+Destination+Mars/)

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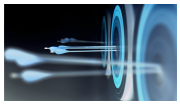


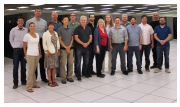
AMD EPYC Video Takes Aim at Intel's Broadwell

(https://www.hpcwire.com/2017/08/14/amd-epyc-video-takes-aim-intels-broadwell/)

August 14, 2017

Let the benchmarking begin. Last week, AMD posted a YouTube video in which one of its EPYC-based systems outperformed a 'comparable' Intel Broadwell-based system on the STREAM benchmark and on a test case running ANSYS's CFD application, Fluent. Read more… (https://www.hpcwire.com/2017/08/14/amd-epyc-video-takes-aim-intels-broadwell/)

By John Russell



Livermore Computing, Reddit Asked Them Anything

(https://www.hpcwire.com/2017/08/10/livermore-computing-reddit-asked-anything/)

August 10, 2017

In case you missed it, the staff of Livermore Computing (LC) at the Lawrence Livermore National Laboratory (LLNL) recently fielded some questions from the internet, part of Reddit's Science Ask Me Anything (AMA) series. Read more… (https://www.hpcwire.com/2017/08/10/livermore-computing-reddit-asked-anything/)

By Tiffany Trader

Oak Ridge to Cut Up to 350 Jobs in 2017; Will Other Labs Follow Suit?

(https://www.hpcwire.com/2017/08/09/oak-ridge-cut-350-jobs-2017-will-labs-follow-suit/)

August 9, 2017

It's not yet clear if staff cuts announced

yesterday at Oak Ridge National Laboratory are just the first of others at other national labs as the Department of Energy feels pressure from President Trump to cut costs. Read more… (https://www.hpcwire.com/2017/08/09/oak-ridge-cut-350-jobs-2017-will-labs-follow-suit/)

By John Russell

Bolstering the ARM Case for HPC Workloads

(https://www.hpcwire.com/2017/08/09/bolstering-arm-case-hpc-workloads/)

August 9, 2017

A new report sponsored by ARM and prepared by the University of Cambridge (UK) shows strong scaling for two popular CFD programs – OpenFOAM and Cloverleaf – on Cavium ThunderX-based ARM systems. Read more… (https://www.hpcwire.com/2017/08/09/bolstering-arm-case-hpc-workloads/)

By John Russell

Deep Learning Thrives in Cancer Moonshot

(https://www.hpcwire.com/2017/08/08/deep-learning-thrives-cancer-moonshot/)

August 8, 2017

The U.S. War on Cancer, certainly a worthy cause, is a collection of programs stretching back more than 40 years and abiding under many banners. Read more… (https://www.hpcwire.com/2017/08/08/deep-learning-thrives-cancer-moonshot/)

By John Russell

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://plus.google.com/share?url=https%3A%2F
/ww.hpcwire.com%2F2017%2F08%2F08%2Fdeep-learning-
s-cancer-moonshot%2F)

IBM Raises the Bar for Distributed Deep Learning

(https://www.hpcwire.com/2017/08/08/ibm-raises-bar-distributed-deep-learning/)
August 8, 2017

IBM is announcing today an enhancement to its PowerAI software platform aimed at facilitating the practical scaling of AI models on today's fastest GPUs. Read more… (https://www.hpcwire.com/2017/08/08/ibm-raises-bar-distributed-deep-learning/)

By Tiffany Trader

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distributed-deep-learning%2F)

Do Big IT Outsourcing Firms Abuse H-1B Program?

(https://www.hpcwire.com/2017/08/08/big-outsourcing-firms-abuse-h-1b-program/)
August 8, 2017

Is the H-1B visa program mostly a way to import cheaper IT talent from abroad? Read more… (https://www.hpcwire.com/2017/08/08/big-outsourcing-firms-abuse-h-1b-program/)

By John Russell

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