

## Quick Take

# DOE's Exascale Computing Project Awards Six US Companies \$258 Million Over Three Years to Advance Exascale Technology

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## HIGHLIGHTS

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The U.S. Department of Energy's (DOE's) Exascale Computing Project (ECP), established in 2016 to accelerate delivery of a capable exascale computing system that can deliver 50 to 100 times more sustained performance than current high-end machines, just announced its most recent round of funding totaling \$258 million spread across six leading US HPC companies.

- The funding will be spread out over a three-year contract period with the US companies supplying at least 40% of the total project cost, bringing the total investment to at least \$430 million.
- The six US technology companies are Advanced Micro Devices, Cray Inc., Hewlett Packard Enterprise, International Business Machines, Intel Corp. and NVIDIA Corp,
- This is ECP's first funding round directly targeting HPC vendor R&D for exascale processor and system technology.

The ECP's multiyear mission is to maximize the benefits of high-performance computing for U.S. economic competitiveness, national security and scientific discovery. In addition to applications development, the DOE ECP project addresses hardware, software, platforms and workforce development needs critical to the effective development and deployment of future exascale systems.

- This is the second round of ECP funding to the commercial sector. Last year, the project awarded 15 contracts totaling \$39.8 million, targeting advanced modeling and simulation solutions supporting DOE missions in science, clean energy, and national security, as well as advanced research collaborations, such as the Precision Medicine Initiative with the National Institutes of Health's National Cancer Institute.

The ECP is a collaborative effort of two DOE organizations: the Office of Science (DOE-SC); and the National Nuclear Security Administration (NNSA), and it directly involves six of DOE's national labs: DOE-SC's Oak Ridge, Argonne, and Lawrence Berkeley national labs and NNSA's Lawrence Livermore, Los Alamos, and Sandia national labs.

## ANALYST OPINION

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Similar to what was seen in the first round of funding last year, for this round ECP planners have cast a wide net, providing R&D funding to a number of processor developers and HPC system suppliers. It is too early to tell which (and how many) processors, architectures, and technology providers will move forward to the final phases of the ECP, culminating in finished exascale systems in the 2021 time frame. It is clear that the ECP has placed itself in a strong position to evaluate a number of alternate

schemes, while at the same time spreading around significant funding to support critical exascale technology development within the US HPC supplier community.

The ECP is the largest, most ambitious, and most comprehensive US national project to develop exascale technologies that directly involves not only DOE labs, but a large number of government agency partners as well as commercial and academic participants.

- Managing such a process requires significant and successful coordination among the many participants and will be key to the ultimate effectiveness of the project.
- Indications are that ECP leadership understands these issues and has successfully stood up a highly respected management team.

ECP managers have stressed that this project that will not itself directly develop or acquire exascale HPCs for specific DOE missions, but rather that it is geared towards developing a wide base of HPC-related capabilities that could ultimately feed into future DOE exascale HPC acquisitions made by the individual DOE national laboratory facilities. As such, ECP leadership will need to ensure that the research directions they set for the project walk the fine line between advancing the state of the art and developing capabilities that will have direct and positive benefit to a wide range of DOE lab mission requirements.

Finally, ECP planners are also working hard to address some of the non-technical, but no less demanding, goals of the program that emphasize the development of HPC capability that can foster US economic competitiveness. ECP planners will need to continue to work closely not only with HPC industry experts but those in the existing and potential HPC users base across a wide range of US commercial segments to better address this important element.

ECP leadership faces some significant competition from overseas in that area. Globally, there is widespread recognition by many governments that HPCs are a critical engine for economic activity and that indigenous HPC development and use is a required national asset to ensure robust capabilities in domestic innovation, product development, and new scientific discovery.

- A recent Hyperion Research study shows that HPC-reliant US economic sectors contribute almost 55% of the GDP to the US economy.

## About Hyperion Research, LLC

Hyperion Research, consisting of the former Hyperion high performance computing (HPC) analyst team, provides HPC information, analysis, and recommendations based on technology and market trends. Research includes market sizing and forecasting, share tracking, segmentation, technology and related trend analysis, and both user & vendor analysis for multi-user technical server technology used for HPC and HPDA (high performance data analysis). We provide thought leadership and practical guidance for users, vendors and other members of the HPC community by focusing on key market and technology trends across government, industry, commerce, and academia.

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