

NCSA Turns to PIER Group to Develop Delta Supercomputer

Client: National Center for Supercomputing Applications

Partner: PIER Group & NVIDIA

Challenge: Quickly meeting National Science Foundation (NSF) grant criteria, then developing and deploying a high-performance compute cluster to support advanced scientific research

Solution: Delta, a computing and data resource that balances cutting-edge graphics processor and CPU architectures to meet advanced research computing demands

Results: Successfully orchestrated compliance with grant criteria and development through deployment of the Delta solution

Introduction

The National Center for Supercomputing Applications (NCSA), housed at the University of Illinois Urbana-Champaign, was developing an innovative supercomputing and data resource to advance scientific research. The NCSA looked to the National Science Foundation (NSF) for funding through its High-Performance Computing Program.

The NCSA decided that the new solution would include the ability to handle traditional CPU-based computing workloads and advanced graphics processing unit (GPU)-based jobs that typically require in-system memory allocation. With COVID-19 impeding progress and under time pressure to meet the NSF grant criteria, the NCSA turned to PIER Group for help orchestrating, developing, and deploying the supercomputer.

Collaborative Implementation Process

With a lengthy history of working with the NCSA, PIER Group consulted, along with partner NVIDIA, with NCSA's engineers and technicians in architecting the basic

systems and code for the solution, now called the Delta supercomputer. They first orchestrated meeting the NSF grant criteria while up against a tight grant deadline—and with COVID slowing communications and supply chains. PIER Group also worked with HPE to provide system benchmarking that met the NSF acceptance criteria.

The NCSA chose NVIDIA accelerated computing GPUs for handling and analyzing data. The NVIDIA team collaborated closely with PIER Group and NCSA throughout the process, from development to installation and fine-tuning of the standard NVIDIA software, including CUDA and the HPC toolkit. After orchestrating the process with the NSF, NVIDIA, HPE, and other OEM teams to develop the system architecture and components, PIER Group then shepherded Delta through to final production.

Results

Thanks to PIER Group's consulting expertise, collaborative approach, and extensive ecosystem of users, partners, software developers, and researchers, the NCSA successfully deployed Delta — the largest NSF cluster in terms of GPUs — for advanced research computing.



In its first year of operation, Delta used 4.2M A100 GPU hours and 260M CPU core hours. Delta's GPU usage exceeds that of all other ACCESSS allocated resources combined. Delta's greater than 98% availability has enabled nearly 2,000 active user accounts to run over 2M compute jobs during the year.

"AI leadership requires world-class AI infrastructure. Our collaboration with NCSA on the modular Delta AI – powered by NVIDIA's accelerated computing platform – is ideal for complex simulation and AI workloads and gives researchers the performance they need to foster innovation and advance science."

- Ian Buck, VP of Hyperscale and HPC, NVIDIA

Contact us or visit our website to learn more about PIER Group's computing solutions and services.

PIER Group and NVIDIA Help You Achieve Your Technology Goals

PIER Group, an Elite Partner with NVIDIA, was formed in early 2010 due to our group's passion for the research and education industry. With an average of 30 years of experience serving the R&E community, the PIER Group team is dedicated to research and education, working daily to continue delivering the best possible technology for the best possible value to customers nationwide.

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