

The Right High Performance Computing Solution for Higher Education

Colleges and universities need an experienced partner who can help solve their computing needs with an eye toward scalability

SUMMARY

High performance computing is becoming a critical component of higher education IT infrastructure. Clustered CPUs can significantly boost computing power, driving university research, allowing for smart campuses, and creating a scalable computing environment.

As universities and colleges seek to optimize systems and improve data management, they face various challenges due to the often siloed structure of higher education institutions. Often each department has its own data sets with its own needs. Creating a network that considers the differences yet meets the needs of the institution overall can be challenging.

High performance computing (HPC) solutions that scale out, on premises or in the cloud, are flexible enough to provide the power and flexibility that complex organizations need. When offered through a consumption-based platform, HPC can align to the economic requirements of many higher education organizations, as well.

Higher education workloads require the power of supercomputing, the flexibility to scale across the campus or within specific departments, and must be available on premises, in the cloud, at the edge, and everywhere in between. The economic realities that many educational institutions face make finding the right solution to support their most demanding workloads even more challenging.

On the surface, it might seem that computing power and connectivity alone are what's needed to fuel the innovative but highly demanding workloads found in academic and research institutions. The truth is, meeting the unique data and computing needs within higher education is more complex. Finding the right partner can make the process of selecting the right solutions much simpler.

PIER Group and Hewlett Packard Enterprise are focused on meeting the unique needs of higher education. From propelling institutions onto the TOP500 supercomputer list to implementing smaller, specialized computing clusters, PIER Group has helped colleges and universities architect the right systems to meet the institutions' needs.



The PIER Group team is composed of professionals with an average of over 30 years serving research in higher education. PIER Group focuses specifically on delivering the HPC needs of R1 and R2 institutions — universities engaging in extensive research. As a long-term partner in research and education, the PIER Group team is positioned to help guide universities through the complex process of finding the right HPC solutions to accelerate their innovation.

HPC and AI in Higher Education

HPC clusters have capabilities that far outstrip a standard desktop computer. HPC consists of clusters of CPUs. The interconnectivity between the CPUs creates much more computing power, allowing an HPC configuration to handle greater data loads.

In higher education, HPCs can help fuel intensive research projects, scale ITOps, and optimize university-wide networks. Although HPCs often are valued for their ability to process large amounts of data, their power can be harnessed in other ways, such as enhanced graphics abilities.

Where HPC represents the hardware side of supercomputing, artificial intelligence (AI) and machine learning (ML) represent the latest in software development. Research projects use AI and ML because they can process vast amounts of data and learn from it, applying past results for predictive analysis. Often, the hardware of HPC is needed to facilitate the operation of AI and ML.

Across the energy industry, organizations are investing heavily in physical and digital infrastructure to better generate, transform, store, and distribute energy. High performance computing is becoming ever more crucial for this digital transformation. HPE offers an advanced portfolio of HPC solutions for energy exploration transition.

Some other considerations include challenging economics, security needs to protect the hardware and software involved with HPC, and the ability to scale up and down, depending on workload needs. Proper network management and interconnectivity to other systems to optimize and integrate them are also crucial considerations.

Key to Scalability

In implementing HPC and scaling up ITOps at a university, there are several key factors the PIER Group team can help a university navigate. For example, the right kind of CPU for the right use can significantly affect network performance, data management, and the ability to scale.

HPE Apollo systems provide universities with machines specifically built and designed for an HPC network cluster. HPE Apollo systems are built to handle workloads that entail massive amounts of data and require an ability to scale computing power as computing needs change.

Architecting a System

PIER Group's expertise with HPC and higher education makes it an ideal partner for a university looking to optimize its IT infrastructure. Although universities have many choices regarding hardware, there are nuances to creating an effective HPC cluster. For example, speed is an obvious priority. But, in the case of creating an HPC cluster for a university department, the type of data and its use matter. PIER Group can help universities ensure they match the right CPU with the right dataset.

In architecting a system, PIER Group considers what a university needs overall and what it needs on a departmental level. A medical school might need CPUs that can support intensive graphics and visuals. In contrast, the business school might need CPUs that can process millions of lines of data and incorporate predictive AI. Ultimately, the right solution must be chosen based on the nuances of the workloads.

PIER Group helps universities make the right choices, bringing a faster return on investment and elongating the effectiveness of the computing solution. The last thing a university or college wants is to make an expensive computing upgrade that doesn't stand the test of time. Rather, an HPC solution should last and allow for upgrades, eliminating the need to revisit the issue in the near term.

Creating a Smart Campus

A smart campus allows a university to create various efficiencies throughout school grounds using AI and automation. HPC clusters can help create a smart campus environment by providing the computing power necessary for AI. Ultimately, an HPC-powered smart campus can save resources and benefit students and educators.

For instance, PIER Group has used IoT devices to help large higher education institutions automate various aspects of facilities management, encouraging energy savings. Some of the systems automated

on campuses include heating, cooling, and electricity use.

Other aspects of a smart campus might include allocating resources and space. A smart campus might be able to identify a quiet place for students to study between classes, for example. It also can be used to alert students in the event of an emergency.

PIER Group has helped higher education institutions create central network management, implement wireless services for large outdoor areas on school grounds, create large-scale IoT and security networks, and allow for smart campus functionality.

An Established Partner in Higher Education

PIER Group has worked with R1 and R2 higher education institutions for more than 25 years. PIER Group has remained focused on networking and HPC that encompasses AI and ML. The fact the group has kept its focus on these areas means it has developed a high degree of expertise.

Many universities still operate with largely siloed legacy systems, using disparate management tools that often involve manual processes. PIER Group has experience creating customized IT as a service (ITaaS) solutions that can act as an internal service broker within a complex university system. ITaaS can allow universities to improve how they use IT resources and assist in managing university infrastructure.

In addressing university HPC needs, PIER Group matches configurations and equipment to meet the unique needs of a higher education partner. PIER Group specializes in architecting scalable HPC systems. PIER Group experts focus on putting together the right hardware and software combinations to ensure optimum performance. Through its partnership with HPE, PIER Group can also deliver the latest technology.

Clear Solutions

As IT and computing needs grow, the ability to scale and operate the resulting systems becomes more complex. If deployed correctly, HPC, AI, and ML provide potential solutions to these challenges. PIER Group works with clients to meet their current and future needs by offering the following value:

- Providing universities with a trusted and proven partner
- Helping to make the right hardware and software decisions down to the departmental level
- Supplying the latest in technology
- Delivering solutions that will last and allow for adaptability and scalability

For R1 and R2 universities, the easy decision is to pursue HPC solutions. The bigger challenge is finding a true partner who can help architect the upgrade in a way that works. PIER Group and HPE offer expertise in designing a customizable system that meets the unique needs of a higher education institution with the best technology available to support HPC now and in the future.

PIER Group: Partners in Education & Research

PIER Group is a Hewlett Packard Enterprise Gold Solution Provider with over 25 years of experience serving the R&E community. We work hard every day to deliver the best possible technology and value to R&E customers across the country. “Partners in Education & Research” means just that to us — being by your side as you achieve all your technology goals. We have built deep relationships with the most reputable manufacturer partners in the world, allowing us to design and provide complete solutions to maximize technological outcomes for even the most complex environments.

To begin solving your HPC computing needs, contact PIER Group at contact@piergroup.com, and begin a transformative partnership.

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HPE Gold Solution Provider for:

- Hybrid IT Specialist
- Networking Specialist

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