Case study

Scaling tomorrow's research labs today

Purdue looks to HP Moonshot for density, efficiency, and scalability

Industry
Research, High-Performance Computing

Objective
Upgrade legacy systems with right-sized resources to save energy, boost performance, and reclaim data center floor space

Approach
Engage with HP Discovery Lab and Matrix Integration to deploy HP Moonshot System for economic scalability

IT matters
- Boosts performance while reclaiming data center real estate
- Enables smart scalability for new programs, delivering growth with minimal resources
- Simplifies future upgrades while paving the way for new, highly efficient deployments

Business matters
- Saves $3,700 per rack, per year in energy consumption
- Extends high-end graphic rendering while minimizing wait times to researchers worldwide
- Strengthens the value proposition of potential students seeking real-world experience

PURDUE UNIVERSITY

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– Mike Shuey, High-Performance Computing Systems Manager, Purdue University

A leader in the computer science world since before the personal computing revolution, Purdue University is a major research university in Lafayette, Indiana, known for discoveries across many disciplines. Recently, the university's research computing program replaced two of its legacy environments with the HP Moonshot System. Today, the university is realizing savings in data center floor space, energy costs, and TCO by replacing standard server installations with HP Moonshot technology.

A better place

Students flock to institutions of higher learning for all sorts of reasons. Some are just trying to get away from home. Others want to pursue a pathway to making more money. And some are honestly trying to make the world a better place.

University researchers fall squarely in the latter category. They're born to solve problems, and their tool of choice is the supercomputer. Huge clusters that deliver massive number-crunching power are the stuff that draw young researchers across the country and across the globe to places such as Purdue University in Indiana—a major research center responsible for important discoveries in science, technology, engineering, and more.

With a long tradition of excellence, Purdue is the kind of place that the world's technology leaders look to for new ideas, young talent, and deep partnerships. When HP reimagined the very fabric of server architecture in its Moonshot System, Purdue was one place it knew it needed to be. The two entities established an HP Discovery Lab on the Purdue campus to allow customers, partners, and students unfettered access to HP Moonshot System technology for testing, application benchmarking, and experimenting in a secure, confidential environment.

Discovering a new compute model

The lab provides real-world job training for Purdue students, and insight into new technology for the university's own IT staff. "The HP Discovery Lab is a great resource for everyone here at Purdue," says Mike Shuey, Research Infrastructure Architect for Purdue. "Through the Pathmaker program, our students actually become residential interns for HP, supporting their ongoing schooling and preparing them for life outside the university."

One Purdue resource benefiting from this partnership was a general-purpose cluster used for onboarding new users to larger HPC systems. The existing environment was six years old, offered limited bandwidth, and was relatively inefficient in its power and space use. "The original resource was built on standard rackmount servers, and we needed a newer platform to help reclaim power and floor space for other users," Shuey says.

Purdue needed a system that offered a significant number of nodes in an efficient profile. Together with Matrix Integration—an HP Elite Partner—and HP employees already on campus in the Discovery Lab, Purdue built its HPC onboarding system using HP Moonshot ProLiant m700 Servers.

"We built our HPC onboarding environment in an eighth of the space, and at a fraction of the power footprint of a standard server deployment," Shuey explains. "We see additional power and space savings from the integrated network options. All told, we're seeing a net savings of $3,700 per rack, per year in energy savings."

Purdue also eyed Moonshot for building a visualization platform for its HUBzero scientific gateway software. The HUBzero project is an open-source platform for building powerful websites that support scientific discovery, learning, and collaboration. Supporting a variety of disciplines, including cancer research, pharmaceuticals, biofuels, micro-electro-mechanical systems, climate modeling, volcanology, and more, HUBzero allows researchers to upload their work so a supercomputer can calculate and analyze results. In some cases, this analysis can produce detailed visualization of the results—an application better suited for desktop graphics than back-office server equipment.

Customer at a glance

Hardware
- HP Moonshot for Hosted Desktops
- HP Moonshot 1500 Chassis
- HP ProLiant m700 Server

HP Partner
- Matrix Integration, an HP Elite Partner

Services
- HP Discovery Lab

Software
- Red Hat Enterprise Linux Server 6.6, Kernel 2.6.32

Right-sized for research

Again, the team could have built the environment using commodity hardware. "The only problem with standard pizza-box style servers is that graphics acceleration is not common in that space," Shuey relates. "We could have built it with a combination of standard servers and desktop workstations, but this would have a higher power requirement and a larger space footprint."

Purdue began tests for HUBzero using the HP ProLiant m700 Server, a main ingredient in the HP Moonshot for Hosted Desktops. "We weren't interested in a virtual or hosted desktop solution, but the m700 server with its AMD Opteron™ X2150 APU, 1.5GHz, (4) x86 cores, and integrated GPU with AMD Radeon™ HD 8000 Series Graphics may also be useful for lightweight visualization and data post processing."

The performance of the system will be tested when the environment is built out over the next several months. "The previous system just wasn't able to deliver image output quickly enough," Shuey says. "We can't afford to have our researchers waiting for results when dozens of people across the globe are trying to build visualizations simultaneously. With the Moonshot ProLiant m700 Server, we can deliver the GPU our researchers need while using significantly less power and floor space than traditional solutions."

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