

Platform™

The Power of Sharing

“With Platform Open Cluster Stack*, it’s very easy to implement a large cluster.”

Senior Linux Cluster Administrator

University implements Platform OCS* to standardize clusters supporting open source HPC applications

Customer

Major US State University

Industry

Education

Challenges

- HPC applications used by graduate students and faculty members at the University were predominately open source with a limited number of commercial software
- Usage of the large number of system resources at the University was very sporadic – during the day, systems were running at full capacity resulting in wait times to run jobs, and at other times, the system had little or no use
- Research on genomes of numerous species generates 100,000s of processes per week that must be scheduled and completed as efficiently as possible

Solution

Platform Open Cluster Stack (OCS)*
Platform LSF
Platform LSF MultiCluster

Results

- The system is now fully utilized at all times with usage of the various systems increasing by as much as 200%
- Open, pre-integrated, standard software stack delivered by Platform OCS* ensures broad application support across the University’s spectrum of cluster computers and makes them far easier to manage and maintain
- Platform LSF improved the productivity for graduate students and faculty members, with service level priority in accessing the systems to execute their jobs

Supporting requirements of multiple departments

The University’s Scientific Graduate Department, is responsible for managing all aspects of the University’s HPC (High Performance Computing) infrastructure to support the requirements of many different departments. Responsibilities include specifying new hardware and software purchases, maintaining the systems, and interacting with the user community. There is also communication with other campuses, such as the University of Oklahoma where there is a plan to implement a joint collaboration project to implement and share super computing resources between the two sites.

The University’s infrastructure is comprised of three major clusters and one smaller cluster. The University’s students and faculty utilize a wide variety of open source software applications from various National Labs. The University’s HPC applications are predominately open source with a limited number of commercial software tools utilized by graduate students and faculty members. Usage of the large number of system resources at the University was very sporadic – during the day, systems were running at full capacity resulting in wait times to run jobs, and at other times, the system had little or no use. The University needed a more efficient solution that would keep the system running effectively at all times.

*Note regarding Platform OCS 4.4.0: This product includes software developed by the Rocks Cluster Group at the San Diego Supercomputer Center at the University of California, San Diego and its contributors.





"We don't really have a lot of application codes that are commercial," according to the Senior Linux Cluster Administrator. "Most of the people at the campus who use our HPC resources are graduate students and faculty members, who have used open source codes in previous places."

Major open source HPC applications that are used at the campus include:

- LAMMPS (Large-scale Atomic / Molecular Massively Parallel Simulator)
- Quantum ESPRESSO (open Source Package for Research in Electronic Structure Simulation, and Optimization)
- ABINIT, a robust, full-featured electronic-structure code based on density functional theory, plane waves, and pseudopotentials

The challenge of maintaining open source applications

"Like many others using open source applications, we found that cobbling together our own versions of Linux, to run on large clusters, is difficult to maintain. When you get to over 32 compute nodes, the support and maintenance of codes definitely becomes an issue," says the Senior Linux Cluster Administrator. "When you need to get into very large machines, you need to be able to make changes at one location and broadcast it over the system, where all of the compute appliances are matching the master appliance."

Supporting many users signed up to access and run this wide range of applications was also a challenge for the department. "We have over 52 users signed up on the main super computer with log-in accounts, and probably 10-15 users who always have jobs running," says the Senior Linux Cluster Administrator. "The challenge was during peak hours at the campus when graduate students and faculty members tried to run jobs at the same time, and either had to wait, or worse were unable to run their jobs in a reasonable amount of time."

Platform's solution streamlines maintenance, manages round-the-clock usage

Platform Open Cluster Stack (OCS)* was acquired to support the University's IT staff in its installation and cluster administration activities. Platform LSF was then implemented to manage the workload so that the University's computing resources were utilized around the clock in a consistent manner, and based upon predetermined policies and service level agreements. Platform OCS* is a pre-integrated, vendor certified, software stack that enables the consistent delivery of scale-out application clusters.

"By installing Platform OCS*, we had more standard support across our Linux clusters and the opportunity to seamlessly manage changes to our applications over our multiple systems," adds the Senior Linux Cluster Administrator. "By using Platform OCS*, our large clusters became easier to support and maintain."

The University also implemented Platform LSF for managing the job scheduling and execution, and Platform LSF MultiCluster, a project planned to support the sharing of cluster systems between this University and the University of Oklahoma.

"Platform's products are very solid and configurable," says the Senior Linux Cluster Administrator. "The support teams at Platform are responsive to my needs and the user community forum is a great place to share ideas and best practices. I'm an open source person and like the community input."

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