CUSTOMER STORY

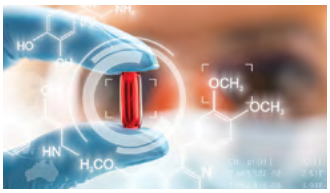
HPC POWERS GLOBAL RESEARCH

KYOTO UNIVERSITY'S HPC RESOURCES POWER JAPAN'S RESEARCH COMMUNITY

About the Customer

Kyoto University is one of the largest and highest-ranked universities in Japan, with a 150-year tradition of providing critical academic and scientific resources across Japan and worldwide. Its Academic Center for Computing and Media Studies (ACCMS) provides HPC tools for researchers, and the Kyoto University team recently celebrated 50 years of supercomputing. The university supports research in a broad variety of areas including natural science, economics, space science, genetics, and civil engineering. With more than 1,600 users relying on its computing resources — around 60% outside university walls — Kyoto University has an important mission with global reach.

> "The highly customizable nature of PBS Professional is a key feature enabling more productive cluster management.
>
> Dr. Hiroshi Nakashima, Professor, Academic Center for Computing and Media Studies, Kyoto University



Kyoto University's HPC resources enable a broad variety of research worldwide

Their Challenge

Today's massive data growth and demand for computing power means **HPC is always evolving**, and Kyoto University's ACCMS needed to evolve with it. To elevate its HPC capabilities, the team commissioned Cray, a Hewlett Packard Enterprise company, to deliver three supercomputing systems with workload management orchestrated by Altair® PBS Professional®.

Professor Hiroshi Nakashima, PhD, leads the ACCMS. He is responsible for acquiring the university's HPC resources and for making sure they operate efficiently and effectively. "**We need to provide our HPC resources to a wide spectrum of users** in terms of the nature of their applications and the amount of resources they need," said Nakashima. "One of the key issues in our acquisition is workload and resource management obeying our own policies, for which PBS Professional gives us a good solution."

Our Solution

Supercomputing at the university was boosted when Cray installed the 5-petaflop Cray® XC™ "Camphor 2" supercomputer and two Cray® CS™ systems, "Laurel 2" and "Cinnamon 2." All three systems had PBS Professional installed, and Altair integrated transparent cache more for the Cray® DataWarp™ application I/O accelerator. **Customization and custom development were key features of the solution.** Altair did custom coding to achieve service-level agreements (SLAs) and, after the supercomputing system was installed, developed a node allocator that worked in conjunction with the scheduler to find the best times and places to schedule jobs.

The Kyoto University supercomputing ecosystem was built to handle a variety of workloads, many with memory-hungry operations and highly parallel vectorized codes. PBS Professional efficiently orchestrates **job scheduling and management for the most complex, demanding HPC workloads**. It also keeps energy costs down by efficiently managing computing resources.

Results

The university's next step is to boost computing power with a new high-performance system that will accommodate an even wider range of applications, including machine learning. This will use advanced technologies such as containers and energy-efficient resource allocation. With state-of-the-art computing architecture and the latest workload management technology from Altair, **Kyoto University is equipped to provide robust HPC resources** for users both within and outside the university for many years to come.