CUSTOMER STORY

POWERING SCIENCE AND RESEARCH

IMPERIAL COLLEGE LONDON FUTURE-PROOFS COMPUTING WITH ALTAIR® PBS PROFESSIONAL®

About the Customer

Imperial College London is the only university in the U.K. to focus solely on science, engineering, medicine, and business. Its international reputation for excellence consistently earns it a spot in lists naming the world's top 10 universities. Imperial's Research Computing Service (RCS) team maintains a centrally supported range of facilities, including a high-performance computing (HPC) cluster, that are available to staff and researchers. It supports research activities across the college, underpins the development of future services that require research computing, and provides access to best-in-class research computing.

> "Partnering with Altair has enabled Imperial to fully adopt a reliable and robust IPv6-based solution to support its latest HPC deployment.
>
> Andrew Richards, Director of Computing Services, Imperial College London

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Their Challenge

Much of today's critical research computing takes place at universities. **Imperial supports cutting-edge research in scientific and engineering fields including genetics, microbiology, climate, chemistry, and more.** To power research across its campuses, the RCS team maintains sophisticated HPC facilities. Their mission is to increase the quality, impact, and sustainability of the research software developed at Imperial and to enhance the college's world-leading research. The RCS team needed to change the protocol they use to run their computing environment — which includes many virtual machines and a smaller number of physical systems — from IPv4 to IPv6, which can accommodate exponentially more addresses than the IPv4 address space. While the physical node count in HPC hasn't increased much recently, the use of virtualization and private cloud means **the need for more network address space is growing.**

Our Solution

While IPv4 is still used by the majority of networks worldwide, **IPv6 is the future of network communication, and those who adopt it now are well ahead of the curve**. It comes with not only a greatly expanded — effectively infinite — set of addresses, but also features a simplified header format for increased connection speed, more efficient routing without fragmenting packets, and security measures including data authentication and encryption.

Because the two protocols don't communicate directly with each other, moving to IPv6 wasn't as straightforward as simply adding addresses. The RCS team at Imperial uses the Altair® PBS Professional® workload manager to orchestrate high-performance and high-throughput computing workloads with powerful, policy-driven scheduling. PBS Professional was designed with IPv4 support, so the experts at Altair worked with the RCS team to enable support for IPv6 communication in PBS Professional and to upgrade the custom scripts the college had been using — **freeing them from IPv4 dependence and allowing future expansion of their compute resources and connected devices**.

Results

Networked computing resources at Imperial can now communicate using safe, efficient, and readily available IPv6 addresses, a change that **empowers the university's research now and in the future**. No longer dependent on the IPv4 protocol, the RCS team can sell their old IPv4 address blocks and free up budget to augment computational support for college-wide learning and research. They're also investigating PBS Professional's built-in allocation and budget management functionality, which gives users better visibility into HPC utilization by groups and individual users. Support for IPv6 will also enable other PBS Professional users to future-proof their computing environments.