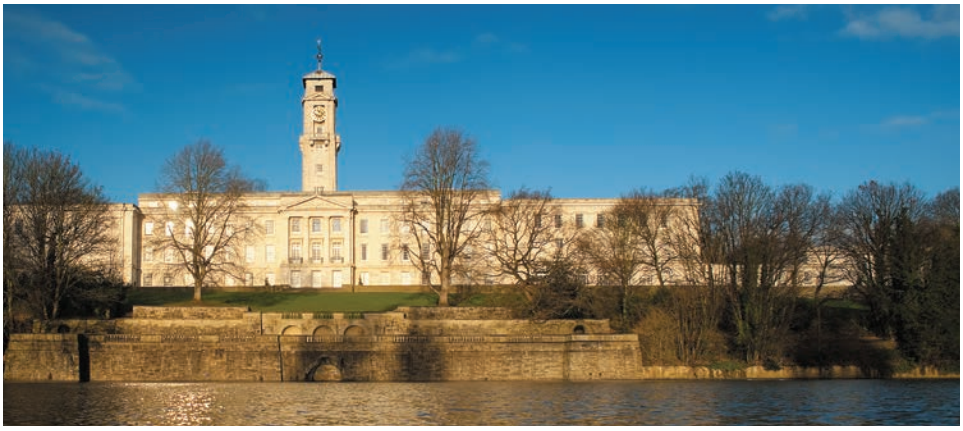
Altair | PBS Works™

PBS Works Suite Deployed for Comprehensive Workload Management at The University of Nottingham



The University of Nottingham

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Key Highlights

Industry
Government and Research

Challenge
Offer a comprehensive range of workload management capabilities to a diverse set of users

Altair Solution
PBS Works suite

Benefits
- Improved cluster reliability
- More successful job completion
- Simplified job submission and management
- Deep visibility into resource utilization

Customer Profile

The University of Nottingham is committed to providing a truly international education, inspiring students, producing world-leading research and benefitting the communities around its campuses in the UK, China and Malaysia. Globally, the University is home to over 43,000 students, more than 9,000 of them postgraduates, and can claim among its guest lecturers Albert Einstein, H.G. Wells and Mahatma Gandhi. The University of Nottingham's position as a world-class University is confirmed by ranking in the UK and European top 30 and by its position in the top 1 per cent of all universities worldwide.

The Challenge: Going Beyond Job Scheduling to Full Workload Management

The academic community at the University of Nottingham produces world-changing research by focusing on the problems and challenges that affect societies and people on a wide scale. Achieving this involves developing ideas, creating discoveries and exchanging knowledge which generates real economic, social, environmental and cultural impact. Over 100 research groups operate at the University of Nottingham, with nine "Priority Groups" in key thematic areas.

To support these researchers and their goals, the University of Nottingham is committed to investing in its infrastructure as well as its staff. The University's high-performance computing (HPC) facility underpins research in the areas of Science, Medicine and Engineering; the HPC users are very diverse in their applications, including: Engineering (CFD, Finite Element); Chemistry (Electronic Structure, Molecular Dynamics); Computer Science (Scheduling, varied simulations); Life Sciences; Vet School

Keywords: Government and Research, The University of Nottingham, HPC, PBS Works Suite

The University of Nottingham Success Story

“The PBS Works suite was the right choice for our comprehensive workload management needs. Its full, integrated set of capabilities, offered from a single vendor with excellent support, was the best solution for our users.”

Dr. Colin Bannister,
HPC Service Manager, The University of Nottingham

(Bioinformatics, gene sequence matching); Business School (textual analysis); Physics & Astronomy (Cosmological simulations, material studies); Mathematics; Pharmacy (molecular dynamics of macro molecules); and more.

In a recent evaluation of their HPC facilities, HPC Service Manager Dr. Colin Bannister was focused on ensuring the University of Nottingham was gaining the maximum possible benefit from its investment in HPC equipment. The best way to ensure this was to implement a powerful, flexible workload management suite that the University’s researchers and IT team could rely on for efficiency, usability and performance.

“We needed more than a job scheduler – we needed a full, integrated suite that could support the needs of our research team from job submission to data analysis and reporting,” says Dr. Bannister. “Managing this diverse a range of users, we did not want to have to worry about whether the system was flexible enough for all the pieces to work together. We wanted to find a well-integrated, customizable and supported suite we could trust to meet both our current and future needs.”

Specifically, the University of Nottingham sought a workload management system that would enable:

- Efficient scheduling of computational workload
- Ability to monitor and analyze workload to ensure the system meets the developing requirements of the University of Nottingham’s customer base
- Access to a convenient and easy-to-use interface
- Straightforward production of management reports

The Solution: PBS Works for Comprehensive, Streamlined Workload Management

The University of Nottingham performed a detailed requirements specification to determine their choice of HPC workload management system, and found that the solution bid that included PBS Works (with PBS Professional, PBS Analytics and Compute Manager) was the best fit overall for their criteria.

“The comprehensive capabilities of the PBS Works suite with its integrated products, and also the willingness of Altair to engage with us to customize the solution for our needs, were very important factors in the decision,” says Dr. Bannister.

The University had previously been using the Sun Grid Engine scheduler. However, according to Dr. Bannister, “This offered no equivalent to Analytics or Compute Manager.”

In response to an ‘HPC Policy’ document the University had produced, Altair prepared a proposal for how PBS Works should be configured. The full team including the hardware provider, Clustervision, discussed the proposal and agreed to details prior to configuration.

“With every step, we have discussed our requirements and Altair has then worked to produce helpful examples which show us how to achieve what we want from these products,” explains Dr. Bannister. “This guarantees the solution will work the way we need it to, and also makes the implementation process much more sound and sensible from the users’ perspective."

Project Summary

The University of Nottingham chose the PBS Works suite as their integrated workload management solution to their HPC system comprising over 170 machines. The solution includes PBS Professional for scheduling, PBS Analytics for workload analytics and reporting, and Compute Manager for web-based job submission and management. Thanks to PBS Works, the University enjoys simplified HPC system usage, better cluster reliability, and enhanced visibility and support for future planning.

Dr. Bannister adds: "Altair's expert consulting makes all the difference, ensuring our unique goals are truly achieved. Altair clearly understands HPC and has the resources, experience and willingness to really engage with us."

The HPC staff within central IT at the University of Nottingham run the PBS Works system. All users of HPC (research and academic staff, postgraduates, and some undergraduates) use PBS Professional to submit and monitor their jobs; the HPC staff use PBS Analytics for analyzing workload data on the system, and they are preparing to roll out use of Compute Manager as well.

All PBS Works products are used on the University's HPC cluster, which comprises high-specification Dell and SuperMicro compute servers totaling approximately 170 machines, accessed by over 200 users.

The Result: Improved Usability, Reliability and Visibility

According to Dr. Bannister, "The PBS Works suite was the right choice for our comprehensive workload management needs. Its full, integrated set of capabilities, offered from a single vendor with excellent support, was the best solution for our users." The individual products in the PBS Works suite are already driving specific benefits.

"PBS Professional has noticeably improved the reliability of the cluster, in terms of getting jobs completed successfully, due to its enforcement of resource allocation," says Dr. Bannister. "This is very much appreciated by our users."

"Also, PBS Analytics provides an easy-to-use interface to a large amount of information on cluster usage, which helps us see clearly how the system is being used. This gives us the visibility we need to plan the right developments in the system," adds Dr. Bannister.

As Compute Manager is rolled out, Dr. Bannister expects the web-based job submission portal will broaden the use of the HPC – especially for those who are discouraged by the inefficiency of a command line interface.

"Compute Manager simply makes HPC easier – it's a key addition to our HPC environment and really enhances the value of our PBS Works implementation," says Dr. Bannister.

Altair continues to collaborate with the University of Nottingham and respond to their questions and suggestions, ensuring the solution continues to be successful and meet the needs of the University's hundreds of users.

"We have been very pleased with the level of engagement the Altair staff has shown. It's an ongoing process, and we hope that our feedback is driving useful improvements in future versions of the products."

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About Altair

Altair empowers client innovation and decision-making through technology that optimizes the analysis, management and visualization of business and engineering information. Privately held with more than 1,800 employees, Altair has offices throughout North America, South America, Europe and Asia/Pacific. With a 27-year-plus track record for high-end software and consulting services for engineering, computing and enterprise analytics, Altair consistently delivers a competitive advantage to customers in a broad range of industries. Altair has more than 3,000 corporate clients representing the automotive, aerospace, government and defense, and consumer products verticals. Altair also has a growing client presence in the electronics, architecture engineering and construction, and energy markets.

About PBS Works

PBS Works™, Altair's suite of on-demand cloud computing technologies, allows enterprises to maximize ROI on existing infrastructure assets. PBS Works is the most widely implemented software environment for managing grid, cloud, and cluster computing resources worldwide. The suite's flagship product, PBS Professional®, allows enterprises to easily share distributed computing resources across geographic boundaries. With additional tools for portal-based submission, analytics, and data management, the PBS Works suite is a comprehensive solution for optimizing HPC environments. Leveraging a revolutionary "pay-for-use" unit-based business model, PBS Works delivers increased value and flexibility over conventional software-licensing models.

www.pbsworks.com

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