Nominee: Keysource

Nomination title: Keysource and the University of Exeter University search for extra-terrestrial life.

University of Exeter chooses Keysource to deliver a UK-first with no room for error

When the University of Exeter required a highly-flexible and efficient data centre to underpin the development of a new High Performance Computing (HPC) system – the first-of-its kind in the education sector – it chose Keysource to lead the complex design and build project.

Keysource had to deliver against an incredibly strict project timeframe, in order for the University to meet deadlines associated with the research requirements and funding for the project. The Keysource team successfully tackled a range of on-site logistical, technical and operational challenges to successfully deliver for its client.

The University of Exeter is one of the world's top 150 universities according to the Times Higher Education ranking. It has over 22,000 students from 130 countries and 4,600 staff across three main campuses. In 2016 the university decided to invest in a new High-Performance Computing (HPC) facility to support a diverse range of research, from the traditional HPC user base in physical sciences, through to the burgeoning requirements in life sciences and new requirements in digital humanities.

Instead of adopting an outsourced compute model, the university decided to build its own data centre to act as the critical infrastructure for its proprietary HPC system, called Isca. Isca provides a next-generation research computing environment, combining traditional HPC with a private cloud infrastructure. This would allow it to ensure its specific research requirements and capacity challenges were met and give it new opportunities to build partnerships with other universities, including the GW4 consortium, and industrial partners.

The Keysource team supported the university across the lifecycle of the project – including concept design, detailed design development, construction planning, delivery and commissioning as well as the ongoing management of the data centre.

The resulting design comprises 24 racks, processing up to 336kW of compute within a 280 square foot data hall in the university's Streatham campus.

The new data centre now underpins all the university's advanced computing requirements for over 200 researchers across 30 projects. Some of the new initiatives that are studied using HPC include research into life on other planets, the formation of stars and galaxies and genetics in relation to diabetes.

An urgent requirement and significant challenges

There was a critical need to ensure the delivery of the new data centre met a tight project timeframe of six months, since research access and funding was at risk if the system wasn't live in time for the research start-date.

Keysource was appointed because it has considerable expertise in delivering HPC-related projects and had a track record in meeting tight project deadlines in live environments without disruption to existing services.

At the outset, the team developed a comprehensive project programme that would meet the university's timetable, including the migration of an existing HPC system. Keysource mapped a series of key milestones and established a framework for communication between the client, Keysource as the consultant and project lead, and a team of specialist subcontractors.

The site's location, adjacent construction projects and another on-campus data centre created a series of major challenges for the Keysource team. The development of this plan was pivotal in avoiding issues and ensuring a streamlined delivery.

The University of Exeter's campus is built into a hill and major groundworks were needed to ensure the site was prepared for the delivery, positioning and support of large plant and equipment.

The team also had to manage the schedule of works around adverse weather in winter, ground conditions, including sub-surface asbestos removal, and avoid deliveries of major equipment during periods of high foot fall including open days and events.

In tandem with the delivery of the new data centre, another live project was in progress nearby – the delivery of a 10-storey building for the Life Sciences Institute. Since staff and students were continuing their day-to-day activities around both sites, there was even more need to develop a robust schedule of works and communication to ensure smooth running of the project and maximum health and safety.

This included the coordination and scheduling of multiple meetings between University stakeholders, change control boards, management boards and broader campus activities.

The project also had to take into consideration delivering the projects adjacent to a live data hall. This data centre holds vital operational data for the university itself, including the systems used for clearing. Crucially, the delivery of the HPC facility could not lead to any downtime in the university's back-office data centre.

A key risk was contamination into the live data centre during the construction phase.

During the commissioning and testing stages, power surges or disconnection to the existing data centre through human error was a concern. A full briefing was given to each on-site team to allow them to avoid risk on the site.

An education sector first

Keysource delivered the university's data centre in time for the new research project and to the allocated budget.

Its end-to-end role, covering both design and delivery, saw it also ensure that there was no impact to the live environment around the construction site – with no downtime caused to the adjacent data centre.

The design of the highly flexible system also means the university is now able to respond effectively to changes in the research computing landscape and keep pace with the rapidly developing requirements of a research intensive university.

The project's success means that the university is now positioned to be a major player in the multi-disciplinary, compute intensive environment of modern research.

Why nominee should win

- **The data centre underpins a market-leading HPC environment and has unlocked new research capabilities that will generate revenue for the university**
- **The project's tight timeframe would have been a challenge regardless of the on-site complexities.**
- **Keysource's active role in engaging with additional stakeholders, including those working on the adjacent site, enabled it to avoid any issues and deliver the project on-time.**
- **Zero downtime was caused to the existing data centre, which is of critical importance to the university's day-to-day business functions.**
- **The back-to-basics approach ensured that there were absolutely no surprises during the build – demonstrating best practice for the industry.**