

The University of Hertfordshire takes the risk out of communications with 2bm

In the highly competitive world of further education, state-of-the-art ICT infrastructure has become an imperative. For the fast growing University of Hertfordshire, staff and students' demand for continuous access to excellent resources was placing huge pressure on the data centre and communications infrastructures, which led to a major redesign and redevelopment.

Data centre expert 2bm has fully designed, refurbished and upgraded the University's strategic communications room, providing fire and flood protection, innovative cooling solutions and power resilience. The introduction of energy efficient solutions has enabled the University to significantly improve its PUE rating, whilst addressing its key considerations of continuous uptime and risk mitigation.



Rapid Growth

The University of Hertfordshire has grown dramatically since attaining University status 20 years ago. The University now has over 27,500 students, including more than 2,000 international students from over 85 different countries, as well as 2,600 staff.



In what has become an increasingly competitive marketplace, the provision of state-of-the-art IT and communications equipment is now a core component of every educational establishment. However, in common with many similar institutions, Hertfordshire's ICT equipment has evolved over time, often typically funded and supported by different educational departments.

In 1997, the University built a resources centre that combined comms equipment with the data centre. However a decision was taken to embark on a major refurbishment process, moving the IT equipment to a new purpose build data centre and rebadging the resources centre as a major comms room housing all the networking equipment.

As Stephen Bowes-Phipps, Data Centre Manager at University of Hertfordshire, explains:

"This is the main communications room for the University, hosting all the external Internet connections, many internal campus connections, as well as the link to the JANET further education network. Furthermore, at this time, the University was a regional JANET hub, handling connections from other local colleges, making it a critical resource for a large number of organisations."

Management Challenge

This facility, however, required a major refurbishment in order to provide the reliance demanded by today's communications requirements. "The migration to the new data centre and reconfiguration of equipment left the comms room in a mess," he confirms. "It was very cluttered and badly managed: cables were strung across the tops of racks, other cables went under the floor but poor documentation meant it was impossible to ascertain which cables were linked to a specific piece of equipment."

"This confusion made the management of the room very difficult. Given the critical nature of this resource, this was an unsustainable situation."

The room also lacked many of the core requirements of resilience, including flood and fire protection. The room had inefficient cooling based on office cooling systems rather than tailored data centre cooling technology; the UPS was inefficient and was located in a high voltage (HV) room, which meant any inspection had to be undertaken by an HV trained engineer, adding to the cost.

In addition, the flooring was carpet-based which caused fibre and dust to get into the equipment, and had hazardous cut outs in the carpet tiles where racks had been moved. Added to the tangle of network cables everywhere and the room was an extremely challenging environment in which to work.

Minimising Risk

The University was granted funds to improve the comms room, focusing primarily on introducing power, fire and flood protection to minimise the risk to this critical network equipment. But, as Bowes-Phipps explains, "The University also took the opportunity to undertake a more energy efficient refurbishment."

Following a tender process, the University opted to work with data centre expert 2bm on the comms room refurbishment. He confirms, "This was a design and build programme, with all the requirements for best practice and compliance to both British and international standards. 2bm had good, innovative ideas for the room and gave the University a lot of confidence that they could deliver what was required."

"This was also a fixed cost project. 2bm were happy to proceed on this basis, irrespective of any problems or unexpected issues that occurred – other potential suppliers insisted on additional contingency fees."

Installation of the project was completed in just three months. 2bm worked closely with the University's project board and team to understand the ongoing use of the room and the strategic IT plan moving forward. The organisations worked together to identify key risk areas, develop an agreement for the project implementation and business continuity project plan together with a plan for management, reduction and elimination of the business and health and safety risks.

One of the most challenging aspects of the project was the need to ensure zero downtime for both students and staff. The JANET rack, for example, had to be moved to enable the flooring to be replaced – but it had never been moved since its installation over ten years earlier and the tangle of under floor cables made it a complex task. "2bm approached the job with kid gloves," he says. "We could not lose that JANET connection at any point: 2bm undertook the entire process live."

A similar process was adopted for several other vendor cabinets – from BT and NTL – that had to be retained, which again had to be shifted in position without being taken offline.

Risk Reduction

2bm undertook significant changes to upgrade the major comms room, including alterations to and removal of the existing electrical and mechanical infrastructure; replacement of the existing suspended ceiling with a new system; replacement of the flooring with a new raised access floor with an ESD panel finish and moving existing comms cabinets including the JANET cabinet to allow a phased refurbishment and upgrade of the room.

The facility was fully re-cabled to provide inter-cabinet links within the comms room with links to remote areas of the campus. The cabling has been designed with exposed components to ensure maintenance can be carried out without the need for intrusion and that additional circuits can be deployed without interruption to IT services.

To improve the power supply, the team installed a completely new electrical supply infrastructure and mains connections, providing a maximum total 100kW data centre power with 54kW of net technical load. The existing generator and ATS was used to provide 24 hour run time power failure resilience; while two high efficiency UPS systems with eight minute autonomy were deployed in parallel to support 'A' supplies, with TVSS filtered mains 'B' supplies providing redundancy in the event of failure of 'A' supply path. The solution can provide up to 98% efficiency when running in 'Smart' mode.

To address the fire risk, a double knock fire detection system was installed, coupled to an FM200 gas fire suppression system together with a VESDA aspirating smoke detection system for very early smoke detection and warning. This was interfaced with the building's main fire alarm system.

Bespoke Design

The University opted for 14 bespoke designed racks, with allocated space and infrastructure for a later deployment of a further six racks. Blanking panels were installed to maximise the efficiency of the solution by maintaining high return air temperatures and each cabinet includes power distribution units (PDU) with integrated Ammeters.

This power consumption information is combined with the IP metering fitted to the new power distribution boards to monitor the room's performance and Power Usage Efficiency (PUE) calculation; while 2bm's environmental monitoring solution provides temperature and humidity monitoring to the front and rear of the IT cabinets.

Energy efficiency was addressed by introducing new low energy lighting to all areas fully controlled by proximity switching. 2bm also had to create an innovative cooling solution given the lack of room height created by a low ceiling (2.35m) and a very low floor void (125mm). The solution was the installation of 40kW of N+1 inverter controlled ducted cooling (expandable to 60kW) coupled to 2bm's bespoke designed air delivery canopy which provides a high efficiency open cold aisle solution for the low density cabinet requirement.

Conclusion

The project, which was part of a six figure contract, was completed in two main phases and delivered on time and within budget. The refurbishment addressed the key requirements of fire, flood and power supply to the comms room. However, by adopting energy efficient designs and solutions, the University has also significantly improved its PUE.

Indeed, the University of Hertfordshire continues to work with 2bm on a number of other initiatives, with a view to gaining further energy savings across the infrastructure. These include retrofitting improvements to one of its older data centres, from aisle containment to power transfer switches and improved monitoring.

"2bm's refurbishment has made a massive improvement. University of Hertfordshire now has a modern comms facility that is fit for purpose. Now, we can leverage that innovative design to gain further energy efficiencies." Bowes-Phipps concluded.

