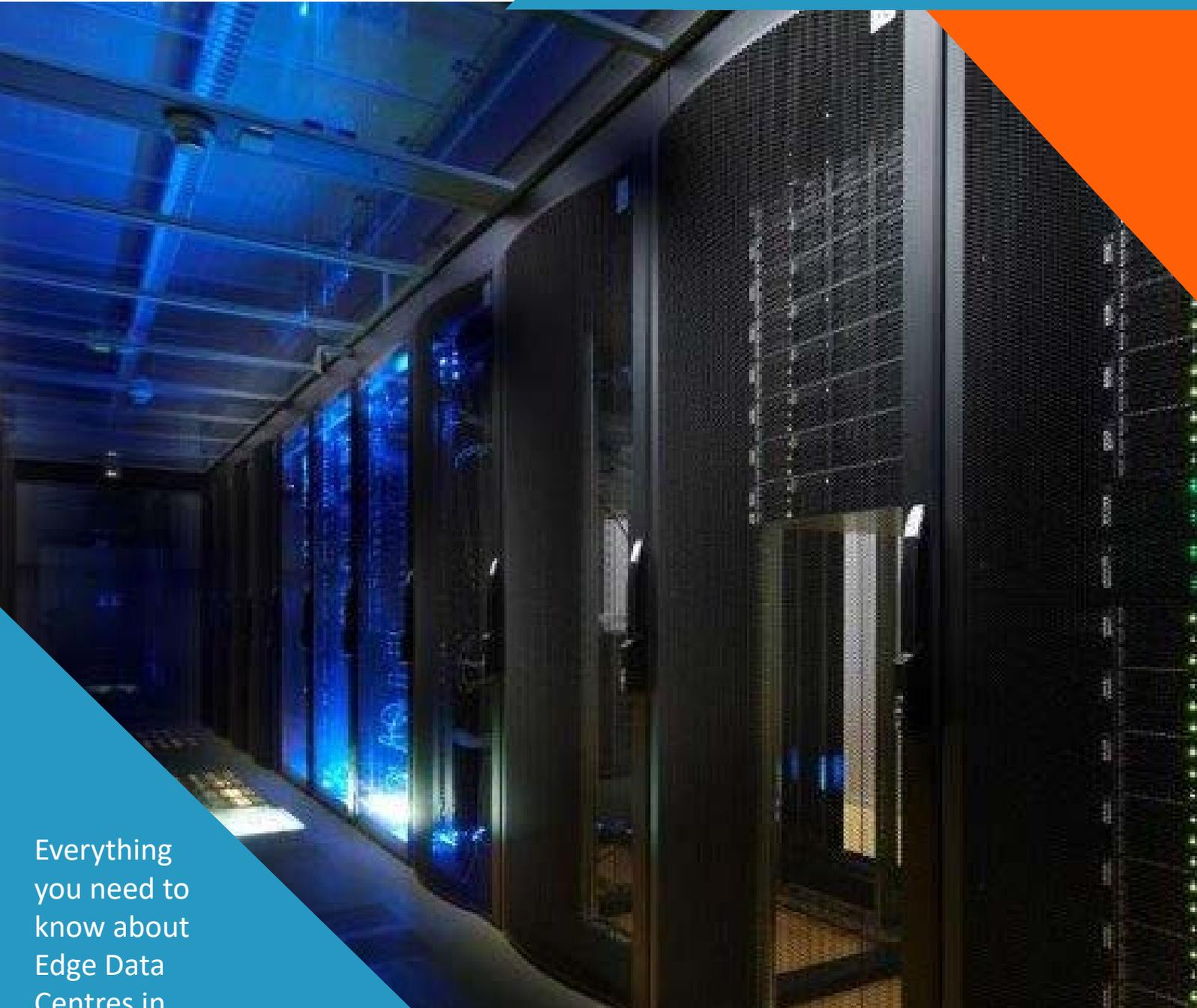




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Edge Data Centres in Higher Education



Everything
you need to
know about
Edge Data
Centres in
Higher
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The importance of edge data centres for higher education



Data centres and networking are at the heart of the modern university. Effective IT planning and wise investment in infrastructure can help universities to address many of the challenges they face. Adopting an edge-based approach means many institutions can deliver better services to students and staff, helping them to stay ahead of the global competition.

The challenges faced by higher education

The global nature of today's higher education (HE) market puts pressure on institutions to deliver an even better working environment for their staff and students. The rise of Big Data and High Process Computing across all fields of research are increasing the demands on creating IT infrastructure. There are also physical challenges such as space constraints and energy efficiency commitments. However, the most important issue faced by HE leaders is managing budgets in a sustainable way to meet changes in the education market. You can read the source Jisc blog [here](#).

Though universities have traditionally had on-premises data centres, the sector could benefit significantly from following the trend towards the edge. With increased availability of cloud services specifically designed for HE, IT departments can refocus their limited resources to where they will have the most benefit.

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Decentralising the data centre

Universities have traditionally operated a centralised IT infrastructure for data and compute functions. With the introduction of education-specific co-location and shared data centres by Jisc and Janet in the UK, the options for university infrastructure design and development have changed considerably.

Just as content providers are shifting capability away from the cloud to the edge of their networks on a micro scale, so universities can benefit from the same approach. This may be of particular benefit to multi-campus and city-based universities.

The cloud offers universities an opportunity to move some of their less sensitive data and non-critical systems to an off-site infrastructure. This can reduce costs and may be particularly beneficial where space is at a premium. Conversely, data and systems that are mission critical can be located directly adjacent to where they are required using microdata centres at the edge of the university network.

Smaller, decentralised data centres at the edge of university networks can provide a range of benefits, including:

- improved staff and student experience
- greater agility and ability to respond more quickly to changing needs
- lower latency for high-bandwidth content, high-performance computing and Big Data applications
- improved redundancy and robustness
- simpler procurement processes
- A larger number of smaller data centres can also simplify the design and implementation of new infrastructure by reducing the power and cooling requirements in a single area.

The availability of all-in-one cabinets, such as the Rittal Micro Data Centre, makes this an increasingly viable option. Built around a standard rack with integrated environmental control, power protection, security, and fire detection and suppression systems, these allow the deployment of a micro data centre almost anywhere. Larger scale 'off-the-shelf' solutions can be deployed quickly and easily to provide departmental or campus-level data centres without the complex design overheads.

'UPS Systems plc have worked with Colleges and Universities across the country on data centres, now that edge data centres are feasible we are recommending using these to enhance existing infrastructure.'

Jack Ogden, Commercial Director, UPS Systems plc



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The benefits of an edge approach to university networks

The recent Jisc HE Sector Barometer Results, which surveyed HE leaders, identified six key transformational challenges that university IT teams face:

1. Creating and sustaining a viable financial and funding model that can adapt to market changes
 2. Meeting the changing needs and expectations of both today's local and global students
 3. Creating the optimum environment to create and sustain learning excellence and deliver the complete learning experience
 4. Creating a truly agile organisation that can anticipate, influence and react to change and manage the risks and complexity that comes with that change
 5. Protecting your institution, its brand, its IP and its reputation from cyber-criminals
 6. Protecting your institution, its brand and reputation from all other threats such as competitors
- Source: Jisc HE Sector Barometer Results, November 2017

Organisational change will be key to meeting these challenges. However, moving away from a centralised approach to IT infrastructure towards a more edge-based data centre strategy can support universities in delivering what is required.

Edge data centres support agile ways of working

The Jisc survey found that supporting a truly agile organisation is the challenge that HE leaders feel requires the most effort.

Traditional data centres have complex design and build requirements, which can take 12–18 months to deploy. Coupled with the extended procurement procedures that universities typically have to follow, it is not possible to deliver new or enhanced data infrastructure in an agile way within existing budgets.

Edge data centres – in particular, modular microdata centres – are quick to deploy and scalable. These lend themselves to an agile approach, allowing IT teams to respond quickly to organisational changes and requirements.



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Creating the optimum environment for complete learning

As e-learning becomes an integral part of teaching, the technology demands within the classroom will also increase. From high definition lecture capture to digital resources and ubiquitous Wi-Fi, the demands on infrastructure have increased exponentially.

To ensure universities are delivering the best learning experience, IT infrastructure needs to support high bandwidth, low latency and, most importantly, easy and reliable access to digital resources. Edge data centres can help to simplify the network infrastructure, making delivery, maintenance and access management easier. The approach also supports high-bandwidth applications by reducing the need for cross-network data transfer. The modular nature of the small cabinets used for edge implementations allows for a great deal of flexibility in their location and application. This allows IT teams to meet



Protecting universities from threats with edge data centres

Large centralised, multi-purpose data centres can pose challenges when it comes to access management and data security. Edge data centres provide a clear separation between different data sources and can simplify user access management for different resources.

Taking a more decentralised approach to HE infrastructure that includes cloud services, central on-premises provision and edge can help to keep sensitive data safe and secure, while making it easier to access shared data.

Modular, micro data centres are available with inbuilt security and monitoring systems, including intrusion detection and biometric access control. This allows such systems to be used in any location regardless of the sensitivity of the data. Integral fire suppression, water and dust-proofing options also allow edge data centres to provide protection against physical risks in harsh environments.

Container-type data centres such as the Rittal RiMatrix S can provide an off-the-shelf backup and mirroring option for disaster recovery. These self-contained, fully featured data centres can hold up to eight 42U racks. With power, cooling and security built in, these data centres can be located anywhere.



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Edge data centre applications within higher education

In addition to supporting universities in meeting specific challenges, edge applications can offer advantages in all aspects of data and compute usage in HE. However, there are some applications to which edge data centres are particularly suited.

High-performance computing (HPC)

Many research-led universities rely on high-performance computing to keep their research at the cutting edge. While some applications will always require large-scale clusters, other research dependent on compute capability can benefit from small-scale implementations. With the advent of high-density, high-efficiency compute platforms, it is perfectly feasible to place one HPC cabinet directly in the lab for research requiring dedicated compute capabilities or with a need for low latency.

Big Data storage

Research is creating more data than ever before. Providing storage close to the data source can prevent losses through transmission errors or hardware failures, as well as providing a route to greater redundancy and safer backup procedures. In research, the data collection and analysis phases may be distinct. A modular, edge approach is scalable and allows compute capability to be easily included, or kept separate, as per the requirements of the project. Self-contained microdata centres also enable a modular approach, allowing additional units to be added as project requirements (or budgets) increase.

Research collaborations

As more collaborative projects between different departments and institutions are launched, the data infrastructure requirements shift. Jisc's shared data centres provide an unparalleled opportunity for shared research, particularly where large data sets are in use. These facilities allow HE institutions to develop a micro data centre outside of their own IT infrastructure. They provide the flexibility for institutions to use their own hardware and give direct access to the fast Janet Network while offering shared maintenance and support services. This approach can simplify the management and security overheads for joint projects, making collaboration easier.

Smart campus and facilities management

As the internet of things (IoT) and smart buildings become more widespread, university estates are likely to see an increasing requirement for connectivity. Building information management systems (BIMS) can generate large quantities of data and the analysis can require significant compute capability.

Universities frequently have some of the most ambitious environmental strategies, but face the challenge of implementing these within an old (or even ancient) physical infrastructure. IoT and BIMS may provide a solution to meeting environmental goals, but their implementation may be dependent on IT provision. Dedicated micro data centres within buildings can reduce the impact on the network that hundreds of additional connected devices might have. They would also reduce latency for real-time systems, allowing for improved efficiency and greater gains.

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Implementing edge data centres on campus

The self-contained and scalable nature of many products designed for edge applications is ideal for implementation on university and other HE campuses, with small micro data centres, data storage and connectivity that can be installed almost anywhere.

For more resource-intensive requirements, pre-fabricated data centres can be quickly and easily installed and even offer containerised versions. Rittal's range of edge data centre products are ideal for the university market, with simple configuration tools, flexible applications and cost-effective pricing.

Find out more about Rittal's range of edge-ready cabinets and pre-fabricated data centres, all available from UPS.

'UPS Systems plc made this large complicated project look easy; we were delighted with their ability to work around a huge number of obstacles to provide a solution to a serious issue in a very short space of time. I would not hesitate to use them for any future projects.'

Simon Atack, Senior HPC System Administrator, University of Bristol



About UPS Systems plc

UPS Systems plc have been trading over 25 years specialising UPS systems, generators and all other power protection equipment.

UPS Systems became a Limited Company in January 1993 and a wholly owned Plc in 1998. UPS Systems traded for 23 years as a family owned business developing power protection solutions. UPS Systems has many long standing customers, including many NHS Trusts, utility companies, train operators, hotel chains and big brands across the UK.

UPS Systems work with all manufacturers of uninterruptible power supplies, generators, aircon units and more, meaning we can supply the perfect backup power solution for the customer using a wide range of different products. In addition maintenance and service contracts are also available so you can be confident your power continuity solution will be there when you need it.



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