A GUIDE TO EDGE COLOCATION DATA CENTRES

Moving your data closer to users and customers

PROXIMITY
DATA CENTRES

FOREWORD

Welcome to our Guide to Edge Colocation Data Centres. While the concept of edge computing may need little explanation, the crucial role of data centres in fulfilling its potential is often overlooked. However, without strategically located data centres, business and industry will become increasingly constrained when seeking new and more responsive ways of serving customers and users. They will be prevented from maximising operational efficiency, improving productivity, reducing costs, and transforming manufacturing processes. Competitive advantage is at risk.

In the UK, strategically located regional data centres are especially important - outside of Greater London there are around 40 densely populated urban areas.

With this, a new category of *'edge'* colocation data centres is emerging in the UK. These are quickly becoming the essential pillars of edge computing. Highly connected, including links to local internet exchanges, they are located close to major conurbations in proximity to highly populated areas. Not only do they greatly reduce network latency, bandwidth congestion and data transit costs by being physically closer to users and customers, the financial burden of operating inhouse facilities is removed.

This guide is intended to give you a broader understanding of what to look for in colocation data centres, helping you to make more informed decisions when planning to move your company's data closer to users and customers.

John Hall, Managing Director Colocation, Proximity Data Centres

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London has long been the UK's largest data centre market and will continue to be so, but there is a growing need for edge data centres to reduce latency and bring services closer to end users – especially as 5G, IoT and the use cases they will unlock come closer to reality. Highly-connected regional data centres near densely populated areas and business hubs will be the cornerstone of edge computing. In tandem they will deliver financial and operational benefits in terms of reduced bandwidth congestion and lower data transit costs, and free up internal resources to focus on driving growth instead of operating in-house facilities

Sacha Kavanagh, Senior Analyst, Structure Research

GETTING CLOSER TO USERS AND CUSTOMERS

When accessing applications and online services, consumers and businesses now demand the ultimate in customer experience. There is a growing expectation of real-time response times, from content streaming, computer gaming and access to web and cloud applications, to the delivery of public sector and financial services.

The same applies in the IoT connected world of smart factories, smart cities, driverless vehicles and remote surgery. This is due to the interconnection of devices, machines and humans on a massive scale. Furthermore, with the harnessing of AI technologies such as Machine Learning/ Deep Learning we are starting to see the seemingly impossible become reality. And, with the imminent roll-out of high-speed, high-bandwidth 5G wireless communications, the volumes of actionable data will grow exponentially.

Being closer to the action removes the inherent distance-related network traffic bottlenecks and untenable response times experienced with overly centralised cloud computing models - where everything is hosted and stored on servers in larger data centres hundreds of miles away.

The key to addressing these business and consumer requirements is very low network latency and high bandwidth availability. This is leading to more and more enterprise businesses and service providers adopting decentralised edge computing strategies whereby much of their data, applications and content are processed and managed 'at the edge' - closer to the users, machines and computing devices that need them.
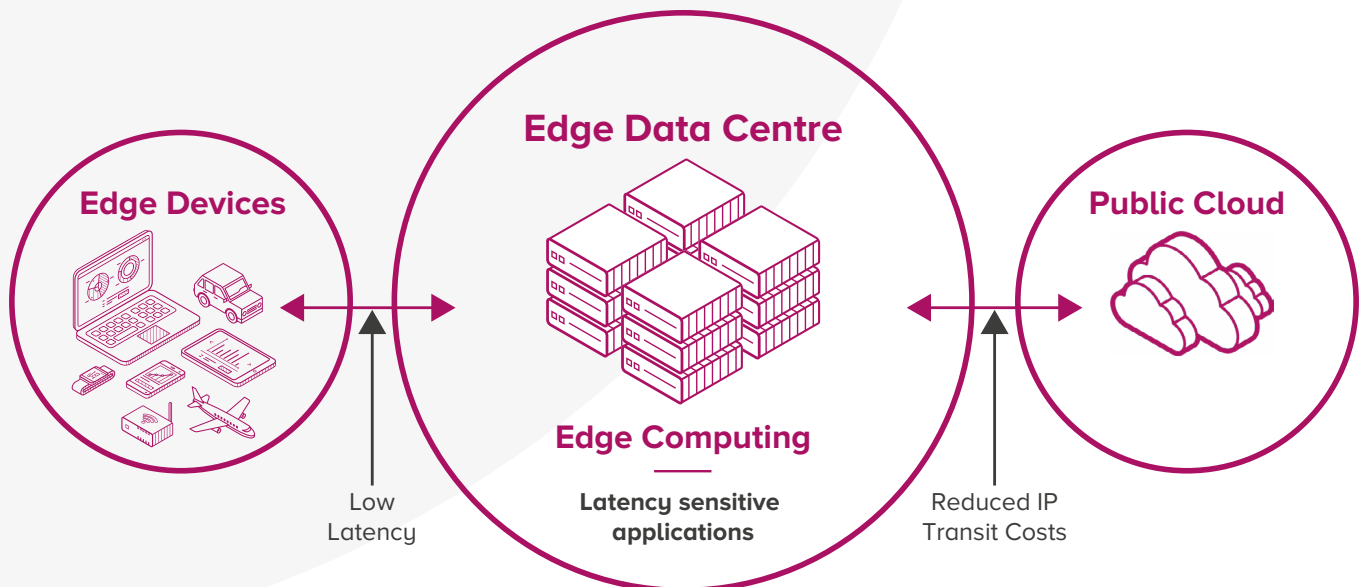
THE RISE OF REGIONAL EDGE COLOCATION DATA CENTRES

The tumbling cost of high-speed fibre over recent years has been key to removing the barriers that previously dictated CIOs and business owners should follow a 'London/M25 first' location strategy. This used to be out of necessity for ensuring proximity to the major telecom exchanges. But, with a more level playing field, strategically located regional colocation facilities have become increasingly viable as alternatives to London area locations. With the ongoing push towards the edge, they will be critical to supporting decentralised edge cloud environments.

In the UK regions, edge colocation data centres can extend the cloud down to the local level. Ensuring low latency in the 'last mile' allows cloud providers, network operators, enterprise businesses and manufacturers to maintain the experience and loyalty of their existing customers while also increasing competitive advantage to unlock new market opportunities.

Edge Devices

Edge Data Centre

Edge Computing

Latency sensitive applications

Public Cloud

Low Latency

Reduced IP Transit Costs

THE RISE OF REGIONAL EDGE COLOCATION DATA CENTRES (continued)

Buyer Beware: Seeing the bigger picture

While the need for speed with low latency connectivity along with greater bandwidth and the benefits of reduced data transit costs are top priorities, these should not be allowed to distract from the fundamentals of how to go about choosing a colocation data centre supplier:

> **Power and cooling:** Adequate power and cooling are essential as they will impact on business agility and your ability to scale applications/services in the future.

> **Connectivity:** Evaluate the network options available, latency, and data transit cost implications.

> **Resilience:** Request certifiable proof of operational management credentials and uptime record, Disaster Recovery and Business Continuity contingencies.

> **Security:** Evaluate security credentials - physical and cyber.

> **Energy efficiency:** Check and confirm the overall power usage effectiveness (PUE) of the facility.

> **Sustainability:** 100 per cent renewably sourced power should be a given but look also at how else a potential provider is addressing sustainability - on-site solar and wind power, for example.

> **On-site engineering competence:** This is especially important when configuring and interconnecting complex hybrid edge cloud environments which combine public, private and even on-premises legacy applications. Door-to-door migration services including server de-installation and installation could also provide a major time saving.

> **On-site testing:** The flexibility to carry out pre-production testing of applications in the data centre will be a bonus, ensuring everything works prior to launching.

> **SLAs:** Straightforward SLAs and single contracts covering all edge colocation sites in an operator's portfolio will save management time and complexity. Dealing with several smaller data centres owned by different suppliers, all with various terms and conditions, brings hidden costs.

DELIVERING 5G SERVICES

With 5G's comparable performance to broadband connections, mobile operators and carriers will soon be able to offer businesses and consumers much faster and more reliable applications.

For video streaming and gaming, for example, as well as boost overall user experience in terms of voice and data services. Business, industry, and public services will have the ability to wirelessly connect millions of remote edge devices for monitoring and controlling an array of IoT applications in real-time – for smart cities, smart motorways, factory floor machinery, medical imaging systems, not to mention the much-vaunted driverless vehicle.

According to Gartner, edge computing will account for 75 percent of enterprise-generated data by 2025. Today it only accounts for 10 percent. The huge increase predicted is largely down to the IoT applications that 5G is expected to enable which in turn creates huge volumes of data to be processed at the edge.

In practice, much of 5G's potential depends on many more data centres being located closer to edge devices and adapting them to 5G's short wavelength transmission frequencies.

We're not there yet. Massive infrastructure is still to be developed and deployed. With this, edge data centre proximity is going to be essential for ensuring efficient processing of the huge data volumes that 5G will create. Long-haul networks will be hard-pressed to handle these data volumes meaning much more processing of critical operational data will have to take place in local data centres.

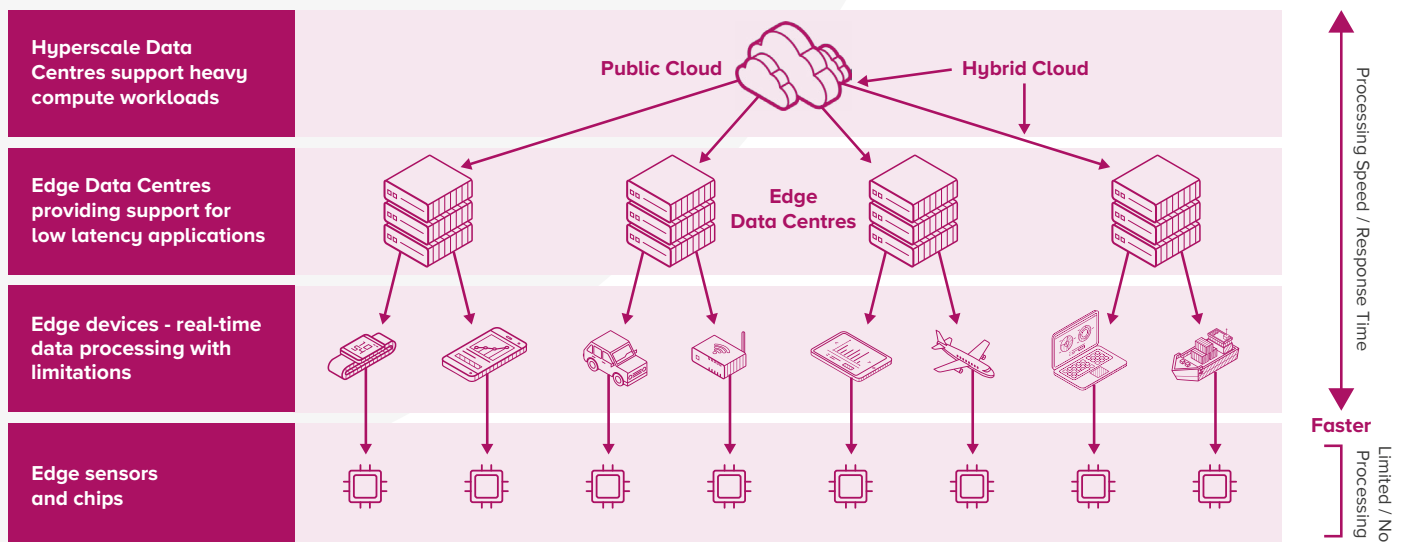# ENGINEERING HYBRID CLOUDS TO OPTIMISE EDGE PERFORMANCE

By combining public and private clouds together, hybrid clouds can optimise available compute, connectivity, bandwidth and storage capabilities which enhances applications responsiveness, user experience and productivity.

However, if the hybrid cloud architecture is overly reliant on data centres located hundreds of miles away, it can put applications and services at risk from poor response times due to latency issues while also racking up unnecessary data transit costs.

A more streamlined solution entails hosting private clouds in one or several edge colocation facilities and connecting these to public cloud services hosted by service providers in centralised hyperscale data centres. Mission critical applications are therefore securely contained within the private edge cloud environment with only data that is non-time critical sent back to the public cloud – perhaps for further analysis or archiving. This effectively bridges the gap between users / devices in local offices or machines on factory floors, ensuring latency is greatly reduced. At the same time, data transit costs are reigned in with fewer high bandwidth circuits required for backhauling traffic to remote hyperscale data centres.

Edge Data Centres working with IoT and Hybrid Cloud

Hyperscale Data Centres support heavy compute workloads	
Edge Data Centres providing support for low latency applications	Public Cloud / Hybrid Cloud / Edge Data Centres
Edge devices - real-time data processing with limitations	
Edge sensors and chips	

Slower — Processing Speed / Response Time — Faster

Limited / No Processing

ENGINEERING HYBRID CLOUDS TO OPTIMISE EDGE PERFORMANCE (continued)

What you need to know:

Building the business case and doing the preparation work for enabling hybrid cloud solutions can be challenging - one size does not fit all. Consideration must be given to how your business will manage the hybrid environment and the hardware, network and storage necessary. The hybrid cloud needs to accommodate specific business needs and must seamlessly operate across on- and off-premises platforms.

When allocating applications between an edge data centre and a hyperscale facility ask the following questions:

> How long will it take to migrate all the applications to the new infrastructure?

> What skills and experience are available within the IT department?

> Does any remaining on-premises legacy IT infrastructure need accommodating?

> Which software will be required for managing all environments within a hybrid implementation?

> Is there direct cloud gateway connectivity available into public cloud infrastructure?

> Does your IT team have sufficient expertise in hybrid cloud functionalities, management, integration and administration?

> Does the edge data centre provider have suitably qualified engineers on-site to assist with configuration?

LATENT TENDENCIES

There are many latency-sensitive use cases. Here we outline a few examples and how edge data centres can help address the challenges involved:

VIDEO CONFERENCING

This is relied on by millions of people every day. But high latency on video calls causes frustration with time delays often resulting in participants talking over one another. However, to keep people reliably connected, businesses can now leverage edge data centres to scale the amount of data they deal with every day. Video conferencing tool Zoom allows customers to choose where their meeting data is stored - a good example of how data can be effectively secured and managed regionally rather than globally.

> **Locating servers closer to users in edge data centres will improve quality of service and alleviate time delays.**

CLOUD GAMING

Nearly all online gamers have experienced 'lag' when gaming, resulting in a high amount of player frustration. Latency is critical for gamers, so the lower the latency the better the experience. High latency can disrupt (or even stop) a game in mid-stream while low latency provides smooth, buffer-free gaming. Jitter can also cause problems for gamers when latency is inconsistent, leading to choppy gameplay and/or distorted audio and chat functionality.

Packet loss is another consideration and occurs when packets of game data are lost in transit to and from the user and cloud service. Packets may also arrive out of order which can lead to a game that's unintelligible.

> **Edge data centres significantly improve latency, jitter and packet loss. Cloud gaming platforms that deliver the best player experience will win out over the competition.**

CONTENT DELIVERY NETWORKS

By working with edge colocation providers, content delivery networks (CDNs) can go a long way in their bid to overcome concerns around latency when streaming video services over long distances to serve local demand. The service must be smooth, uninterrupted and in the resolution required by the customer.

Reducing backhaul video delivery is also key, particularly with the development of higher definition 4K and 8K services. For CDNs and streaming services, the challenge is to efficiently manage the growing demand for bandwidth more efficiently as new streaming titles and live sports programmes are launched. While some of these challenges can be resolved by increasing egress capacity, the long-term solution must include larger deployments of storage closer to the consumer.

> **CDNs must avoid data congestion and delays to maximise consumer experience and loyalty. Edge colocation data centres allow them to achieve savings on time, money and resources with reliable hosting infrastructure that is both resilient and fast.**

LATENT TENDENCIES (continued)

VIRTUAL REALITY/AUGMENTED REALITY

End to end ultra-low latency is critical to delivering the most accurate and lifelike user experience when using VR/AR applications whether in entertainment, healthcare, retail or manufacturing. The human brain detects any fractional delay in motion-to-photon latency which can also cause virtual content to become misaligned with real-life features. This issue becomes particularly acute in AR medical / healthcare scenarios.

> **Instead of backhauling data and video though several hubs to central data centres, edge facilities ensure real-time response times, accuracy and lifelike user experience.**

THE IOT AND 5G

Ultra-low latency in the sub 10ms range - well below the current 50 – 150ms of Content Delivery Networks - is essential in delivering future 5G and IoT enabled technologies and applications, such as driverless vehicles and AI-enabled Machine Learning and Deep Learning.

Highly dynamic IoT systems require real-time control, for example, to perform predictive maintenance and machine vision applications on the factory floor. Moreover, driverless cars depend on zero latency connection to edge data centres via wireless 5G networks to enable real-time access to essential data, not only for navigation but also local traffic updates and parking availability. These vehicles cannot risk any delay in data computing - it could cost drivers and passengers their lives.

> **In the hyperconnected IoT world real-time processing and analysis are prerequisites. Any delay in sending or receiving an instruction from an application to a device or machine will cause problems. Edge data centres mitigate such risk.**

BUILDING A BUSINESS CASE FOR THE EDGE

As more and more organisations consider an 'edge first' deployment, they are often challenged by how to develop the business case for justifying their proposal compared to using a centralised public cloud solution.

Typically, it is not an either/or decision. The debate centres around which applications should be deployed locally and which should be centralised.

There are two fundamental factors to consider – both impact on your bottom line.

1   **Reduction in bandwidth/transit costs**

2   **Improving latency for applications**

Applications which meet either of these criteria should be deployed locally while others can be centralised.

In a computer gaming use case, consider the following scenario for a regional edge data centre in an area serving a population of 1,500,000:

If each user requires 20Mbps and 25% of the population are gamers (a conservative estimate) this would mean potentially 375,000 users in the region. Not all of these will be gaming at the same time, so we may reasonably assume that 70% are online simultaneously, particularly in the evening or at the weekend.

This means there will be 260K simultaneous users.

Advances in compression allows a reduction in bandwidth requirements, but at a 2:1 ratio, up to 30 x 100Gbps circuits will be required to service this community.

With an edge deployment this could be reduced to 2 x 100Gbps as significantly less data traffic will need to be backhauled, most of which can be kept local.

The other factor to be considered is the end user experience. While the development of 400G and 800G optics serves to highlight the need to increase bandwidths to deliver content, a mixed solution comprising edge data centres and IP transit will be the most flexible, secure, and cost-effective solution.

THE SCIENCE OF LOCATION

Daren Baythorpe, CEO of ITS, a leading wholesale provider of full fibre infrastructure with over a 1000km of core networks built so far, explains the importance of edge data centre location when it comes to maximising the benefits of deploying fibre in regional areas of the UK, in particular, the new 212km network fibre ITS is currently constructing in the North West around the Liverpool region.

For hyperscalers, regional cloud providers, CDNs, enterprises, manufacturers and telecom operators, minimising latency and reducing backhaul costs are the keys to bringing data closer to consumers and unlocking the potential of new technologies and applications. For this to happen they must tap into regional fibre infrastructure terminating at strategically positioned edge data centres. These are the new digital economy's equivalent of the old 20th Century telephone exchanges.

ITS, with its new network in the North West Region, and Proximity, having recently selected the area for two new data centre facilities, are working together to help businesses move their IT applications into colocation and connect to public clouds. Much of this might seem challenging, however, working with Proximity we can help our customers with advice and support to make the journey fast and secure, allowing them to benefit from the best practice we offer.

In a country the size of the UK, it may sound relatively straightforward to get connected. After all, the physical distances involved between regions and large cities are relatively small compared to, say, the U.S. or China. But, away from the London metro area, easily the most densely populated area with around 9.4 million, there are still some 57 million citizens to reach.

Moving with the times

The creation of new networks and colocation facilities in the North West Region offers new opportunities to local businesses. The pandemic is creating change in how and where we expect to live and work. People and businesses want to move to hybrid working and be closer to the country. Cities in the North West will benefit from this trend with movement from the South East.

However, it is expensive to backhaul data traffic to the few hyperscale data centres, many of these being in the South. Moreover, on the network capacity side of things, many areas of the UK are currently underserved when it comes to high capacity fibre infrastructure – this shortage is being addressed by ITS Technology, especially in the North where competitive high capacity networks are sparse.

THE SCIENCE OF LOCATION (continued)

X marks the spot

The Liverpool City Region is a useful practical example of how targeted regional fibre network infrastructure can combine with strategic colocation data centres. There is a population of 1.5 million and over 37,000 active businesses which need access to computing, applications and IT services hosted locally - not in large, centralised data centres in the South East of the UK.

Earlier this year ITS embarked on a joint venture with the Liverpool City Region (LCRCA) and its construction partner NGE as part of a programme that will support and accelerate digital transformation across the region. A resilient 212km fibre backhaul 'ring' network is being built across the region where the 'ring' connects three transatlantic cables and major economic clusters in each of the six local authority areas.

Network services are available now, with the full network being largely completed over the next 18 months. This will enable carriers and ISPs to provision gigabit capable direct connection (DIA), Ethernet and broadband services across the local authorities, businesses and consumers in the area. With this, Proximity Data Centres' newly opened world class edge facilities in Liverpool and Chester will serve as strategic points of presence (PoP), helping reduce latency and data transit costs for service providers and thousands of businesses; avoiding the need to backhaul large volumes of data traffic long distance to data centres which are far removed from the area. At the same time, these edge facilities will help businesses maximise agility, operational efficiency, and data security. In turn, edge data centres like Proximity's offer onward connection options to the global leaders in public cloud.

In the case of Liverpool City Region, relying on far distant data centres located in, say, London, Bristol, Birmingham, or Leeds, just won't do. The combination of the new LCR Connect Region network being led by ITS Technology Group and Proximity's new data centres, ensures an outstanding digital infrastructure for now and into the future. It is an exciting time for businesses in the area which will see many of them moving their IT into edge colocation data centres at an increasing rate.

LOCATIONS

Closer to your customer

We are deploying a network of 20 highly efficient regional edge colocation data centres across the UK.

Our data centre locations will soon offer data storage and colocation in close proximity to 95% of the UK population.

WAKEFIELD

LIVERPOOL

NOTTINGHAM

CHESTER

COVENTRY

BRIDGEND

ABOUT PROXIMITY DATA CENTRES

Proximity Data Centres operates a rapidly growing trusted network of regional carrier-neutral edge data centres across the UK. These allow clients to locate their data in local markets, close to the data end user. By choosing Proximity's network of edge data centres enterprise, public cloud and content service provider organisations maximise competitive edge through reduced latency, enabling improved response times and reduced transit costs.

The company is fully committed to providing energy efficient and sustainable facilities which are built to tier 3 industry standards and are ISO 9001, 14001 and 27001 compliant. Full on-site support, transition and onboarding is provided to customers. For maximum convenience, a straightforward customer contracting model is provided with a single set of SLAs covering one or multiple sites, as required. Scope of services is tailored to suit regional demand.

Please contact us to find out more about how regional edge colocation data centres can help your business get closer to users and customers in one or multiple UK regions.

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