# DCS DATACENTRE SOLUTIONS

DEVELOPING DIGITAL INFRASTRUCTURE IN A HYBRID WORLD

ISSUE I 2022

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## Why diversity, inclusion, and education can unlock the data centre skills shortage

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# Editor's view

By Phil Alsop

## Difficult choices ahead?

TALKING ABOUT SUSTAINABILITY and, in particular, the current energy price crisis, without touching on politics is no easy matter, nevertheless, I'll give it a try!

Across the globe, governments and businesses alike (including the heavily energy dependent data centre industry) have some major decisions to make.

The most basic one being: how much do we want/need to be in control of our own energy resources/destiny? Globalisation, for better or worse, has encouraged the belief that there's always a relatively cheap and plentiful supply of almost anything somewhere in the world, so the idea of self-sufficiency has gone out of the window. And an understandable approach, maybe, but, taken too far, it ignores the importance of security for both countries and companies. Of course, many resources have to be supplied from outside a geographical region or an organisation's boundaries, but the current, post-pandemic cliff edge suggests that it might just be wise to increase self-reliance once again.

Most obviously, relying on third party energy resources is not looking that smart a move right now. For the data centre sector, I'm not suggesting that every colo needs to build, own and operate its own power plant, but it may well be that the apparent unreliability of various renewables is maybe not that unreliable when compared to the volatility of fossil fuel prices. As per my previous comment, where data centres are constructed into the future might just take more account of the availability and likely cost of local power supplies. On a government level, I would have thought energy self-sufficiency should become a must. The current tension between Russia and the Ukraine, for example, is clouded somewhat by many European countries' reliance on Russian gas.

Moving away from geopolitics, supply chains have also been a cause of much angst during the pandemic. The question here is, is it right to assume that, over time, the logistics world will return to normal, or are the problems of manufacturing, supply and delivery here to stay?

A much more difficult question to answer I think. But, if one believes that Net Zero targets are to mean much at all, it would seem safe to assume that supply chains will at least shrink over the coming years. Not only will this be good for the environment, but also, potentially, for reliability and cost of goods.

The final decision, and one which I suspect is the most difficult of all, is around the increasing impact of the digital world. Is digitalisation to be allowed to develop unchecked, or will there be a time when it will be socially unacceptable to have 10,000 pictures of the family pet on your phone? And, while I concede that my knowledge of the metaverse is at the kindergarten level, it is not immediately obvious to me what are the benefits of this rapidly developing concept when offset against the environmental impact of a whole new, virtual world (other, than, of course, to make even more money for a few tech companies!).

But then, as someone who believes that real, physical books – the dust cover artwork, the paper quality, the typeface and the simple pleasure of page turning – should never be replaced by anything electronic, what do I know?!

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# Surging supply necessitates contingency power for under-strain FLAP markets

A large surge in data centre supply across the FLAP market and an anticipated record-breaking year overall means facility operators must explore distributed energy solutions to avoid potential disruption from under-strain power grids

THIS WARNING comes from temporary power specialist Aggreko and follows the publication of a recent CBRE report predicting that 2019's supply record of 318MW registered will be broken in 2021. Specifically, the real estate investment firm has reported 114MW came online in Q3 2021, with 94MW predicted over Q4 as part of a continued upward trajectory into 2022.

Billy Durie, Global Sector Head for Data Centres, said: "The data centre market continues to be extremely vibrant, and driven by ever-increasing colocation supply in Amsterdam and Frankfurt specifically. Yet despite this good news, challenges still remain around power provision as 2022 begins, with both cities' grids under strain, new builds subject to restrictions, and London and Paris also experiencing long-standing energy supply issues.

"Consequently, we must ensure this success is built on a solid foundation of stable, non-fluctuating power in these affected areas, and stakeholders must be aware of potential legislative shifts from this issue. The Irish market provides a glimpse of what may happen if supply continues to outstrip energy provision, and further underlines the need for pre-emptive steps now."

Recent events in Ireland include the recent decision from the Commission for Regulation of Utilities to reserve the right to place a moratorium on data centre connections to protect security of supply. Alongside this, EirGrid now requires data centre builds offset grid power consumption with on-site, decentralised energy provision, otherwise known as 'Firm Capacity'.

"The steps taken by the Irish government starkly show that there are caveats to the traditional model of supply-and-demand in the colocation data centre market," concludes Billy. "Namely, grid-based energy provision to these facilities is no longer guaranteed, but instead classed as 'flexible'.

"The CBRE's latest report shows this situation is not far off repeating in the FLAP markets, which may become more stringently regulated to combat this growing concern. Consequently, data centre suppliers should take steps now to become more self-sufficient if they are to effectively loadbank test future facilities, access the grid and avoid blackouts and other disruption.

"The provision of environmentally-friendly energy solutions including Stage V generators and hybrid battery systems could therefore prove crucial to bridging energy gaps during construction continued facility operation. Alongside providing a steady, decentralised power supply, such solutions can operate in urban areas subject to stricter emissions rules – a key concern given where colocation centres are often situated."

# Over one third of businesses stung by unexpected cloud hosting costs

Research finds signs of mounting business disquiet as the hyperscalers prioritise profits over user-friendly billing tools

CIVO has published the result of its research on cloud costs. It surveyed 1,000 developers at businesses of all sizes and found that over one-third of public cloud users (37%) have been stung by unexpected costs in the last 12 months. Half affected said that it was a mistake or configuration change that led to the unexpected cost as opaque and complicated cloud usage hinders cost planning.

Time and again, respondents pointed to a lack of transparency amongst providers. Thirty-four percent claim to find it difficult to calculate how much their cloud provider is going to charge them each month. Indeed, only 17% said that there are no areas of their cloud usage where it is difficult to monitor costs. The areas that businesses find the most challenging to monitor include

- Data transfer – 21%
- Compute – 16%
- Storage – 15%
- On demand instances – 14%

Hyperscale growth has accelerated during the COVID-19 pandemic; in its last reported quarter Amazon reported profits of almost $5 billion on sales of over $16 billion – an operating margin of over 30%. The research shows that businesses have a low opinion of the hyperscalers.

Civo's research found that 82% companies think the big three hyperscalers should reduce their charges and 81% believe the hyperscalers try to give the impression they are low cost.

Despite this healthy revenue growth and a growing number of organisations relying on public cloud services, individual customers are still seeing their cloud costs increase at a high rate. Civo's research shows 74% of businesses have seen their cloud costs increase over the last 12 months with an average increase of 66%. Mark Boost, CEO of Civo commented "It's still the wild west when it comes to cloud billing. The hyperscalers purposely create opaque billing models with a myriad of confusing options and hidden extras. These offerings are clearly built to maximise shareholder value, not to deliver on the needs of the organisations that use them."

"There's no recourse to accidental billing, businesses can only plead for leniency when mistakes happen and hope for the best."

In 2020, a start-up accidentally incurred a bill of over $71,000 overnight even though it had set a budget of $7. Google cancelled the bill as a one-time gesture, but the incident demonstrated the potential dangers. Mark Boost, CEO of Civo continued: "For any organisation, thorough and accurate cost planning is essential for sustainable growth. Receiving an unexpected bill from your cloud provider, for something as simple as data transfer, can be costly for any business but has the potential to be crippling for a new start-up or organisation running on fine margins. The practice of employing these unexpected charges is exploitative and unethical when considering hyperscaler revenue growth.

"The status quo in today's cloud market is unsustainable. Customers are more discerning than ever and will be willing to make the switch to cloud providers that don't penalise them with hidden charges and unexpected costs. The industry needs to put the needs of their customers first, offering businesses a streamlined approach to infrastructure that is transparent on pricing and delivers for the organisation. This will free up development teams from worrying about infrastructure management and allow them to focus on what these businesses do best: creating innovative solutions that are essential for success in today's tech-driven world."

# Rolls-Royce provides mtu trigeneration plant for largest data centre in Romania

mtu Series 4000 gas generator sets to provide electricity, heat and cooling for ClusterPower's Technology Campus in Craiova

ROLLS-ROYCE, along with its distributor partner Knopf & Wallisch (K&W), has supplied three mtu customized and containerized combined cooling, heat and power plant (CCHP) trigeneration units to Romanian cloud service provider ClusterPower. They will be used for the efficient and sustainable energy supply at its new technology campus near the southern Romanian city of Craiova, where the IT company will open the largest data center in Romania.

## Trigeneration plants are hydrogen-ready

The generator sets are based on mtu 20V 4000 L64 FNER gas engines, which fulfil the strictest emissions standards, allow for quick ramp-up and ramp-down, offer a wide-range of load operations, and high performance also at high temperatures. The gensets are hydrogen-ready, offering the ability to blend 25% hydrogen along with natural gas as the fuel and can even be transformed into a pure hydrogen engine in the future. In this way, they contribute to the reduction of CO2 emissions. This was an important factor for ClusterPower when selecting a partner to supply the energy system for the project.

## ClusterPower counts on innovative and environmentally friendly technologies

"We need a very reliable and sustainable solution and a company that is innovative enough to match our ambitions," said Cosmin Georgescu, CEO of ClusterPower. "Therefore, we are proud of our partnership with Rolls-Royce and the mtu brand. It is a relationship of trust based on common goals like using an innovative and environmental-centric technology for the benefit of our clients. One of the most important values ClusterPower embraces is trust," added Georgescu.

"It is the central element of our relationship with our customers, partners and all those involved in this project."

## First Hyperscale Data Center in South-East Europe

The 273,000-square-metre campus is being built with the aim of increasing Romania's competitiveness in global IT infrastructure and is the first hyperscale datacenter in south-eastern Europe. (Hyperscale data centers are characterised by the fact that they can be scaled hugely and quickly.). All five data centers are scheduled for completion in 2025. In the course of this, ClusterPower plans to expand its gas-fired power plant to a total capacity of 200 MW and thus produce its own sustainable electricity.

## Sustainable energy concept with combined cooling, heat and power

The first of the five data centers will open its doors in the first quarter of 2022. The mtu CCHP units supply electricity, heat and cooling for the building and the infrastructure. The concept to use the gas gensets as prime power producing electricity while using the main grid as backup is a unique configuration that is currently rarely seen. Guided by ClusterPower's requests, K&W developed a highly efficient solution to capture most of the exhaust heat from the system with conversion chillers and transform it into chilled air to cool the data center facilities.

"I think that Romania has a lot to say about the European future of innovation and digitalization and we have the opportunity here to develop new infrastructures, using the latest technologies and with modern environmental standards," said Georgescu. "We are lucky enough to start fresh and we will put this opportunity to good use. It is always nice to know that we have partners ready to support us in our endeavors."

# 89% of businesses plan to host tech off-premise

REMOTE AND HYBRID WORKING is driving a permanent shift in how businesses are organising their tech. Dependence on on-premise infrastructure, to support a full capacity office, is no longer required, shows survey.

It's estimated that only 55% of office space and desks are expected to be in use over the next year, with a majority of workers set to spend three days there a week in 2022 (or less in-line with government guidelines changes).

More space will also be created when on-premise data centres move 'online'; currently on-premise data centres are found to take up on average of 8% of office floor space.

When determining what companies who have a data centre are doing with their office space in 2022, 39% of those questioned said that they will use the extra space for 'collaboration meeting areas'.

Other plans include creating social spaces (36%) and individual working spaces (33%) to aid hybrid working. Meeting rooms (32%), adding additional equipment (32%) and leaving it as open space (28%) would also be amongst the plans if they did not have an on-premise data centre, according to business leaders.

Commenting on these findings, Becky Turner, Workplace Psychologist at office interior design fit-out, furniture and technology company Claremont, said: "As we're propelled into the Hybrid Era, the purpose of the office is rapidly evolving, becoming a place where the primary goals are for colleagues to meet, collaborate, socialise, and learn – becoming The Destination Office.

"Whilst focused tasks can largely be carried out from home, the Destination Office maximises the office space for those necessary functions that have been noticeably absent from our working lives over the past 18 months; the Coffee Shop provides a social heart to your space, enabling you to build relationships with your colleagues over a coffee or lunch; the Department Store is your support centre, where you can find helpful resources to work effectively from any given location; the Co-working Bureau enables teams to come together to work from a central location, providing mentoring, meeting and collaboration opportunities; and the Forum is a flexible space to facilitate larger-scale collaboration sessions or town hall meetings.

While small to medium sized businesses are moving to CloudComms to benefit overall business operations, and adopting the latest solutions for remote and hybrid working, the move away from on-site hardware opens up of lots more space within working environments and allows space to be re-utilised more creatively.

Steve Warburton from zen.co.uk added: "The combination of fewer employees working full time on site, advances in cloud technology and less siloed ways of working between departments will reach a crescendo in 2022 to fuel a permanent reconfiguration in office design. More businesses may even now take the step to reduce square footage altogether as a means to adapt to this shift.

# Supply chain disruption tempers sector's optimism

AN OPTIMISTIC SECTOR with record levels of respondents (98%) seeing demand either maintained or increasing was an encouraging finding from The Winter Report 2021/22, which is undertaken by independent research house IX Consulting and commissioned by BCS, (Business Critical Solutions) the specialist services provider to the digital infrastructure industry. It captures the views of over 3000 senior datacentre professionals across Europe, including owners, operators, developers, consultants and end users.

However, despite these findings – the highest levels of confidence since the survey began 14 years ago - there are real concerns within the industry about how to deliver this capacity against a backdrop of a shortage of key skills and the ongoing disruption in the supply chain. In fact 91% of respondents had experienced some issues over the past 12 months. Disruptions were felt the hardest amongst our build professionals, with 69% of developer/investor respondents and 62% of design engineering and construction respondents reporting that in 2021 they had experienced significant supply chain volatility. James Hart, CEO at BCS, said: "These well documented supply problems have led to delayed deliveries and higher prices. They are widespread and there is a general reduction in the supply and the reliability of supply visible in our sectors. There are massive dislocations in the container market, shipping routes, ports, air cargo, trucking lines, railways and even warehouses. The result is shortages of key manufacturing components, order backlogs, delivery delays and a spike in transportation costs and consumer prices.

"Covid 19 has not only exacerbated these issues but has also brought about a shift in how we look at current supply chains. We at BCS are helping clients through this process and have mapped supply chains associated with the deployment of data centres."

# Manchester data centre installs hydrogen-ready fuel cell

Teledata teams up with Conrad Energy, Electricity North West (Construction & Maintenance) Limited and Bloom Energy to deploy an initial 1.2MW low environmental impact solid oxide fuel cell installation at its Wythenshawe facility, reducing carbon emissions through a cleaner, hydrogen ready fuel supply

MANCHESTER cloud hosting and data centre operator, Teledata will be installing a scalable 1.2MW hydrogen-ready fuel cell microgrid to provide clean energy to its Wythenshawe facility. Working with energy providers Conrad Energy, Electricity North West (Construction & Maintenance) Limited (ENWCML) and Bloom Energy, Teledata will be the first data centre in the UK to deploy fuel cell technology, in a move which will see the firm reduce greenhouse gas emissions through a cleaner, hydrogen ready fuel supply, whilst also boosting the resilience of the data centre via a second power feed into the facility, from a different fuel source.

Fuel cells work by converting fuel such as natural gas, biogas, and hydrogen, or a blend of fuels into electricity through an electrochemical process that requires no combustion - thus avoiding the emissions normally associated with burning this type of fuel.

Teledata will be working with Conrad Energy on the power project, who will fully fund the fuel cell installation, which is provided by Bloom Energy. Teledata, who is an existing customer of ENWCML, was introduced to the parties via their strategic collaboration to offer these hydrogen ready, behind the meter applications to their customer base. ENWCML will be undertaking all elements of the EPC work for the installation.

Matt Edgley, director for Teledata, commented; “As a data centre provider we are constantly looking for innovative energy solutions to help ensure a cheaper, cleaner, uninterrupted energy supply. We have already reduced our carbon output by over 500 tonnes annually through a number of energy saving measures including the

installation of a 2MW smart energy battery storage system in 2019. The fuel cell solution not only reduces our carbon emissions through a cleaner, hydrogen ready fuel supply, but it also gives us a second power feed into the facility from a completely different fuel source. This level of resilience running in parallel with the existing mains supply will give our clients even more certainty when hosting business critical equipment at our data centres.”

“The Teledata deal comes hot on the heels of our partnership announcement with Bloom Energy and ENWCML,” says Mark Kelly, Conrad Energy’s Head of Power Solutions. “Forward thinking companies like Teledata recognise the need to future-proof their energy supply whilst taking control of their energy costs. On-site generation from fuel cells is a viable solution which is available today. The fuel cell will operate under a long-term Power Purchase Agreement (PPA) which brings real added value, helping Teledata on their path to net zero carbon emissions.”

“To be able to announce the first collaboration with one of our existing customers so quickly evidences the huge potential fuel cell technology has for the UK energy sector,” says Charles Hesketh, ENWCML Market Sector Manager. “Not only is it our first project, but also Bloom Energy’s first foray into the European market. To be able to bring this exciting technology to the UK is a mark of our intention to be at the forefront of new technologies. Teledata’s vision to adopt this solution at its Manchester site is testament to the firm’s energy strategy and one that we are sure others will adopt.”

“We are delighted Teledata has selected Bloom’s energy platform as their technology of choice to bring clean and resilient power to the UK,” said Tim Schweikert, Senior Managing Director of International Business Development at Bloom Energy. “Teledata is a progressive leader in the data centre industry, and we look forward to supporting their critical infrastructure with clean, always-on power while facilitating a transition to a net-zero future.”

Solid oxide fuel cell technology converts fuel into electricity through an electrochemical process without combustion, at high efficiency. The fuel cells consist of three parts - an electrolyte, an anode and a cathode. Electrical ions move through the electrolyte in a fuel cell. An electrochemical reaction converts fuel such as natural gas, biogas or hydrogen, into electricity without combustion.

Warmed air enters the cathode side of the fuel cell, while steam mixes with fuel entering the anode side to produce reformed fuel. As the reformed fuel crosses the anode, it attracts oxygen ions from the cathode. The oxygen ions combine with the reformed fuel to produce electricity - and clean, affordable, highly reliable, always-on power.

# Digital DEWA's Moro Hub breaks ground for the largest solar-powered data centre in the Middle East and Africa

HE Saeed Mohammed Al Tayer, MD & CEO of Dubai Electricity and Water Authority (DEWA) and Steven Yi, President of Huawei Middle East & Africa, have broken ground for the first phase of the largest solar-powered data centre in the Middle East and Africa, set to be Uptime TIER III-Certified

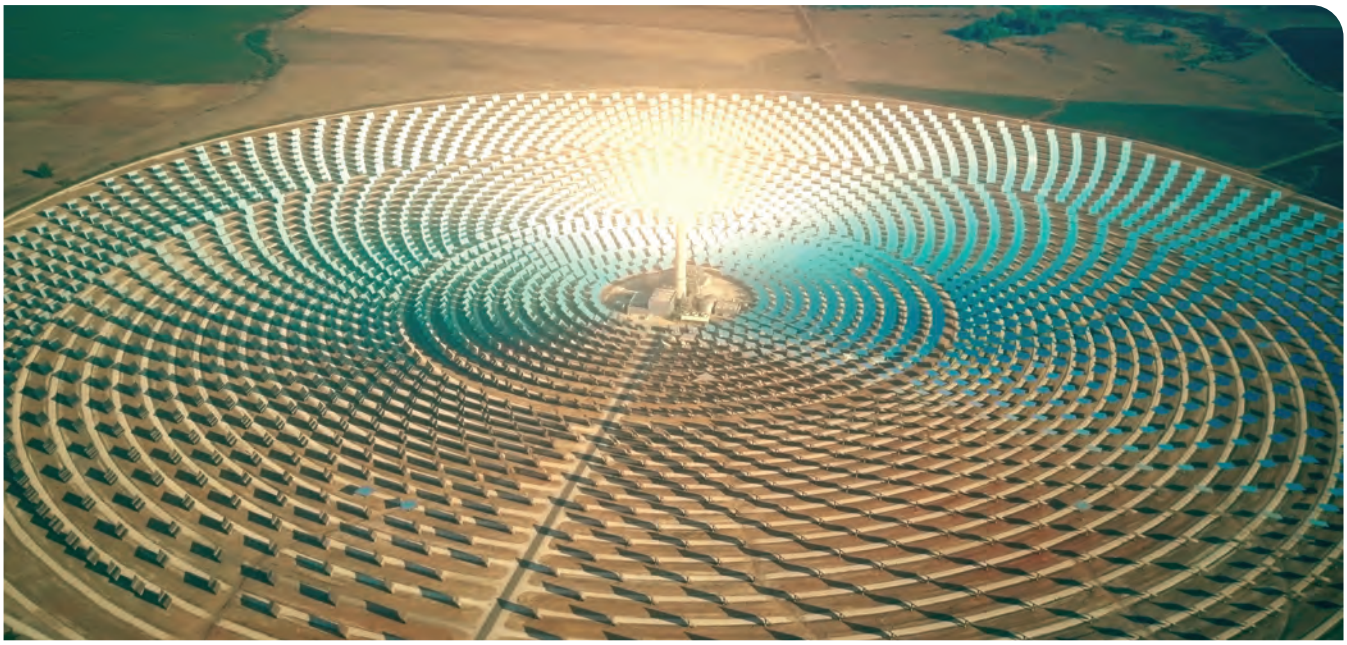
THE DATA CENTRE will be implemented by Moro Hub (Data Hub Integrated Solutions LLC), a subsidiary of Digital DEWA, the digital arm of DEWA at the Mohammed bin Rashid Al Maktoum Solar Park in Dubai. The carbon-neutral green data centre will use 100% renewable energy with a capacity exceeding 100 megawatts (MW).

The ground-breaking ceremony was attended by Marwan Bin Haidar, Vice Chairman - Digital & Group CEO of Digital DEWA; Waleed Bin Salman, Vice Chairman - Energy, Digital DEWA; Matar Al Mehairi, Board Member of Digital DEWA; Mohammad Bin Sulaiman, CEO of Moro Hub; Jerry Liu, CEO of Huawei UAE; and other officials from both sides.

"We work in line with the vision and directives of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, to make Dubai a global hub for green economy and sustainable development. Breaking ground for the largest green data centre in the Middle East and Africa confirms that we are on the right track to achieve the goals of the Dubai Clean Energy Strategy 2050 and the Dubai Net Zero Emissions Strategy 2050 to provide 100% of energy from clean energy sources by 2050, as well as the Dubai Demand Side Management Strategy, which aims to reduce electricity and water demand by 30% by 2030. We do this by developing innovative environment-friendly solutions that reduce carbon emissions. The green data centre that Moro Hub implements will enable global hyper-scalers to access carbon-free computing. It will also help organisations in their sustainability initiatives to reduce their carbon footprint," said Al Tayer.

"Data is quickly becoming the new engine for economic expansion and diversification. As more data centre facilities are established in the future, this project serves as an exemplar of combining digital and power electronic technologies to create greener, low-carbon ICT infrastructure powered through renewable energy. We are committed to contributing towards carbon neutrality worldwide and very proud to be working with Moro Hub, in what is truly a landmark project for the region in this regard," said Steven Yi.

This is the second solar-powered green data centre in Dubai launched by Moro Hub. It will offer digital products and services using Fourth Industrial Revolution technologies, such as cloud services, the Internet of Things (IoT) and Artificial Intelligence (AI).



# Over 80% of CIOs and senior leaders plan to deploy private 5G networks within the next 24 months

Research of over 200 CIOs and top executives shows the acceleration of private 5G networks as organizations look to improve security, reliability, and speed.

NTT Ltd has released a new report developed by Economist Impact. The report, 'Private 5G here and now', reveals insights from a survey of 216 CIOs and senior decision-makers from the UK, US, Japan, and Germany, examining the industry challenges around the implementation and adoption of private 5G. The report shows a significant interest in private 5G networks, with 90% of executives expecting that private 5G will become the standard network choice.

## Where is private 5G being deployed?

The research shows that just over half of companies (51%) planning to deploy a private 5G network will do so within the next six to 24 months to improve security, reliability, and speed, with 30% of these respondents already deploying or being in the process of deploying a private 5G network. The most significant interest is from German organizations, with 40% of German businesses deploying private 5G networks. This is followed by 28% of UK firms, 26% of Japanese firms and 24% of American firms.

The majority (80%) of executives agree that Covid-19 has made it easier to secure the budget needed for 5G deployment. This attitude is strongest in Germany (93%), followed by the US (83%), the UK (77%) and Japan (65%).

## Security concerns are accelerating private 5G adoption

With ransomware on the rise, the CIO and CISO are looking for ways to shore up their defences against increasingly sophisticated attacks. The report finds that 69% of executives agree that that the security of their current infrastructure is not strong enough. Other pain points include the control of enterprise data (48%), coverage and speed (43%) and the response time (latency) of their current service provider (40%). When compared with technologies such as Wi-Fi and Public 5G, private 5G networks provide significantly more security capabilities.

83% of executives rate improved data privacy and security as a very important outcome they expect to achieve with the implementation of private 5G networks. It is clear that CIOs want security and control while also enabling digitalization – and believe a local private 5G network will enable these critical business requirements. This is encouraging enterprises to build and run their own private 5G networks.

## Challenges and successful deployment strategies for private 5G

The report identifies that the most common (44%) barrier to deploying private 5G networks is integrating the technology with legacy systems and networks. The complexity surrounding the deployment and management of private 5G networks is also cited as another significant barrier by 37% of respondents. Employees lacking the technical skills and expertise to manage 5G networks is the third most common barrier facing 30% of firms.

This is one of the reasons why outsourcing to a managed service provider is the preferred approach by 38% of CIOs when it comes to implementing private 5G networks. Buying private 5G network 'as-a-service' can accelerate time to adoption and offer a better end-user experience and return on investment.

## Private 5G powers digital transformation across industries

"The research highlights that the adoption of private 5G is happening now. The companies leveraging private 5G will have an unprecedented competitive advantage. Whether a company owns a factory floor, distribution centers, storefront or office space, private 5G can dramatically help digitize their businesses securely", said Shahid Ahmed, Group EVP, New Ventures and Innovation at NTT Ltd.

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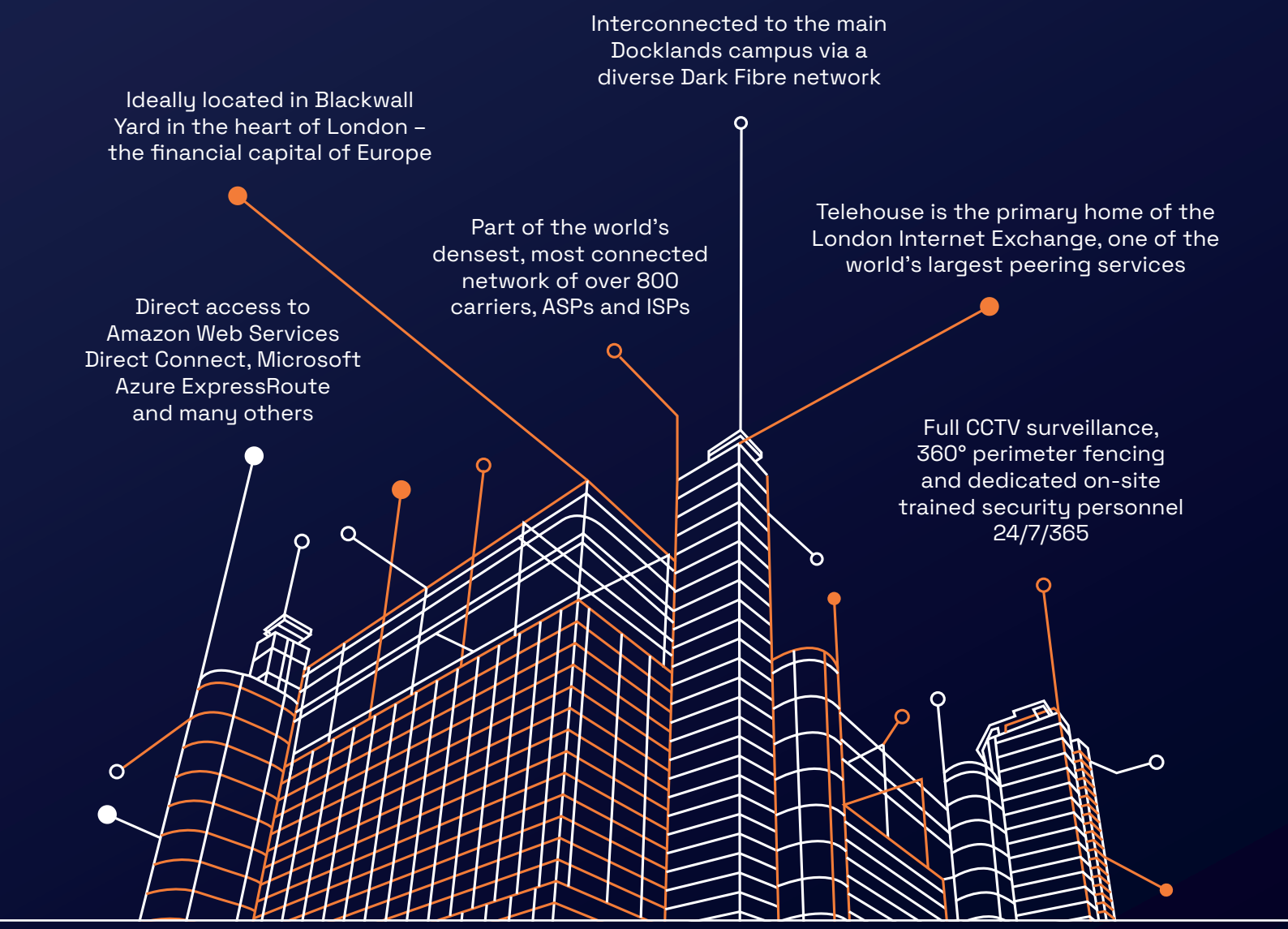


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# Double-digit growth for Edge Computing investments

Worldwide spending on edge computing is expected to be $176 billion in 2022, an increase of 14.8% over 2021. Enterprise and service provider spending on hardware, software, and services for edge solutions is forecast to sustain this pace of growth through 2025 when spending will reach nearly $274 billion, according to the International Data Corporation (IDC) Worldwide Edge Spending Guide.

EDGE is the foremost technology infrastructure that extends and innovates on the capabilities found in core datacenters, whether they are enterprise or service provider owned. The value of edge is the movement of computing resources to the physical location where data is created, dramatically reducing time to value and the instant enablement of business processes, decisions, and intelligence outside of the core IT environment. IDC defines edge as the technology-related actions that are performed outside of the centralized datacenter, where edge is the intermediary between the connected endpoints and the core IT environment. Characteristically, edge is distributed, software defined, and flexible.

“Edge computing continues to gain momentum as digital-first organizations seek to innovate outside of the datacenter,” said Dave McCarthy, research vice president, Cloud and Edge Infrastructure Services at IDC. “The diverse needs of edge deployments have created a tremendous market opportunity for technology suppliers as they bring new solutions to market, increasingly through partnerships and alliances.”

IDC has identified more than 150 use cases for edge computing across various industries and domains. The two edge use cases that will see the largest investments in 2022 – content delivery networks and virtual network functions – are both foundational to service providers’ edge services

offerings. Combined, these two use cases will generate nearly $26 billion in spending this year. In total, service providers will invest more than $38 billion in enabling edge offerings this year. For enterprise adopters, the edge use cases with the largest investments in 2022 include manufacturing operations, production asset management, smart grids, omni-channel operations, public safety & emergency response, freight monitoring, and intelligent transportation systems. Use cases that will see the fastest spending growth over the 2020-2025 forecast include public infrastructure maintenance, network maintenance, anatomy diagnostics, and AR assisted surgery.

Across enterprise end user industries, discrete and process manufacturing combined will invest $33.6 billion in edge solutions this year. Retail and professional services will also see spending of more than $10 billion on edge computing in 2022 while all 19 industries profiled in the Spending Guide will experience double-digit spending growth over the five year forecast period.

“In the service provider segment, a five-year compound annual growth rate (CAGR) of 21.6% reflects the edge infrastructure buildout underway to deliver edge cloud services. For enterprise edge technology buyers, growing at a 14.1% CAGR, provisioned services such as IaaS will grow significantly and capture an increasing share of total expenditures over the forecast period,” said Marcus Torchia, research vice president, Customer Insights & Analysis group.

IDC expects hardware and services spending will account for 85% of all edge spending in 2022 with the remainder going to software. Hardware spending will be led by investments in edge gateways, which feature low-power components designed for running limited or single functions in environments where power and cooling availability is limited. Investments in compute and storage assets adapted for edge locations or deployment will grow at a faster rate and will nearly equal spending on edge gateways by the end of the forecast period. Services spending, comprised of professional and provisioned services, will grow at a faster rate than the other two groups with a five-year CAGR of 19.6%. By 2025, services will account for nearly 50% of all edge spending led by investments in provisioned services, including connectivity and edge-related infrastructure, platform, and software as a service (IaaS, PaaS, and SaaS). Software spending will primarily be allocated toward system infrastructure and security software with analytics & AI software seeing faster growth within the group.

From a geographic perspective, the United States will be the largest investor in edge solutions with spending forecast to reach $76.5 billion in 2022. Western Europe and China will be the next largest regions with spending totals of $30.6 and $20.8 billion, respectively. China will see the fastest spending growth over the five-year forecast with a CAGR of 19.7%, followed by Latin America at 19.4%.

“The European edge market has developed significantly in the last couple of years and is expected to nearly double in value over the forecast period,” said Alexandra Rotaru, research analyst with IDC’s European Customer Insights & Analysis group. “With nearly 30% of European organizations planning to start using edge technologies in the next two years and going beyond the pilot phase, solutions related to smart buildings, manufacturing operations, or production asset management will become more prevalent.”

## European Edge investments

International Data Corporation’s (IDC) Worldwide Edge Spending Guide estimates that enterprise and service provider spending on edge computing will reach $40 billion in 2022 in Europe and significantly increase over the forecast period, reaching nearly $64 billion through 2025, with a five-year compound annual growth rate (CAGR) of 16.4%. Performance,

innovation, and cost improvement are the top business goals driving adoption in Europe, pushing nearly one in three European organizations to plan to use edge technologies in the next few years.

Driven by its role in bringing computing resources closer to where the data is created, edge dramatically reduces time to value and enables business processes, decisions, and intelligence outside of the core IT environment. Edge will therefore unlock an entire set of new opportunities for new solutions to be developed to serve different industries and use cases in Europe

Driven by its role in bringing computing resources closer to where the data is created, edge dramatically reduces time to value and enables business processes, decisions, and intelligence outside of the core IT environment. Edge will therefore unlock an entire set of new opportunities for new solutions to be developed to serve different industries and use cases in Europe.

In 2022, most European enterprise and service provider spending on edge is expected to remain within the services category, mainly professional and provisioned services, followed by hardware, driven by the adoption of light edge platforms. Compared with heavy edge platforms designed to perform heavier tasks adapted for the edge location or deployment, light edge platforms are designed with low-power components to be able to run limited or single functions in environments where power and cooling availability are limited. The remainder of the market is allocated to software, driven by spending on security software, used to ensure integrity of data, end points, and infrastructure and systems infrastructure software.

Edge services are also the fastest-growing area in the European edge landscape, driven by adoption of provisioned services such as connectivity and software as a service (IaaS, PaaS, and SaaS). "The increasing inter-dependency of infrastructure, software, communications, and cloud will be under the spotlight over the next few years," said Andrew Buss, research director with IDC's European Enterprise Infrastructure group. "In this case, we'll see more and more technology providers partnering to be able to mix all these capabilities together to offer a portfolio of end-to-end solutions and use cases."

With different use cases emerging in the European edge landscape, content delivery networks and virtual network functions, predominantly found in the service providers' edge services offerings, will see the largest investments in 2022. In Europe, service providers will invest more than $8 billion in enabling edge offerings this year and will become the fastest-growing spending area through 2025.

For European enterprise adopters, the edge use cases with the highest adoption in 2022 include manufacturing operations, production asset management, omni-channel operations, smart grids, and freight monitoring. Use cases that will see the fastest spending growth over the forecast period are those linked mostly with artificial intelligence and AR/VR domains, such as AR assisted surgery, anatomy diagnostic, expert shopping advisors and product recommendations, and automated claims processing. Even though these domains will strongly develop in the next couple of years, IoT will remain a

key component of edge spending in Europe. Across enterprise end-user sectors and industries, distribution and services and manufacturing and resources will drive more than half of the European investments in edge solutions in 2022.

“With new industry-specific solutions developed and a value chain that is building up in Europe, many industries have started to understand the benefits and opportunities behind edge and have increased their edge investments,” said Alexandra Rotaru, research analyst with IDC’s European Customer Insights & Analysis group. “Therefore, organizations will increasingly move from initial awareness and pilot phases to more mature production rollouts in the next few years, supported by a wide range of edge-enabled service providers.”

## Securing edge success

To compete in a digital-first world, organizations are prioritizing investments in digital tools to augment physical spaces and assets and enable seamless and secure data gathering and analysis. These investments empower organizations to provision enterprise workloads at edge locations in support of innovative edge use cases. New research from International Data Corporation (IDC) examines the infrastructure needs of various edge use cases and how growth in these use cases will create new demands for enterprise workloads.

Edge computing is comprised of IT infrastructure and applications deployed outside of core datacenters to support data gathering and analysis closer to the source. IDC has identified four workloads from its Worldwide Enterprise Infrastructure Workloads Taxonomy that have a significant influence among edge use cases: business intelligence/data analytics; content delivery; text and image analytics; and networking & security. Multiple workloads are combined to support specific edge use cases. For each workload category, IDC ranks the contained workloads by primary, secondary, and tertiary impact on select edge use cases.

Because workloads can reside across a continuum of core, edge, and endpoint locations, edge computing requires a significant amount of coordination among technology and service providers. Similarly, workloads run across a range of compute architectures, requiring a high degree of interoperability and scalability.

Accordingly, a symbiotic edge and core to workload relationship is needed to enable workloads based at the core that support the edge, workloads based at the edge that support the edge, and workloads at the edge that support the core. While all three scenarios are important, the report focuses on enterprise workloads that are primarily located at, and managed from, the edge.

The most significant edge workload opportunity is streamlining business intelligence and analytics. Because data management and analysis-related workloads have and are expected to have a major or secondary role in nearly all significant edge use case development, IDC expects it will be one of the primary areas of investment at the edge. Similarly, development tools and applications workloads will see growing investment because of their influence on more forward edge use cases, especially in systems related to advanced AI and robotics. In contrast, IDC doesn’t see business application workloads as critical to the development of any major enterprise edge use cases, especially for newer developing areas of edge networks.

Because workloads can reside across a continuum of core, edge, and endpoint locations, edge computing requires a significant amount of coordination among technology and service providers

“Using digital technologies to improve the safety of people and communities and to increase the resilience of operations are being adopted the most rapidly. Industries such as manufacturing are already recognizing the impact that edge resources are having on operational efficiency and improved product quality,” said Jennifer Cooke, research director, Edge Strategies at IDC. «As these platforms become more readily customized and adapted for broader use, the need for more IT infrastructure at the edge will escalate.”

“The rapid deployment of edge computing is significantly shaping workload evolution,” said Max Pepper, senior research analyst, Infrastructure Systems, Platforms and Technologies. “As edge technology continues to expand in usage in a variety of workplace environments, we are seeing growing interest in expected concurrent workload growth in areas such as business intelligence and analytics, AI/ML-related workloads, and content workloads. While organizations should expect these workloads to be the main areas of edge-related growth, workloads across the spectrum will have critical influence even in minor roles within edge use cases.”

# Is 2022 the year of the hybrid?

Whilst public cloud solutions have the appeal of convenience and low start-up capital expenditure, vendors now find themselves rethinking their options and turning their attention to hybrid offerings. Business leaders should re-evaluate their IT infrastructure this year, amidst the ongoing global pandemic.

BY MASSIMO BANDINELLI, ENTERPRISE MARKETING MANAGER AT ARUBA

IN RECENT YEARS, digital technology has been integrated into businesses at a rapid pace, transforming the nature of their operations. From The World Economic Forum predicting great technological changes in the future, to global boardrooms, it is clear that the digital revolution shows no signs of slowing down this year. 2022 promises to welcome a further blurring of boundaries between the physical and digital world, as organisations are noticing how technology can support the way we work in today's post-pandemic world and harnessing it to consolidate and futureproof operations.

Cloud has now quickly become a defining force of IT operations for enterprises, particularly since the shift toward remote working. A recent survey by ABB Power Conversion revealed that an unsurprising 96% of US data centre professionals reported increased demand on their data centre services since the beginning of the pandemic. But it doesn't end here. As businesses continue to embrace arising technologies like AI, machine learning, automation, big data analytics, 5G and more, the rise in data centre demand will likely continue for years to come. Without a strong cloud infrastructure, the integration of these technologies

would be unsupported and problematic. Vendors are now considering a move away from public cloud and looking towards customised hybrid solutions as more appealing options, because they offer both private and public cloud architecture. So how would switching to hybrid cloud solutions benefit enterprises, as opposed to sticking with public? Let's find out.

Let's remember what hybrid cloud stands for
Public cloud solutions tend to attract most enterprises at the start of their cloud journey due to several advantages such as ease of use, flexibility, and low capital expenditure. Although, with these advantages comes a greater number of drawbacks. Among these is the performance and functionality compromise that companies often have to make to align with the regulations of external cloud platforms. This may result in companies becoming reliant on these platforms, restricting them from switching to a different vendor. Secondly, the low-cost set-up is likely to result in high operating costs, as enterprises increase the scale of their cloud operations.

What's great about the hybrid cloud is that it combines the benefits of public and private solutions to provide a bespoke offering of different technologies, specifically designed to fit an enterprise's needs and objectives. Developing a hybrid solution involves combining a public cloud with a physical data centre (a private cloud), which then enables the flow of data and applications between cloud and on-premises data centres and different cloud servers. The most significant advantages of adopting hybrid cloud relate to security, scalability, cost and compliance. Let's dive into each of these.

Improved protection and security of data
With a hybrid cloud solution, enterprises can better control their data. IT managers can use the private cloud to store data that requires higher levels of security, whilst utilising the public cloud to store less sensitive data, lowering company costs without sacrificing the security of data. Solid technical measures of security such as encryption, access control, automation, orchestration and endpoint security are a lot easier to implement with the centralised management system of the hybrid solution, ensuring a more secure and protected data flow.

## Much more scalability

Over the last two years industry leaders have learned to expect the unexpected. Despite how well they satisfy the needs of their business, changes in demand can occur overnight. In today's world that is constantly changing, flexibility is crucial. The hybrid cloud offering provides IT leaders with the flexibility to easily respond to unprecedented spikes in demand. For example, it is easy to obtain additional public cloud capacity in the short-term, whilst more fixed long-term can be stored in on-premises data centres. Enterprises can use this approach to keep their cloud infrastructure as adaptable as possible, without procuring expensive access capacity they seldom use, or exceed their existing capacity.

## Compliance is a key benefit

The regulation of data is a frequently changing landscape, and the complexity is only expected to increase in the next few years as cyber security and privacy become a priority for global leaders and regulators.

When determining the right cloud solution for their business, the issue of data sovereignty, in particular, should be the frontier for enterprise leaders. The principle of data sovereignty refers to the governance of digital data by the laws of the country where it is processed. Not only does this concept apply to EU countries, but also to companies that process, store or manage data from EU-based organisations. Taking this into consideration, companies that are reliant on a public cloud solution can expect a complex set of compliance requirements, as it demands a certain degree of control and management of data. Due to a lack of transparency from most public cloud providers, it can be difficult to determine how and where data is stored. Meanwhile, the hybrid solution offers complete transparency as IT leaders can store data in a private cloud, maintaining a storage and networking infrastructure that is specific to them. As a result, thorough compliance with regional and industry regulations is achieved, whilst also producing evidence of this as a means of reporting and auditing.

In the years to come data management challenges are only going to grow. In contrast to public cloud solutions alone, businesses that adopt a bespoke hybrid cloud solution will sooner be able to respond to changes in demand while staying innovative and ensuring maximum protection and compliance of their customers' data.

# Meeting the demand for truly high performance, sustainable and flexible data centres

**ANDY CONNOR, EMEA CHANNEL DIRECTOR AT SUBZERO ENGINEERING**, discusses key areas of focus for the data centre industry, as it seeks to meet the ever-increasing expectations of digital consumers, alongside the environmental imperatives highlighted at COP26.

THE DATA CENTRE INDUSTRY faces potentially opposing challenges over the next few years. On the one hand, the demands of our digital age show no sign of stopping, and with 5G expected to reach mainstream adoption, one could reasonably argue that the digital infrastructure required to support such applications is going to increase significantly. What's clear is that it needs to be agile, scalable, quick-to-deploy, and, above all, efficient, if it is to meet the users' expectations.

At the same time the data centre industry, as a major power consumer, must become more sustainable, and move forward from the easy wins of carbon offsetting to a much more sophisticated programme of carbon reduction and eventual elimination - Net Zero.

Set against these twin objectives, optimising data centre performance has never been more important, and in order to achieve this, at Subzero Engineering, we believe a number of things have to happen:

## Data drives decision-making

Cliché or not, the saying that 'if you can't measure it, you can't manage or improve it' remains true.

For data centre owners and operators, this means understanding either how your existing facility performs under varying environmental conditions and identifying ways to improve it. This may mean major modernisations work will need to take place where efficiencies are lacking. Or designing a new facility, which offers the layout, optimum flexibility and environmental performance to meet the constantly changing requirements of digital customers alongside sustainability targets.

Computational Fluid Dynamics (CFD) software will play an increasingly important role when it comes to data centre design and construction, retrofit and helping to improve the efficiency and performance of legacy data centres. It allows the simulation of an endless combination of racks, cabinets, cabling and mechanical and engineering (M&E) equipment, with the anticipated IT load, to ensure optimisation.

In providing data-driven analysis of the cold and hot air within the data centre, CFD analysis also delivers optimised layout recommendations and highlights how energy costs can be reduced by optimising and maximising cooling usage throughout the data centre. Such an Environmental Impact Evaluation provides valuable information to help operators reduce energy usage and carbon emissions and will play a critical role in meeting Net Zero data centres.

## Modernisation is critical

Armed with the data, it's time for action. And this is where I believe that data centre containment solutions can play a critical role - especially as data centre owners/operators look to improve both the IT and environmental performance of new and legacy facilities.

The benefits are many, and both hot and cold aisle containment solutions optimise the interaction of the cold supply and hot exhaust air within the data centre. This eliminates hot spots and significantly reduces the prospect of equipment failure. It also applies to the M&E and the IT hardware, both of which might otherwise be challenged to cope with extreme, unregulated temperatures. Improved reliability is a prerequisite for today's digital applications.

Once installed, containment solutions provide major environmental benefits, including higher cooling supply temperatures, lower CRAC fan speeds, a lower carbon footprint and a lower PUE.

Another key containment outcome is significantly reduced energy usage, hence a smaller energy bill. Combined with an energy management and monitoring programme, containment solutions also allow operators to extend the lifecycle of their systems, which is a major sustainability win.

## Greater flexibility at the edge

The edge infrastructure market is predicted to surge over the next two years, but today is dominated by small-scale micro data centres which are often pre-populated, single rack solutions. This can mean little flexibility in terms of their make-up, size or ability to scale up a single system in a modular manner and that the key needs of our digital age – flexibility, agility, scalability, speed – may not be met.

At Subzero, we believe that a new kind of micro data centre will gain momentum in the coming months, one that can be truly vendor agnostic, and designed with the user's choice of data centre components (power, cooling, racks, cabling, safety systems). Such systems can be provided as standardised, but highly flexible or fully customised solutions, enabling the user to define their edge based on the business requirements. Furthermore, they can offer a 20-30% cost saving when compared to a fully containerised micro data centre.

As we look towards Net Zero, sustainability and performance demands must be met. It requires greater flexibility in our infrastructure and a data driven approach to design and deployment.

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# No return to normal

For data and the data centre industry, the pandemic disruption was also a major catalyst for accelerated digitalisation. Thankfully most of the technology needed during the crisis was already in existence, supported by data centre and telecoms infrastructure.

**BY CIARAN FORD, DATA CENTRE SEGMENT LEADER (EMEA) AT EATON**

THE CRISIS drove the rapid adoption of these technologies and sped developments which were already underway. But what is most significant is that this change is likely to be irreversible.

When you remove a catalyst, the reactions it caused do not reverse themselves. The increased reliance on data centres (and by extension the telecoms infrastructure which connects us to them) is here to stay.

However, there are serious associated issues with this. A decades-long efficiency drive, which held data centres to steady demand levels while processing much more, has run out of headroom. Our economy and society have gone full throttle on data, exactly at the time when we need to put the brakes on energy consumption if we're to combat climate change. There are no megabits without megawatts, and as we demand and produce more and more data, energy consumption levels will rise.

## The data centre in a world of power transformation

How, then, can the industry achieve seemingly contrasting objectives and ramp up while ramping down? Squaring this circle will be the dominant feature of the energy and data centre industry for

the next five years. As if this conundrum was not enough, now throw in the fact that electrification is sweeping other industrial sectors, transport, domestic and commercial heating/cooling. As the demand for electrical energy is set to soar, data centre operators will face tough challenges in accessing scarce, new energy production.
The solution is to ramp up renewable energy production, not only meet new demand but to also displace current fossil-based production.

So, it is not just the data centre industry facing challenges. Energy network operators themselves will be stretched as they are asked to perform the magic trick of increasing supply while simultaneously decommissioning fossil fuel plants.

This may apply further pressure on commercial end-users. And governments setting the rules and direction for energy markets will be asked to make complex and highly consequential decisions about how energy is produced, managed and who is prioritised for power consumption. Dublin for example, has risen to become a major data hub for Europe, and data centres currently take up around 11% of Ireland's grid capacity, with warnings that this will rise significantly higher, there were even political calls for a moratorium on new data centres.

Between all the stakeholder the energy and data centre landscape is now quite complex requiring new policy and strategies. It would be naïve to assume that Ireland's case is unique, it is perhaps just to first to experience the confleunces of trends.

## Limited capacity means acute oversight

Players in the data centre sector – from big tech to service providers and real estate owners – have grown used to getting power whenever they need it. But as the plates spin across many sources of demand, data's role will be scrutinised in detail. The sector can make the case that its activities offset existing demand elsewhere but cannot excuse itself from the consequences of creating greater demand in the main. As such the challenge for data centres will no longer be one of efficiency, but one of sustainability. New metrics, new approaches to data centre design and operations will fall under greater scrutiny, as will the energy consumed by the overall telecom infrastructure which has an energy requirement many times that of the data centre industry.

We rely on data, data relies on power, and a significant gap between our wants and needs will soon emerge. On one side this appears as a crisis. However, on the other side, this will be the kind of gap that will attract serious investment and innovation. For the grid, this gap will enable new and existing private ventures to build out the renewable power we desperately need.

## The market opportunity for alignment of data and power

A seller's market for power supply opens the door to new approaches and new models. For data centres, it will solidify the economic case for a new relationship with power, not just as consumers but as sites which support the grid with energy services, storage and even power generation.

Data and power will realign and soon in some cases that alignment will become a physical proximity, too. With economics and policy beginning to align in this manner, there is a case for data centres to offer not just frequency response, but also move into direct flexible supply to the grid. Sector coupling, then, could become one of 2022's major headlines for the data centre sector. Here in late 2021, we're seeing the first glimmers of what this might look like; by the end of 2022 and beyond the dots between data and power will truly have been redrawn and hopefully look joined up, and we will continue to see the growth of ventures structured to make data centres part of the solution to the renewable transition.

# Data centres to drive digital recovery

The results of the Keysource 2021 State of the Industry report show that the data centre sector will continue to be at the heart of the global post pandemic recovery in 2022, as for many respondents, the ability to bounce back or accelerate growth lies in their technology and continued digital transformation. The good news is that this is creating increased budgets which, combined with a market that is bursting with service options, suggests a positive outlook.

**BY JON HEALY, OPERATIONS DIRECTOR AT KEYSOURCE**

IT IS AGAINST THIS BACKDROP that we will likely see the following trends:

**1. Mergers & Acquisitions**

With the backdrop of global digitalisation, demand in transformation critical assets will continue to be very attractive for investors and I believe that the market will continue with small, medium and large mergers and acquisitions. For some operators this will be the short cut to getting what they need or getting ahead.

**2. Sustainability**

As the globe increasingly turns its attention to the action required to limit the damage being done to the environment, the data centre sector will continue to get to grips with the role it must play in reducing carbon emissions. For the data centre industry there is still an enormous opportunity to improve the efficiency of existing live facilities, predominantly in scope 1 and 2 such as optimising power.

However I think we will see an increasing focus on Scope 3 emissions, the indirect emissions resulting upstream and downstream from the value chain activities, for example goods the business purchases and how end of life products sold are treated. This has a much wider impact which when controlled can drive much bigger strides in improvement. That said, developing the capability to measure this can be a huge challenge and is clearly an area requiring much more collaboration to achieve.

**3. Embedded carbon**

Following on from this I think the issue of embodied carbon and its impact will also be a focus for the industry. This is different from 'operational carbon' which is from heating, cooling and power during use and where to date the real work has been done, 'embodied carbon' is generated from the construction product supply chain such as energy consumption, chemical reactions, transport and installation/construction activities.

It is arguably more complex and expensive to

address and involves Life Cycle Assessments. However, moving forward this will be vital for organisations wishing to stay within their carbon budget.

**4. Renewable Energy**

In 2022, I believe there will be greater emphasis on alternative power sources such as wind and solar as well as the use of battery storage. There are some exciting innovations in this area. On 23 June 2021 the UK's first grid-scale battery storage system directly connected to the electricity transmission network was activated in Oxford and Harvard researchers have designed a long-lasting, stable, solid-state lithium battery.

At Keysource we believe that this could be a real game changer with a key feature being quicker charging time. Quicker charging times potentially overcome a key limitation of battery storage for data centres allowing researchers to deliver a battery autonomy which can be maintained more sustainably.

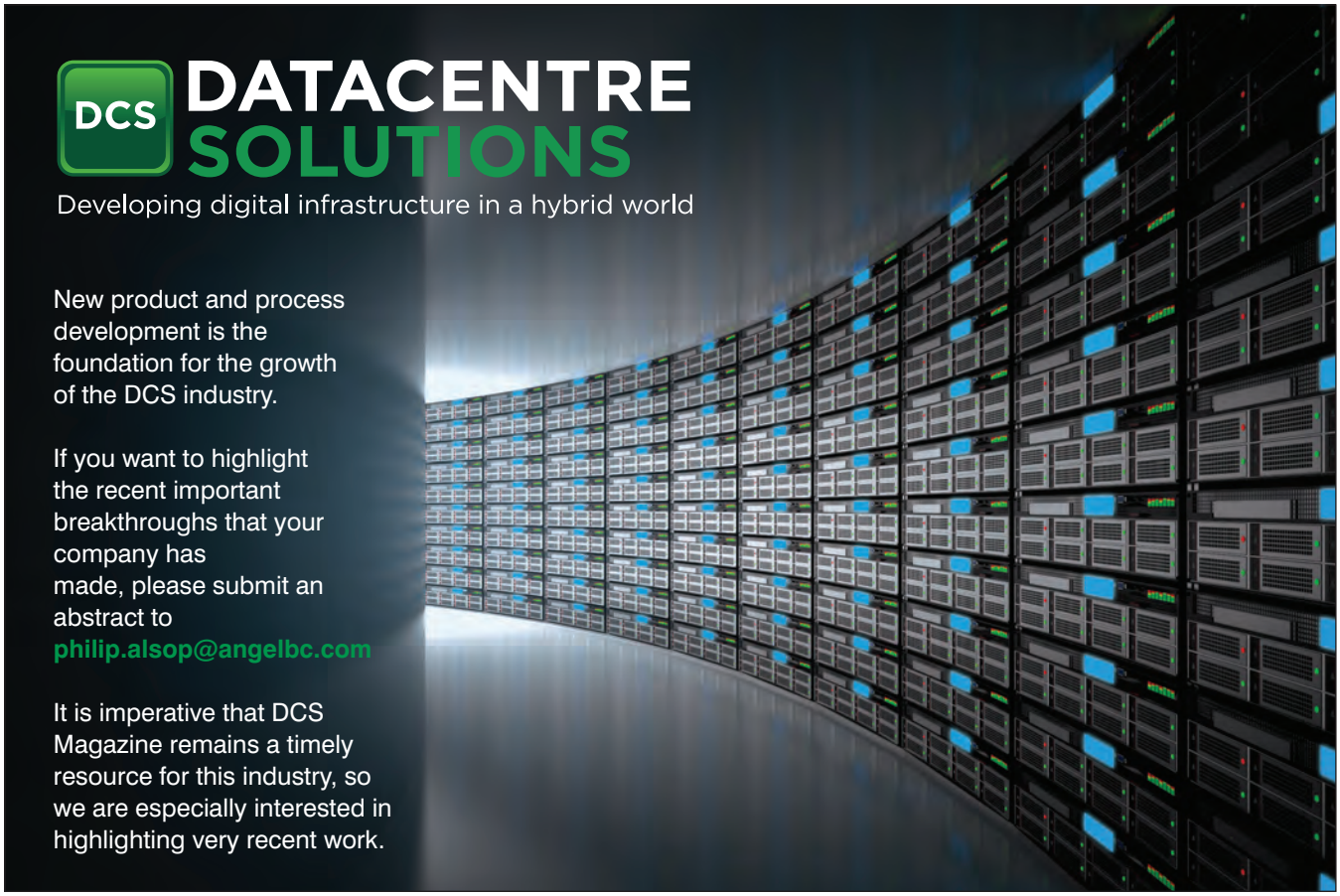
**5. Security**

Concerns around security has grown significantly with some high-profile incidents in 2021 and I think this will continue. Although the landscape is broad the data centre continues to be a "soft underbelly", which puts national services and business operations at risk. Given the financial and reputational damage a data breach or outage can bring this may the biggest challenge facing the sector.

I believe we will see an increasing awareness of the importance of securing the data centre management network to the same level, or more, as the corporate networks – often overlooked with responsibility falling between the IT, Security and Engineering teams.

Throughout industry, Industrial Control Systems (ICS) have long been targeted with Cyber Crime but now, however, more malicious, and sophisticated strains of Malware and Ransomware are specifically targeting these Operational Technology (OT) environments. This is as the Data Centre industry develops and forward-thinking operators are using techniques and approaches typical of more complex industrial facilities to drive innovation.

Another focus may be the security risks that lie within areas managed or supplied by third party organisations and where contractual compliance is key as is ensuring that policies and procedures reflect contractual and regulatory obligations.



# Why diversity, inclusion, and education can unlock the data centre skills shortage

The data centre sector skills shortage has been documented by industry publications and research firms for almost a decade. In fact, a report published by Gartner in 2016 found 80% of firms expected to find their growth held back due to a lack of new data centre skills, with the McKinsey Global Institute predicting a global shortage of 1.5 million qualified data centre managers as early as 2015.

**BY MARC GARNER, VP, SECURE POWER DIVISION, SCHNEIDER ELECTRIC UK & IRELAND**

DATA CENTRES have become the beating heart of the global digital economy, and while the industry's growth has fast accelerated, the question remains, have we done enough to encourage new professionals into the sector? The short answer, some may argue, is no.

Research detailed within the Uptime Institute Annual Data Center Survey 2021 estimates that staff requirements will grow globally from about 2.0 million full-time equivalents in 2019 to nearly 2.3 million in 2025. Further, 32% of respondents reported having difficulty retaining staff, with 20% being hired by competitors. However, what is more concerning is that 47% of data centre businesses seem to be having difficulty just finding qualified candidates for open jobs. So, while global demands for digital transformation and mission-critical infrastructure proliferates, the skills gap affecting the sector grows ever wider.

Attracting and retaining talent within the industry is now reaching a critical mass, so what can our industry do to address this?

## Address the lack of diversity

One of the first areas our industry must address is around diversity and inclusion (D&I), especially in a sector dominated by male professionals. The same report from Uptime found that from a diversity perspective, intent continued to outstrip action, with just 5% of operators reporting that 'about half' of their data centre staff were women. Moreover, since Uptime began tracking the sector's diversity in 2018, the industry's gender demographics have not changed materially, and more than three-quarters of those surveyed report that their workforce is made up of around 10% women, or less. These figures present a stark look for our industry, especially one that is fuelled by investments, mergers and acquisitions (M&A), and growth.

As an industry, we must drive the development of a broader talent pool, and engage, empower, and encourage more female candidates to join and futureproof the sector. This, however, is one area where Schneider Electric is leading by example, and through our commitments to sustainability and diversity, we are creating an inclusive environment for the next generation of female professionals. Our goal is to ensure that women represent 50% of all new hires, 40% of all frontline managers, and 30% of senior leadership roles in our organisation by 2025.

Through this vision we believe we can acquire different skills and perspectives, attract new talent, and provide a diverse range of candidates to help drive sustainable change within the data centre and energy management industries.

Become greater advocates for STEM

Another key means to address the shortage is to encourage young professionals to consider careers in science, technology, engineering, and mathematics (STEM). Here driving awareness among the next generation from a young age is critical, primarily so that they understand the importance of the sector and consider it as a valuable career path.

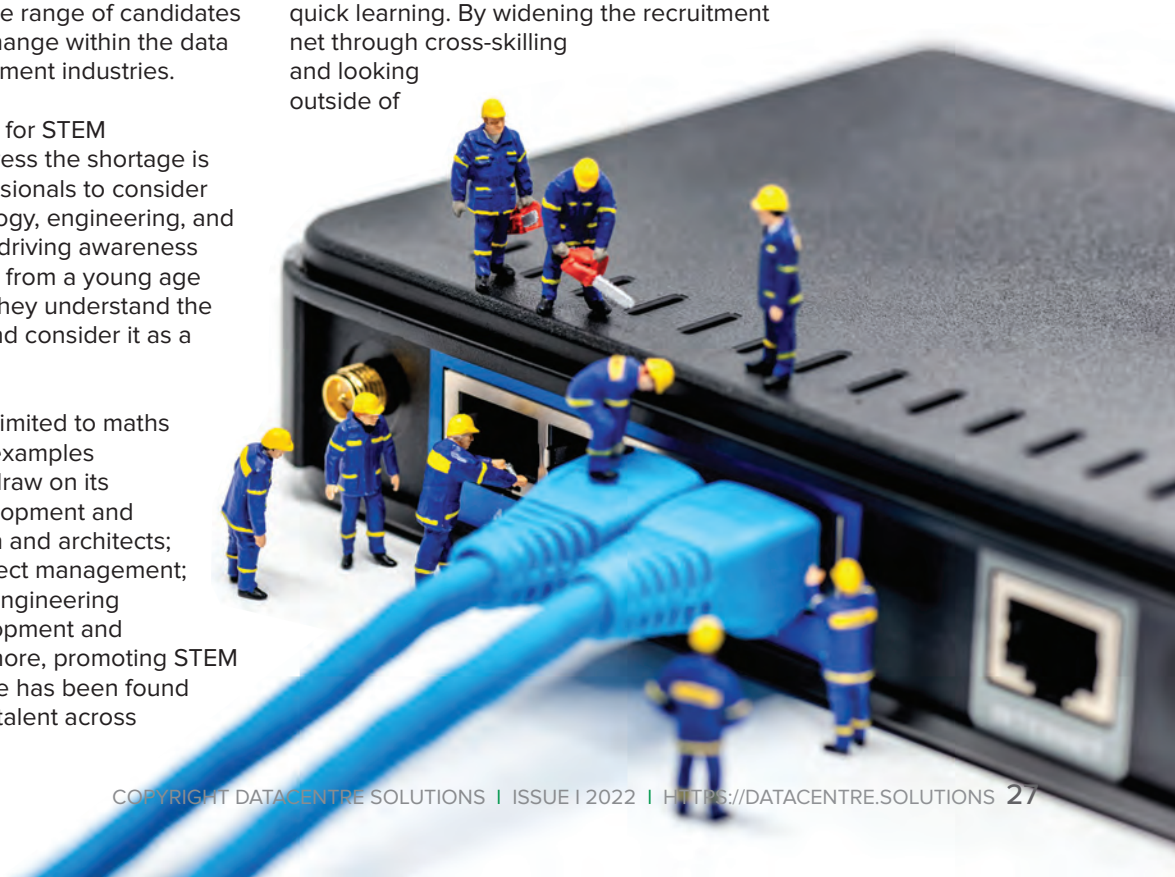
STEM, however, is not just limited to maths and engineering, and key examples of business roles that can draw on its skills include product development and marketing; solutions design and architects; strategic planning and project management; mechanical and electrical engineering (M&E); and business development and Entrepreneurship. Furthermore, promoting STEM education from an early age has been found to create a diverse pool of talent across all levels, which is likely to help attract more professionals into the industry and foster the growth of its future leaders.

Another route to bridging the skills gap is via graduate programmes, and by collaborating more closely with universities we can empower the next generation of data centre professionals to pursue purpose-driven careers in our sector. Today the industry underpins some of the world's most important and influential businesses, from global social media platforms and Internet Giants to Financial Services, Life Science and Pharmaceutical research organisations. Each one of these businesses has established a strong, digital foundation within the industry and is dependent on its mission-critical infrastructure, presenting a rewarding career for any new industry advocate.

At Schneider Electric, we target a 50% gender split amongst our graduate and early-career recruitment intake, and in 2020, 65% of our graduate hires were female. By addressing STEM from an early age and removing stereotypes around engineering, we can gain new perspectives and encourage a new generation of talent to join the sector.

## Reassess the skills required to enter the sector and retain the workforce

Today there are many expert individuals who possess skills that can be cross trained into the industry. At Schneider Electric, we believe we must reassess the criterion for entering the sector and consider candidates who have built core competencies which can translate into quick learning. By widening the recruitment net through cross-skilling and looking outside of



the sector, we can identify candidates who have comparable expertise and bridge the skills gap.

Staff retention is reported by Uptime to be another key challenge, and one that should be a key focus for our industry. Mentorship and development from within remain essential, and we believe it is essential to recognise both the value and the potential in our people.

During the pandemic, for example, our sector's professionals were named key workers, and data centres became instrumental to every facet of the digital economy. With more skilled professionals leaving our sector to join other industries, there has never been a more important time for us to focus on mentorship and to create opportunities for development, which will be vital to retain staff within the sector.

As an industry we can go one step further, and adopt key learnings from other sectors, especially those around remote and hybrid working. By considering new candidate motivations, which could include flexible hours for professionals with young families, reducing commute hours, or advocating hybrid working, we can do much to retain talent and begin to bridge the talent gap for generations to come.

## Educate from within

Finally access to ongoing education, including CPD-accredited professional development programmes and diverse training paths is pivotal. As such, Schneider Electric has created a professional education platform, named the 'Schneider Electric University', offering free access to vendor-agnostic education to help train and upskill the next generation of data centre professionals.

Formerly known as the APC™ 'Data Center University', the platform has evolved to offer over 200 data centre, energy efficiency, and sustainability courses, and to-date has delivered over 1,000,000 courses to more than 650,000 users globally.

Furthermore, by being specifically designed as a vendor-neutral, CPD-accredited education platform, it is recognised by numerous global industry associates including Engineers Ireland, the Electrical Contractors Association (ECA), and BICSI.

Crucially, through Schneider Electric University we are helping train, retain and upskill the next generation of data centre professionals, and are playing a key role in addressing the industry skills challenge on a global scale. As we look forward there are many things that our industry can do to futureproof the sector.

Attracting, retraining, and retaining talent is essential, but only by building a diverse, inclusive, and resilient workforce can we empower our industry to drive change, and build the sustainable data centres of the future.

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- Questions would be prepared and shared in advance
- There would be an opportunity to view and edit out any unflattering bloopers

This event would be publicised for 4 weeks through all our mediums including:

- A banner on the Digitalisation World homepage for 8 weeks
- 4x weekly dedicated HTMLs
- 4x news pieces which would also appear on the weekly newsletters
- Promoted through our social media platforms for 8 weeks (pre and post event)
- Available as an on-demand asset through all mediums
- All registered attendees' details would be made available to you

**Cost: £4995**

Contact: Jackie Cannon
jackie.cannon@angelbc.com

# The changing data centre power game

Why power saving and achieving net zero is the foundation of all future builds.

**BY ED ANSETT, CO-FOUNDER AND CHAIRMAN OF i3 SOLUTIONS GROUP**

THE CLIMATE CRISIS AGENDA is placing all businesses under pressure to prove their sustainability credentials for every activity. Banks are looking for climate impact reports and policies before lending. Investors are seeking viable data to measure the value of ESG actions, with a particular focus on verifiable strategies that tackle climate change and cut carbon emissions.

The amount of information being sought will be huge. It will span everything from financial reporting to providing valid data on how each and every operation sources energy and uses electricity.

For example, the International Financial Reporting Standards Foundation has set up an International Sustainability Standards Board to develop global sustainability reporting standards. Blackrock, the world's largest asset manager says on its homepage: "Our investment conviction is that climate risk is investment risk, and that integrating climate and sustainability considerations into investment processes can help investors build more resilient portfolios and achieve better long-term, risk-adjusted returns. We believe that society is on the cusp of a transformational change towards sustainability."

Businesses are being warned to step up. Large companies are hiring or promoting individuals to the role of Chief Sustainability Officer. It's a big job.

Writing in Forbes recently, Oracle's CSO pointed to technology innovations as holding some of the answers to achieving net zero. Whether it's through more efficient light bulbs, using AI tracking and reduce power use across vast built environments or developing tools that help firms comply with climate regs, technology is vital.

## Data centres don't stand alone

For businesspeople outside the data centre industry, all they know is their data lives in the cloud and they want that cloud to be carbon neutral.

They demand that none of their data, including the sustainability data that will be used to inform decision making, is stored in carbon spewing, energy wasting data centres.

For users and customers, the information (data) on where, how, and how much power is consumed inside the data centre is suddenly becoming important.
For those inside the data centre business, as we begin the journey to become carbon net zero, this presents big challenges.

We are currently just another business sector reacting to price and supply volatility in the energy markets and looking for solutions. Yet in the short to medium term, the data centre sector may fast become an integrated part of the energy supply chain.

Some data centre operators are reacting quickly to the carbon issue and citing grid integration as a USP. Today, firms like Lancium.com are providing valuable data on grid power system integration. Lancium says it is building data centres in Texas that will act as 'controllable load resources,' where 'the net effect on the electrical system is carbon negative.'

## Can technology make data centres adaptable to net zero aims?

So, where to start? Delivering power to the workload for secure uptime remains the critical role of a data centre. Ordinarily, the infrastructure used to ensure the design purpose is met is fixed, inflexible and wasteful. Adaptability, while clearly and increasingly desirable, has been elusive to date.

Enter, Adaptable Redundant Power (ARP), an innovative power design technology that enables existing data centre power topologies to overcome the challenges associated with fixed systems and deliver flexibility that addresses waste and stranded capacity while ensuring the availability of critical services.

For developers of new data centres basing power designs on ARP, the technology helps bake in energy efficiency by bringing flexibility to power topologies. This creates responsive power chains that direct power to ensure IT workloads operate at maximum energy efficiency. With measurable results.

Data centres will be sustainable. Data centre developers seeking investment (and permission) to build the vast campuses to run the 21st century digital economy will need to demonstrate policies that address climate change.

Whatever we build in the future or change in existing data centres is going to be measured against sustainability credentials. The climate crisis demands long term solutions and as we plan for 2030 only those that stand up to scrutiny will be accepted.

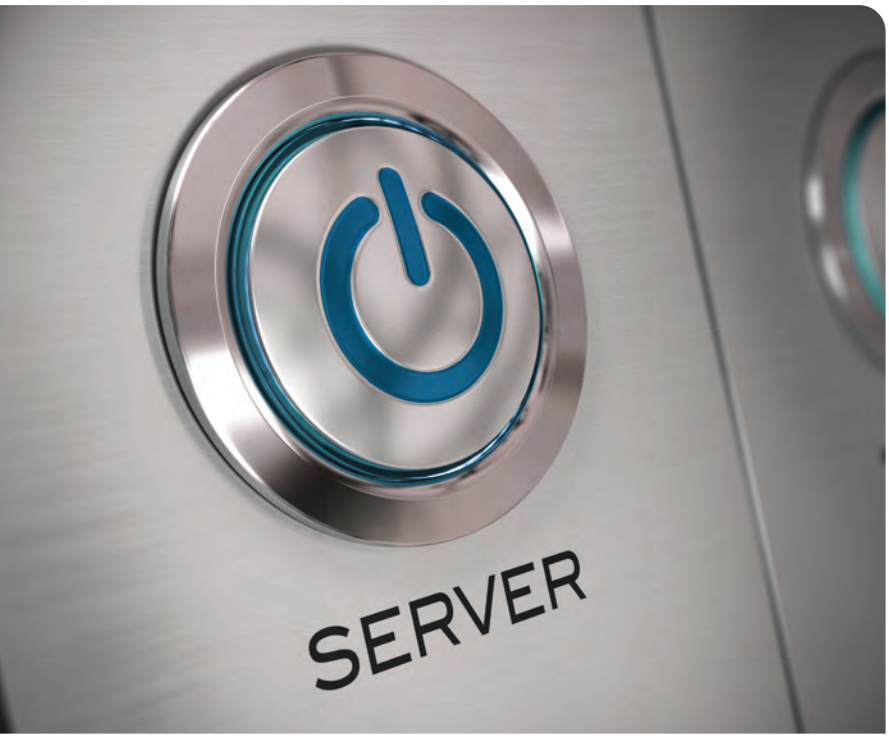
# **Data center infrastructure:** The importance of effective power supply and what happens when it fails

It goes without saying that a constant power supply is absolutely vital for a data center. The fire that burned down the OVH data centers in Strasbourg, France last March, proved to be a big wake-up call for facility managers around the globe.

**BY MARTIN HODGSON, COUNTRY MANAGER, PAESSLER AG**

THE FINANCIAL IMPACT of the fire is not for the faint-hearted. According to Reuters, it is estimated to have cost the company 130million euros after factoring in lost revenue, litigation provisions, impairment charges, and the cost of reimbursing customers and replacing equipment.

Usually, there are systems to ensure uninterrupted power supply in a data center, but these have to be regularly serviced and monitored. This requires a monitoring solution that can check standard power supply as well as UPS systems to make sure that every single part of the power supply system is working properly and that any failure or performance issue is immediately detected and solved.




Here are five steps every data center or facility manager should consider implementing to ensure an effective power supply:

**1. Gather the right information**

The first step is to measure and analyse the power supply and total amount of electricity to the data center. In addition, IT and air conditioning should be measured separately. Through these measurements, the efficiency of the cooling in the data center can be measured. This key figure is called PUE. The quality should also be recorded using an appropriate measuring device. For fail-safety, the power supply should be provided by an active UPS, and N+1 redundancy should also be available.

**2. Safety first**

A well-maintained power supply ensures the safe protection of data. To ensure an effective operating system, a permanent measurement and monitoring of the residual current of the data center must be carried out according to the international standard IEC 60364-6. If the power failure should be longer, then this can be absorbed with the mains backup system. The backup power system should be permanently monitored with a network monitoring solution that must be operational at all

times and available within a few minutes. It is also advisable to set up alerts so that the facility manager can be notified if there are any issues with the power supply even when they aren't on-site.

### 3. Check the power distribution

Make sure the power is made available to the IT components. This distribution takes place via the power distribution unit (PDU). During this process, important information can be collected from the PDU such as:

- What's the power/heat load for the rack?
- How much power is needed for the servers?
- Is an integrated differential current measurement possible?

It is also worth considering whether you can install PDUs which offer the possibility to monitor further environmental parameters like temperature and humidity. This helps facility managers know how well the air conditioning units are performing and if they are keeping the servers at the correct optimal temperature.

### 4. Put a monitoring strategy in place

Because of the complexity of the points mentioned above, monitoring the power supply and the overall environment of the data center is crucial. It's important to understand the condition and status of servers and machines in the data center, that all air conditioning units are functioning correctly, the air temperature in the facility, to name just a few metrics. In addition to this, they need to measure the KPIs that were defined in the first step.

For this, they need a sufficiently complex monitoring tool that is able to bring in data from IIoT sensors, OT systems, and traditional IT components using several common protocols and display everything in one place.

### 5. Prevent cyberattacks

Since the beginning of the pandemic, cyberattacks have been on the increase so it's important to put in place a robust monitoring system whilst also protecting the power supply from being accessed by potential attackers. In this day and age, the majority of power equipment can be controlled and configured remotely. This leaves the data center wide open to potential hacks, downtime, or devastating data loss. Hackers can also cause a power surge, resulting in damaged equipment or a fire outbreak. In 2017, British Airways suffered from a deliberate power surge that lasted a few minutes but cost them dearly as the incident affected around 75,000 travellers. It is estimated that this cost the company a staggering £80 million.

The power supply installation and maintenance market is growing exponentially as it is core to the operation and management of every data center. With the boom in cloud-based applications since the start of the COVID-19 pandemic, the take-up of data centers has drastically increased. According to the FT, data centre mergers and acquisitions totalled almost $35bn globally last year, more than five times the volume of deals in 2019.

This makes the issue of effective power supply a 'no brainer' for many facility and IT managers who want to reduce downtime and protect their most precious asset – their clients' data.

# Scalability in action:
## How to deploy pay-as-you-grow

With many businesses responding to new and more flexible working practices following the pandemic, colocation data centre operators are under pressure to build new capacity fast. In this interview, **DAVE STERLACE, ABB'S HEAD OF TECHNOLOGY FOR GLOBAL DATA CENTRES**, answers questions on how to deploy a 'pay-as-you-grow' strategy that limits upfront investment costs for colocation data centres and helps them secure tenants earlier.

**Q:** *What are the benefits of scalability?*

**DS:** Infrastructure for colocation data centres needs huge up-front investment but operators often don't earn income until tenants are ready to rent space. As a result, many are using a pay-as-you-grow strategy as a better way to control costs.

The key is to deploy systems in modular and replicable building blocks that increase capacity as it's needed over time. This enables faster deployment and reduces capital costs. However, it also improves reliability as the standardised modules provide consistent performance and maintenance. In addition, pay-as-you-grow improves energy efficiency as the operator is not drawing power to run systems that are not yet needed.

**Q:** *How fast can you build new capacity?*

**DS:** Speed of deployment is becoming more

important in the data centre industry. In 2010, it typically took more than two years to build a new facility. However, a survey of data centre professionals in June 2020 found that almost 40 percent of sites are now being deployed in less than a year, with 66 percent in up to 18 months.
US data centre operator GIGA is a good example. In 2019, it deployed the first phase of a new data centre in North Carolina within six months, with a view to scaling up to meet growing demand.

It wanted a scalable system that would also achieve an ultra-low Power Usage Effectiveness (PUE) of 1.15. In turn, this would enable GIGA to reduce costs for its customers by 31 percent. It appointed ABB as its design partner to deliver the most efficient system possible and handle challenging timelines.

Working alongside GIGA and its mechanical, electrical and plumbing consultants, we designed and implemented a packaged power solution to support 60 MW of IT loads. This included low-voltage switchboards, dry type transformers and UPS systems.

Working alongside GIGA and its mechanical, electrical and plumbing consultants, we designed and implemented a packaged power solution to support 60 MW of IT loads. This included low-voltage switchboards, dry type transformers and UPS systems

The design is based on a 'system plus system' topology to provide a flexible and scalable approach. It includes two types of UPS systems in a 'best of both worlds' approach. It makes the most of an existing TLE UPS to support customer IT loads. This had the additional advantage of a small footprint, making it suitable for housing on a mezzanine with space and weight constraints. It was integrated with lightweight lithium-ion (Li-ion) batteries, which provide high availability and reduce PUE as they need less cooling so operate at higher temperatures.

GIGA chose an ABB decentralised parallel architecture (DPA) UPS for its network servers. This is better suited to supporting lower power systems and is ideal for scalability, enabling GIGA to expand in increments of 2 MW.

**Q:** *What is important for power systems under the pay-as-you-grow approach?*

**DS:** There are four key design considerations. These are the electrical topology, scalability of equipment, digitalisation, and modular deployment.

In terms of the topology, most data centre systems are unique. However, there are only three main types: system plus system, shared redundant and block redundant topology.

All are used to support colocation data centres and the operator will choose the one that gives them the required level of redundancy versus asset utilisation. All three topologies can be applied with a standard solution architecture covering electrical distribution from the grid connection to the rack. Subsystems can then be factory assembled and tested into power modules that are skid-mounted or integrated into e-houses. These standard modules typically contain medium and low voltage switchgear, transformers, low voltage switchboards, UPS systems, power distribution units (PDUs), remote power panels (RPPs) and IT busways.

The benefit of modules is that they can be prefabricated, pre-engineered and pre-tested in parallel with site construction work. Not only does this accelerate the construction schedule, but it also reduces the time and risk of on-site testing and commissioning, as well as minimising the number of people required on site.

**Q:** *How can operators build scalability in?*

**DS:** The key to scalability is to select subsystems that have been designed for straightforward scalability. For example, by specifying medium voltage Gas Insulated Switchgear (GIS) that can be extended without accessing the gas compartment. This avoids the additional step of calling in specialist contractors to handle gas. Scalability can be built into UPS systems by specifying DPA designs, every power module has its own independent control system and hardware. This avoids having a single point of failure as power can be rerouted when needed. As long as enough modules are available to fully supply the load, one or more modules can be lost with no interruption to power.

When it comes to power distribution units and panels, these can be configured in modules to provide the required number of outputs and output power.

**Q:** *What have you learned about scalability from real-world deployment?*

**DS:** It's essential to specify systems that are designed for scalability from the very beginning. One example is Volico's FLL1 Tier IV colocation data centre in Fort Lauderdale, Florida, which provides server hosting, disaster recovery, business continuity, backup services, private and public cloud computing.

When it was planning its FLL1 site in 2016, Volico wanted architecture and infrastructure to deliver the highest levels of reliability, availability and dedicated server space for customers. One of the operator's selling points is flexibility and scalability, as it offers customers flexibility of taking ¼ racks, ½ racks, full racks, and cages, as well as their own secure and private space on Volico's site.

The operator chose a pay-as-you-grow strategy to underpin this. However, it faced a challenge when it realized the UPS in its original specification was not designed for scalability – an error that created a roadblock. It reached out to ABB to help.

We suggested using a modular DPA UPS in 1 MW building blocks of two frames of 10-module sets. This is suited to large and mid-sized data centres and provides Volico with the flexibility to scale in 100 kW increments. These can be combined vertically with up to 500 kW in a single frame, as well as horizontally with up to six parallel frames for a total of 3 MW power.

The UPS laid a foundation for future growth, enabling Volico to add more UPS capacity as required. In addition, the DPA architecture supports Volico's six-nines (99.9999 percent) availability, has high energy efficiency and allows hot-swapping of modules while the system is running.

**Q:** *How is digitalisation important for scalability?*

**DS:** Data centre power distribution systems can become extremely complex to design and maintain. Digitalisation has the advantage of simplifying them by using an open communication protocol such as the IEC 61860 smart grid standard.

This has the advantage of carrying signals via a single communication bus rather than the many point-to-point copper wire connections needed in a traditional data centre power system.

The result is that operators can reduce wiring by 90 percent – this significantly cuts time on assembly, testing, installation and commissioning. However, it also means better scalability as it is straightforward to extend.

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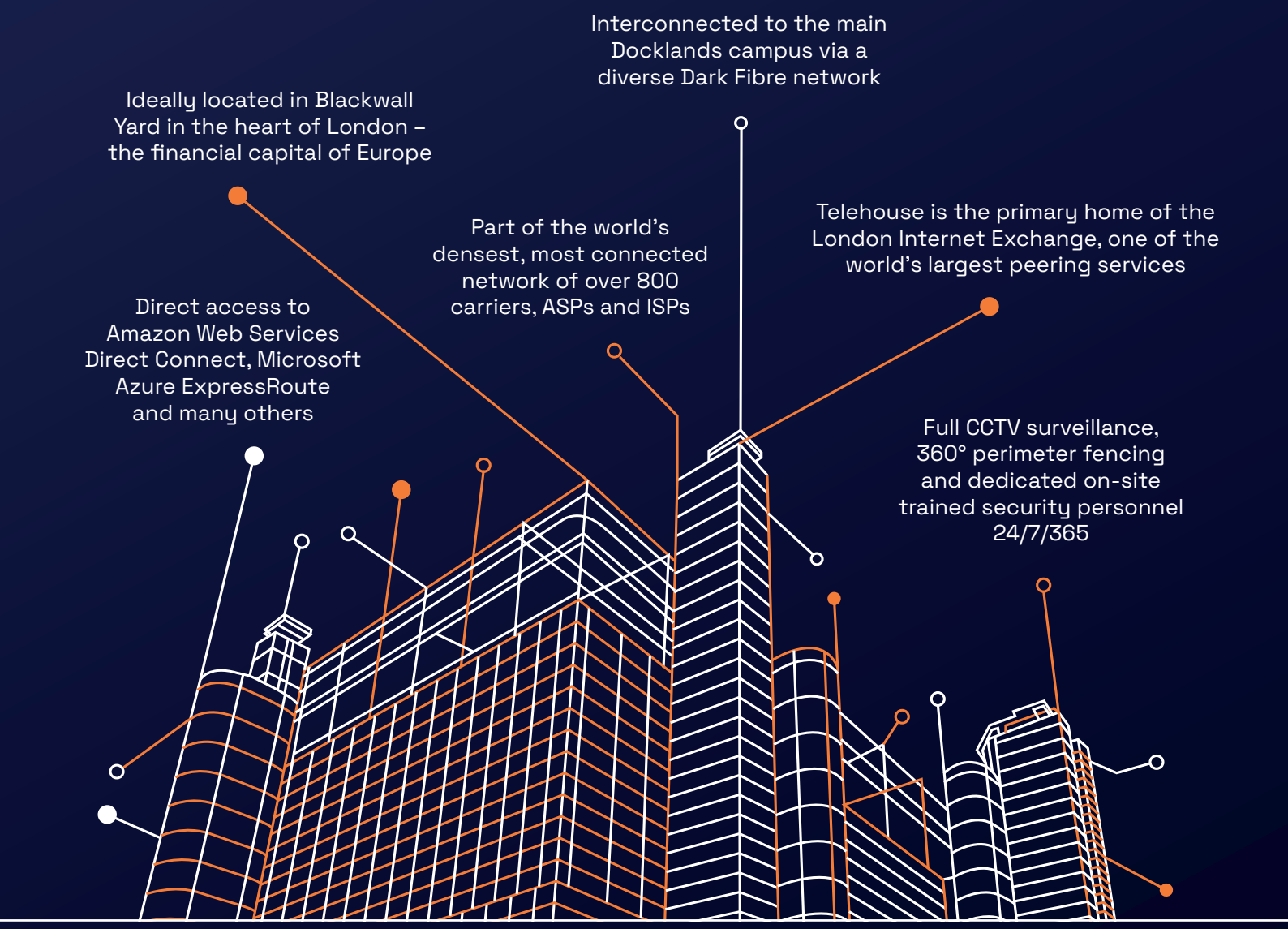


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# Decarbonising on the cloud

The tech transition that is central to driving efficiency across organisations.

**BY MARK TURNER, DIRECTOR OF CLOUD BUSINESS AT CLARANET**

RECENT RESEARCH by Havas found that 64% of people prefer to buy from companies with a reputation for purpose as well as profit and more than half (53%) are willing to pay more for a brand that takes a stand. In the aftermath of COP26 this has only increased. It is now imperative that businesses put a focus on ESG commitments – in an EY respondent survey 98% of investors reported that they use climate change markers to evaluate a company's non-financial performance.

The various ways a business can promote sustainability can be complicated to navigate. Often the methods with the most notoriety - such as aiming for zero-waste across the organisation - are costly and, for a lot of businesses, unfeasible without full company support and a lot of reorganising of internal operations.

For sectors that produce high emissions such as IT, manufacturing and utilities, sustainability has long been a priority discussion – but that's not true for every sector. Sustainability must now be on the agenda when businesses are establishing strategy over a five-year period.

Transitioning to cloud is one of the simplest ways to not only be more environmentally friendly, but also to be more productive and cost-efficient across the business. For example, using Claranet's services Page Group switched to cloud and reduced 1,968 Metric Tons $CO_2$ equivalent, the same as driving 4.81 million miles in a car.

## Reducing carbon emissions

Cloud computing could eliminate a billion metric tons of $CO_2$ emissions over the next 4 years, and possibly more, according to a new IDC forecast. Additionally, research by Microsoft and EY reveals cloud can create a reduction of businesses' carbon footprint by up to 98%.

Transitioning to the cloud means moving an organisation's system from hardware-based to software-based.

A by-product of this change is a reduction in e-waste – a huge contributor towards landfill. Less overall

As cloud is server-based, employees are no longer required to print documents or spend time liaising with other colleagues to access them, they can simply locate necessary resources themselves. This not only eliminates physical waste, but further reduces time spent trying to access documents, minimising electronic usage, and increasing employee productivity

system maintenance (such as overcomplicated heating and cooling systems) provides more streamlined infrastructure and reduces all associated emissions.

There are many more ways cloud can be successful in reducing $CO_2$ emissions in business, and one way that often goes unnoticed is a reduction in pollution from the commute to work. Cloud contributes towards the increasingly popular hybrid working models, providing a smooth transition into virtual work and enabling remote working.

## The data behind decarbonisation

As ESG commitments gain precedence in investor and client's minds, companies should be considering where it is they can make changes. Data and analytics are invaluable to tracking companies' optimal operations.

Where cloud has previously been used for data and analytical information in a general sense, it can now be used to monitor a business's ESG data. This can show businesses where they need to be improving in their journey towards net zero or sustainability. Businesses need to consider sustainability across their wider operations and supply chain, which would extend to their cloud provider.

Accenture's "The green behind the cloud" provides information on emission goals and renewable-energy purchases. For example, Claranet is committed to moving workloads into carbon-neutral cloud data centres and holds an ISO 14001 certification for environmental management.

## Supercharging efficiency

Microsoft looked into the efficiency of businesses both before and after transitioning to cloud-based operation and found businesses who migrated to Microsoft Azure Cloud achieved up to 93% energy efficiency.
Aside from this comes the simplification of systems, switching to cloud further boasts cost saving and reduced 'tech friction'.

As cloud is server-based, employees are no longer required to print documents or spend time liaising with other colleagues to access them, they can simply locate necessary resources themselves. This not only eliminates physical waste, but further reduces time spent trying to access documents, minimising electronic usage, and increasing employee productivity. Microsoft's customers reported new-found confidence in the resiliency and performance of their services, they gained the insights needed to better control their current IT landscape.

This efficiency even continues when cloud isn't in use. By switching off after work, businesses can see cost saving of up to 70%.

Many green business initiatives have the potential to fulfil multiple goals. For example, reducing your carbon footprint is good for the environment, but it also immediately saves on energy costs, makes you a green business, involves employees so they feel empowered It's time to change the way we talk about technology, and position it as the enabler for sustainable business transformation. Many organisations have done this by adopting a 'triple bottom line' to account for: people, planet, and profit.

Business who are struggling to find ways to be more sustainable should look into the numerous benefits of cloud computing, not just in terms of environmental impact, and discover a long-term, sustainable plan which works for them and their clients.

We are living in a period of suspense, a time where no one really knows how the future of business will evolve. To optimise efficiency and sustainability, businesses must adapt and evolve.

# How the cloud can reduce our digital pollution

It is critical that organisations gain a handle on their current environmental impact; there is still so much to be done to reduce digital pollution and ensure green practices become the norm.

**BY GERARD LAVIN, FIELD CTO EMEA, CITRIX**

LAST YEAR saw the world quite rightly turn its spotlight towards the environment and sustainability – perhaps with a closer lens ever before. From Greta Thunberg's longstanding campaigning to COP26, we have all become increasingly aware of how our actions are impacting the planet.

Indeed, consumer and business-to-business purchasing decisions are being increasingly influenced by organisations' ESG strategies, which are now placed under greater scrutiny. According to recent Gartner research, by 2025, the carbon emissions of hyperscale cloud services will be a

top three criterion in cloud purchase decisions. Yet up until recently, technology's impact on the environment - the 'digital pollution' effect - has often gone unnoticed. So given such an emphasis is being placed on the supply-chain and its ESG credentials, how can large organisations tackle their digital pollution and make more sustainable technology investments?

## Hybrid work gains

Even before the onset of the pandemic - and the subsequent increase in technology demands - the carbon footprint of devices, the internet, and the systems supporting them was responsible for approximately 3.7% of global greenhouse gas emissions.

This is similar to the amount produced by the aviation industry globally and at the time was predicted to double by 2025. Certainly, it can only have increased.

Covid-19 enforced shifts to home and now hybrid working have naturally resulted in a reduction of most businesses' carbon footprints, primarily through a significant drop in commuting and lower energy usage in offices. In fact, a recent study found that by cutting commuting and consolidating real estate as part of a broader sustainability effort, remote work could help reduce annual $CO_2$ emissions by 214 million tonnes.

Yet, such large scale remote working does bring with it unwanted consequences for the planet. Just a single internet request represents 7g of carbon dioxide equivalent ($CO_2e$) and sending or receiving an email emits 4g of $CO_2e$. With more organisations rolling out hybrid working models, in which technology will be increasingly relied on for meetings and collaboration, we must ensure sustainability remains front of mind as we focus on the future of work.

## Setting the pathway to sustainability

A recent Citrix study found that nearly two thirds (63%) of UK IT leaders believe their organisations are at an advanced stage of their environmental, social and governance (ESG) development. Alongside this, just one in 10 (11%) reported their businesses are at the early stages of their ESG journey. Of those who said they were advanced on their development, nearly half (43%) are also helping their clients become more sustainable as well, as part of their business models.

When compiling ESG reporting, nearly half (45%) of enterprises surveyed deploy in-built mechanisms that track exact carbon emissions based on usage from electricity consumption of the full lifecycle of the products/devices they manufacture or services they deliver (e.g. SaaS) to customers. A similar number (51%) estimate based on typical usage over an average product lifespan. The research found 42% of large organisations even track the environmental impact of their employees working remotely, i.e. the electricity tariff they use, with a further 39% planning to do this. Just 16% of respondents said their business has no plans to do this.

As businesses review every aspect of their ESG strategies, analysing the environmental impact of the technologies they use should be high-up on their agenda. Architecting a more sustainable IT infrastructure means choosing technologies that help reduce an organisation's carbon footprint, while still selecting those that enable productivity and growth over the long-term.

## Public cloud efficiencies

As the exponential demand for collaboration, digital engagement and technological innovation continues, hyperscale service providers (for example, the likes of Azure, AWS, Google, Oracle and IBM) are increasingly turning to renewable energy to reduce their greenhouse gas emissions and create a sustainable approach to data centre computing.

The Citrix study mentioned above also found that on average, nearly two thirds (61%) of data and applications are currently hosted and managed in the cloud. As part of this, around half (49%) of those running in the cloud are within public clouds provided by the hyperscale players.

Moving data to the public cloud can reduce $CO_2$ emissions by 59 million tonnes per year – the equivalent of taking 22 million cars off the road. Large technology companies are already taking the lead by powering their data centres with renewable energy: for example, Microsoft has a goal to be carbon neutral by 2030 and Google is the largest non-utility investor in renewable energy in the world.

## Working together

Delivering a truly sustainable business model involves fine-tuning every aspect of a business so it hits those environmental metrics and lets an organisation become the change the world so desperately needs. Today, as we stand on the brink of a climate emergency, cloud computing, when used wisely, has the potential to minimise the environmental impact that going digital has had upon our planet.

It is critical that organisations gain a handle on their current environmental impact; there is still so much to be done to reduce digital pollution and ensure green practices become the norm. IT leaders have a vital role to play in helping make this happen, by making better choices not just for their department or business, but for the future of the planet.

# Sustainable use of cloud technology

Why companies need to consider using cloud-based IT systems to reduce their carbon footprint

**BY DAMIAN HANSON, CO-FOUNDER & DIRECTOR OF CIRCLELOOP**

LAST YEAR, the pledges made at COP26 sent a clear message to companies globally that tackling sustainability issues in the workplace should be of the utmost importance to meet environmental goals.

With climate change being an important focus, we have witnessed organisations and corporations finding new ways to become more sustainable. Many have seen the benefits of implementing cloud-based technologies to increase productivity and serve the purpose of becoming environmentally friendly.

The rise of cloud-based technologies has gone hand in hand with the business landscape and their combined efforts to reduce waste and improve energy efficiency for SME businesses in the UK. It will be interesting to see how sustainable IT initiatives will become more apparent this year as the bid for businesses to become more energy-efficient and reduce their carbon footprint for the foreseeable future grows.

## Traditional business tools vs cloud-based business tools

There are stark differences between the traditional business tools used in the workplace and the revolutionised cloud-based business tools being implemented. As well as empowering employees to stay connected from wherever they decide to work, all software, servers, and networks are hosted in the cloud providing both flexibility and scalability.

Cloud-based technology is the future of business, and it boasts a long list of benefits such as cost savings, increased productivity, speed, and security capabilities. Compared to traditional business IT tools, day-to-day work has become effortless and no longer requires an on-premises infrastructure to leverage growth in the business.

As we all know, the advantages of using cloud-based business tools over traditional tools could not have been clearer following the Covid-19 pandemic. Businesses that adopted the cloud adapted to the new remote working norms swiftly. With England's Plan B Covid measures still in place, implementing

cloud-based technologies to enhance the working model of employees working from a distance couldn't be more vital.

## Sustainable benefits of implementing cloud-based technologies

We have seen first-hand the sustainable benefits of switching to cloud technology with the SME businesses we work with. Hosting on the cloud is more environmentally friendly and results in less of a carbon footprint.

Cloud-based technologies have brought about the end of printing, signing, scanning, and storing physical documents. The process is reduced to just a couple of clicks thanks to the cloud meaning reduce wastage for businesses who adopt the paperless option as a sustainable alternative.

Energy efficiency is also a benefit that should be considered when using cloud-based technologies. Businesses can use less physical hardware; equipment can be more efficient with accessible data, and resources can be allocated with ease eliminating the need for extra servers or machines. Cloud-based phone systems, for example, require little to no hardware and equipment, whereas a traditional phone system in the workplace requires high maintenance and more usage of electricity. You can't typically use traditional phone systems externally or from another location, which adds the importance of having a model that can reduce energy consumption.

## How companies can shift away from traditional business IT tools that are less sustainable

We can't expect a business to become sustainable overnight. However, it is becoming easier to integrate cloud-based IT tools in the workplace to streamline processes for the greater good. Now has never been a better time to make the switch to expand and grow to make sure your business is as future-proof and as sustainable as possible.

Before migrating to the cloud, it is worth establishing your cloud KPIs to measure how the business performs against your expectations. Categorising your objectives from cost efficiency, return on investment (ROI) to sustainability is a great way to ensure that success is measurable across the board.

Creating a data migration plan is also key to evaluating what needs to be moved from on-premises to the cloud. Knowing what data you have, the hardware you use and the integrated apps you will need will be reflective of your business goals and what you hope to achieve. Migrating the physical documents to the cloud could very well be the first step to reach a point of reduced paper waste, followed by migrating the data from the physical servers that can be removed once the data has been backed up.

## Final thoughts...

I have no doubt that organisations will continue to adopt cloud-based technologies to meet sustainability requirements. Cloud-based technologies shifted how businesses prioritise sustainability and the impact it will have on the environment for years to come.

As customers become more ethically aware, they will gravitate towards businesses that prioritise sustainability. Efficient, streamlined cloud-based technology will be a benefit to meet CSR policies and sustainability pledges in the workplace. Being environmentally friendly applies to all aspects of business and must start with internal measures. We can all do our part by addressing wastefulness and energy usage at every level of the business, and using cloud technology is a great starting point for more sustainable practice.

# Data centres delivering sustainable, digital transformation

**DCS** talks to **MARK PESTRIDGE, SENIOR CUSTOMER EXPERIENCE DIRECTOR, TELEHOUSE,** about the company's expansion plans in both the UK and mainland Europe, as well as key industry issues, including sustainability, edge and skills.

**DCS:** *If we can start with some Telehouse specific questions and then move on to wider industry issues, perhaps you can give us an update on what the company has been up to over the past few months – in particular, there's been a major upgrade to your Telehouse North site?*

**MP:** The refurbishment of the TFM25 suite within Telehouse North was in direct response to new and existing customer requests to scale up and benefit from being interconnected in our original carrier-neutral facility. It now delivers higher power densities in line with modern day demands, as well as fully redundant power supply to meet increasing resiliency requirements.

**DCS:** *And you've also announced plans to construct your fifth London data centre – Telehouse South – can you give us some more details about this major project?*

**MP:** The first phase which will deliver 2MW of IT power of the construction activities at Telehouse South is almost complete in readiness to open our doors to customers this quarter. We've installed a dark fibre network to integrate Telehouse South with our main London Docklands campus located just 300 metres away, allowing our customers to benefit from the same unrivalled connectivity to over 800 ISPs, ASPs and carriers.

**DCS:** *And both these projects are part of a planned European expansion programme – are you able to tell us what else has been done when it comes to developing existing sites and/or building new data centres in new locations?*

**MP:** Last year we doubled the size of our Paris data centre and launched a new point of presence in Marseille. Our presence in Marseille provides access to all the submarine cables

in the region, allowing our customers to reach new global markets quickly and easily in Africa, the Middle East and Asia. We are also looking to expand in Frankfurt and then are looking at further expansion in the Docklands in the mid-2020s

**DCS:** *Before we move on, clearly Telehouse's success is in no small part due to keeping your customers happy – and a recent example of this is with post-production company, Racoon. Can you tell us about this customer win?*

**MP:** As a post-production services start-up company, Racoon required direct connections to its broadcaster customers, access to cloud services and the ability to scale IT quickly. Colocation at Telehouse was an important enabler of that change, providing lean, modern infrastructure with rich connectivity. We were able to equip Racoon with a secure, sustainable environment where it and all its stakeholders can collaborate easily from any location.

**DCS:** *If we can turn to one or two wider industry issues, to start with sustainability, what has Telehouse itself done thus far when it comes to addressing its carbon footprint?*

**MP:** One key policy we are proud to have implemented is the sourcing of electricity from only 100% renewable sources for all our data centres since February 2019. Electricity consumption represents the biggest source of emissions for data centre centres, therefore, addressing one of our major sources of emissions is key for the industry in the journey to Net Zero. We also pioneered the world's first multi-storey adiabatic cooling system for our industry – the use of external air provides a high cooling capacity with low power consumption and reduces of the amount of energy needed. We actively participate in voluntary standards, regulations and frameworks, such as the Climate Neutral Data Centre Pact and the EU's Code of Conduct for DCs, and many joint schemes, such as the European Union scheme for Emissions Trading and Climate Change Agreement.

**DCS:** *And are your customers putting pressure on you to address sustainability – driven by their own environmental objectives and the looming threat of legislation/obligations such as the impending Sustainability Disclosure Requirements?*

**MP:** In recent years sustainability has become one the key driving forces behind transformation and has fast risen to the top of the business agendas. Customers have become more aware of the sustainability trends, and they are moving towards a more efficient, environmentally friendly and more sustainable providers. Legal frameworks such as the UK's Sustainability Disclosure Requirements has also impacted customers who are requesting more transparency regarding emissions to address requirements. This can be evidenced by our recent research report, where 9% of enterprises agreed that sustainability is important to their IT maturity aims. We will continue to be transparent and provide the relevant information so our stakeholders can be confident we are taking actions to tackle the climate emergency.

**DCS:** *More generally, do you see the face of the data centre industry changing dramatically to address sustainability issues – everything from supply chains, construction, data centre locations and the like – or do you think it will continue to be more of a 'quiet evolution'?*

digital transformation around the globe is accelerating at an unprecedented rate and connectivity demands are rising as the word is becoming dominated by the digital world. Therefore, the data centre industry is now at the centre of this transformation to ensure they achieve end-user requirements and expectations regarding sustainability

**MP:** The digital transformation around the globe is accelerating at an unprecedented rate and connectivity demands are rising as the word is becoming dominated by the digital world. Therefore, the data centre industry is now at the centre of this transformation to ensure they achieve end-user requirements and expectations regarding sustainability. What is clear is that if the industry is going to achieve the challenging goal of Net Zero, the industry needs to outline a strategy that define an action plan which will provide achievable and reasonable targets that can be incorporate in business plans data centre operators. This combined with resource-efficient facilities designed and built for ultra-efficiency and powered by renewables. However, all of this require investment that it is not clear how the government support these ambitions. Furthermore, today's businesses need invest in resources, expertise that support and fund projects in sustainability. And finally, it's

vital that the industry begins to decarbonise the supply chain. The Scope 3 emissions are one of our industry's biggest challenges, so should be mechanism to work closely with suppliers to ensure we help end-users to understand their embodied carbon footprint.

**DCS:** *Moving on, any thoughts as to how and when the edge data centre market will develop over the next year or so?*

**MP:** As data capacity is increasing, the ways of storing and processing this data need to be developed. Enterprises use edge data to increase agility, inform strategy, launch new services and aid decision making, but the sheer volume of data is overwhelming. Many are now looking towards edge computing as the answer but ultimately success will boil down to having the right robust infrastructure and connectivity. Having a data centre partner that can provide secure, scalable and resilient on-demand access to cloud and edge ecosystems is now crucial.

**DCS:** *And is this a market in which Telehouse has a role to play?*

**MP:** We have seen demand for edge driven by its convergence with other technologies such as cloud and colocation, evidenced by the fact that many organisations now opt for a mix of technologies. At Telehouse, we provide a variety of secure and resilient cloud and connectivity solutions for companies to achieve a seamless hybrid connectivity.

**DCS:** *The data centre industry faces a marked skills shortage over the next few years – how worrying is this, and what can be done to address the problem – both from a Telehouse perspective and the industry more generally?*

**MP:** From the Telehouse perspective, we are firmly committed to attracting talent into the business with the ability to learn and grow with our organisation. We firmly believe in investing in individuals within our team through structured development programmes. This enables us address the need for enhanced skills within our industry but also challenges our employees to push themselves and their careers forward. This in turn helps us to retain our top talent.

**DCS:** *We've covered a fair amount of ground, are there any other issues which you believe are already impacting or will likely impact the data centre industry in the near future?*

**MP:** As the data centre industry becomes increasingly crucial to the everyday activities of consumers and organisations, we will see more opportunities to use AI to enhance efficiency. One example is improving cyber security – there are solutions that leverage AI to look for changes in typical traffic behaviour at specific times of the day or analyse the size of data packets that are being transmitted across networks.

Any anomalies that are detected then result in the automatic shutdown of ports on the networks where those anomalies are identified.

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# Providing sustainability and a data solution for Oxford University's GLAM Division

**OXFORD UNIVERSITY'S GARDENS, LIBRARIES AND MUSEUMS DIVISION (GLAM)** forms one of the greatest concentrations of university collections in the world. GLAM holds over 21 million objects, specimens and printed items, constituting one of the largest and most significant collections in the world. Faced with the challenges of increased data demand, the Museum of Natural History – one of the museums within GLAM – wanted to upgrade its IT infrastructure to house core network switches, responsible for running the services. A major rewiring project was undertaken with the aim of significantly improving the data connectivity for computers, phones and next generation devices.

THE WIRING presented a challenge in itself as the historically significant listed building was not best designed to accommodate the space for conventional hardware. This required ingenious methods to work with the fabric of the building. Faced with these challenges, Anjanesh Babu the technical project lead in the Gardens, Libraries and Museums IT team, researched options available. The traditional approach was for the designated network core of a building to be stripped bare and rebuilt with air conditioning and electrics to meet the requirements for the equipment. However, given the nature of the building, this would present a number of challenges, including space and cooling loss through the surfaces.  The design approach was led by GLAM Sustainability strategy.

Anjanesh Babu, Technical Lead for the Project, approached Rittal's IT team who quickly identified the "Data Centre in a Box" (DCiB) concept as a possible option. DCiB replicates the key data centre capabilities but on a smaller scale and has been developed to enable equipment to be deployed in non-traditional Data Centre environments. The turnkey package concept provides IT Racks, demand-orientated climate control, PDU, monitoring and fire suppression.

It provides a complete solution from product selection, through to installation and ongoing maintenance. When installed in the Museum of Natural History, the cooling footprint would be significantly lower than the traditional full-room air conditioning and the absence of any work to the space to accommodate the system would mean that the building would remain relatively untouched.

A site visit by Rittal's Area Sales Manager for IT was arranged, and  the requirements gathered. "The system was to be located in the museum's basement which had restricted access with very narrow staircase & doorways. In addition to this, the

building's listed status would mean that any cooling equipment would have to be positioned cleverly and with the utmost consideration, not only to aesthetic but to any noise pollution emitted" recalls Joel.

The IT Area Sales Manager and members of the Rittal IT development team, Clive Partridge and Andrew Wreford, worked with Anjanesh Babu to identify key areas that needed to be achieved. "Given the kW loads & environment of the proposed location, it became clear that the DCiB's LCU option was the best way to go, and we quickly built up a package including racks, accessories, cooling, fire suppression, PDUs & monitoring. To mitigate the access restrictions, we used the 'rack splitting / re-joining' service which enabled us to resolve the challenge of space limitations of the project" says Rittal's Technical IT Manager, Clive Partridge.

Rittal provided an end-to-end solution from the manufacture of kit, to the installation, commissioning & hand-over. To overcome the issues with the listed building status, Rittal's IT team worked in collaboration with Babu and the lead contractor, Monard Electrical, to find a suitable home for the condenser. Technical project lead from GLAM, Anjanesh Babu, reflected on the options deployed: "RIttal's DCiB allowed the museum to utilise the proposed location without having to make costly building modifications, thus saving time, energy and effort."

By adopting "in-rack" precision cooling instead of "in-room" cooling, the location is more environmentally efficient and this controls operational expenditure. Cooling via the high-performance LCU option provides temperature consistency, allows better care of their equipment along with nearly silent operations. Not only is the installation providing energy efficiency and longevity for the museum, there is the added benefit of noise reduction in the room compared to an existing server room utilising in-room cooling.

Haas Ezzet, Head of IT Gardens and Museums (GLAM) at the University of Oxford, contextualises this piece of work as being part of the "Museum's drive towards greater environmental sustainability. The approach piloted here, of focussing climate control specifically to the area needed, the data cabinet, rather than the entire space in which it is house, will optimise energy consumption and afford a blueprint for other spaces within GLAM and beyond."

# When developing fire protection for your data centre, think reliability, speed and flexibility

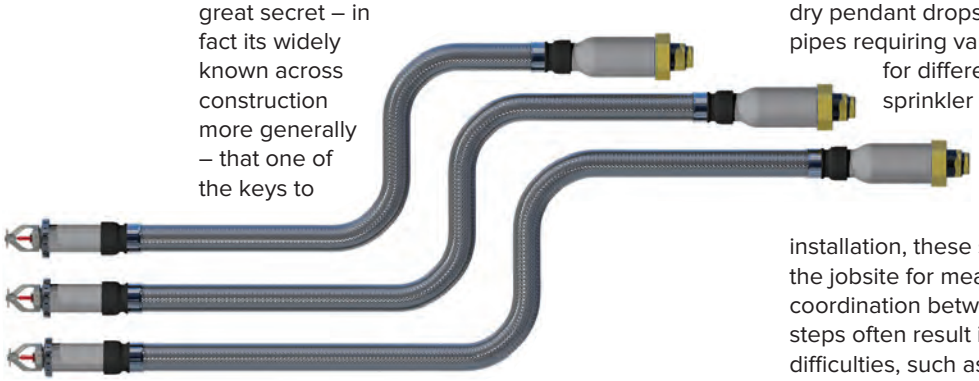
We live in a modern world; fast-paced, heavily reliant on digital technology, and consistently expanding. Behind this all, the very backbone of the technological age, sits data centres. From streaming Netflix to mediating natural disasters, data centres are integral. Which is why it's so integral data centres operate at high speed and are completely reliable. We cannot afford for them to go down, in any circumstance.

**BY ALEX DICK, FIRE PROTECTION BUSINESS DEVELOPMENT MANAGER, DATA CENTRES, VICTAULIC**

IT'S THE HYPER-IMPORTANT nature of data centres which still excites me – after 30 years in the industry – as I enter my new role as Fire protection Business Development Manager for Data Centres across Europe at Victaulic, one of the leading producers of mechanical pipe joining, flow control & fire protection solutions. My peers from across the industry and I play an important role in ensuring that data centres operate to their fullest potential, backed up by systems which are fast to install, reliable, and flexible – much like the data centres themselves.

## Saving time on the jobsite

Just as the world's population relies on data centres to operate at the highest speed possible, data centre owners are equally reliant on fire protection systems that are quick and easy to install. It's no great secret – in fact its widely known across construction more generally – that one of the keys to keeping projects within budget is to mitigate labour risk wherever possible. That's where you'll make those crucial savings.



Mitigating labour risk can be achieved through several ways, but within fire protection, across the years I have been working in the industry, three buzzwords have always held the most weight: 'reliability', 'ease' and 'flexibility'.

## The power to be flexible

Flexibility isn't always easy to achieve, especially in data centres. Server rooms can get expanded, new server rooms can get started up, roof dimensions can often differ from one area of the building to the next and fire protection piping must compete with a plethora of other wire-runs and applications. Additionally, traditional fire protection systems use dry pendant drops to protect sever rooms, hard pipes requiring varying lengths – to accommodate for different roof heights – with a dry sprinkler head at the bottom of the pipe. They must be installed very precisely to perfectly fit the dimensions and designs of the existing building. During installation, these systems require numerous trips to the jobsite for measurement, design and installation coordination between different trades. These added steps often result in redesign. Inherent installation difficulties, such as complex measurements and

insulation requirements, can lead to errors, delays and additional expenses – all of which will result in negative effects on a project's budget and timeline.

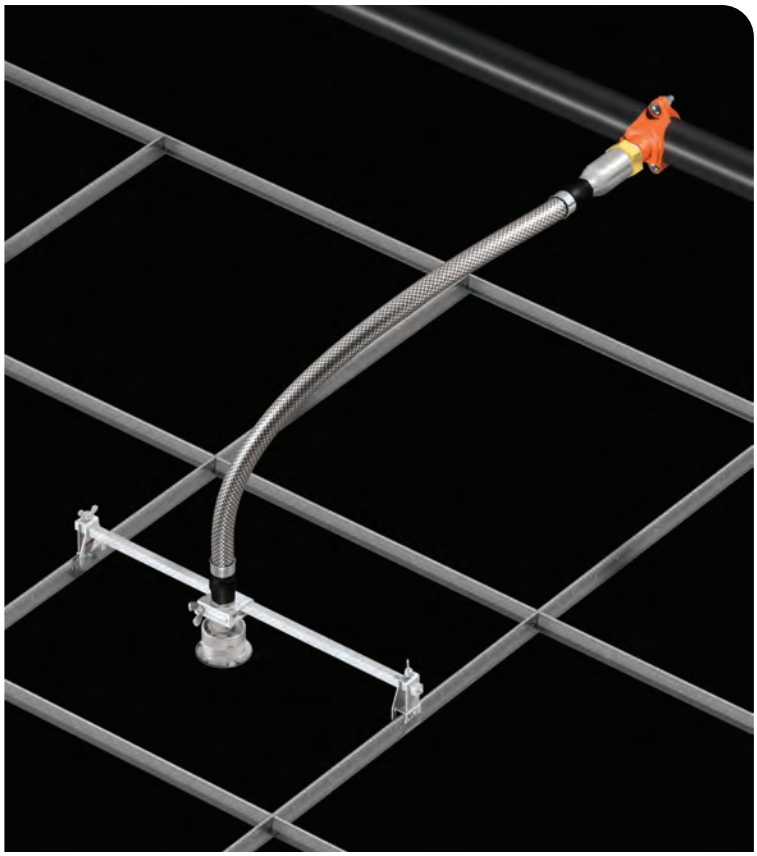
What data centre managers can really benefit from is a more flexible system. This is where it's on suppliers to innovate, investing in new products which can offer improved solutions for our customers. I'm particularly excited to bring the Style VS1 flexible dry drop to market: a flexible braided hose, ranging from 50" to 58" in length, in combination with a dry sprinkler. The product comes to site ready to install as one single piece and eliminates the need for hard pipe systems. It provides designers and owners the freedom to seamlessly move the water farther into away from the servers and the flexible nature of the hose ensures it can be positioned according to the building's constraints or can easily be readjusted if servers in the room are added or moved.

## Delivering reliability for customers

In my previous role as business development manager within UK and Ireland, I spoke regularly and in depth to project managers across the market about the issues and challenges they faced. Naturally, reliability was always top of the agenda; the word they would keep coming back to. Fire protection systems must be reliable.

It's always been up to the industry to provide that reliability. I believe in working with the customer right from the design stage, using software to draw virtual sketches (Victaulic has its in-house VDC team), through to overseeing installation on-site or off-site during the modulisation phase. It's those reassuring touches that give customers confidence in the system they're using.

In fact, modulisation is a trend I see continuing to grow. Where ten years ago prefabrication was rarely used, now nearly 70% of projects are built using this method. The benefits are undeniable: from limiting labour risks on site to saving money due to faster construction and installation. At an early stage of the project, I recommend approaching customers with a modulised offer to understand their openness to constructing FP systems off-site.



## A bright future ahead

Undoubtedly, the data centre industry is set to keep growing. We have never been so reliant on technology; in fact our reliance is increasing. As I enter my new European remit, my goal is to get out there, meet people from the industry, and understand the challenges they are facing and provide solutions that impact their bottom line. I completely believe, as manufacturer, the best we can do is listen to our customers and prospective clients.

I have a vision for Victaulic to be the number one fire protection solution for data centres in Europe and with new products – such as the Style VS1 flexible Dry Sprinkler – providing customers with ease, reliability and flexibility, I believe we're on the right path.

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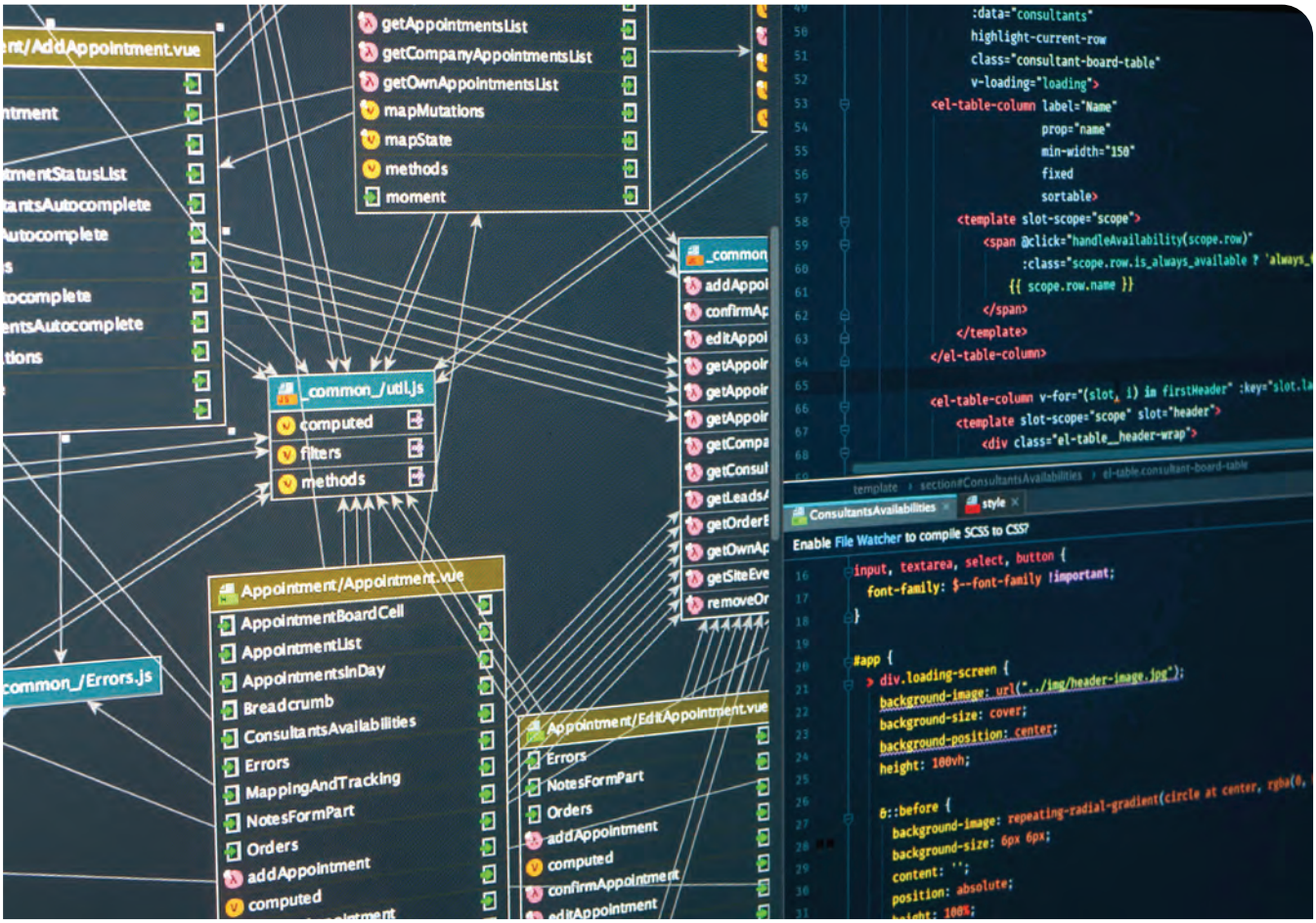



# Digitising the design and build of data centres

As we adapt to a new and hybrid world, greater innovation will be necessary to help overcome many of the remaining challenges, including the need for increased sustainability, more efficient use of energy, and for our industry to meet accelerated demands for capacity. Let's take a closer look at five trends that are influencing the direction of data centres.

**BY STEVEN CARLINI, VICE PRESIDENT, INNOVATION AND DATA CENTRE, SCHNEIDER ELECTRIC**

DIGITAL DESIGN TOOLS speed development

I expect to see greater innovation in the digitisation of data centre design and build.

One of the top challenges customers are experiencing is the need to meet demands for new data centre capacity. To help address this challenge, new software tools are emerging that speed up the design and construction of data centres. Schneider Electric's partner ETAP produces software (essentially a digital twins tool) that allows designers to model the electrical powertrain for availability, efficiency, and sustainability. Another company, in which Schneider Electric has a stake, is RIB, which

develops construction management software. Traditional computer-aided design (CAD) platforms have long allowed users to design the layout of a facility, however, the use of ETAP's software allows detailed modelling of the powertrain while RIB's enables time and cost modelling. Although CAD tools have been familiar for many years, the ability to model the powertrain is new. End-users can now choose or substitute components and subsystems based on their environmental impact or energy efficiency - evaluating the effects on technical performance and pricing via digital twins before committing to physical prototypes.

## The 6G effect

Fifth generation networks have been expected to make an impact for some time, but the fast millimetre wave 5G variant has been slow to materialise. 5G is, however, beginning to make an impact in open spaces with few physical barriers such as stadiums, airports, and shipyards. The problem remains that a killer application to drive the need for mass adoption has yet to materialise.

An exciting prospect is 6G networks, which could offer life and experience changing functionality. 6G operates at THz frequencies and has access speeds of 1Tbps, which will deliver near 'air latency'. Whereas high band 5G hits speeds around 500Mbps, with air latency aimed at 8-12ms. Potential use cases for 6G include embedded technology for controlling artificial limbs (prosthetics) through wireless Brain-Computer Interactions (BCI), which is an incredible prospect! In the 6G world, people could interact with their environment and other people using devices that could be held, worn, or implanted.

6G networks also have the potential to eliminate traditional base station and antenna networks because their high frequencies need a ubiquitous mesh network where everything around you has an antenna function. In theory everything that powers up will have a built in antenna function and become part of this new 'antenna free' network. While the network architecture may change with 6G, the computing capacity will need to grow, so placement at the edge will become even more crucial.

## Energy concerns at the edge

Adoption of edge infrastructure will also continue to grow. However, energy efficiency will become a critical factor, with customers demanding that edge deployments match the capabilities of larger data centres in terms of resilience, efficiency, and sustainability. Edge deployments may be smaller than traditional facilities, but the scale and volume at which the infrastructure is likely to be deployed demands its environmental impact be minimised.

Building a sustainable edge at scale requires greater attention when selecting components, during the design and deployment stages, and use of comprehensive management systems to drive operational efficiency. Cooling will remain an essential part of the efficiency requirements, but the challenges presented by edge deployments, especially those in unmanned environments, will require innovative approaches in terms of technology and topology.

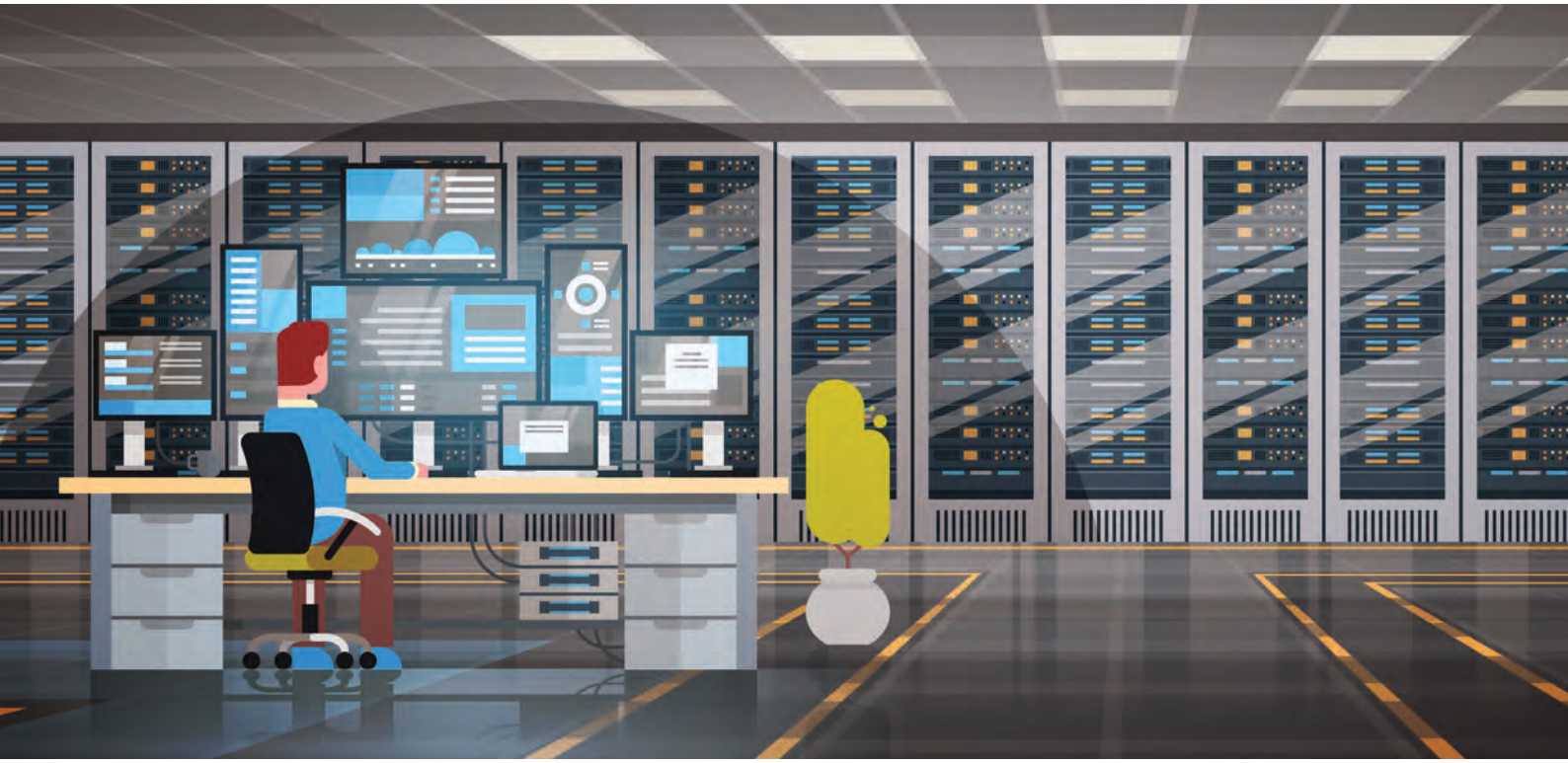
Air cooling is often unsuitable for edge deployments, which are frequently located in urbanised and harsh locations where dust and other contaminants abound. Blowing such material around an unmanned or remote edge data centre is far from ideal, and even if filters were attached, the task of frequent replacement and servicing remains a key challenge – especially where cost and circularity are concerned.

With sealed and unmanned edge data centres, therefore, liquid cooling will be required, although it is not yet clear what sort of topology will be best suited. As such, new liquid cooled architectures may emerge for the edge at scale. Whether that involves direct-to-chip liquid cooling or chassis-based immersive cooling is yet to be seen.

## Standardised metrics for sustainability

The circular economy - the ability to reduce, reuse, and recycle technologies deployed at the edge - will be an important consideration in 2022 and beyond. However, another area growing in importance is the need for standardised sustainability metrics. Today, there are a plethora of metrics from which to

With sealed and unmanned edge data centres, therefore, liquid cooling will be required, although it is not yet clear what sort of topology will be best suited. As such, new liquid cooled architectures may emerge for the edge at scale. Whether that involves direct-to-chip liquid cooling or chassis-based immersive cooling is yet to be seen



choose, with data centre operators each reporting their own preferred measurements. However, I believe there is a need to measure sustainable progress in a consistent and organised way.

According to the Uptime Institute, IT and Power consumption, and Power Usage Effectiveness (PUE) remain the top sustainability metrics tracked across the industry. While PUE has long been an excellent marker of efficiency, we must also agree on metrics for the other categories of environmental sustainability – greenhouse gas emissions, water use, waste, and biodiversity.

Going forward, I believe sustainability metrics within the industry must evolve and become more standardised. This effort can leverage business processes, like GAAP balance sheets and income statements, to provide a ledger where each company can state the results using established rules and units of measurement. An approach such as this ensures comprehensive reporting that is universally understood and provides a baseline to measure success. Further, it makes it possible to compare sustainability results with other companies.

At Schneider Electric, we know that not all companies are at the same stage of their sustainability journey, which is why we recommend a framework for Beginning, Advanced, and Leading. Beginning companies will report on energy use, Greenhouse Gas Emissions (GHG), and water utilisation. The 11 metrics for this level are a mix of measured values like GHG emissions in mtCO2e and ratios like Carbon usage effectiveness (CUE) in mtCO2e/kWh. 'Advanced' metrics bring in the 'waste' category and 'Leading' metrics will include a category for land and biodiversity.

## Data centre functions become services

Data Centre as a Service (DCaaS) offerings are beginning to gain popularity. The trend is enabled by standardising power, cooling, IT and storage in data centres to offer the same user experience and data access from everywhere. Companies like Microsoft and Amazon have already started offering such services with their Azure and Outposts initiatives, extending versions of their cloud architecture into the edge environment where customers can pay a monthly service fee for their capacity.

Many traditional IT companies such as Dell and HPE have positioned themselves as IT advisors to help companies design and run business application or workloads in the cloud (consulting services, engineering, integration and management), rather than as IT hardware and software suppliers, so one might predict that DCaaS will continue to gain traction.

Overall, I believe data centre capacity will continue to grow at both the core and edge driven by digital acceleration and enabled by high capacity networking 4/5/6G and WiFi 6. Model based software will be leveraged to bring efficient, resilient, and sustainable data centre capacity online faster, which is great timing, as we are at the precipice of edge being deployed at scale.

# The DCA - Advisory Board

THE DATA CENTRE ALLIANCE (DCA) is a not-for-profit trade organisation with Data Centre experts and leaders from across the sector actively involved in the association. With over 450 Associate and Corporate members The DCA represents the largest Independent data centre trade association of its kind.

Through The DCA, organisations operating their own data centres and server rooms can confidently access trusted and reliable information related to best practice and find out more about innovative products, services and projects.

The DCA was established back in 2009 following consultation between industry leaders, the DTI, RDA and EU Commission. The trade association was, and still is completely inclusive, independent and vendor neutral. The association represents the interests of the entire data centre community, this includes private data centre/server room owners, consumers of data centre 3rd party services and suppliers providing products and services to the data centre sector.

Historically the sector has not been well publicised, this has always been due to security requirements, however this should not dimmish its importance. Data Centres underpin all digital infrastructure. The DCA is considered a trusted voice - the media, governments and public are informed of the vital role the sector plays to keep the wheels of business, commerce and social media all turning. On behalf of its members The DCA supports the development of UK/ EU/Intl Standards designed to increase operational professionalism and ensure consumer confidence in the products and services.

The DCA peer reviews over 100 member authored articles a year with a different focus each month / quarter, these articles are then included within DCA features in leading Data Centre publications. Our Media Partnerships provide members with free access to a combined audience of 120,000 subscribers – this is an extremely cost-effective way for our members to reach their target audience. The trade association provides many other ways for members to raise their profile in the sector: articles, newsletters, panels, speaking sessions, special interest groups, networking events are all on offer.

DCA Special Interest Groups (SiGs) provide DCA members with the ability to influence and address key issues of concern to their business or the sector via workshops, dissemination, reports and lobbying activities. The trade association also collaborates with members and strategic partners on R&D projects designed to ensure the future health and sustainability of the Data Centre sector for the benefit of all. We recommend our partners look at the SIG's to find out which is relevant to their organisation.

## DCA Advisory Board

The DCA Advisory Board have been handpicked for their knowledge and skills. There is a wealth of Data Centre related experience within the board this includes specific technologies, legal guidance and advice for organisations who wish to attract new talent into their organisation. These skills are used by to help define strategy, address important industry issues, produce reports and to provide support and advice. Please reach out to The DCA with any questions you may have for board members.

**Steve Hone, DCA CEO**

Steve Hone started his career as an engineer in the MOD in Berkshire. He's built up over 25-years of experience in the IT Communication Industry working for leading technology organisations. In 2009 Steve co-founded the Data Centre Trade Association, know globally as The DCA with Simon Campbell-Whyte. From the time of forming The DCA Steve has continued to support the sector by promoting the vital role data centres play in the digital world.

Today, Steve continues to form part of the secretariat team for The DCA as CEO, he also sits on several steering committees, think tanks and advisory boards for organisations connected to both the ICT & data centre sector. Steve is also an active member of a number of APPG's with connections to the Data Centre sector representing the sectors best interests at all times.

**Ed Cooke, DCA Advisory Board & Managing Partner - Conexus Law**

Ed is an international lawyer, commercial advisor, and skilled negotiator. He is a recognised expert in critical Technology Infrastructure (datacentres, fibre, Smart Cities and IoT). He has been a specialist lawyer to the datacentre sector for over 15 years and formed Conexus Law in 2019 to address the needs of Technology Infrastructure clients. Conexus Law is now a team of 15 lawyers across all disciplines, and works on Edge, Colocation and Hyperscale projects across the globe. Ed has been a member of the DCA Advisory Council since 2019.

"Through my involvement with the DCA it is a real pleasure to contribute back to the datacentre sector, which has been very loyal to me for over a decade and has created many friendships. I find the datacentre sector to be incredibly dynamic. Most of us recognise how important the sector is to commerce and our way of life. The sector also faces considerable challenges – it is still widely misunderstood by lawmakers and regulators. The pace of growth exacerbates many issues including bringing on new talent, sustainability, power capacity restrictions, geopolitical issues (such as data sovereignty), the need to respond to changing data usage (including edge) and constrained supply chains.

All of these pressing issues have a legal context, and our team is already at the heart of them. That is why we're committed to working with the DCA and others in the datacentre sector to unlock the challenges, enable innovation and create a datacentre sector prepared for the decades to come."

### Steve Bowes-Phipps, DCA Advisory Board & Senior Consultant at PTS Consulting

Steve Bowes-Phipps has over 25 years of operational systems management experience. After five years managing Financial Services Data Centres and IT operations in the UK and Ireland, joined ambitious web hosting company GlobalCenter who were expanding from the US into Europe.

Sitting on the senior management team, he oversaw the building of five internet data centres in London, Amsterdam, Frankfurt, Munich and Paris until Exodus Internet bought the company in 2001. From there he moved into a more strategic role, dealing with blue chip customer issues and relationship management, process improvement and building a culture of continuous improvement.

Spent four years in Visa Europe managing strategically important projects and processes. In 2007, joined his Alma Mater, Hertfordshire University, to become their head of Data Centres and worked with the UK's Higher and Further Education IT funding arm, Joint Information Systems Committee (JISC), to assist in embedding Green IT in UK HE and FE institutions, and throughout the EU. In 2010, the University of Hertfordshire became the first European university to comply with the EU Code of Conduct for Data Centres and has won in categories at the European Datacentre Leaders Awards 2010, the Uptime Institute Green Enterprise IT (GEITTM) 2011 and the EAUC Green Gown Awards 2011.

Steve joined PTS Consulting as their Senior Consultant on Data Centres in January 2015 and has presented at many conferences at home and abroad on reducing DC investment risk, Best Practices in Green IT and exemplar case studies. He is involved in various industry bodies forming new international standards and metrics for IT and Data Centre efficiency.

### Vanessa Moffat, DCA Advisory Board & Business Development Consultant Digital Technologies

Marketing, Strategy and Growth Hacking specialist, with 20 years' experience in the Data Centre and tech industries. Venessa holds a BSc in Computer Science, a Post Grad Diploma in Business Administration, as well as an MBA from Essex University, where she specialised in agile IT architectures for maximum business value. She has successfully led strategy development and implementation programmes in multiple international data centre organisations. "I've been in the industry since before the DCA was set up and have remotely supported its growth since its inception. I believe that we are living in interesting times regarding data centres, energy, infrastructure and climate change. I'm honoured to join the Advisory Board to help and guide the Association during times of such change."

### Mark Acton, DCA Advisory Board & Independent Data Centre Consultant

As both a Chartered Engineer and Chartered IT Professional with over 25 years of experience in the data centre sector Mark has been a specialist in the field of data centre operations and technical management for more than 2 decades. During this time, he has focussed on the delivery of business-critical services from highly reliable, world class data centres with 24x365 availability expectations. Now operating as an Independent Consultant and Technical Advisor with extensive international experience and solid technical skills combining data centre facilities design, IT and facilities operational management, energy efficiency and engineering expertise to support all facets of the Data Centre Lifecycle.

A regular public speaker, conference host and industry thought leader on data centre technical issues as well as sitting on multiple technical and advisory boards. Mark is also involved in the development of International data centre Standards through ISO and CENELEC as the UK national representative as well as being the Technical Editor and Committee Chair of the European Commission Code of Conduct on data centre energy efficiency."I support the DCA and take an active role in the Advisory Board and a I firmly believe that the UK data centre sector requires informed, knowledgeable and collective representation to the media and potential regulators.

As sector data centres are a key component of the digital infrastructure we all depend upon so heavily for both our business and personal lives, yet we are a very diverse and disseminated community which requires a trade association to act as a representative body and bring cohesion to all the many facets of this rapidly growing and developing sector. I see my involvement in the DCA Advisory Board as helping to make sure that our sector is properly represented and that the services provided are both appropriate and valuable to the members of our burgeoning community."

### Dr Jon Summers, Scientific Lead in Data Centres at Research Institutes of Sweden

Jon Summers is Scientific Lead in Data Centres at Research Institutes of Sweden (RISE), Adjunct Professor

As sector data centres are a key component of the digital infrastructure we all depend upon so heavily for both our business and personal lives, yet we are a very diverse and disseminated community which requires a trade association to act as a representative body and bring cohesion to all the many facets of this rapidly growing and developing sector

in Fluid Mechanics at Lulea Technical University in Sweden and a Visiting Professor in Thermofluids at the University of Leeds in the UK.

During the last 25 years, he has worked on several government and industry funded projects requiring the use of computation. Having built and managed compute clusters to support many research projects, Jon chaired the High-Performance Computing User Group for 20 years at the University of Leeds. In the last eight years Jon's research has focused on a range of thermal management and energy flow projects within Data Centres, Heating Ventilation and Air Conditioning and industrial sectors. Since early 2013 Jon has been involved in liquid cooled IT research projects, focussing both at the data centre and the microprocessor scales, which has been further transformed by the opportunities of integrated digital infrastructure research at the RISE ICE datacenter facility, which includes large testbeds supporting industry and academia. In line with aspirations of the DCA, Jon's research and technological development at RISE during this decade is focussed on making the digital infrastructure as energy efficient and sustainable as possible.

**Adelle Desouza, DCA Advisory Board & HireHigher Ltd**

From Datacentre infrastructure to telecommunications to managed services, and now the founder of HireHigher, Adelle is working in both The UK and Australia to drive aspirations and awareness of career and development opportunities for young people.

With a passion for the data centre and wider industries joining the DCA board provides an opportunity to drive real change, both mindset and in practice as to how we can promote, present and preserve the talent of the existing workforce to future generations.

"The DCA has been a constant of my career in the DC and wider IT sector and as such it's an honour to now work with esteemed members of the industry on the DCA advisory board to ensure the association can continue to be the voice of reason, trailblazing agents and central point of best practice for both the current and future talent of the industry. Raising topics at our forums with clear actions to drive change at pace is a huge reason I remain committed to the industries served by the DCA".

**Dan Scarbrough, DCA Advisory Board & MD Rockscar Ltd**

A highly experienced entrepreneur with strong professional skilled in Business Planning, Operations Management, Event Management, Real-estate Development, Sales and Marketing. The Co-Founder of Datacenter Dynamics, Dan founded DCD in 1998 and remained the acting CEO, until 2013. Under his leadership, the company became globally recognised as a leading voice of the data centre industry and during Dan's leadership was holding 47 conferences in 37 countries, operating a thriving publishing, training and research business through 13 overseas and a staff base of 150.

Having worked in the data centre and cloud infrastructure industry since its inception, Dan has an intricate understanding of this rapidly developing sector. After stepping down from DCD in 2014, Dan created RockScar as a holding company to capitalise on the industry understanding and global network that he had built over the last twenty years. RockScar has worked with multiple organisations involved in the entire life cycle of Digital Infrastructure in various regions globally.

Through his variety of engagement's Dan has worked extensively in both residential and commercial real-estate, and cloud and data centre technology. He understands the end-to-end development process and the challenges of delivering and operating complex digital infrastructure projects in multiple international locations. He is currently working on his next media and events project with the launch of Digital Infrastructure Partners a group of like-minded individuals focused on moving the global market towards sustainable digital infrastructure. Dan is also working with Salute Mission Critical to help them grow and develop their business in Europe. Salute Mission Critical specialises in both project work and operating mission critical infrastructure using a veteran's work force.

It is and has been an inspiring network of dedicated people from all the different corners of the data centre industry. Via the DCA we have participated in the most challenging and interesting European projects

**Frank Verhagen, DCA Advisory Board & CEO Certios**

Frank is currently managing a project to increase cyber security in an industrial automation (IA) environment in The Netherlands. He is also working in a part time position teaching Cyber Security and Cloud at the University of Applied Science in Utrecht.

Frank continues to run Certios, a business that advises governmental bodies on how to manage energy efficiency in data centres. Certios recently completed valuable research, whjch includes a paper entitled '*Server Idle Coefficients – KPI's to assess energy wasted in servers and Data Centres'*. Frank has also been involved in a new start up, a foundation named: Save Energy Foundation, this foundation will assist with dissemination of the metrics discussed in the paper.

"The DCA is important for Certios. It is and has been an inspiring network of dedicated people from all the different corners of the data centre industry. Via the DCA we have participated in the most challenging and interesting European projects and hope to be able to meet up with the DCA members soon."

If you would like to know more about The DCA visit **www.dca-global.org** or email: **info@dca-global.org**

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