# Inside_Networks

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## Full speed ahe

THE MIGRATION PATH TO
400GB/S AND 800GB/S IN THE
PHYSICAL LAYER

WHY AVOIDING
OVERSIMPLIFICATION WHEN
IT COMES TO DATA CENTRE
COOLING AND CLIMATE
MANAGEMENT IS VITAL

# Trend setting

WHAT'S BEHIND THE SUDDEN
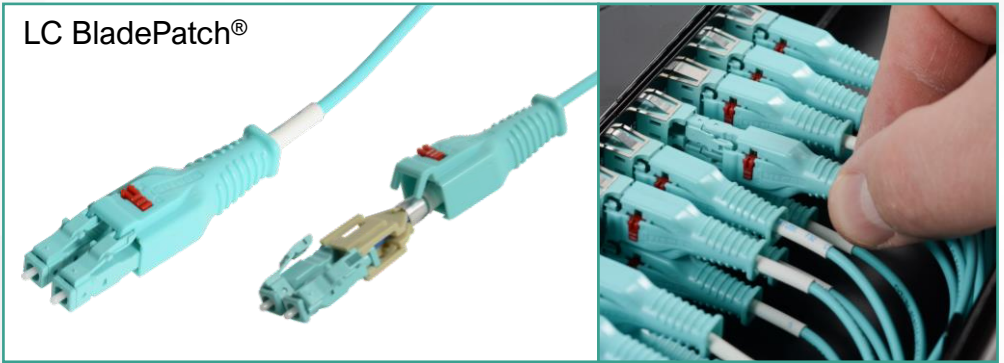RISE IN POPULARITY OF
PREFABRICATED MODULAR
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# Take a chill pill

## CHALK HILL MEDIA

▶ Ensuring that the sensitive IT equipment housed in enclosures, racks and cabinets operates optimally is a primary factor in achieving maximum levels of uptime. However, the energy used in a cooling strategy is not only an additional operating expense, it is also something that can have a negative impact on a facility's Power Usage Effectiveness (PUE) rating.

Compounding the amount of head scratching that owners, operators and users of data centres have to go through on this issue is that some of the available guidance can often be confusing, contradictory and oversimplistic. In this issue we have a feature dedicated to cooling and climate management, with two excellent articles on the subject. In the first, Stu Redshaw of EkkoSense looks at why it's important to steer clear of oversimplification when optimising data centres, while Steve Conne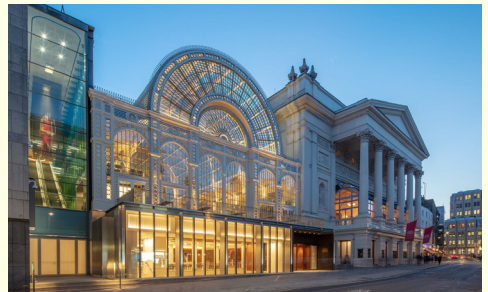r of Vantage Data Centers examines whether technology from the 1800s could hold the key to solving current – and future – high density compute challenges.

It's interesting just how often technology that has existed for some while previously can take time to gain mass acceptance. Prefabricated modular data centres are certainly nothing new but over the last year or so they have been deployed in increasing numbers. To examine why, this month's Question Time asks a panel of experts to explain the key advantages they offer and, in order to maximise return on investment and ensure optimum functionality, what pitfalls should be avoided when designing and specifying them.

The role of optical fibre cabling in facilitating our increasingly connected world should never be underestimated. Technology is progressing at a rapid rate, so Inside_Networks has asked Gary Bernstein of Siemon to explain why the road to 400Gb/s and 800Gb/s is laid and waiting, and Andreas Sila of Huber+Suhner to examine why rising data centre demands require the use high quality fibre systems.

I hope you enjoy this issue of Inside_Networks. Don't forget, if you'd like to comment on any of these subjects, or anything else, I'd be delighted to hear from you.

**Rob Shepherd**
Editor

## Inside_Networks
THE NETWORK INFRASTRUCTURE E-MAGAZINE

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**More information**

# Coronavirus pandemic driven data reliance fuels record data centre investment

Knight Frank's Data Centre Report 2021 has found that the data centre market has experienced strong momentum in 2021. The report, published in partnership with DC Byte, shows Europe, Middle East and Africa (EMEA) markets have seen take-up rise four per cent in the last quarter to 120MW, with a 10 per cent increase in new supply overall totalling more than 180MW.

Amsterdam, Frankfurt, London, Paris and Dublin continued their momentum, yet the trend is towards expansion outside of these markets, with Africa poised to become a significant hyperscale region. Istanbul and Warsaw are also noted as edge markets to watch. Development in EMEA's leading markets has been most notable in Q1 in Dublin with 108MW added, which represents 75 per cent of 2020's new supply. London and Moscow both saw 40MW added, whilst Zurich added 33MW.
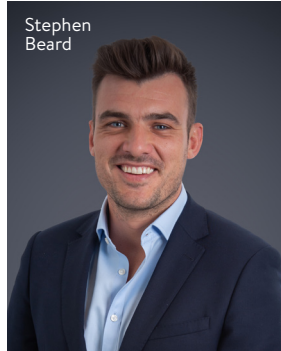
Stephen Beard

Stephen Beard, partner and co-head of global data centres at Knight Frank, said, 'The increase in data centre facilities is becoming more widely distributed, as providers expand into new territories to add political and geographic diversity, as well as meeting new data protection legislation requirements. Belgium, Denmark, Spain, Zurich and Warsaw, for example, have been recent targets for cloud availability zones. New investors looking to maximise facility value to serve the 5G data economy will likely target sites for upgrades rather than decommissioning.'

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# The OCP announces key leadership changes

Rebecca Weekly has been elected to the position of chairperson of the Open Compute Project (OCP). She is vice president, general manager and senior manager, and senior principal engineer of hyperscale strategy and execution at Intel Corporation.

Weekly replaces Mark Roenigk, head of hardware engineering at Facebook, who served as chair for the past two years. He said, 'Rebecca brings a wealth of technical expertise, leadership and perspective to this role that will positively impact the OCP Foundation as we kick off the next decade of OCP.'

An additional change is the retirement of Rocky Bullock as chief executive officer (CEO) of the OCP Foundation. Bullock has faithfully served on the board since its inception, served the OCP Foundation as chief financial officer, and was named CEO of the OCP in 2015.

Rebecca Weekly

# Economic recovery must be built on better internet access yet concerns over the digital divide remain

The Cisco Broadband Index has highlighted that whilst our lives are more connected than ever before, concern is rising over the accessibility of internet services, which nearly 70 per cent of UK workers believe will underpin economic growth.

Whilst 54 per cent of us spend seven hours online a day, 40 per cent still claim to have missed out on access to critical services such as medical care or education during lockdowns because of connectivity issues. Nearly half of those surveyed believe it's important that we further invest in connectivity, with 66 per cent stating that

David Meads

it is now a necessity.

David Meads, chief executive at Cisco UK & Ireland, commented, 'Almost overnight the expectations of professionals and consumers around the world fundamentally changed. For many of us, the way we connect with colleagues, companies and services is incomparable to just over a year ago, and 75 per cent of workers in the UK do not plan to go back to how they used the internet prior to the pandemic.'

# Over two thirds of office workers dread speaking to their IT departments

Research has shown that 45 per cent of office workers have had to wait longer for an issue to be resolved whilst working from home – with 73 per cent going on to say they have had to wait up to an extra five hours for an issue to be fixed.

Some UK IT departments might take offence by these findings, and they have a case, with almost half of the same UK respondents (45 per cent) stating that it hasn't taken any longer to resolve an issue whilst working remotely than it would in the office. However, there is clearly room for improvement, with 69 per cent having had a negative experience with their IT

Anthony Lamoureux

department – either dreading it, feeling patronised, intimated or frustrated at the length of the time they have to wait to resolve a problem.

Anthony Lamoureux, CEO of Velocity Smart Technology, said, 'With many workplaces going from zero to full remote working almost overnight, this urgent demand undoubtedly led to many IT departments adopting quick fixes out of a necessity to support their workforces, rather than putting in place a long-term plan that can be scaled. This has resulted in poor experiences.'

# Kao Data becomes first UK data centre to transition from diesel to renewable HVO fuel

Kao Data has become the UK's first data centre to transition all back-up generators at its Harlow campus to hydrotreated vegetable oil (HVO) fuel. This move, made possible through a partnership with Crown Oil, means Kao Data will eliminate up to 90 per cent of net CO2 from its back-up generators and significantly reduce nitrogen oxide, particulate matter and carbon monoxide emissions.


Gérard Thibault

'This pioneering approach to replace our diesel provision with HVO fuel is a further demonstration of our leadership in the international data centre sustainability field,' said Gérard Thibault, chief technology officer at Kao Data. 'This move effectively eliminates fossil fuels from our data centre operations and helps us reduce Scope 3 emissions in our customers' supply chain, while delivering no degradation to the service they receive. Most importantly, it shows how our industry can take a simple and highly beneficial step forward for the good of the environment, ahead of COP26.'

# Majority of Brits are unsure about what a smart city is

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Research from Milestone Systems has found that 55 per cent of the UK population doesn't know what a smart city is, despite global spend reaching $124bn in 2020 and at least 18 cities across the UK already having rolled out smart technology. When asked if they understand what is meant by smart city, just 18 per cent of people said that they are very familiar with the concept, while 28 per cent said that they think they have a rough understanding.

While awareness is low, the research did also show that feelings towards the growing prevalence of smart city technology are largely positive. Around a quarter (24 per cent) of people said that they were


Malou Toft

very excited about future smart city developments, and 32 per cent said that they believe it'll be a good thing.

Malou Toft, EMEA vice president at Milestone Systems, commented, 'The UK has been one of the earliest adopters of smart city technology and is recognised as a global pioneer, with London, Manchester and Newcastle all ranked within the top 25 smart cities in the world in 2020. Yet the majority of the public are seemingly unaware of this progress. Communicating the benefits of smart technology over the coming years will help to maintain the current positive feeling towards smarter cities, and ensure there is no backlash to further digital transformation.'

# Energy efficient optical fibre is leading the way towards a more sustainable Europe

According to the Prysmian Group, by deploying optical fibre networks that use eco-friendly materials, operators will reduce energy consumption and cut unnecessary emissions across the supply chain. Fibre connections account for just 26 per cent of total broadband connections on average in the Organisation for Economic Co-operation and Development (OECD).

Optical fibre helps to reduce energy consumption, with gains made during production. These are built upon further once it has been deployed across networks and used for last mile connectivity. This is due to its use of spectrum, which can be lit on demand, rather than constantly, at each end point. Fibre is also more energy efficient than its rivals ADSL, PSTN and mobile, through its reliability, longer lifespan and future proofed capacities – even more so when choosing a high quality bend insensitive solution.

'Fibre offers enhanced stability and reliability and has a longer expected network lifetime,' said Philippe Vanhille, executive vice president telecom business at Prysmian Group. 'Not only does this subsequently save money, but it reduces the environmental impact, as less material is being used. We are making vast improvements in energy efficiency, through the use of spectrum and by reducing consumption across mobile networks, but this is not a solo effort. The entire ecosystem must come together to make sustainable networks a reality.'

Philippe Vanhille

## NEWS IN BRIEF

IWCS has developed a new brand image for its annual Cable & Connectivity Industry Forum, a premier technology event for the exchange of information and development of industry professionals and scholars.

Data presented by Atlas VPN research has revealed that 34 per cent of businesses in the UK and 31 per cent of businesses in the US were forced to close down as a consequence of falling victim to ransomware attacks.
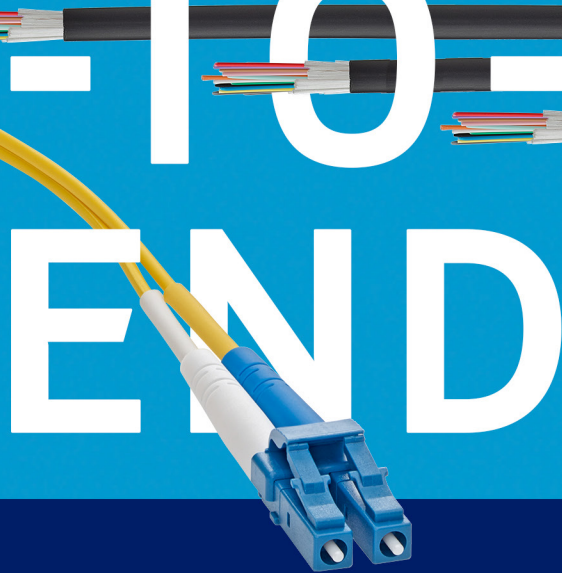
Virgin Media O2, working with Freshwave and CommScope, has become the first mobile network operator to make live calls from its network using a new Neutral Host In-Building mobile specification. Made from a customer site in Canary Wharf in London, this pioneering approach will help to simplify multi-operator indoor mobile network coverage for businesses around the UK.

According to Oxylabs, 82 per cent of financial service organisations have seen an increase in their data needs over the last 12 months to help enhance business operations/ performance following the coronavirus pandemic.

# Cheap at half the price?

**Hi Rob**

Something that really irritates me is the lack of value associated with maintenance plans – and I don't just mean money. However, you do get what you pay for.

Let me explain. There seems to be a perpetual misunderstanding in our industry about how uninterruptible power system (UPS) equipment should be maintained. Taking out a maintenance plan is often seen as a tick box exercise but in reality it's much more than that.

The most important thing about maintenance is prevention. It's about identifying potential risks to a system and taking preventative action. It is essential that a UPS is always available when you need it, and continues to do the job it was purchased to do for many years to come. Just like any sophisticated piece of equipment, it needs to be serviced regularly. A cheap maintenance plan taken out with an organisation that is not either the manufacturer or an approved service provider is a false economy. Engineers may not have the relevant expertise, access to technical support and firmware updates or spare parts, which puts the load at risk.

I've seen it many times where new systems have been installed and the maintenance plan has been taken out with an unapproved third-party. What organisations may not realise is that warranties are invalid if the UPS is not maintained correctly.

If you purchase a new car, for example, and have it serviced by an unapproved mechanic the warranty is invalidated. Simple. It's the same situation with UPS equipment. This is because the manufacturer or approved maintenance engineer is trained, experienced and able to service the UPS to ensure optimal functionality. Others are not! They also have access to the correct firmware

?

updates to guarantee it continues to operate properly and protect the load.

UPS are sophisticated systems and a valuable asset. They cannot simply be installed and left. Regular service visits are necessary. However, visits can be pointless and could be highly detrimental, unless those employed know exactly what they are doing to ensure anything that poses a threat to the load is picked up early and rectified.

It baffles me why firms continue to put their critical power at risk when they've gone to all the effort of researching, purchasing and installing the best system available. There is always someone out there who claims they can do it cheaper. But if it's cheap at half the price, what's the real risk? A dropped load could cost a firm millions of pounds in revenue, financial penalties or, when it comes to medical facilities, people's lives could be put in jeopardy.

There, I feel much better now I've got that off my chest!

**Louis McGarry**
**Centiel**

### Editor's comment
Louis makes a number of excellent points but the one that stands out for me is where he questions why an organisation would go to the trouble of installing a best in class UPS system and then try and skimp on maintenance fees. They should be factored into the total cost of ownership and I'm sure that this type of information could be provided at the point of purchase.

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# CONNECTING YOUR BRAND
## TO YOUR WORLD

## #ConnectingYourBrand

## The Inspiration

**You don't need to spend too long in the company of Susan Anderton, a master practitioner in the art of persuasive marketing, to discover one of the great influences on her own attitudes and behaviours.**

**The managing director of The Brand Marquee is a self-professed "daddy's girl" and talks openly of the pride she has in her father Patrick for his decision to dedicate his career to supporting one of the biggest – and most distinguished – brands in the world, the British Army.**

"I was what's known as an 'Army brat' and spent much of my childhood living on military camps," she told Inside Networks, recalling with affection her dad's days in the Royal Army Ordnance Corps.

"Having a parent in the Armed Forces isn't easy given the nomadic nature of Service life and worry associated with a loved one potentially being put in harm's way, but I didn't know any different.

"As an adult, I'm proud to be able to say he wore the uniform, but even as a child I knew from the stories dad told me that he believed in the British Army as an institution and was fully invested in what it did, stood for and its people.

**"That commitment to a common cause and drive to collectively succeed has stuck with me ever since."**

The 52-year-old's march to The Brand Marquee – a consultancy specialising in brand identity, marketing and business development – began, inevitably, at a technology firm with close ties to the defence sector.

"Initially I was set on pursuing a career in computer engineering," Susan added. "In truth, I wasn't even 100 per cent sure what that meant back then, but I had always been intrigued by technological advancements and a desire to be involved with emerging technologies – undoubtedly down to a fear of missing out!

"My first employers quickly identified that my inquisitive nature and habit of asking everyone about what they were doing were better suited to the company's PR and marketing department.

**"Looking back, my original manager was probably just tired of hearing my voice, but I instantly felt at home with marketing."**

It was a shift in direction that certainly paid dividends and led to Susan being recruited for a succession of business-to-business marketing roles. Over the following two decades she gained valuable experience enhancing the competitive positioning of everything from large corporates to small and medium-sized enterprises in a diverse range of sectors, which

included professional services, IT, construction, finance and retail and leisure.

However, it was during a tenure on the executive board of a 55-strong architectural practice that Susan says she cemented her holistic understanding of marketing and first imbued the elements of the British Army she so admired into a commercial setting.

"My time with the company coincided with the UK entering into recession in 2008, when businesses had to quickly perfect how to sell their services if they were going to survive and flourish," she explained. "Doing so meant knowing your brand inside and out and then having every member of the team pulling in the same direction; projecting and practicing the firm's identity.

**"You can't sell to others unless you wholeheartedly commit to the cause yourselves."**

It is an ethos that Susan has embedded within her own agency, where teamwork is at the forefront of sharpening clients' competitive edge.

**"Our track record for helping companies to challenge and change perceptions of their products and services is down to doing more than just being an organisation to outsource functions of a business to.**

**"We see ourselves as an extension of your 'home team' and immerse ourselves to ensure we have a comprehensive knowledge of the job at hand."**

With The Brand Marquee now in its eighth year, it is a plan that stands up to scrutiny. Susan has assembled a team of experts that can be deployed to go into battle for an impressive portfolio of clients and has masterminded an ever-expanding catalogue of campaign victories – many of which have been delivered on behalf of technology companies.

*the*
*brand*
marquee

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# Horses for **courses**

**Hi Rob**

There's been quite a bit of debate in recent times around whether it makes sense to stick with multimode optical fibre cabling, or if upgrading to singlemode is inevitable in order to bridge greater distances and manage higher speeds.

The bottom line is that one isn't necessarily 'better' than the other. The choice of using either singlemode or multimode fibre depends on many factors including the cost of the fibre itself, its installation, the equipment used, any requirements of the target applications, the distances to be bridged, transmission, speeds – the list goes on. When we ask IT and other professionals what they think, their replies seem to be strongly linked to their own requirements. It appears that they all have a very different understanding of their topologies!

When it comes to straightforward campus expansions, as planned by facilities management departments, there's already a clear preference for singlemode. Taking this route means they don't need to place repeaters when using any kind of multimode cabling that exceeds a certain length. People from a 'techy' background love to have the latest technology, although from a technical point of view and key performance indicator (KPI) requirements, they don't always need it. For example, they'll choose OM5 even if OM4 is perfectly adequate!

Then there is a category of people that will stick with an existing level of technical performance for as long as possible to save money. And then we have people that like to stick with their existing network design. We sometimes see people who simply can't move beyond the designs they used for their initial deployments, and are still using OM2 and OM3 today.

However, regardless of such preferences, we do see a clear trend toward singlemode in the long run.

**Carsten Ludwig**
**R&M**

**Editor's comment**
The singlemode versus multimode debate is often positioned in an either/or context but as Carsten and other industry commentators have pointed out there is still, at the moment anyway, a place for both. As ever in this industry things move quickly though and singlemode has a great deal going for it.

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# Made to measure

Although they've been around for well over a decade, its only recently that prefabricated modular data centres have become a significant talking point. Inside_Networks has assembled a panel of industry experts to explain what's behind their sudden rise in popularity

▶ As the data centre sector continues its journey from a centralised to decentralised model, one of the more interesting developments has been the growing interest in prefabricated modular facilities. This was highlighted last year when Microsoft launched its Azure Modular Datacenter (MDC), which it described as 'a self-contained data centre for the most challenging missions'.

Far from a new innovation, they've been around for many years but have, to a greater or lesser extent, remained something of a niche concern. Utilised at various sites around the world where they are often exposed to severe weather and seismic activity, they offer all the functionality of a conventional data centre. The defence and healthcare sectors, in particular, have been using them for some while.

To explain more about the rise of the prefabricated modular data centre, Inside_Networks has assembled a panel of experts to examine the advantages they offer and how to maximise return on investment and ensure optimum functionality.

Don't forget, if you have a question that you would like answered **CLICK HERE** and we'll do our best to feature it.

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**GIVEN THAT THEY ARE NOTHING NEW, WHAT'S BEHIND THE SUDDEN RISE IN POPULARITY OF PREFABRICATED MODULAR DATA CENTRES? WHAT KEY ADVANTAGES DO THEY OFFER AND, IN ORDER TO MAXIMISE RETURN ON INVESTMENT AND ENSURE OPTIMUM FUNCTIONALITY, WHAT PITFALLS SHOULD BE AVOIDED WHEN DESIGNING AND SPECIFYING THEM?**

# RUSSELL BULLEY
## TECHNICAL SUPPORT MANAGER AT VERTIV

It should come as no surprise that we're witnessing a sharp rise in the popularity of prefabricated modular data centres. There were indications of this last year when research conducted by Omdia revealed the global market for prefabricated modular data centres, from edge to the core, increased by more than 65 per cent.

Since then, new applications in artificial intelligence (AI), machine learning, deep learning, connected devices and the internet of things (IoT) have only increased demand for computing power. Businesses including financial services, manufacturing and healthcare need to scale up their data processing infrastructure fast to manage these increasingly heavy computing demands, while remaining flexible for future digital transformation.

Prefabricated modular data centres enable organisations to scale out IT infrastructure with a much quicker turnaround than a traditional data centre build – sometimes in a matter of months. These plug and play data centres not also offer time and cost efficiencies, they also come equipped with cutting edge equipment to deliver energy savings, operational efficiency and the highest levels of availability.

Organisations that deploy prefabricated modular units remain agile by design. They can easily scale to match their needs and the design of prefabricated modular data centres makes it easy for businesses to add or remove units as required. Should business needs change, prefabricated units can be moved to another site to support different compute requirements. This makes them ideal for temporary sites in areas such as construction or events.

Two of the most common misconceptions levied at prefabricated modular data centres is that they are less resilient and secure than their traditional housed counterparts. This is not true. Portability has no bearing on physical security or resilience, so the technology is ultimately as safe as the location it's placed in. If surrounded by the same security as found on conventional builds, it is equally secure. To this end, many units are equipped with intrusion detection technologies to boost physical security.

Prefabricated modular data centres are also arguably less prone to failure. With components pre-integrated, potential maintenance issues arising from incorrect installation are reduced. In fact, the Uptime Institute has developed its Tier-Ready program to streamline the certification of facilities built using prefabricated modular components, ensuring peace of mind for customers. When we look at the fast evolving use cases for computing, especially at the edge, prefabricated approaches will only gain more traction.

> 'TWO OF THE MOST COMMON MISCONCEPTIONS LEVIED AT PREFABRICATED MODULAR DATA CENTRES IS THAT THEY ARE LESS RESILIENT AND SECURE THAN THEIR TRADITIONAL HOUSED COUNTERPARTS. THIS IS NOT TRUE.'

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# CLIVE PARTRIDGE
## TECHNICAL MANAGER IT INFRASTRUCTURE AT RITTAL

Yes, it's true, modular data centres aren't that new – their origins can be traced back to the early 2000s for use as disaster recovery solutions, with many leading IT industry companies offering lorry based containerised data centres for rapid deployment in times of emergency. Recently, however, they have seen a rise in popularity – so what's behind it?

One explanation could perhaps be the coronavirus pandemic, which has led to most of us working from home, placing even greater demands on internet providers. This is alongside the introduction of 5G mobile networks, the expansion of the cloud, and a massive increase in internet shopping. For example, many traditional well-known supermarket brands are finding the need to introduce edge solutions close to their points of sale in support of cloud services.

Edge data centres are not a one size fits all solution. Depending on the need, they can be anything from a single rack 'data centre in a box' to a 40ft containerised solution housing a complete mini data centre infrastructure with power and uninterruptible power supply (UPS), cooling, IT racking, fire suppression, networking and environmental monitoring.

Apart from cost savings on constructing or modifying a traditional bricks and mortar solution, a modular data centre can be rapidly deployed, with a fully pre-tested and equipped containerised solution just requiring a suitable place to be dropped, and power and fibre connectivity to be fully operational. It's a no brainer, with big industry names adopting such methods too.

A quick internet search points to how most of the usual players in this market have 'off the peg' offerings – from large to small solutions. It just goes to show that there is demand here. When specifying modular solutions care should be taken to provide the required permanent power and cooling redundancy and ensure enough space for maintenance and further expansion.

> 'YES, IT'S TRUE, MODULAR DATA CENTRES AREN'T THAT NEW – THEIR ORIGINS CAN BE TRACED BACK TO THE EARLY 2000S FOR USE AS DISASTER RECOVERY SOLUTIONS, WITH MANY LEADING IT INDUSTRY COMPANIES OFFERING LORRY BASED CONTAINERISED DATA CENTRES FOR RAPID DEPLOYMENT IN TIMES OF EMERGENCY.'

# MICHAEL AKINLA
## BUSINESS MANAGER EMEA AT PANDUIT

My first experience of a containerised prefabricated computing resource was as a disaster recovery solution, which had to be external to the building and highly secure, for obvious reasons. The technology has moved on and so has the requirement for additional on-tap compute capacity. One could ask, in a hybrid IT model, isn't this what cloud providers are for? However, many organisations are returning from cloud solutions after finding these didn't fulfil their individual requirements.

The prefabricated data centre is an important addition to the capabilities that a company needs to consider when planning its IT equipment requirement. There are multiple advantages to this system including technical and financial. As an additional IT equipment suite, a containerised solution can be specified, ordered and delivered ready for operation in far less time, and with less administrative complexity, than building an extra computer facility on-site. Utilising prefabricated solutions also allows for future additional expansion, which provides a highly effective upscaling capability.

Working with a partner that can deliver the whitespace infrastructure – cabinets, cable management and connectivity systems – that seamlessly support the compute, storage and networking equipment is vital. The latest flexible rack and cabinet systems ensure specified compute capability is configured in the most efficient and effective layout.

High density optical fibre connectivity solutions allow up to 50 per cent higher port density per RU and help manage patch cord density in cable pathways. Infrastructure can be designed, preconfigured and preinstalled along with a customer's compute selection in off-site clean conditions to ensure maximum quality control. Additionally, factory installed environmental monitoring systems can ensure the specified environment is maintained within the container.

On a global basis, an organisation that requires specific compute capabilities in remote and harsh environments can deliver identical prequalified IT equipment within guaranteed timeframes and costs, providing a lights-out, plug-in and forget solution, dependent on situation requirements. As with any technology solution, key to its success is that the delivered prefabricated system completely corresponds to the design specification and matches the end use requirement.

'THE PREFABRICATED DATA CENTRE IS AN IMPORTANT ADDITION TO THE CAPABILITIES THAT A COMPANY NEEDS TO CONSIDER WHEN PLANNING ITS IT EQUIPMENT REQUIREMENT. THERE ARE MULTIPLE ADVANTAGES TO THIS SYSTEM INCLUDING TECHNICAL AND FINANCIAL.'

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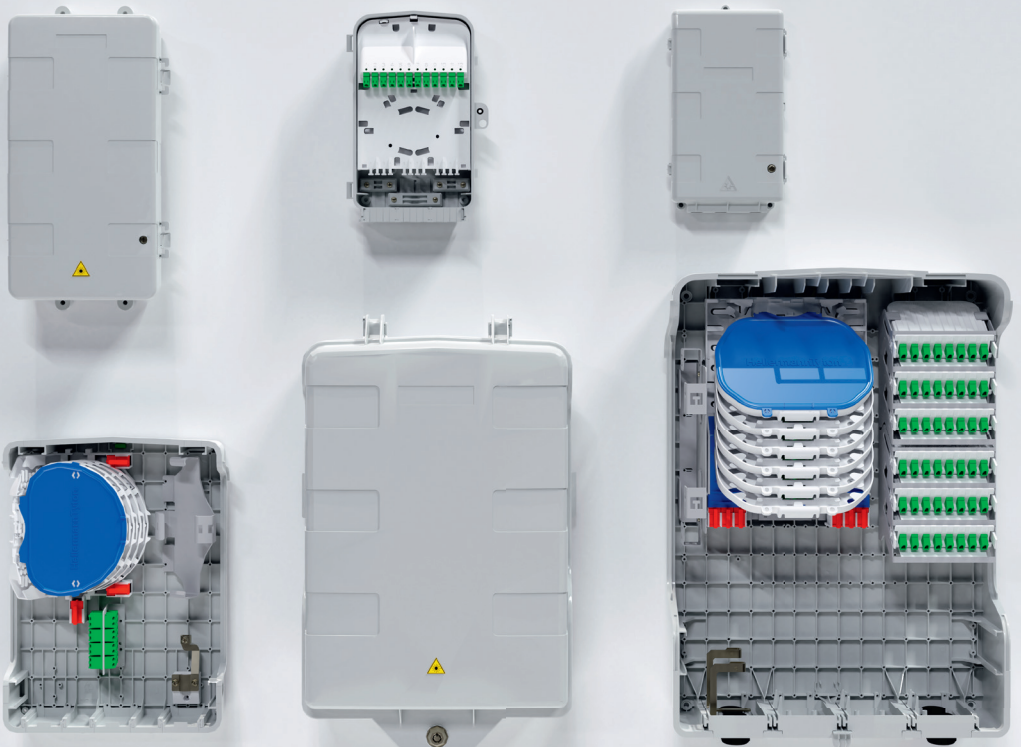
IN-AD-MDU-R10

# JOE MCCAFFREY
## MANAGING DIRECTOR AT DUKE MCCAFFREY

The sudden rise in pre-fabricated modular data centres is due to the significant targets that underline the three pillars of sustainability – social, economic and environmental. In Ireland we face a number of key issues including the rising cost of materials, which is currently at an average increase of 12 per cent above last year and continues to rise. In some instances steelwork is increasing as much as 35 per cent.

Ireland has committed to growing its international technology community and with this comes increased opportunity to grow the data centre sector. Outside of Dublin we are seeing some major schemes – some as large as 100MW+ in regional parts of Ireland. To build quickly and accurately, modular buildings are becoming the preferred option.

Of course, whilst speed of build is desirable, this is not the only factor for the operator. Prescriptive design and future proofing are major considerations. As we progress to more building information modelling (BIM) for data centres, modular solutions fit perfectly. Imagine planning a four phase development for a 200MW site – having the ability to prescribe each phase using BIM and a templated modular design brings better accuracy, cost saving and almost error free solutions.

Cost considerations are very significant, while speed and safety of build are key factors for fast paced construction. The added pressure of being flexible for grid utility connectivity is now very high on the agenda in regions like Ireland, Germany and Singapore, where power to data centres is a significant issue that a modular approach can address in the short-term.

In relation to the environment and the world's environmental targets, we are facing a race against time to hit net zero no later than 2050. For planning departments across the world, the idea of designing buildings that can be more easily disassembled, reused and relocated is enough to contribute to a positive decision. This is one area where developers can be on the winning side.

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> 'IN RELATION TO THE ENVIRONMENT AND THE WORLD'S ENVIRONMENTAL TARGETS, WE ARE FACING A RACE AGAINST TIME TO HIT NET ZERO NO LATER THAN 2050. FOR PLANNING DEPARTMENTS ACROSS THE WORLD, THE IDEA OF DESIGNING BUILDINGS THAT CAN BE MORE EASILY DISASSEMBLED, REUSED AND RELOCATED IS ENOUGH TO CONTRIBUTE TO A POSITIVE DECISION.'

# CHRIS WELLFAIR
## PROJECT DIRECTOR AT SECURE IT ENVIRONMENTS

Modular data centres can help companies overcome a wide variety of different challenges. They are fast to build relative to traditional data centres, while still offering huge levels of functionality and flexibility.

There are two aspects in particular driving interest in them right now. Firstly, I think data centre and IT managers are now realising that the technology used in a modular facility is essentially the same as they would use in a traditional data centre. They are not a compromise in terms of technical specification. I think early iterations of the concept left people dubious but the reality is they now have a proven track record for cost saving, reliability and security.

The second reason is that a modular data centre gives an organisation a lot of choices when it comes to location. If a company does not have a long-term commitment to a building, or space is limited on-site, a modular or containerised option can be positioned anywhere and with minimum disruption during the build phase. This, along with the rapid deployment offered by modular systems, can dramatically cut costs.

In terms of pitfalls, it is important to remember that careful planning is still needed in relation to the site location, especially if future expansion is a possibility. Planning permission is likely to be needed and, as a separate structure, you will need to plan for getting power and optical fibre services to the site.

Today, modular has a lot going for it. It's a mature technology that gives traditional data centres a run for their money.

'MODULAR DATA CENTRES GIVE AN ORGANISATION A LOT OF CHOICES WHEN IT COMES TO LOCATION. IF A COMPANY DOES NOT HAVE A LONG-TERM COMMITMENT TO A BUILDING, OR SPACE IS LIMITED ON-SITE, A MODULAR OR CONTAINERISED OPTION CAN BE POSITIONED ANYWHERE AND WITH MINIMUM DISRUPTION DURING THE BUILD PHASE. THIS, ALONG WITH THE RAPID DEPLOYMENT OFFERED BY MODULAR SYSTEMS, CAN DRAMATICALLY CUT COSTS.'

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# CARRIE GOETZ
## PRINCIPAL AND CHIEF TECHNOLOGY OFFICER AT STRATEGITCOM

The move to edge data centres and edge computing is driving the renewed popularity of modular prefabricated data centres. First off, I will say that there is some confusion between modularly built, prefabricated and containerised (shipping container) data centres. While the terms are often used synonymously, all are not created equal. The confusion of words may be artificially inflating the number to some extent, but in the smart city and edge data centre work I am involved with, they all have a place.

For various applications, entities have figured out that while getting into the cloud is not expensive, moving data around the cloud and out of the cloud sometimes bears high costs. There simply is a lot of data that never needs to hit the cloud to start with.

Storage needs may be better served locally but a data centre needed for any storage and computing may not be in place or up to par. Modular prefabricated containers are a fast and efficient way to place computing resources where needed, or upgrade aging facilities for local and repatriated data and applications. Enterprises have learned that local compute with only the necessary information hitting the public cloud is sometimes more cost effective.

Application drivers range from cellular companies and streaming providers putting edge compute for content delivery networks (CDN) and streaming closer to consumers. Healing the digital divide, smart city services, surveillance with local chain of custody needs, artificial intelligence, smart transportation, precision agriculture, Industry 4.0, point of sale systems and the like lend themselves to a distributed (edge) compute model.

As we add services that increase demand for low latency, local processing and storage, rapid decision sets and the resiliency provided from multiple edge centres, modular and containers answer many needs. Having the compute distributed with failover further provides excellent resiliency, as it adds geographic diversity.

In short, the benefits to support the above include having a pre-engineered solution that decreases engineering needs, minimal site preparation, rapid delivery and spin-up, fixed form factors with known environmentals, limited on-site labour and rapid transit etc. It's easy to see the uptick for all these reasons.

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> 'MODULAR PREFABRICATED CONTAINERS ARE A FAST AND EFFICIENT WAY TO PLACE COMPUTING RESOURCES WHERE NEEDED, OR UPGRADE AGING FACILITIES FOR LOCAL AND REPATRIATED DATA AND APPLICATIONS.'

# Life in the *fast lane*

Gary Bernstein of Siemon explains why the road to 400Gb/s and 800Gb/s is laid and waiting

▶ Only a decade ago, the enterprise data centre industry was discussing the migration from 10Gb/s to 40Gb/s and 100Gb/s for uplinks, and 1Gb/s to 10Gb/s for server connections. Now IEEE standards exist for 400Gb/s over multimode and singlemode optical fibre, and the IEEE Beyond 400Gb/s Ethernet Study Group is defining physical layer specifications to support 800Gb/s and, potentially, 1.6Tb/s.

## MIGRATION PATH

Whilst migration to 400Gb/s and 800Gb/s may seem farfetched for the enterprise anytime soon, trends in digital transformation and bandwidth intensive applications have hyperscale and larger cloud data centres already in the planning stages. These trendsetters have inherently propelled technology advancement for the industry, making the road to 400Gb/s and 800Gb/s easily travelable and, perhaps, not as far away as the enterprise might think.

Whilst it can be difficult to fathom any enterprise on-premise applications and workloads requiring anything beyond 100Gb/s uplink speeds, many are realising the cost per port reduction of utilising new 400Gb/s switches to breakout to multiple 10Gb/s or 25Gb/s lanes. Hyperscale and cloud data centres, on the other hand, actually do see a need for 400Gb/s and 800Gb/s uplink speeds.

With 92 per cent of enterprises currently adopting a multi-cloud strategy, and consumer demand for streaming and online retail reaching an all-time high, more than 4OZB of data is already flowing through cloud networks and is expected to quadruple over the next few years. To put that into perspective, 1ZB of data is
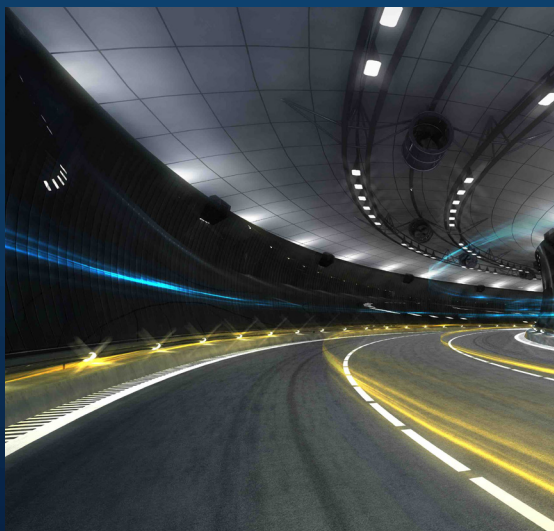


equivalent to a billion terabytes (TB) or a trillion gigabytes (GB).

## CROSSTOWN TRAFFIC

The coronavirus pandemic, with work from home strategies and significant increases

in video traffic, has further fuelled cloud adoption, with spending rising 37 per cent during the first quarter of 2020. Even in the face of an economic downturn from the pandemic, cloud spending is expected to continue increasing, with Gartner predicting a growth of more than 23 per cent in 2021 and spending on public cloud services to reach nearly $700bn by 2025.

While more data is moving to the cloud, the size of that data is also increasing, and emerging applications are requiring more bandwidth to support lower latency transmission. Large enterprise customers are generating increasing amounts of internet of things (IoT) and industrial IoT (IIoT) data, while adopting artificial intelligence, machine learning and advanced data analytics that require extreme low latency and 50Gb/s and

100Gb/s server connections in cloud data centres.

## HEALTH CHECK
High definition magnetic resonance imaging (MRI) images and virtual telehealth

in healthcare and high frequency trading, online banking and data analytics in finance are further driving bandwidth demands and the need for near real time transmission. Across the professional media and gaming industries, uncompressed high resolution video, computer animation and visual effects are driving file sizes to an all-time high.

While one hour of uncompressed raw standard definition video content requires about 13GB of storage, that same video content at 4K requires upwards of 100GB of storage. As resolutions transition to 8K, and picture improvement technologies demand higher frame rates and deeper colour depth, the file size implications are exponential. For example, one hour of 8K raw video content amounts to more than 7TB.

5G buildouts, next generation virtualisation and cloud native applications are also driving the need for higher 400GB connectivity in edge data centres and central offices. Within hyperscale and cloud based data centres, the adoption of data centre interconnect (DCI) technology, which connects multiple dispersed data centres and super-spine architecture to connect multiple leaf-spine networks, is also increasing the size of data sets being transmitted. As a result, moves to 50Gb/s, 100Gb/s and even 200Gb/s server connections with 400Gb/s and 800Gb/s uplink capacity are being demanded.

## HOW DO WE GET THERE?
The 2016 Ethernet Roadmap predicted speeds of 400Gb/s coming to fruition in 2017 and 800Gb/s for 2020. Those predictions held true with the IEEE 802.3bs standard for 200Gb/s and 400Gb/s approved in December 2017. This included 400Gb/s supported over eight lanes of

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'With 92 per cent of enterprises currently adopting a multi-cloud strategy, and consumer demand for streaming and online retail reaching an all-time high, more than 40ZB of data is already flowing through cloud networks and is expected to quadruple over the next few years.'

multimode fibre to 100m and 200Gb/s and 400Gb/s supported over four lanes of singlemode fibre to 500m. A year later, IEEE 802.3cd defined 200Gb/s over four lanes of multimode fibre to 100m. Early last year saw the approval of IEEE 802.3cm with 400Gb/s over eight lanes of multimode fibre, as well as over four lanes of multimode fibre using shortwave wavelength division multiplexing (SWDM).

While IEEE is currently working on defining 800Gb/s applications, with objectives that include over eight lanes of multimode fibre to 100m and eight lanes of singlemode fibre to 500m, the Ethernet Technology Consortium unveiled 800Gb/s specifications in April 2020. Based on existing IEEE 802.3bs 400Gb/s logic, its 800GBASE-R application essentially doubles the number of singlemode fibre lanes to eight. With the 800Gb/s standard and hardware specifications already determined, it is believed that the commercial availability of optics will happen this year.

**FINGER ON THE PULSE**
The development of 200Gb/s, 400Gb/s and 800Gb/s and the reduction in the number of lanes has been enabled, in part, by advancements in encoding technology that have shifted the

migration pattern. Newer four level pulse amplitude modulation (PAM4) encoding technology offers twice the bit rate of non-return to zero (NRZ) encoding technology, enabling both a 25Gb/s and 50Gb/s per lane approach.

Both NRZ based 40GBASE-SR4 and 100GBASE-SR10 are therefore now being phased out, and the NRZ based 400GBASE-SR16 application is all but considered 'dead on arrival'. It is not surprising that IEEE has identified PAM4 as the modulation scheme moving forward, enabling a more efficient migration path of 25-50-100-200-400-800Gb/s.

As shown in Figure 1, enterprise and cloud data centre applications and speeds are quite different and have become more contrasting in the past 2-3 years. Enterprise data centres are currently running 1Gb/s or 10Gb/s server speeds with 10Gb/s or 40Gb/s uplink speeds. Most cloud data centres are at 10Gb/s or 25Gb/s to servers with 40Gb/s or 100Gb/s uplink speeds, with several options to increase bandwidth. These two different environments and their various applications also require different cabling designs and solutions –

| | Enterprise Data Centres | | Cloud Data Centres | |
|---|---|---|---|---|
| | SERVER | UPLINKS | SERVER | UPLINKS |
| Current | ⬇ 1/10G | ⬆ 10/40G | ⬇ 10/25G | ⬆ 40/100G |
| Future | ⬇ 25G | ⬆ 100G | ⬇ 50G | ⬆ 200G |
| | OR | | OR | |
| | ⬇ 50G | ⬆ 400G | ⬇ 100G | ⬆ 400G |
| | | | OR | |
| | | | ⬇ 200G | ⬆ 800G |

enterprises still deploy multimode cabling, whilst almost all cloud data centres use singlemode.

## MARKET VIABILITY

Both 400Gb/s and 800Gb/s are expected to offer superior cost saving benefits, and are highly achievable due to leveraging existing MPO connectivity and singlemode and multimode fibre. They offer broad market potential, as they enable cost effective aggregation for enterprise data centres to connect a single 400Gb/s switch port down to eight 50Gb/s servers and cloud data centres to connect a single 800Gb/s switch port down to eight 100Gb/s servers. Furthermore, the short reach singlemode option for 400Gb/s over four lanes to 500m, which is specifically targeted for data centres, leverages low power transceivers that carry a price tag far less than high power lasers used in long haul singlemode applications.

While the market viability of specific 800Gb/s applications and transceivers will become clearer over the next 2-3 years, the following options for 400Gb/s currently appear to have the most market adoption:

- 400GBASE-DR4 (IEEE 802.3bs) over four lanes (8-fibres) of singlemode (100Gb/s per lane) to 500m
- 400GBASE-FR4 (IEEE 802.3cu) over four wavelengths (WDM) per fibre (2-fibres) of singlemode (100Gb/s per wavelength) to 2000m
- 400GBASE-SR4.2 (IEEE 802.3cm) over two wavelengths (SWDM) per fibre (8-fibres) of OM4 multimode (50Gb/s per wavelength) to 100m

Already available 200Gb/s transceiver technology is expected to reach high

market volume. This includes Cisco's 2X100G-PSM4 QSFP-DD for singlemode fibre to 500m and a 2X100G-SR4 QSFP-DD for OM4 multimode to 100m. For 400Gb/s, Arista, Cisco and Juniper have transceivers available for both 400GBASE-DR4 and 400GBASE-FR4 singlemode applications.

## TAKE IT EASY

To provide an easy migration path and to take advantage of 100Gb/s and 400Gb/s technologies, it is recommended that enterprise data centres utilise a Base-8 MPO OM4 cabling solution – something many already use and are familiar with. Cloud data centres will likely utilise a Base-8 MPO singlemode cabling solution for easy migration to 400Gb/s and 800Gb/s speeds and beyond. ■
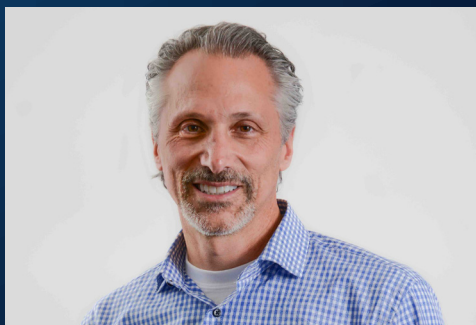
**GARY BERNSTEIN**
Gary Bernstein is global data centre solutions specialist at Siemon. He has more than 25 years of industry experience and extensive knowledge in data centre infrastructure, telecommunications, and copper and fibre structured cabling systems. He has been a member of the TIA TR42.7 Copper Cabling Committee, TIA TR42.11 Optical Fiber Committee and various IEEE 802.3 taskforces and study groups.

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The Enbeam range of fibre optic systems from Excel Networking Solutions delivers high performance, reliability and scalability for a large range of multi-purpose venues, supporting high density data centre applications or enhancing the cabling infrastructure for a small business. Excel's portfolio is extensive and includes cable, patch cords, adaptors and connectors, pigtails and fibre panels, which are available in plastic free packaging.

Alongside a comprehensive product portfolio, Excel offers a range of pre-terminated fibre solutions featuring machine polishing, ferrule geometry checking and bespoke pre-terminated options to suit any requirement. Pre-terminated solutions help to reduce installation costs and times, equipment and specialist labour costs. The Excel team operates with a fast turnaround – typically three working days – with all items 100 per cent inspected, fully tested and traceable.

**CLICK HERE** for more information or to contact the sales team **CLICK HERE.**
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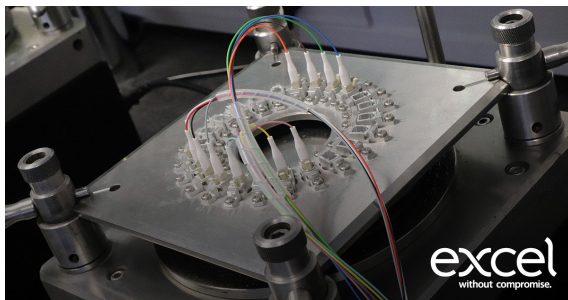
# Corning Optical Communications

EDGE Rapid Connect is the latest innovation in Corning Optical Communications' multi-award winning data centre portfolio. Designed to interconnect data centres or large data halls, EDGE Rapid Connect utilises trunks with the new Fast-Track MTP Connector, enabling more optical fibres to be pulled through a single conduit, overcoming previous outside plant challenges.

Developed by Corning and US Conec, the Fast-Track MTP's small profile enables pre-terminated trunks with reduced two inch diameter pulling grips for small or crowded conduits. EDGE Rapid Connect allows the deployment of more fibres in less time and reduces trunk installation time by up to 70 per cent, giving data centre operators a new path to extreme density. Want to pull over 10,000 connectorised fibres through a four inch conduit, and complete the project faster than ever? Now you can.

To find out more **CLICK HERE.**
**www.corning.com**
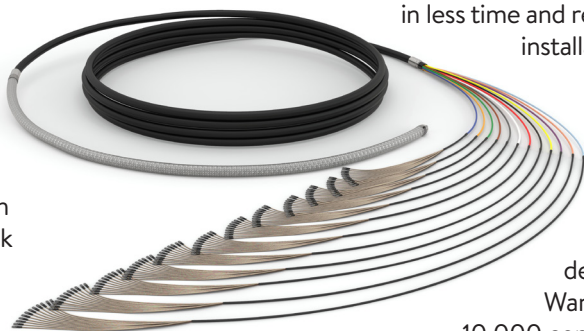
# Siemon

Siemon has extended its fibre optic cabling portfolio in 2021 with a range of innovative solutions. First up is LightWays, the halogen free, toolless fibre routing system that effectively manages and protects critical fibre links between networking equipment, storage area networks (SAN) and server clusters, while ensuring the capacity to support continued growth.

Siemon's proven LC BladePatch duplex fibre optic jumper has been equipped with a new space-saving, one piece UniClick housing that features an integrated polarity reversal switch to enable faster and easier polarity change. This reduces the jumper's already small footprint, simplifying installation and patching in even the tightest, side-stacked server, switch and SAN port configurations.

With a capacity of 1,728 fibres in a 5U footprint, Siemon's fibre splice enclosure offers one of the highest fibre densities in the industry, whilst also delivering improved accessibility and manageability. The rack mounted unit is ideal for handling the transition of outdoor to indoor fibre optic cable at the building entrance or for dismounting high fibre counts to multiple lower fibre count cables.

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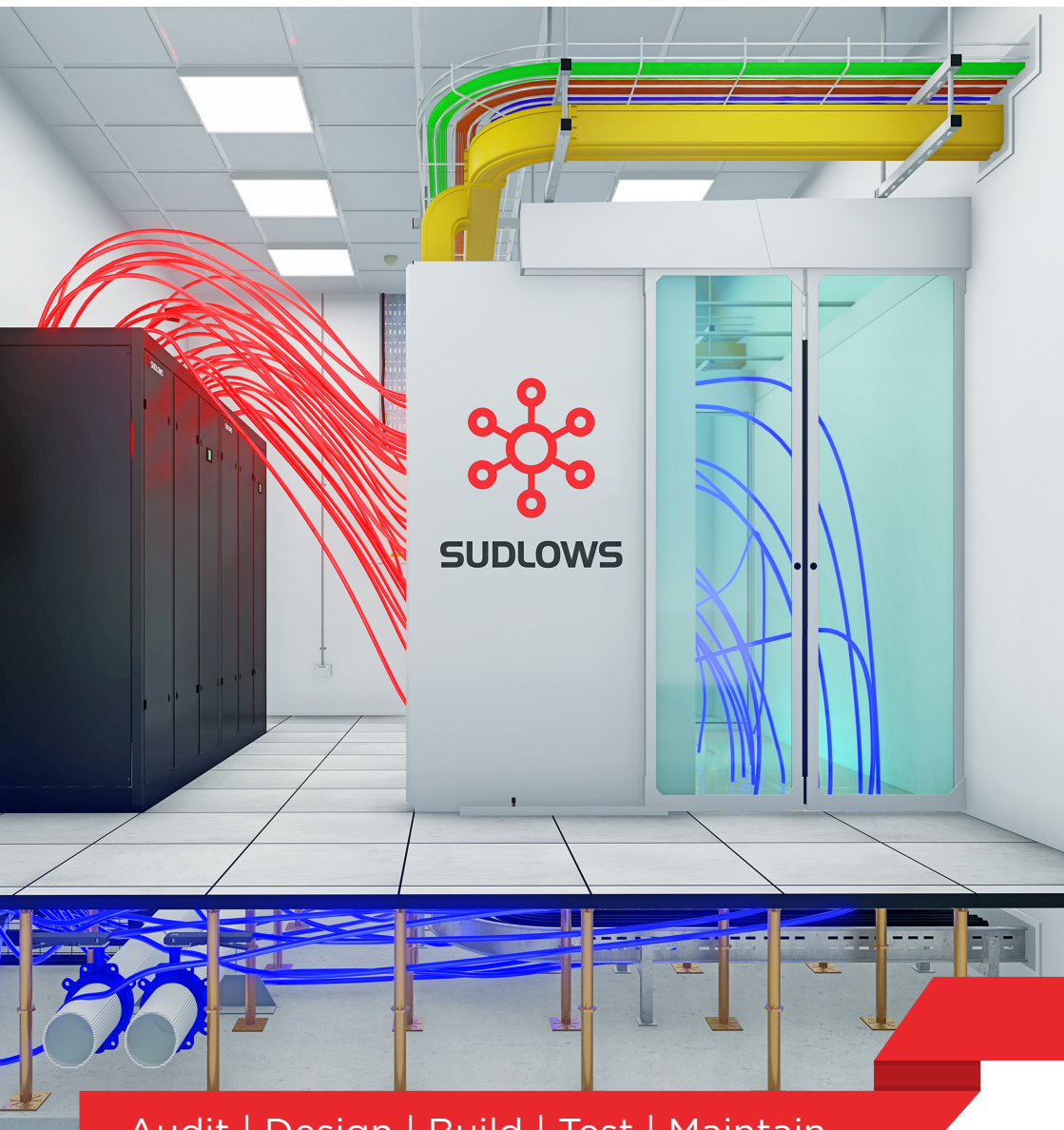
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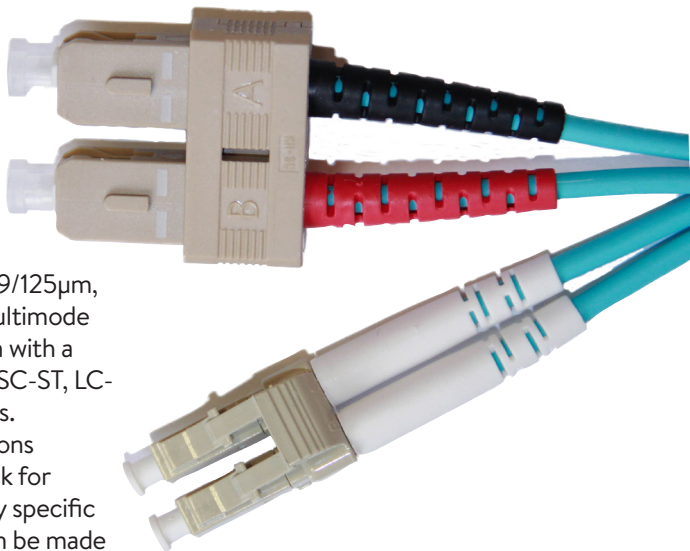
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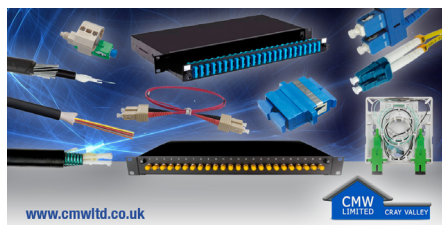
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Networks Centre is a premier optical fibre distributor in the UK. We've emerged from the 2020 lockdown chrysalis with two shiny new premises in the Netherlands and Scotland – with our Scottish warehouse and trade counter we've increased accessibility for fibre cable and components in the north. Our already extensive range of fibre cables has also been expanded to include more FTTX market cables.

The new Sumitomo T72C+ core alignment splicer, coupled with Networks Centre's Concierge Service, is proving to be one of our most successful lines. For customers who like to have access to the latest tools and equipment, without the huge cost, we've widened and updated our range of fibre hire and lease equipment, which includes Fluke Networks, Exfo, Sumitomo and NetAlly products.

As well as physical locations, we've beefed-up our online fibre offering, which now includes the unique ability to add multiple cut lengths of the same fibre cable to basket, without them being summed together.

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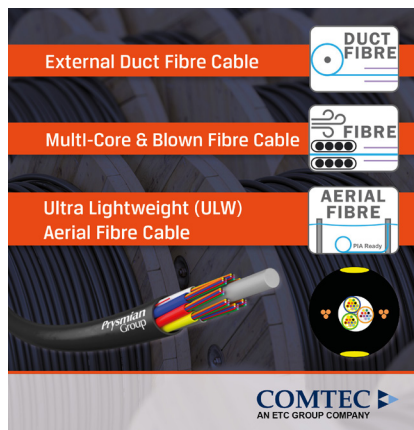
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# HellermannTyton

HellermannTyton provides a complete end to end range of FTTX solutions, delivering optical fibre from the point of presence (PoP) to the building and through to the customer termination point.

HellermannTyton's new range of multi-dwelling unit (MDU) fibre distribution enclosures strengthens its FTTX product portfolio. Adding the new MDU enclosures allows HellermannTyton to offer a full end to end 'last mile' fibre solution that provides installers, engineers and network designers with a one stop shop of products for every step of the fibre network.

With a combination of continuous innovation and an increasing demand for fibre delivery to buildings of every shape and size, HellermannTyton now has an extensive MDU product offering. From 12 fibres to 432 fibres, there is an MDU product to meet every fibre network requirement. From the smallest to the largest buildings and everything in-between, HellermannTyton has the perfect fibre solution.

For more information **CLICK HERE.**
**www.htdata.co.uk**

**HellermannTyton**

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# Leviton

Data centre managers need a network infrastructure that can support multiple generations of tech refreshes. The Opt-X Unity Fiber Migration System from Leviton offers an ideal path to 100Gb/s, 200Gb/s, 400Gb/s and beyond.

The system features pre-terminated trunks, harnesses and cassettes that use best in class MTP connectors. It includes ultra-low loss 8-fibre and 12-fibre cabling, and a 24-fibre MTP backbone that stays in place through multiple upgrades.

The Opt-X Unity Fiber Migration System is offered in OM3, OM4 and OS2, and includes colour coding to identify fibre count and mode.

**CLICK HERE** to learn more.
**www.levitonemea.com**
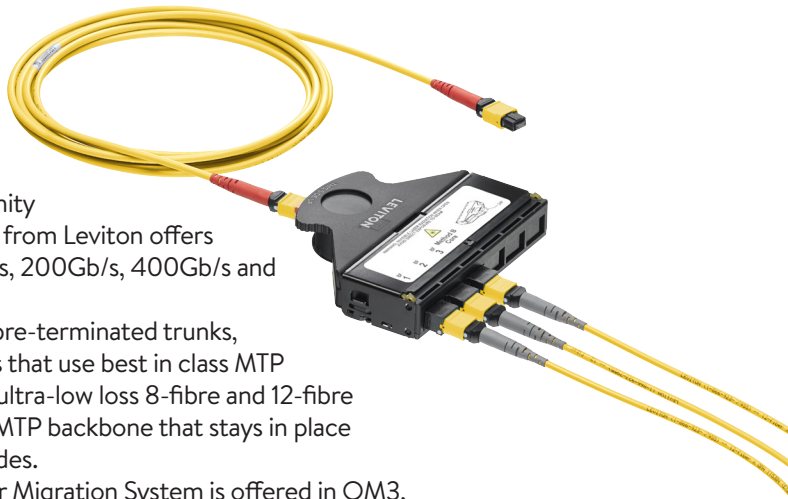
# See the light

Andreas Sila of Huber+Suhner examines why rising data centre demands require the use high quality optical fibre cabling systems

▶ Technological advancements in recent years have led to dramatic changes in the amount of data that is generated, hosted and transferred. As rapid progress is made in the industry, the pressure is on for data centres around the world to adapt to, and manage, this demand. Advances such as the internet of things (IoT), virtual reality, artificial intelligence (AI) and Industry 4.0 are creating huge volumes of data, and data centres need to be able to react quickly and seamlessly.

## STRUCTURING FOR GROWTH

Data centres must be built for a sustainable future and fibre optic cabling systems play a key role in making this happen. Failure to properly manage this critical part of data centre infrastructure can lead to serious issues for operators, such as increased operating costs and expensive outages. To ensure success in an increasingly digital world, data centres must optimise the fibre optic cabling systems that grow alongside them.

Setting up or overhauling the cabling and cable management within a data centre is a major investment. It is vital to develop a structured cabling strategy that meets current business needs, but also takes into consideration future demands. Getting the strategy right from the start will save time and costs later down the line.

## STAYING POWER

A structured cabling system is built to last over the long-term, but during this time networking technologies may evolve several times. To save time, costs and



resources, operators should look at implementing a cabling system that will serve current technologies but be capable of supporting future applications too.

Cable management within data centres

can be split into categories. The first is permanent cables, which include trunk cables in backbone and horizontal cabling, and the second is patch cord cables, which include optical cables used to connect transceivers or active equipment. Fibre optic cable management systems are vital in organising the cabling in a clear and concise way, and reducing the risk of damage and downtime, which is incredibly costly for a data centre operator. The lack

of a documentation system, or system for monitoring and processing changes, is a common way that data centre cabling can be mismanaged.

## RIGHT FIRST TIME
Inadequate cable management opens the

door to prolonged reaction times to any changes, which can lead to poor service for customers. This is very expensive and can have a direct impact on return on investment. An unorganised data centre can make it challenging for members of staff to work with cabling, with human error one of the leading causes of downtime. The accidental removal of the wrong patch cord, or perhaps getting cables tangled whilst carrying out moves, adds and changes (MACs), are all avoidable with a simply designed, effective cabling system in place.

Overall poor performance is a common issue if cabling is improperly structured, so operators must take the time to get it right first time. To ensure all opportunities are fully explored, operators should work with a strong partner to help guide them to the most suitable cabling solution, as different solutions will work for different environments. Data centres must be built on the strongest fibre optic foundation to ensure they have the space, time and ability to grow in line with ever changing data demands.

## ENHANCING CAPABILITIES
Fibre optic cabling solutions should be structured to optimise any available space and a constant consideration for data centres is scalability. To enhance the capabilities of their data centres, operators must ensure any systems they implement take up as little space as possible. It is a difficult balance, but a lack of space should not compromise performance, cost, accessibility or reliability. To optimise the capabilities of available space, a high density solution is required. This allows for a more solid, structured cabling approach in a smaller space, leaving more room for active equipment.

'Fibre optic cabling solutions should be structured to optimise any available space and a constant consideration for data centres is scalability. To enhance the capabilities of their data centres, operators must ensure any systems they implement take up as little space as possible.'

To maximise performance, automation and the ability to remotely control systems should be considered. Reduced manual maintenance enables operators to enhance their services by redirecting resources elsewhere to more critical areas. This provides operators with peace of mind and allows the focus to be on new investments and enhanced service offerings.

### GETTING IT RIGHT

Data centres should not trail behind in a fast paced industry, playing catch-up. Operators must ensure their data centres are at the forefront and ready to adapt to new technologies and data demands. To do this effectively, a fibre optic cabling solution should be scalable, with the ability to upgrade options when needed. Operating in a fastmoving environment can be challenging and costly, so implementing a cable management system that can grow alongside a business is key.

Adaptable, scalable fibre optic cabling solutions provide a solid foundation

on which a data centre can grow. By implementing a solution that not only meets the needs of today but tomorrow too, operators avoid having to start the process all over again when demands change.

## ASK THE EXPERT

To get it right first time, operators should work with a specialist expert to benefit from its extensive in-depth knowledge and support. This will give a full understanding of the different solutions that are available to build a data centre best suited to individual requirements. With many aspects to consider, such as direct splice, duplex connectivity, MPO connectivity and pre-assembled solutions, having the guidance of an industry expert will ensure a data centre is built for success. Those with structured, scalable, manageable and future focused fibre optic cabling solutions will thrive not just today but for years to come. ◾

### ANDREAS SILA

Andreas Sila is vice president of the data centre market at Huber+Suhner. He has more than 10 years of experience in the ICT and optical fibre industries.

# CMW signs distribution deal with Micos Telcom

Cable Management Warehouse (CMW) has signed a deal with Micos Telcom to distribute its range of FFTX and fibre optic solutions. Micos Telcom has developed, produced and supplied components for fibre optic networks since 1990. With a production portfolio of 1,000 products, the range is used extensively in the many FTTX scenarios – externally, internally and for business or residential deployment.

Ian Bankhurst, director at CMW, commented, 'I'm delighted to form this partnership with Micos Telcom. We have a great team which can support customers

Ian Bankhurst

with product choice, while Micos Telcom has technical experts that work closely with customers on an ongoing basis to develop new leading edge products.'

Jiri Novak, Micos Telcom's EMEA sales director, added, 'We are delighted to announce our collaboration with CMW. Its expertise will enable us to enhance the supply and distribution of our product range at a time when availability and speed of delivery play a decisive factor for the FTTX and telecoms markets. I look forward to a long and successful relationship.'

# Mayflex Academy Video Channel is launched online

Mayflex has launched the Mayflex Academy Video Channel, which will feature unboxing and tutorial videos across a wide range of vendors, products and solutions.

James Vian, Mayflex's training and technical manager, said, 'Up until now the Mayflex Academy has been very much about training, which due to the coronavirus pandemic has seen most of the classes delivered online. With our new Mayflex Academy Video Channel we are providing more support, education and top

tips via short videos that can be viewed at any time. They will be particularly useful for engineers out on-site who might need to understand a little more about the products they are installing and what to expect.'

He continued, 'The first in the series covers the Hikvision 4MB External Turret cameras and in just over three minutes I talk through the product and highlight the features of the camera range. There are more videos in the pipeline and they will be added to the channel on a regular basis.'

James Vian

# Team Mayflex completes Peak District 52km Challenge for dementia charities

Mayflex associates Amanda Griffiths, Liz Evans and Tracey Calcutt, together with retired Mayflex colleagues Margaret Butterfield and Lyn Gale, as well a friend, recently took part in the Peak District 52km Challenge to raise money for the Alzheimer's Society, Dementia UK and Dementia Support.

Calcutt commented, 'Amanda, Liz and I have lost parents and a grandparent due to dementia, so it's a cause that is massively close to our hearts and this is the third ultra-challenge that we've taken part in since 2014 to raise money. There is currently no cure for this terminal disease and research needs to be done to ensure that more families don't have to experience what we've been through.'

The walk started and finished at Bakewell in the Peak District and it was an extra hard challenge due to the very wet weather at the start and end of the walk, with a thunderstorm and torrential rain for the last few hours. The Mayflex group walked in two teams of three, with the first team finishing in just over 11 hours and the second in just over 13.

They have currently raised over £6,700 between them and you can donate by **CLICKING HERE.**

## CHANNEL UPDATE IN BRIEF

Sierra Wireless has appointed Phil Brace as its new president and CEO. He was most recently executive vice president at Veritas Technologies and previously worked for Seagate Technology, LSI Corporation and Intel Corporation.

Delphix has appointed Tammi Warfield as senior vice president of customer success.

Epsilon has been awarded Diamond partner status by the London Internet Exchange (LINX) as a member of its ConneXions Partner Programme.

EkkoSense has partnered with Assetspire to support data centre operators with an innovative solution that makes enterprise class data centre infrastructure management (DCIM) available inside the rack.

Iceotope Technologies has formed an OEM agreement with Hewlett Packard Enterprise (HPE) to offer its liquid cooled chassis with HPE ProLiant servers in its Ku:l Extreme Data Centre solution. The combined solution runs in enterprise data centres, as well as at the extreme edge, to enable reliable performance and efficiency while ensuring a high level of protection.

# The voice of reason

Mark Acton is a well-known figure in the world of data centres and works tirelessly to drive higher standards in a number of key areas. Rob Shepherd recently caught up with him to find out more about his life and career, and the lessons he's learnt along the way

▶ **RS: Tell us a bit about yourself – who are you and what do you do?**

MA: I am now an independent consultant specialising in data centres. I have worked for the likes of Exodus/Digital Island, Global Switch, Intel, Dell, Uptime Institute and CBRE. I now have multiple clients and a few areas of interest and specialisation.

Among them is an ongoing involvement in UK, European and global data centre standards development through BSI, CENELEC and ISO. I am also the current editor and best practice committee chair for the EU Code of Conduct for Data Centre Energy Efficiency, as well as being a chartered engineer and charted IT professional, and a fellow of both the IET and BCS.

**RS: How and why did you decide to embark on a career in data centres?**

MA: I didn't! Like most people in the sector mine has been a career of chance rather than choice.

My circular route into data centres started with a degree in geology, from which I worked in the oil industry as a geologist in the North Sea and Libya for about three years in various locations and on a number of exploration oil rigs. In the North Sea this involved the installation, cabling, use and evaluation of 'new' computer based remote sensing technology on oil rigs which, given the hostile nature of a drilling rig, frequently broke! From that I realised I had something of an aptitude for installing, maintaining and improving IT systems.

When the price of oil collapsed in the mid-1980s and the rigs in the North Sea were towed to the Firth of Forth and welded shut, I took the obvious step of taking a job working as an IT support engineer in a pickle factory in Derby! There I became the
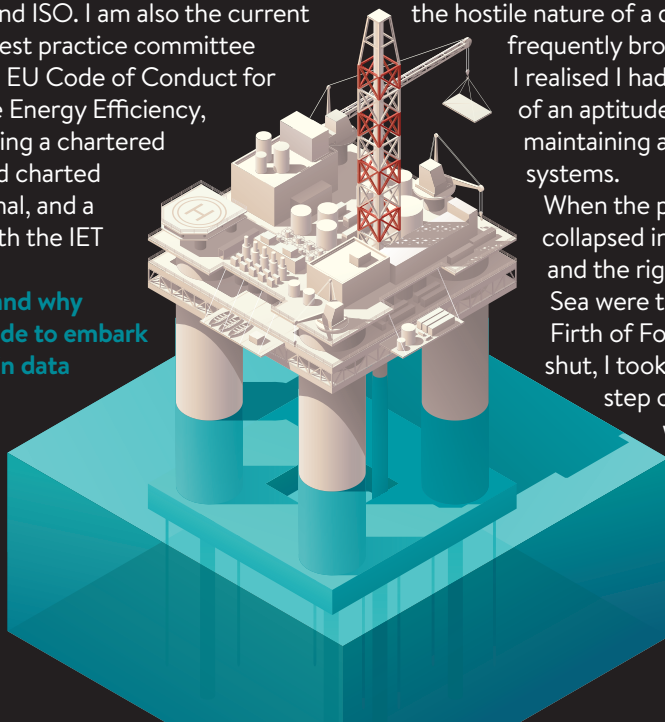
company's network and communications manager, looking after remotely connected sites around the UK. I then made the move to London to become an ICT manager for a company of chartered surveyors dealing in commercial property.

Now based in London, I then took the opportunity of a role with LexisNexis to set up the first remote processing facility outside the USA. This was in effect a small data centre. From there I moved to CompuServe to manage its European modem and network sites. These were used for 'bulletin board' services prior to the adoption of the internet and wide availability of native TCP-IP connectivity. The modem sites were large sites containing cabinets full of modems and X.25 networking equipment – all indistinguishable from a modern data centre at first glance. Apparently, I was now responsible for managing buildings rather than ICT systems, so I had a lot to learn very quickly!

The rest of the story is a little more mainstream and involves roles that people in the sector would be more familiar with today. I have now chosen an independent data centre consultancy role and have the luxury of choosing the areas I want to work in and the clients I want to work with, as well as the time that I spend doing it. I am extremely lucky and pleased that it has worked out this way though, despite a complete lack of direction on my part!

**RS: How important are data centre consultants and how has the role changed over the last 10 years?**

MA: We offer impartial advice not available from equipment manufacturers or others with vested interests. We are also often involved in trade associations, standards bodies and speak at industry events as advisors. We tend to operate a little behind the scenes, so we probably have more influence on the sector than many might appreciate.

Genuine consultants tend to have decades of experience – a valuable commodity in an industry that is only 25 years old or so. In addition, I always say about myself and fellow senior consultants that we may not always have an immediate solution to a problem, but can almost certainly tell a client how not to do something, as we have probably tried it at some point in the past and failed!

**RS: What is the most common question you're asked by your clients?**

MA: What does it cost? Followed immediately by can it be done for less?

**RS: What excites you about the data centre sector at the moment and what will be the next big 'game changer'?**

MA: I suspect the biggest change will

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be on the IT side rather than what we think of as the data centre sector itself. We are seeing a significant slowdown in Moore's Law and the search is on for a new platform and technologies on which to build future generations of processors. Where that will take us would require a crystal ball but I am sure we will see some fundamental changes in processor design and usage over the next 10 years.

It is obvious though that energy efficiency, net zero and carbon neutrality will have a huge part to play in the ongoing development of the data centre sector, which may also be forced to respond to regulation or legislation. The emphasis needs to shift away from the increasingly diminishing returns on the building side and focus on the efficiency and use of the compute, storage, network and software that drives the digital services that we all now depend upon so much. I think the biggest change will come when we begin to focus properly on the digital services hosted in the data centre and look more closely at that area in terms of efficiency, rather than hiding behind the smokescreen of the Power Usage Effectiveness (PUE) metric!

**RS: You're a familiar face at industry conferences and**

'I think the biggest change will come when we begin to focus properly on the digital services hosted in the data centre and look more closely at that area in terms of efficiency, rather than hiding behind the smokescreen of the PUE metric!'

**seminars. What motivates you to present at these types of events?**

MA: I have a reasonable degree of insight and knowledge that others may find useful and that I'm happy to pass on. I probably also have a somewhat unique perspective as I have been closely involved in both the IT operations and management sides, as well with building engineering and management. I can see where the gaps are and pride myself on speaking both languages reasonably well. I also see a good deal of misunderstanding and, frankly, basic inaccuracies disseminated and perpetuated in our sector, which I feel do need to be corrected.

I have to be honest though, it is also about brand awareness and marketing for both my clients and myself. This may sound a little egotistical, but I decided many years ago that I needed to take control of my own personal brand, as this is what is going to get me my next client.

Over the years I have proved that this is the case and is a piece of advice I would give to anybody not already doing it. It obviously helps to have something useful to say and which also makes sense. Ultimately, event organisers see some value in me being there, otherwise I guess I would not be invited! As a direct result though, one
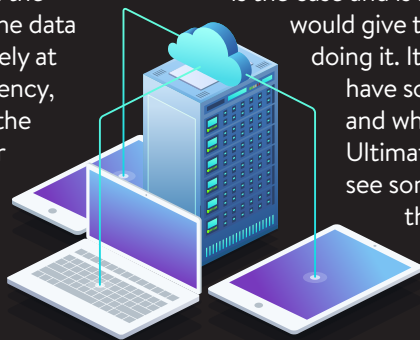
of the things that I can do for my clients is represent them credibly and help them raise their own visibility. I seem to have managed to get away with it so far!

**RS: What impact is the coronavirus pandemic having on the data centre sector?**

MA: There has been a greater recognition of the importance of the data centre sector and digital infrastructure in general. Our digital infrastructure has been through a significant test with unparalleled growth in data volumes and usage over the last year or so. It has proved to be remarkably resilient – probably more than people had anticipated. This new confidence in digital infrastructure will inevitably lead to additional services and new features that will continue to grow demand and investment.

At a more tactical level we have become familiar with limited travel and restricted site access. We have also been prepared to adopt greater levels of remote management and to consider tools that allow us to manage in this way, without the needs for routine or regular site visits. This absolutely plays into the growing edge data centre deployment strategy, with options for smarter and cheaper smarter ways of doing things. Not just for remote, dark edge sites but for larger core data centres too. I am sure these important lessons and approaches that have been developed and learned will be adopted increasingly widely. To this point there is even a resurgent interest in data centre infrastructure management (DCIM)!

**RS: If you could change one thing about the industry that you work in, what would it be?**

MA: A greater level of accurate, engineering based understanding, associated with more standardisation, would probably help reduce the number of those that still try to sell snake oil. Other than that, relatively little.

**RS: What's the best piece of advice you've been given and how has it helped you during your career?**

MA: It was from Frank Hughes, who managed the IT department for the pickle manufacturer based in Derby. When I started there he told me that his office door was always open for me but if I ever walked through it he would know that I was not able to cope. An interesting dilemma!

He was actually incredibly supportive and the real underlying message was that I had permission to go out and do what I believed to be correct. I was genuinely empowered and did not need to bother him with small details, even being allowed to make small mistakes provided I learned from them. I would like to think I have been that way ever since – somewhat independent and autonomous.

From that lesson I strongly believe that managing good people is largely about giving them the tools and resources they need to do the job that they are being asked to do properly, rather than tying their hands and being too fixated on the minutiae. ∎

> 'A greater level of accurate, engineering based understanding, associated with more standardisation, would probably help reduce the number of those that still try to sell snake oil.'

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# Quickclicks

Your one click guide to the very best industry events, webinars, electronic literature, white papers, blogs and videos

Turns Out Not All Wi-Fi 6 APs Are Created Equal is a blog by Rowell Dionicio of **Packet6.**
**CLICK HERE** to read it.

Conducted on behalf of **EfficientIP,** the IDC 2021 Global D Threat Report can be downloaded by **CLICKING HERE.**

Data Center Challenges: The Importance of Power, Cooling and Connectivity is a blog by Dave Fredricks of **Siemon.**
**CLICK HERE** to read it.

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ONS

Why Do Fiber Optic Cables Shrink? is the question posed in a blog by Hermann Christen of **R&M**. **CLICK HERE** to find the answer.

Cabling Architectures for Smart Buildings is a blog by Kirk Krahn of **Leviton**. **CLICK HERE** to read it.

How to Cable an MTDC is an article by Juan Penaranda of **Corning Optical Communications**. **CLICK HERE** to read it.

Top Tips For Enclosure Cooling is a blog by Karl Lycett of **Rittal**. **CLICK HERE** to read it.

# Better by degrees

Stu Redshaw of EkkoSense looks at why it's important to steer clear of oversimplification when optimising data centres

▶ The American Society of Heating, Refrigerating and Air-Conditioning Engineers' (ASHRAE) mission to advance the art and science of heating, ventilation, air conditioning (HVAC) and refrigeration is one that I have always admired and supported. ASHRAE is the global professional society dedicated to promoting a healthy and sustainable built environment. However, when working with customers on data centre optimisation projects, my colleagues and I always try to help them exceed ASHRAE guidelines wherever possible.

## TERMS OF REFERENCE

ASHRAE's Thermal Guidelines for Data Processing Environments is a highly regarded, vendor neutral reference resource for data centre designers, operators and managers. First published in 2004, it focuses on helping to optimise data centre thermal performance. In the latest 2021 5th edition, however, there are several areas where ASHRAE could have taken its best practice recommendations further.

So, here's where ASHRAE's 5th edition reference resource could do more – particularly in resolving some of the oversimplifications that, while well intentioned, could cost energy and expose data centre and other critical facility operators to potential risk. I've also flagged

up two updates where ASHRAE is keeping pace with today's data centre realities.

## TEMPERATURE VARIATIONS

In its latest edition, ASHRAE makes the argument that IT failure rates increase when temperatures exceed 15°C – implying that if data centres ran at colder temperatures reliability would get much better. I think this position is far too

simplistic. In reality failures are rare but above 27°C IT equipment tends to enter self-protection mode, shutting down important functions, which is service affecting but is not damage. However, this is a failure to the operation of a data centre, even if it is not a failure of the equipment itself.
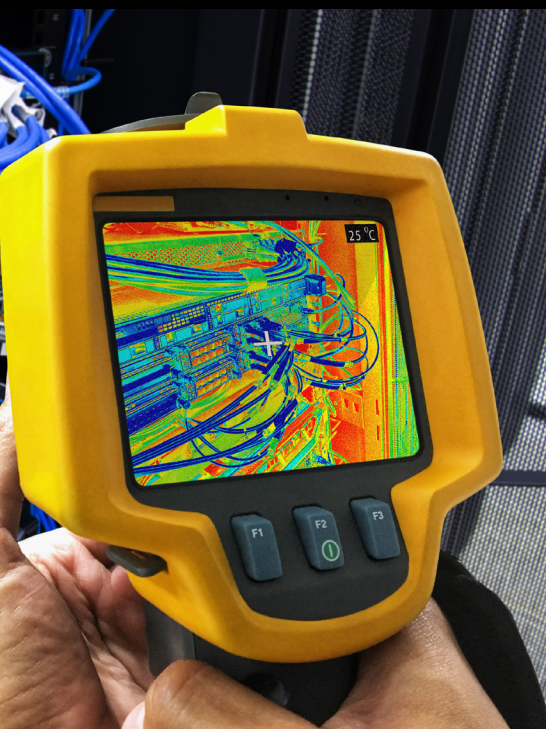


The regime where mechanical damage is more often sustained is, counterintuitively, under 20°C – particularly where rapid thermal cycling is taking place and causing mechanical fatigue in components. Over the last 20 years, the lower the rack temperature, the more we see failures from mechanical stress, as well as water, humidity and corrosion damage. This effect clearly shows up when racks close

to air handling units (AHUs) are subjected to more extreme low temperatures than those further away in a room.

I would therefore question the information in the ASHRAE guidelines that presents reliability degradation as a straight line increase, with temperature starting at 15°C without thresholds, when we know that different processes kick-in above and below certain temperatures. Given the lack of reliable data underpinning this commentary, I would suggest it only serves to confirm the need to track data centre temperature and equipment performance, and measure at a much more granular level. Only then can organisations make the right judgements about their critical data centre facilities.

## THE HEAT IS ON

The question of energy efficiency gains or losses approaching 27°C has always been a tricky one because internal equipment fans tend to ramp-up with temperature. But since IT manufacturers are – not surprisingly – hesitant about releasing clear data on this, it will remain an area of confusion. I believe ASHRAE should simplify its position and acknowledge the partial energy gains when IT equipment is run at higher temperatures, but make it very clear that this is more than made up for with mechanical efficiencies in the 25°-27°C inlet temperature range.

A strong lead from ASHRAE in this area would do much to illustrate to manufacturers that the thermal environments that IT systems operate in are changing and that higher temperature operation needs to be part of the IT equipment selection process. In fact, ASHRAE should publish a roadmap for further increases in inlet temperature,

'The question of energy efficiency gains or losses approaching 27°C has always been a tricky one because internal equipment fans tend to ramp-up with temperature. But since IT manufacturers are – not surprisingly – hesitant about releasing clear data on this, it will remain an area of confusion.'

so that future data centre builds can plan for facilities coming into service in the mid 2020s that will operate beyond 2050. Let's not forget the commitments we have all signed up for in terms of net zero carbon emissions.

## ROOM FOR MANOEUVRE

ASHRAE has kept recommended temperature bands largely unchanged in its 5th edition. Interestingly, there appears to be no reference to how temperatures vary significantly across data centre rooms – one of the great challenges we face in optimisation. In keeping things simple by trusting that one temperature value can be used to describe the overall inlet of an entire site, ASHRAE is underestimating the variance and complexities involved.

I frequently see temperatures of 10°C+ that can be reduced to less than 5°C through a software led optimisation approach. Therefore, perhaps ASHRAE can look at the standard deviation of the rack inlets as a useful measure? Similarly, there is no discussion regarding temperature

changes over time, where again there are significant variations that can go unnoticed. Often as many as four significant temperature swings per hour can occur as oversized AHUs modulate into and out of their cooling regimes, leading to the thermal stresses mentioned previously.

## STOP AND THINK

Credit to ASHRAE for trying to stop people measuring temperatures on the exhausts

of IT racks. You can draw no conclusions from this data – so please, invest instead in measuring the front of all racks. However, ASHRAE still isn't consistent in its measurement recommendations, as it advocates measuring just one out of every three racks.

Does it believe the unmeasured racks have exactly the same temperature as their nearest measured neighbour? Surely, it's time that we recognise that there's no meaningful relationship between one rack and its neighbour. I don't understand why ASHRAE doesn't say that 'ideally' every rack should have its own sensor – maybe the 6th edition will make this logical step?

The 5th edition also recommends the automated logging of HVAC equipment parameters, suggesting that this can provide valuable insight into operational trends and simplify data collection. Monitoring ΔTs, humidity levels and air mass flow rates allows individuals to monitor the operating status of computer room air conditioning (CRAC) and AHUs, and offers the ability to capture actual changes to operating conditions between AHUs and their respective racks. It's a powerful capability and it's good news that ASHRAE has picked up on this important activity.

## VALUE ADDED

As I mentioned earlier, the ASHRAE Thermal Guidelines for Data Processing Environments is a great publication and a valuable source of best practice thinking. I'm sure others will have further comments and suggestions for how the new edition could be further improved – I'm looking forward to seeing what makes it to the 6th edition! ∎

### STU REDSHAW

Stu Redshaw is chief technology officer at EkkoSense. He holds a doctorate in heat transfer and thermodynamics from Nottingham University and specialises in revolutionary clean tech and energy efficient systems. He is particularly recognised for his focus on resolving thermal challenges and his goal has always been to look at technical problems from first principles and to challenge the status quo.

# EDP Europe

Aisle containment, as part of an airflow and thermal management strategy, improves cooling optimisation and thermal performance, delivering potential energy efficiency gains at computer room air conditioning (CRAC) unit level.

EDP Europe provides various hot and cold aisle containment (HAC and CAC) solutions, from custom engineered systems that attach to the fabric of a data centre to the AisleLok out of the box solution that can be installed simply in minutes. EDP Europe's custom solutions are fully flexible, tailor-made and effective, and can be utilised in new build projects or retrofitted within legacy environments.

Independent of cabinet manufacturer, EDP Europe's HAC and CAC solutions can be designed to fit any configuration of rack heights and widths, accommodate overhead services, structural columns and all other possible variations in a data hall. EDP Europe offers a range of door, infill and roof options including FM Global approved panels.

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1 – Seal openings in raised floors.
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3 – Separate hot & cold aisles.

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# Austin Hughes

Maximise aisle containment cooling performance and minimise hotspots in server racks with InfraCool Raised Floor Mounted Fan Units from Austin Hughes. Suitable for new project deployments or retrofits, easy installation provides immediate monitoring and management of data centre temperatures and other vital indicators.

InfraCool Intelligent Raised Floor Mounted Fan Units deliver strong cool air from underfloor via the contained aisle to high density server racks to eliminate inside hotspots. This not only maximises computer room air conditioning (CRAC) efficiency but also saves on energy costs.

With two temperature sensors and an LED display, it is easy to monitor temperature status at rack level, aisle level and even air duct underfloor level – allowing users to accurately monitor the overall temperature environment. A free built-in graphical user interface (GUI) allows users, via a web browser, to see and manage an InfraCool Intelligent Raised Floor Mounted Fan Unit's data remotely over a TCP/IP Ethernet network.

To find out more **CLICK HERE.**
**www.austin-hughes.com**

# Secure Power

Monitoring the environmental conditions for uninterruptible power supply (UPS) solutions is becoming increasingly challenging and climate control procedures are having to work much harder to maintain optimum atmospheres.

Preventative UPS maintenance is absolutely critical to managing back-up power environments and ensuring UPS performance. Routine UPS service visits will not only analyse external environmental conditions but will also pay particular attention to the condition of the UPS system, its internal components and UPS batteries. As UPS batteries are central to functionality, extra care should be taken to adopt specialist methods such as temperature compensated UPS battery charging, where UPS battery life can be significantly extended.

Maintaining an optimum environment for UPS systems where temperatures are kept between 20-25°C, with good airflow and no foreign dust particles, will also contribute to prolonging UPS lifespan.

For more information about Secure Power's UPS battery services, UPS solutions and other power protection services **CLICK HERE** or call 0800 080 3118.
**www.securepower.com**

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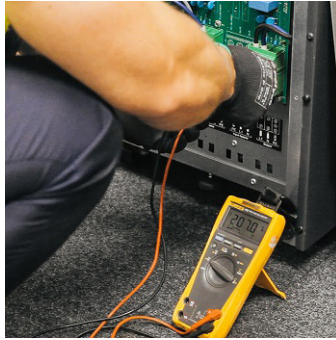
# EkkoSense

Today's data centre teams face a challenge that looks impossible to resolve. Operations have never been busier, yet, at the same time, you are coming under increased pressure to cut energy consumption, especially as net zero commitments start to bite.

Traditional software toolsets such as building management systems (BMS), electrical power management systems (EPMS), computational fluid dynamics (CFD) and data centre infrastructure management (DCIM) find it difficult to provide a credible answer – particularly as they don't equip you with a complete view of what's happening in your data centres.

That's where EkkoSense can make a difference. Our EkkoSoft Critical software driven optimisation solution takes advantage of the power of machine learning and artificial intelligence (AI) algorithms to provide a true visualisation of your real time data centre performance. The result is an average 30 per cent cooling energy saving, improved cooling utilisation and 100 per cent rack level ASHRAE thermal compliance.

**CLICK HERE** to learn more in our latest free AI white paper or **CLICK HERE** to book a demo.
**www.ekkosense.com**
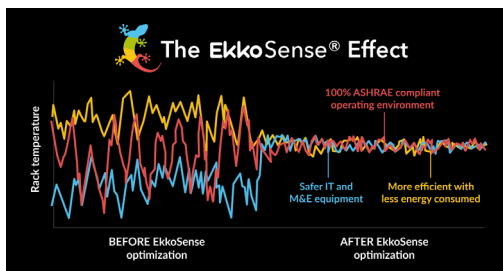
# Past, present and future

Steve Conner of Vantage Data Centers examines whether technology from the 1800s could hold the key to solving current – and future – high density compute challenges

▶ In technology, as time marches on things evolve. Over the past two decades, the industry has changed dramatically, moving from siloed applications to software as a service (SaaS), and now to a highly connected world leveraging massive amounts of compute capacity across the globe. The evolution of application architectures and the need for data has resulted in the adoption of innovative, energy hungry technologies that apply additional pressure on traditional architectures. Technologies such as artificial intelligence (AI), big data analytics and machine learning (ML) drive higher compute densities and tighter network couplings.

## VACUUM PACKED

But evolution does not happen in a vacuum. The rise of high density computing has forced the data centre market to evolve too. Gone are the days when we looked at 5kW racks as large deployments. So too are the times when data centres relied 100 per cent on water for cooling.

Engineers are being asked to develop new techniques to cool data centre footprints with average densities of 15kW, with some applications pushing demand to more than 100kW in a single server rack footprint. They also need to devise methods to control, or even eliminate,

water usage and lower overall Power Usage Effectiveness (PUE) ratings, while keeping power hungry graphics processing units (GPU) and computers cool and operational.

This has led many engineers to look more closely once again at the benefits of liquid cooling as an alternative to air and, specifically, immersion cooling. Let's take a look at what these processes involve, what they mean for today's data centres, and the exciting future possibilities they will support.

## LIQUID ASSET

Traditional air cooled environments present barriers for organisations that need to increase their kWs per square foot while simultaneously lowering PUEs. To achieve these goals, data centre engineers must consider thermodynamics, proper airflow and other factors. Still, they're likely to only achieve a maximum of 15-20kWs before they've exceeded airflow dynamics without

sacrificing floorspace or making critical design changes to containment. Air cooled solutions struggle to cool highly dense server pods and clusters running intensive technologies like AI and ML applications.

Liquid cooling allows data centre operators to handle exceptionally high densities by bringing cooling mechanisms closer to the computers that they cool. Traditionally, this has been done through rear door exchangers, which enable data centre operators to increase densities while keeping PUEs at least level. But even that approach is insufficient when dealing with high powered compute processing.

There are other options, such as

high performance computing (HPC) environments, while potentially driving PUEs down even further to below 1.2. But that is expensive and requires considerable micro plumbing and customised outfitting.

As it turns out, there's a better way to approach the high density, lower PUE challenge – and it's been with us for decades.

## GOLDEN OLDIE

Immersion cooling is a well proven but lesser used cooling methodology that is starting to regain traction today. Used in the 19th century for electrical systems, immersion cooling was first introduced for specialty applications in the mid-1980s with the advent of the then cutting edge Cray-2 supercomputer. With immersion cooling, data centre racks become tanks filled with fluid. Computers are immersed in the fluid, which keeps them cool.

Until recently, traditional immersion cooling tanks involved mineral oil based solutions, which presented significant



pumping liquid directly into specially designed built-in manifolds that interact directly with the heat sinks on computers or GPUs. Direct contact liquid cooling dramatically increases the ability to extract British thermal units (BTUs) out of dense

challenges. The solvent was very sticky and did not mesh well with commonplace network optics, risking major connectivity problems should they come in contact with the cooling solutions. Plus, the liquid had negative environmental and human health

impacts.

The evolution of computing architectures has enabled immersion cooling to become a viable option for today's data centres. One of the biggest issues with legacy computer designs, which decreased the ability to leverage immersion cooling, was the presence of moving parts. With the advent of low cost solid state drives, modern compute workloads replaced the spinning discs of old, thereby eliminating one of immersion cooling's major adoption hurdles. Couple complete solid state computers – involving no specific moving parts – with the ability to either turn off or eliminate computer fans, and you now have a computing platform that is more conducive to being completely submerged in liquid.

'Used in the 19th century for electrical systems, immersion cooling was first introduced for specialty applications in the mid-1980s with the advent of the then cutting edge Cray-2 supercomputer.'

need to rethink data centre designs. An immersive cooling environment requires racks to be placed horizontally, rather than vertically, allowing the computers to be completely immersed in liquid. The geometry of the tanks is different than



## CHEMICAL ELEMENT

Simultaneously, the liquid itself has evolved and improved. Unlike traditional, oil based solutions, modern chemistry delivers much more advanced immersion cooling liquids. Most of today's immersive liquids are vegan based and non-viscous – they feel more like water or a light sunscreen than thick oil. They are non-conductive like the fluids of old but, most importantly, have no refractive qualities, meaning network optics are not impacted when submerged in the solution, allowing the entire computer and network interface card (NIC) to be fully submerged.

Still, immersion cooling presents the

that of traditional racks, requiring system designers to rethink rack and tank layouts. Because of the overall density increase per tank, the actual floorspace required decreases as compared to traditional rack based solutions.

## SUPPORT STRUCTURE

The biggest potential architectural change revolves around the electrical room. Immersion cooling has the potential to natively support up to 100kW per tank, which could drive the need for more uninterruptible power supply (UPS) units,

generators and power distribution (PDU) units to meet the demands of an immersion cooled platform.

Yet the positives are noteworthy. Immersion cooling can bring PUE levels down significantly – a single tank could absorb 100kWs of heat with a PUE near 1.0. This is significant, as many data centre operators, hyperscalers, cloud companies and, of course, countries are making major commitments to reducing energy use and carbon emissions.

Also, since immersion tanks are completely self-contained, there's no need for advanced mechanical footprints. Engineers simply need to ensure plumbing supports the need for supply and return water, generally leveraging a closed loop system. As the use of potable water and grey water becomes more heavily regulated and the sources harder to find, looking to systems that use no water on a continual basis, like immersion cooling, may be the ideal solution for high density applications.

## ON THE HORIZON

While immersion cooling makes it possible for data centres to support today's high density compute demands, what lies ahead may be even more exciting. For example, quantum computing – a platform that changes the basic idea of how we look at the state of electrons, moving from bits to qubits – will simply not be possible using ambient air. Because of the dynamic nature of the qubit, the materials in a quantum computer need to allow for electrons to maintain state without jumping electron shells.

Today, the only way that this can be achieved is by cooling central processing units (CPUs) to near absolute zero or zero degrees kelvin. The sheer computing

capacity of a quantum computer will dwarf today's HPC environments and will have major impacts on the way we view cooling as a whole.

## REAL DEAL

Immersion cooling will help make this future possible. As more operators grapple with the demands imposed by AI and ML workloads, engineers will need to consider the requirements for their facilities and embrace their immersion cooling destinies for applications requiring this level of cooling. ■

## STEVE CONNER

Steve Conner brings 30 years of sales and engineering expertise to his role as vice president solutions engineering at Vantage Data Centers. He is responsible for leading the company's sales team on technical requirements in pursuit of new business. Prior to Vantage, Conner held senior roles at Cloudistics, Nutanix and Sequoia Worldwide.

# Nutanix enables the Royal Opera House to take advantage of the cloud

With a history spanning more than 250 years, the Royal Opera House (ROH) in London is the UK's only permanent house for opera and ballet, staging 420 live performances every year. Following a £50m makeover and building upgrade at its headquarters in London's Covent Garden, the ROH wanted to modernise its IT infrastructure. Whilst its relatively modern systems were functional, the lack of flexibility in the stack meant that it was 'ticking over', rather than delivering added value to the business.

With plans to expand its digital streaming offering, it evaluated all available options. The ROH chose the Nutanix Prism Pro multi-cloud management console and Nutanix Calm, along with Rubrik back-up and recovery as a service. Delivered by Nutanix partner, ET Works, the solution was cost effective, with a lower total cost of ownership than other options.

# Fidelity and Mitsui form joint venture to accelerate hyperscale strategy in Japan

Colt Data Centre Services (DCS) has announced that its owner, Fidelity, has entered into a joint venture agreement with Mitsui & Co and Mitsui & Co Asset Management Holdings to provide state-of-the-art hyperscale data centres in Japan. The new joint venture will be owned 50/50 and will further strengthen Colt DCS' presence in the Tokyo and Osaka regions.

The venture will allow Colt DCS to further accelerate its hyperscale strategy in Japan. The company pre-sold 94 per cent of its capacity before the launch of its Inzai Three facility November of last year, and has recently been named Frost & Sullivan's 2021 Japan Data Center Services Company of the Year.

Fidelity and Mitsui will appoint Colt Data Centre Services as the exclusive service provider for design, development, operations and customer service management. Mitsui & Co Realty Management will serve as the asset manager, covering structuring, financing, land sourcing, development support and customer marketing.

# Birmingham Women and Children's NHS Foundation Trust deploys Schneider Electric's EcoStruxure IT Expert

Schneider Electric, in collaboration with Advanced Power Technology (APT), has deployed its EcoStruxure IT Expert software at the Birmingham Women and Children's NHS Foundation Trust. The open and interoperable data centre infrastructure management (DCIM) platform will provide a dedicated remote monitoring solution, offering data driven decision making, increased resiliency and uptime for its distributed IT and critical back-up power systems.

The Birmingham Women and Children's NHS Foundation Trust is a specialist provider of healthcare services for more than 140,000 patients. Its operations are supported by an extensive IT infrastructure system including two on-premise data centres, a growing number of distributed network closets and more than 100 uninterruptible power supplies (UPS) that safeguard critical equipment and patient data.

APT recommended the installation of Schneider Electric's EcoStruxure IT Expert software to help monitor and manage its UPS, battery systems and edge IT infrastructure. The cloud based architecture allows the data centres, distributed IT and back-up power systems to be monitored from a central console.

## PROJECTS & CONTRACTS IN BRIEF

Extreme Networks has added a new Regional Data Center (RDC) in London, enabling customers to run its native cloud management platform, ExtremeCloud IQ, on Microsoft Azure.

Mitel is expanding its partnership with BT to deliver a customisable unified communications as a service (UCaaS) solution for its business customers.

Ecosurety selected Comms365 to provide a reliable and fast internet connection to support essential work during its recent office move.

AMS-IX is expanding its data centre footprint in the Netherlands with two new locations. As of October, AMS-IX will add points of presence (PoP) in the data centres of Smartdc in Rotterdam and Greenhouse Data Centers in Naaldwijk.

Neos Networks has announced the completion of segment three of a project to bring a full fibre network to Aberdeenshire, which will boost economic activity, quality of life and improve the delivery of public services.

# CNet Training

CNet Training has launched the Certified Wireless Infrastructure Technician (CWIT) program. It focuses on a broad range of common wireless technologies that coexist to create a complete wireless networking solution and deliver a seamless mobility experience.

When most people think of wireless networks they think of mobile technology and Wi-Fi. In reality wireless networking comprises these as well as Bluetooth, satellite, microwave, line of sight optics etc. As the global leader in digital infrastructure technical education, CNet Training identified a potential area in the industry where a gap in skills and knowledge could arise, so created the CWIT program.

The CWIT program has been developed for experienced digital infrastructure technicians wishing to take their professional credentials to the next level. It expands learners' knowledge with a focus on mobile architecture, Wi-Fi solutions and in-building wireless (IBW) systems, including distributed antenna systems (DAS), license exempt (OFCOM approved) cellular extension, Wi-Fi mesh and wireless LAN (WLAN) featuring prominently.

The CWIT program provides a platform for learners to explore the challenges of wireless network implementation, analyse problems and identify technical solutions.

To find out more **CLICK HERE.**
**www.cnet-training.com**

# STL

STL has launched NetXs – a new age suite of structured cabling solutions. With NetXs, STL delivers superior performance in data transmission for advanced networks across the globe.

Data centres and enterprises need structured cabling solutions that bring greater bandwidth, scale, connectivity and security. It has become critical to select the right cable design for meeting current and future requirements. Therefore, cabling solutions must be designed for high data transmission, high agility and flexibility to enable service providers and enterprises to adopt digital and seamlessly move to the cloud.

NetXs delivers high speed, high volume data transmission and superior performance in the most challenging environments. The range includes customised cable designs in UTP, STP, indoor and outdoor categories, with superior noise immunity that offers high headroom at both low and high frequencies. Other features include:

• Reduced alien crosstalk, with up to 100m horizontal link test compliance
• Adherence to ANSI/TIA 568.2-D, IEC 61156-5 and ISO/IEC 11801
• Thermal stability up to 90W for PoE/PoE+ applications
• Small cable diameter
• High scalability and flexibility for future network deployments

To find out more **CLICK HERE.**
**www.stl.tech**

# Panduit

Panduit's FlexFusion cabinets provide a single universal platform for all types of data centre and enterprise service needs including hyperscale, edge and multi-tenant facilities. Built with a best in class weight load of 3,500lbs and doors with a maximum airflow of 80 per cent, FlexFusion can accommodate the most complex cabinet installations.

FlexFusion enclosures deliver performance that allows optimum operation in any network environment, with sizes from 600-800mm widths, 1070mm and 1200mm depths and a range of heights from 42-51RU. A configuration tool can be used to select a standard or pre-configured turnkey bay – including size, colour, number of luggage racks, types of locks and handles, position of the electric rail, type of roof, sensors, power distribution units (PDUs) and side panels. Key features include:

• Fully integrated design without the use of grounding wires
• 170° door opening
• Adjustable front and rear cage nut equipment rail
• Multiple tool-less cable management options
• Easy lift side panels with lifting handles
  For more information **CLICK HERE.**
**www.panduit.com**

# Trend Networks

Trend Networks has developed its new Tone and Probe for the easy and dependable tracing of all types of copper cables including data, telephone, electrical and coax.

The Tone Generator features an industry leading power output of 13dBm, providing reliable cable tracing even over long distances. Easy to use, with no training needed, it is equipped with comprehensive line testing features for troubleshooting and service verification. With 70 hours of battery life, and a shielded button to prevent accidental battery drain, users can depend on it.

The Probe features a visual signal strength light that grows brighter the stronger the signal, as well as an audible indicator with volume control. Headphones can be plugged into the probe so that users can easily hear the sound, even in noisy environments, while an LED torch at the tip makes it easier to work in dark conditions.

The new tools have helpful applications for a wide range of industries such as telecommunications, cable TV, electrical installation, security, audiovisual, IT and data cable installation.

To find out more **CLICK HERE.**
**www.trend-networks.com**

# All you need to know

# Target practice

Scott Balloch of Colt Data Centre Services (DCS) looks at how data centres can achieve their net zero goals

▶ With the upcoming UN Climate Change Conference (COP26), the expectation on technology organisations to show progress on their green transition is growing. It is a critical time for those operating in the sector to not only lead by example but help their customers and suppliers bring about positive change too.

## COMMAND AND CONTROL

There are many issues that companies need to address when setting their net zero vision and for data centres this should start at the operational level. Sustainability and efficiency need to be incorporated into a facility's design – from the use of energy efficiency monitoring systems to committing to acquiring renewable energy in markets where available.

Bearing in mind that the industry generates around one per cent of overall global electricity demand, power consumption needs to be controlled and reduced where possible. To record any

improvements within power usage, businesses should be able to benchmark existing energy use against a comparable timeframe. For starters, it is good to use whatever resources are available, even if they are considered rudimentary or incomplete.

For instance, Power Usage Effectiveness (PUE) is a widely used metric employed by operators that can help address that challenge. Starting to measure, record and track power use on a regular basis is the first step to a more efficient data centre. Aside from power consumption, it is important to scrutinise the approach to day to day issues such as water usage, waste management solutions and local pollution control.

'Sustainability and efficiency need to be incorporated into a facility's design – from the use of energy efficiency monitoring systems to committing to acquiring renewable energy in markets where available.'

## LISTEN TO THE SCIENCE

These day to day challenges are difficult as it is, but it becomes even more challenging to map out strategy and ultimate goals for a long-term vision. On the one hand, data centre capacity is often tough to estimate. As traditional planning cycles account for requirements that last around a decade, it makes it difficult to set and meet long-term goals, given the rapid pace of technological innovation.

Nevertheless, a greater emphasis on the sustainable and social responsibilities associated with running scalable estates means efficiency gains at data centres are a top priority for operational management teams and operators at large. The processes of controlling harmful emissions produced by data centres might often be impossible to establish and it can be difficult to collect tangible numbers. These challenges in measuring and collecting information about the actual footprint can lead to unrealistic or nonfactual corporate sustainability pledges being made.

Businesses should look into setting science based targets that are accredited and regarded as the industry standard. To become a truly green organisation, they should be able to measure the actual carbon footprint, as well as monitor the progress they're making towards those targets. Ideally, the methodology should be in line with globally agreed goals such as those from the Paris Climate Agreement. This type of science based approach supports genuine sustainability initiatives and helps drive authentic change, while a lack of measurable proof of transition progress puts companies' efforts at risk of being perceived as a marketing gimmick.

## COLLECTIVE ACTION

Championing climate initiatives within an organisation can have positive impacts on the environment. However, as businesses operate within ecosystems with different stakeholders, suppliers and partners interacting on different levels, organisations are influenced by each other's green policies and actions.

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One of the main obstacles for companies with green ambitions is being reliant on these other organisations' commitments to environmental, social and governance (ESG) goals. For instance, a company might need to source parts, material and labour from elsewhere. Business leaders aim to also source this from organisations that are driving a sustainability agenda so the carbon footprint of their supply chain is lower, but that requires other stakeholders to also make that decision and drive collective action.

## PART OF THE PROBLEM

Technology, and the data centre market in particular, has been seen as part of the climate problem due to its perceived high energy consumption. With the mass move online caused by the coronavirus

pandemic, the demand for large scale solutions, such as hyperscale data facilities, to support seamless remote working has surged. Although some might see data centres as an environmentally unfriendly alternative to using a company's own facilities, it is rarely the case.

In practice, data centres only store technology tools that otherwise would be kept elsewhere. Put simply, companies often need additional physical space for their servers to be able to run vital applications such as internal drives and communication tools. For instance, many large corporations would require a number of separate server rooms located in different buildings to support their daily operations. This would potentially cause great harm to the environment, as many facilities wouldn't have been designed for the purpose, making them much less efficient and much less sustainable than one all-encompassing purpose built site.

## SMART THINKING

On the other hand, purpose built sites are often designed to be much more sustainable and resource efficient. For instance, facilities dedicated to store large scale hardware might use modular uninterruptible power supplies (UPSs) in addition to centralised generation plants and distributed redundant systems that require less materials and maintenance.

It is vital to think of data centres as an extension of an organisation instead of an additional source of power consumption. In other words, the technology focuses the necessary power into a single building, rather than distributing it across a number of different sites. Creating such purpose built facilities also increases the possibility of applying the self-generation of renewable power.

## SUSTAINABLE FUTURE

The decarbonisation of data centres should be a priority to all forward facing leaders who understand that now is the time to take action. Improving energy measurement at the operational level, creating an ecosystem that delivers responsible supply chains, as well as science based methodology, are the vital steps to meet green targets. To drive positive, industry-wide change, every data centre business needs to adopt better practice and hold their organisation accountable. ∎



**SCOTT BALLOCH**

As director of energy and sustainability, Scott Balloch spearheads Colt DCS' global strategy in these areas. With over 12 years' experience in energy and sustainability management, he was previously director of the energy and environmental unit at BT, where he was responsible for the company's environmental risk and carbon programme, and the design and build of its network and data centre accommodation.

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