

Inside_Networks

Time to go real

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ASSESSING THE IMPACT OF LIQUID COOLING ON MODERN DATA CENTRE DESIGN

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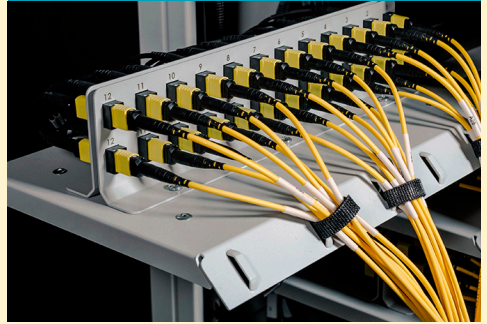
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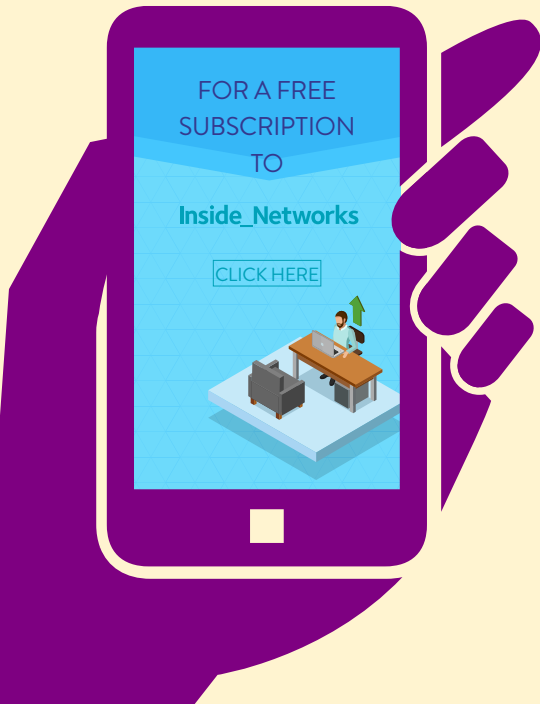


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Genuine article

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The phenomenal growth of artificial intelligence (AI) is incredible to witness. The most popular example is OpenAI's ChatGPT, which is estimated to have reached 100 million monthly active users in January, just two months after its launch, making it the fastest growing consumer application in history. Rarely does a day go past without a mainstream media story detailing how AI will enhance productivity, improve healthcare and increase access to education, or mark the beginning of the end of the human race as we know it.

As the uptake of AI increases, so is the demand for computing power in data centres. The server computer density required by AI generates significant amounts of heat, presenting energy efficiency and sustainability challenges, while older facilities that were not designed for AI applications could need to undergo expensive upgrading. To assess the impact of AI on the data centre sector, Inside_Networks has assembled a panel of experts to give us their opinions and suggest how these facilities will need to be designed, built and operated to accommodate the computing power demands AI puts on them in the future.

Given the heat generated by AI, it is timely that this issue also has a feature dedicated to cooling and climate management. Jason Matteson of Iceotope assesses the impact of liquid cooling on modern data centre design, while Paul Mellon of Stellium Datacenters looks at where the data centre sector can go with the latest cooling technologies to optimise the performance of these facilities.

Turning our attention to cabling infrastructure, this issue also contains a feature on fibre optic technology, with two excellent articles on the subject. Up first, Gary Bernstein of Siemon examines what's required from the physical IT network infrastructure to cope with the new demands of AI. He's followed by Manja Thessin of AFL, who explores the advances of fibre optic cable technology in data centre interconnects.

With lots more besides, I hope you enjoy this issue of Inside_Networks and 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





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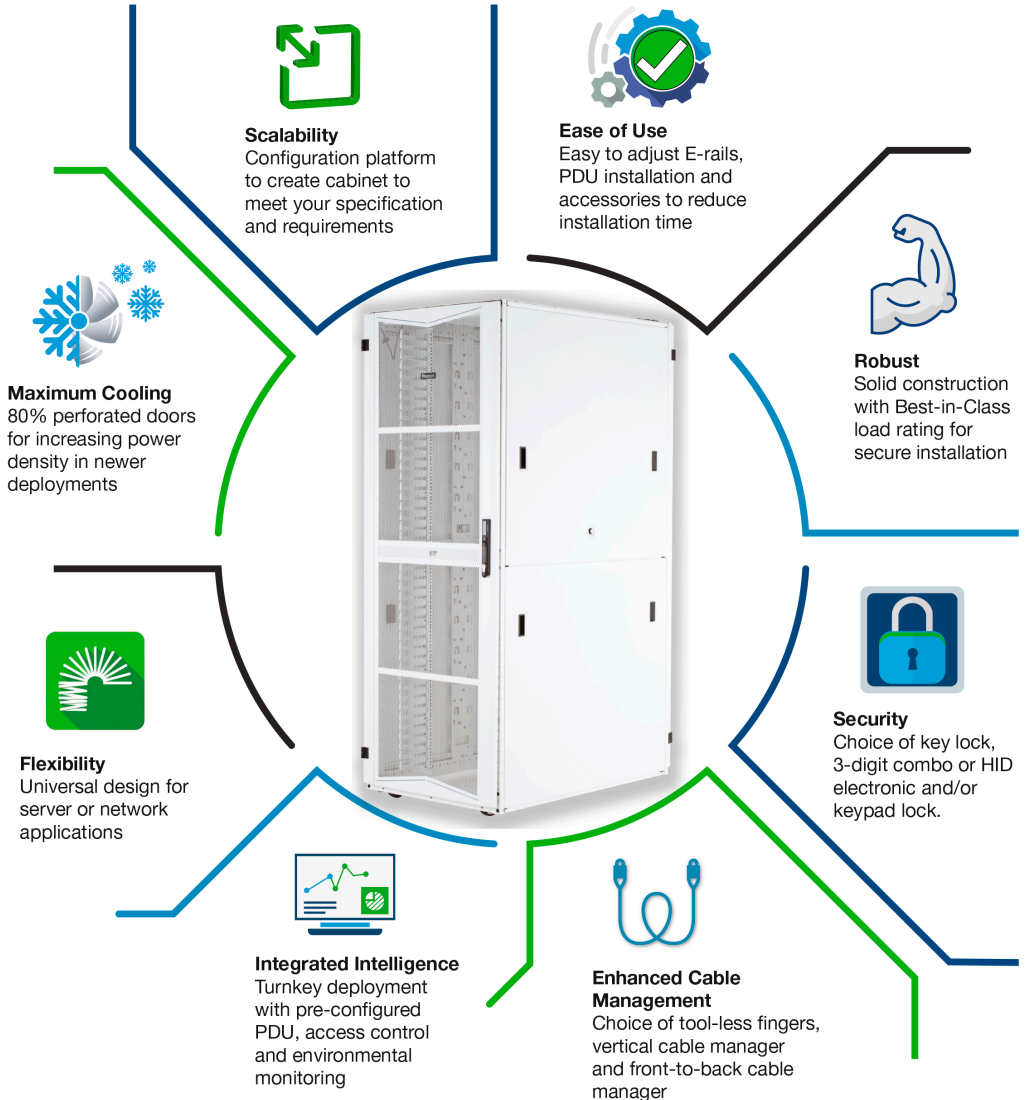


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Industry remains concerned about the challenge of sourcing affordable and renewable power

The latest BCS Summer Report has found that that concerns about power remain prevalent as the drive for net zero continues, with an increasing number of respondents now assessing the utilisation of waste heat energy generated by data centres.

The survey, which captured the views of over 3,000 senior data centre professionals across Europe, found that 81 per cent of survey respondents expect consumption levels to rise over the next three years and 88 per cent expect a rise in the cost of power to increase the demand for power efficient data centre space. One recurring topic is the reuse of waste heat,



with the survey showing that the concerns around economic viability of this are diminishing, with a 15 per cent decrease of respondents claiming this was an issue.

James Hart, CEO at BCS, said, 'Planning and permitting processes are increasingly requiring that more is done to utilise waste heat from data centres to support sustainable development and foster community

resilience. By capturing and repurposing waste heat, data centre operators can significantly reduce their environmental impact, while providing tangible benefits to nearby communities.'

Head of UK government AI taskforce warns of potential job losses

The head of the UK government's artificial intelligence (AI) taskforce has warned that protecting jobs will be a challenge as AI systems become more advanced. Ian Hograth, the taskforce's head, warned that it was 'inevitable' that more jobs would be automated. He also said that there will be 'winners and losers' regarding job losses and the world will have to rethink the way in which people work, as the potential harm AI could cause is also examined.

Sridhar Iyengar, managing director for Zoho Europe, commented, 'We have



recently seen leaders from governments come together to discuss ethical AI and

regulation development. This combined global approach must continue in order to fuel public belief and trust. The UK hopes to cement itself as a leading global voice in AI, ensuring best practice is delivered, which will allow for safe and secure adoption. As AI continues to develop at a rapid pace, industry and governments should collaborate to drive education. We can then see AI

adopted in the right way to boost business performance and positively impact economies.'

Schneider Electric unveils industry first free carbon calculator for understanding full environmental footprint of data centres

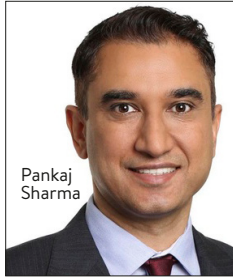
Schneider Electric has unveiled a new framework to help companies understand the full environmental impact of enterprise data centres. By quantifying Scope 3 emissions from their value chain, organisations can measure their total carbon footprint, including outsourced IT services from cloud and colocation service providers. The Schneider Electric framework takes a data driven approach to helping data centre operators identify and categorise emissions from operations and the supply chain, then prioritise efforts to make impactful carbon reductions.

As the US and European Union (EU) are proposing rules to mandate, enhance and standardise climate related disclosures, accounting for and reporting on Scope 3 emissions will become

a future requirement. Establishing and implementing a framework that incorporates carbon counting and target setting, while systematically reviewing company data and emissions sources, is the foundation to creating an achievable reduction plan.

‘We are 100 per cent behind the drive for the industry to become the most sustainable

in the world by making resources free and readily available,’ said Pankaj Sharma, executive vice president Secure Power Division at Schneider Electric. ‘Proactive data centre operators understand they will be held accountable for achieving net zero climate goals in the future to meet the expectations of their customers, investors, employees, business partners and communities up and down the value chain.’



Pankaj Sharma

KDDI expands data centre presence in North America

KDDI Corporation, together with its data centre brand Telehouse, has expanded its global footprint in North America by reaching an agreement with Allied Properties REIT to acquire three data centres and accompanying assets in Toronto, Canada. This investment comes as a result of increased demand in the market for reliable interconnectivity services and is an important milestone for KDDI’s expansion plans.

Yasuaki Kuwahara,

member of the board, senior managing executive officer and head of business solutions at KDDI, commented, ‘This is an

exciting investment that will enhance connectivity capabilities for Canadian businesses. With many North American organisations accelerating their digital transformation and innovation initiatives, we’re delighted to be able to play a part in their success, offering reliable, scalable, flexible and secure services to modernise and future proof IT environments.’



Yasuaki Kuwahara

Cybersecurity and data sovereignty concerns are top drivers for public sector's growth in hybrid multicloud deployments

Nutanix has announced the public sector findings of its fifth annual Enterprise Cloud Index (ECI) survey, which measures enterprise progress in cloud adoption. The research reveals that public sector organisations plan to accelerate their hybrid multicloud deployments nearly fivefold over the next three years.

Overall, public sector respondents expect to increase their general use of mixed IT infrastructure to 73 per cent. Cybersecurity, data security, sovereignty, protection and recovery are top drivers of this group's IT infrastructure purchasing decisions.



'Public sector chief information officers (CIOs) are universally modernising their IT environments to effectively serve their constituents, missions and mandates,' said Sammy Zoghلامي, senior vice president EMEA at Nutanix. 'The coronavirus pandemic underscored the importance of agility to swiftly adapt to changing circumstances in government, education and healthcare sectors. Recognising this need, public sector IT leaders are embracing diverse IT environments, encompassing data centres, edge computing, colocation and various public clouds to meet their individual specific requirements.'

Berlin ranked number one smart city in Europe in 2023

Juniper Research has selected Berlin as the leading smart city in Europe in 2023.

The top five smart cities ranked by Juniper Research are Berlin, London, Barcelona, Rome and Madrid. Juniper Research's ranking of 50 world cities is based on an evaluation of many different smart city aspects, covering transportation and infrastructure, energy and lighting, city management and technology, and urban connectivity.

The analysis identified Berlin as a leading city due to its focus on improving its transit infrastructure. Berlin has also taken

proactive steps on shared micromobility and renewable energy generation,

demonstrating a joined-up approach to smart city development.

Juniper Research's vice president of fintech market research, Nick Maynard, explained, 'Europe, as the birthplace of mobility as a service (MaaS), has seen significant development

and deployment of the concept over the past few years. As such, transit in leading European smart cities is a central part of future strategies for smart city development, embracing the benefits of MaaS in reducing congestion.'



81 per cent of IT infrastructure is still not stored in the cloud

Research from Paessler has found that cloud adoption is the number one challenge that IT leaders are facing, with 64 per cent of businesses believing that they will have more IT infrastructure in the cloud over the next two years. Artificial intelligence (AI) is yet to enter IT leaders' top five challenges, with them instead listing resilient infrastructure in second place, data storage in third place, operational technology in fourth place and finally automation and robotics in fifth place.



infrastructure is in the cloud. In terms of sustainability, storing data in the cloud reduces the on premises footprint associated with powering, cooling and maintaining hardware and data on local servers. Paessler also found that globally only 37 per cent of companies have started to work on sustainable IT strategies.

Martin Hodgson, country manager UK and Ireland at Paessler, commented, 'It's clear that cloud adoption is the number one challenge for IT leaders – it's not that easy to lift and shift. Infrastructures are complex and it takes time to modernise. While cloud may help to reduce the carbon footprint of a business, enabling them to meet their sustainability goals, it has to be right for them.'

The research found that just 25 per cent of UK and 19 per cent of global storage

NEWS IN BRIEF

Colt Data Centre Services (DCS) has achieved a 53 per cent reduction in Scope 1 and Scope 2 emissions and a 28 per cent reduction in Scope 3 emissions compared to 2019.

The European Data Centre Association (EUDCA) has elected three new members to its board of directors. It welcomes Géraldine Camara of France Datacenter, Marie Chabanon of Data4 and Matthew Winter from Global Switch. It also reconfirmed Michael Winterson as chair of EUDCA for a second two year term.

According to data analysed by Atlas VPN, companies had to pay over €1.5bn in General Data Protection Regulation (GDPR) fines through the first half of 2023. On 25th May GDPR celebrated its fifth anniversary. Throughout this time, businesses received 1,679 fines combining to a sum of nearly €4bn.

UK technology companies raised £5.9bn during the first half of 2023 in the sharpest funding decline across Europe. Data shows that UK tech investment fell by 57 per cent year over year, while France decreased by 55 per cent and Germany by 44 per cent, according to Atomico.

Research from Apogee Corporation has found that 35 per cent of employees are having their productivity stunted by insufficient, slow and unreliable technology – yet 27 per cent of chief information officers say home distractions are the culprits.

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Embracing change in the evolution

Hi Rob

Having been in the IT and telecoms market for over 25 years and known you for a good number of those, I must admit I've not written to Inside_Networks as often as I should have! However, due to the current circumstances I felt compelled to write in to call out the changes we are currently witnessing, which are surpassing anything I have ever experienced.

Working with my colleagues around the world, these seem to be truly global trends. We are seeing many organisations embrace hybrid working as a long-term policy after a prolonged period following the coronavirus pandemic, characterised by a cautious wait and see approach, whereby staff are working from home 2-3 days per week.

As a result, there is a significant trend to downsize large corporate office spaces as a major cost saving initiative, with smaller satellite offices being embraced. When combined with the emergence and adoption of various new technologies such as generative artificial intelligence (GenAI), which is already disrupting some traditional office jobs, and 5G potentially reducing the need for office cabling, it's clear that the industry is going to need to adjust to this very quickly to meet the implications that this will have for construction, installation, cabling, distribution stockholding and so forth. It is a ripple that will be felt across the market.

However, instead of fearing it, we should perceive this as an opportunity for evolution and wholeheartedly embrace this change. We all need to adapt and explore the ways to support our end user



customers as they themselves grapple with, and figure out, the complexities of this transformation.

From a cabling perspective, we are seeing the resurgence of zone cabling, as an increasing number of applications are being integrated onto the IT network – security, Wi-Fi, door access control, lighting, booking systems, sensors, CCTV, the list goes on and on. People may be in the office less, but when they are, they expect – and in many cases demand – best in class services and facilities. So, office footprints may shrink, yet the cabling

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footprint in these spaces will need to significantly grow and provide even more flexibility. Working with companies that can provide value added services to look at these needs, as well as solutions to support their deployment, is obviously key.

Wherever people are based, as we all adapt and evolve one thing seems certain – the data centre will continue to grow as the engine room of the IT world. With AI the current hot topic and expected to drive billions of dollars, if not trillions, of network infrastructure investment globally, the data centre market will continue to grow, just

in very different ways. Demands on the cabling will remain extremely high in this context, and the pace of change within bandwidth speeds, deployment strategies and technology refreshes is astonishing.

What I would say, now more than at any other time I've known, is how crucial it is that we proactively explore avenues for change, switch things up, and challenge ourselves around how we can adapt and support this transformation. The industry can, at times, be quite set in its ways, holding on to a mindset of 'this is how we've always done it'. However, those who will thrive in the coming years will be the ones who are most willing to embrace change, try new things, take calculated risks and, above all, understand the long-term challenges and needs of their customers.

There's enough market for everyone to thrive if we all adapt and evolve.

Steve Foster
Siemon

Editor's comment

Steve and I joined the network infrastructure industry around the same time and I've always enjoyed hearing his thoughts on the issues affecting the sector. I fully agree with him that we are in unprecedented times for the industry and the next few years will bring much change and indeed opportunity for those who are prepared to face it with a positive approach. Always the foundation that the rest of the enterprise and data centre network infrastructure relies upon, high quality cabling has never been more vital.

The cost of the cloud and how

Hi Rob

With some large enterprises now spending huge amounts of money each year on cloud computing services, the true cost of the cloud has come into sharp focus and many organisations have identified a need to cut this cost wherever they can. As a result, some businesses are tempted to enter multi-year contracts and reciprocal strategic partnerships with the leading 'big three' cloud service providers, for a reduced annual spend.

As recently outlined in Forbes, however, packaged services often do not suit businesses' technological needs, and may not be cost effective. Frequently, the true expense to companies only becomes apparent following the commencement of a multi-year contract. To avoid these pitfalls and maintain control over their cloud costs, businesses must make smart decisions about who to partner with, what support they need and what it is really going to cost them.

Cloud service providers often tempt enterprises with promises that they will save money by moving to the cloud, despite the significant initial cost required to do so. However, companies usually must continue running and supporting their legacy infrastructure in parallel to their migration to the cloud. Although this is usually a temporary measure, it is an expensive one. Regardless of whether a business decides to run all, or more likely, part of its infrastructure on the cloud, the question remains whether this will ever become more cost effective than its current set-up and if so, how.

Companies must consider whether such a move truly makes sense for their specific needs. Most organisations are looking to migrate to the cloud for increased reliability, performance agility and to avoid upgrading on



premises systems every 5-7 years. Companies must consider what cost is worth it and have a clear picture of their return on investment (ROI).

Enterprises commonly become concerned about being locked in to a

How to build a resilient system

specific vendor, particularly if they have experienced the reality of being bound to a specific cloud service provider for numerous years. As a solution, they turn to multi-cloud agreements.

I would not recommend this unless a business already has an extremely high cloud maturity. The multiple provider arrangement does not alter the overall structure of the service model. In essence, enterprises remain locked in to more providers. If businesses do decide to transition from an entirely in-house model, it would be more practical to move to a hybrid model, which is most cost effective for enterprises.

By adopting a step by step process, businesses can strategically evaluate the benefits and challenges of each phase and make informed decisions. This approach allows for a clearer understanding of an organisation's specific needs and ensures that the cloud migration aligns with the desired long-term goals. Companies need to be forward looking to effectively build a cloud strategy. Understanding their needs and facilitating a step by step process

from all on premises to a hybrid model, and finally to a fully cloud based system, necessitates that organisations have a clear view of their potential ROI and what workloads it makes sense to migrate.

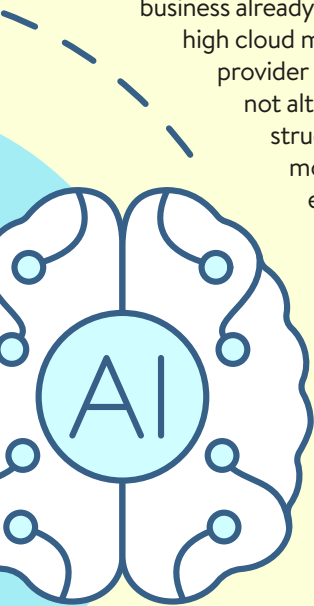
Despite these potential pitfalls, when implemented thoughtfully and with a clear view of future goals, cloud services really do transform organisations for the better and set them up for success. By leveraging cloud technology strategically, businesses can improve agility, enhance collaboration, scale resources on demand and focus more on core competencies, while leaving infrastructure management to the cloud service providers.

However, these benefits will only be available to organisations that can be agile, keep costs under control and plan appropriately for a cloud implementation that fits their actual needs. Businesses must implement cloud based systems in a way that still leaves them in full control and able to measure their success at every stage. Business leaders should consider all these factors before signing themselves up for contracts that may not benefit their business.

Aaron East
esynergy

Editor's comment

A long-term multi-year contract that could lead to being locked in should be heavily scrutinised and approached with caution. Recent years have highlighted just how important it is for businesses to remain agile and, as Aaron points out, they should have a clear picture of any ROI.





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Keeping it real

2023 is already shaping up to be the year of artificial intelligence (AI). [Inside_Networks](#) has assembled a panel of industry experts to examine what effect it is having on the data centre sector and whether existing facilities will be able to cope


▶ AI is currently the hottest topic around and its rapid advancement is being met with a mixture of excitement and horror. Earlier this year an open letter by the Future of Life Institute called for an immediate halt in training of systems ‘more powerful than GPT-4’ for at least six months. However, concerns that this could play into the hands of rogue regimes and organisations means that this might not happen.

One thing is for sure – the influx of consumer generative AI programs like Google’s Bard and OpenAI’s ChatGPT means that generative AI market is exploding. According to a report by Bloomberg Intelligence (BI) it will grow to \$1.3tn over the next 10 years from a

market size of just \$40bn in 2022.

The rise of AI has led to an increase in data centre demand. However, the rise in computing power brings challenges to existing facilities, especially those that were not designed for these types of applications. Even in more modern facilities, the rack power density required by AI generates significant heat, presenting energy efficiency and sustainability challenges.

In order to ascertain the impact of AI on the data centre, [Inside_Networks](#) has assembled a panel of experts to give us their views and look at how facilities will need to be designed, built and operated to accommodate it in the future.



HOW IS THE RAPID DEVELOPMENT AND UPTAKE OF AI AFFECTING THE DATA CENTRE SECTOR? WILL THE FACILITIES THAT ARE CURRENTLY OPERATING BE ABLE SUPPORT THIS GROWTH FOR MUCH LONGER AND HOW CAN DATA CENTRES BE DESIGNED, BUILT AND OPERATED TO ACCOMMODATE THE COMPUTING POWER DEMANDS AI PUTS ON THEM IN THE FUTURE?

MARK ACTON

HEAD OF TECHNICAL DUE DILIGENCE AT FUTURE-TECH

With the attention gained by ChatGPT etc performing impressive creative tasks, it is easy to overlook the significant amounts of power needed to enable these tools. Some researchers involved in the development of these platforms are already saying that use of the current large language models (LLMs) is unsustainable in terms of energy consumption. Where do these platforms sit? In data centres, of course!

The power consumed by LLMs is now being recognised as adding to data centre power needs. This is inevitably going to be a growing problem for the current models, some of which rely on existing 'unused' processing capacity and are therefore currently hidden in terms of increased data centre power consumption. As power consumption rises, this will inevitably result in increasing calls from poorly informed media and governments to curb data centre power usage, while failing to understand where this demand comes from – us using ChatGPT etc!

Additionally, the high power demands of the new AI graphics processing unit (GPU) chipsets from Nvidia are going to be increasingly difficult to host in traditional data centres. A single chipset can consume 1kW, with some individual servers reportedly consuming up to 17kW. This produces both problems and opportunities for data centre operators – some of which may be solved

using AI!

Artificial general intelligence (AGI) is very different to generative AI (GenAI). AGI emulates human intelligence and remains theoretical, with some even doubting that it will ever be truly possible and others saying it may be possible by the end of the decade. GenAI is with us now and is very good at solving specific problems or dealing with very specific tasks by offering a statistically valid representation based on available content, rather than being truly 'intelligent'.

Artificial superintelligence (ASI) is intelligence above and beyond human,

and although very theoretical is where things get really interesting and words of caution become meaningful. In this case the word 'artificial' may even have to be dropped. GenAI is not going to take over the planet – ASI might!

One thing is certain, AI will inevitably follow Amara's Law – the initial promise may be inflated, but the long-term impact is likely to be highly underestimated.

'ONE THING IS CERTAIN, AI WILL INEVITABLY FOLLOW AMARA'S LAW – THE INITIAL PROMISE MAY BE INFLATED, BUT THE LONG-TERM IMPACT IS LIKELY TO BE HIGHLY UNDERESTIMATED.'



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RICHARD CLIFFORD

DIRECTOR OF SOLUTIONS AT KEYSOURCE

Nvidia made the headlines announcing its revenue was up 19 per cent from the previous quarter with record data centre revenue of \$4.2bn. Its CEO, Jensen Huang, summed up the current situation and said, 'The computer industry is going through two simultaneous transitions – accelerated computing and generative AI (GenAI). A trillion dollars of installed global data centre infrastructure will transition from general purpose to accelerated computing as companies race to apply GenAI into every product, service and business process.'

The impact of AI will be huge on the data centre sector. As this unprecedented demand continues lead times may start to affect speed of deployment, as the sector struggles with both physical and human resources. Over the past 12-18 months we have seen data centre designs changing to ensure they can adapt to the rise in liquid cooling and higher density. Legacy facilities have not been designed for this revolution. The challenge is not so much the power, as this is a universal problem, but more one of density and cooling.

Perhaps an unexpected and positive impact of the rapid development and

uptake of AI is that this increased density enables a higher grade of heat (40°C-50°C) for export to district heating networks, electrified buildings and community

services such as swimming pools. This means there is an opportunity to transform our industry by harnessing the heat for the benefit of our local communities, and those in areas with high fuel poverty. In addition, if we can decentralise to spread the power, heat and benefit across a larger geographic area, it would help to make our industry more sustainable and a 'good neighbour' – sharing benefit to our

local communities and helping to achieve net zero goals.

AI is amplifying the growth in our sector with 4GW of data centre development across Europe. But make no mistake, this is just the start. Cloud is the driver but AI is definitely a noisy neighbour in the growth stakes.

'AI IS AMPLIFYING THE GROWTH IN OUR SECTOR THAT HAS SEEN 4GW OF DATA CENTRE DEVELOPMENT ACROSS EUROPE. BUT MAKE NO MISTAKE, THIS IS JUST THE START.'



DEAN BOYLE

CEO AT EKKOSENSE

There's no doubt handling the explosive growth in AI will be challenging for data centres. Even before OpenAI launched ChatGPT at the end of 2022, many operators were finding it hard to support the escalating workloads required to support their multiple digital transformation initiatives. The wider introduction and adoption of generative AI (GenAI) tools and applications is only going to make things harder.



First wave GenAI is undergoing massive growth. Precedence Research suggests that this is set to grow annually by 27 per cent over the next 10 years. Tiras Research estimates that GenAI activity will place huge demands on data processing performance and power consumption. While it predicts that improvements in neural networking and algorithm handling may help deliver a 400 per cent increase in compute performance, it believes that this will be offset by a 50 times increase in processing workload volumes.

Given that data centres were already looking at a 20 per cent plus increase in workload levels, it's imperative that operations teams now do everything they can to optimise performance. There are four main areas that they can work on:

- **Removing thermal and power risk**

By identifying potential risks earlier, thermal hotspots can be removed and enabling facilities to run warmer.

- **Optimising data centre cooling capacity**
EkkoSense research suggests that facilities could reduce their current data centre cooling costs by up to 30 per cent.

- **Releasing stranded cooling capacity**

Average cooling utilisation within critical facilities sits at just 40 per cent – there's a huge opportunity to maximise existing estate infrastructure.

- **Unlocking quantifiable carbon savings**

Cutting cooling energy usage translates directly into carbon savings that support corporate environmental, social and governance (ESG)

programmes.

AI will place huge additional power and workload demands on data centres. That's why effective optimisation needs to be top of the agenda if operations teams are to step up and meet this challenge. And, despite the many challenges that AI workload growth will bring to operations in terms of trying to control risk, energy and capacity, AI based software technologies will also be at the heart of delivering operational efficiencies for those same operators.

'AI WILL INEVITABLY PLACE HUGE ADDITIONAL POWER AND WORKLOAD DEMANDS ON DATA CENTRES. THAT'S WHY EFFECTIVE OPTIMISATION NEEDS TO BE TOP OF THE AGENDA IF OPERATIONS TEAMS ARE TO STEP UP AND MEET THIS CHALLENGE.'

NANCY NOVAK

CHIEF INNOVATION OFFICER AT COMPASS DATACENTERS

AI is already making us rethink data centre design and operation. Meta's decision to completely redesign its future facilities is evidence of that. The volume of processing capability to support AI based functionality places increasing demand on the power and cooling capabilities of a facility. Of course, these burgeoning requirements haven't rendered every existing data centre obsolete overnight. What they do illustrate is the magnitude of the design and operational changes required to support AI 'at scale'.

The volume of heat generated by racks of graphics processing unit (GPU) based servers will require providers to re-examine their cooling methodologies. We will see a substantial increase in cooling at the rack level, with liquid cooling capability becoming more the rule than the exception. This doesn't mean airside or water based cooling solutions will become obsolete, but they will need the augmented capabilities that technologies like liquid cooling provide to maintain a server friendly environment.

The most interesting area that will be impacted by AI's growth is in power. At least for the next few years the demand for electricity will force changes in modes of power generation – specifically in the area of renewables.

Despite the continued migration to wind and solar, they both have capacity issues exacerbated by the absence of the required

battery technology and a lack of suitable infrastructure across the globe. In the US, for example, the permitting process for a transmission line can take years and when you multiply that by the volume that will be required to support escalating demand, establishing an infrastructure to support

the requirements for AI applications is a problem. It would not be surprising to see an accelerated timetable for the development and use of small modular reactors to service large campuses.

AI's proliferation will have a dramatic impact on the data centre industry in general and facility design specifically. Alleviating the stress AI functionality brings

to the industry might be seen as daunting. The challenges associated with supporting AI based functionality will demand that providers place an even greater emphasis on developing solutions to address the known and unknown issues associated with the technology, and this will provide the opportunity for organisations predisposed toward innovation to establish clear competitive advantages.



'IT WOULD NOT BE SURPRISING TO SEE AN ACCELERATED TIMETABLE FOR THE DEVELOPMENT AND USE OF SMALL MODULAR REACTORS TO SERVICE LARGE CAMPUSES.'

Connectivity infrastructures for data centers

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GARY AITKENHEAD

SENIOR VICE PRESIDENT FOR IBX OPERATIONS EMEA AT EQUINIX

The rapid uptake of AI is intrinsically linked to the data centre industry. The latest Equinix 2023 Global Tech Trends Survey (GTTS) reveals that although 82 per cent of IT leaders in the EMEA region are pushing ahead with AI strategies, 49 per cent believe their existing IT infrastructure is not fully prepared for the demands of AI.

To support the surge in AI, IT strategies must be re-evaluated to ensure they meet the intensified demands of the technology. AI models rely on large and diverse datasets, so efficient data sharing, storage and processing capabilities are essential. This is where colocation data centre partners come in, as they can provide the necessary secure and high speed access to both internal and external data sources. Their scale also helps to power the massive amounts of data generated by AI applications, while pairing companies with services to manage data privacy and security.

As AI processing moves to the edge, colocation data centres can offer further support, as their geographical footprint and housed digital ecosystems allow companies to more closely reach their business partners and customers. This enables faster processing and reduced latency – ideal for AI applications that require real time decision making.

The recent GTTS also highlights skills shortages and the need for education to optimise the deployment of AI infrastructure. IT teams require expertise

in AI and machine learning to effectively leverage the technology. Data centre operators could consider investing in

training and knowledge sharing initiatives to empower their teams to better help customers to stay ahead of the curve.

Perhaps the most important area where data centre partners can help organisations successfully implement AI set-ups is sustainability. The computing power demands of AI can lead to increased energy consumption. To balance

environmental responsibilities with technological advancements, data centre operators are utilising their scale to explore and invest in energy efficient infrastructure, investigating renewable energy sources and newer propositions such as high density liquid cooling, which may support technologies like AI more efficiently. This is critical as the data centre industry designs, builds and operates facilities of the future, seeking to underpin our digital economy and its rapid evolution whilst reducing its carbon footprint.



'TO SUPPORT THE SURGE IN AI, IT STRATEGIES MUST BE RE-EVALUATED TO ENSURE THEY MEET THE INTENSIFIED DEMANDS OF THE TECHNOLOGY. AI MODELS RELY ON LARGE AND DIVERSE DATASETS, SO EFFICIENT DATA SHARING, STORAGE AND PROCESSING CAPABILITIES ARE ESSENTIAL.'

SIMON MICHIE

CHIEF TECHNOLOGY OFFICER AT PULSANT

The rapid development and uptake of AI has been a catalyst for infrastructural development across the data centre sector. Research from IoT Analytics expects the number of IoT enabled devices to rise to 16.7 billion by the end of 2023 – or just over two for every single person on the planet.

With such rapid growth in sensors and the data volumes they need, data centres are under pressure to deliver significant computing power and high speed data processing capabilities if cutting edge technologies are to thrive in the longer-term. However, not all data centres are equipped to deal with the scale of demand for high performance connectivity and application delivery, and the throughput of data required. Many are geared towards serving conventional cloud and network needs, rather than being designed to scale with the speed and processing power leading edge AI use cases now require.

These data centres are likely to suffer from serious latency and connectivity issues, excess heat generation, spiralling power consumption and limited storage capacity. More progressive data centres are creating network infrastructures that enable edge computing – unlocking opportunities

for businesses to use technologies like 5G, AI, machine learning and the internet of things to drive innovation and growth.

By placing the required compute close

to the point where data is generated and stored, businesses will benefit from the low latency, high speed performance that's becoming essential for the delivery of applications. Critically, this regional edge infrastructure enables higher quality connectivity to be delivered into regions and communities that haven't before had access, helping to level up

opportunities.

Regional technology development – be that smart cities, autonomous vehicles or smart healthcare – can only be realised at scale through edge networks.



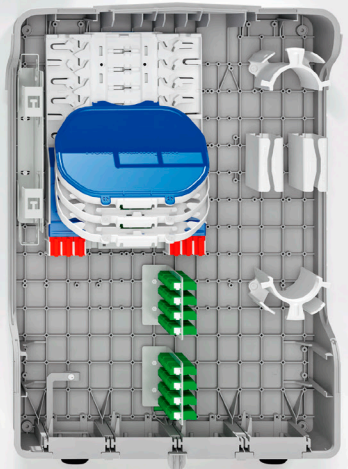
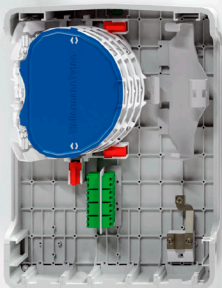
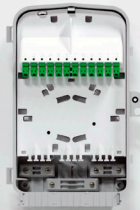
'WITH SUCH RAPID GROWTH IN SENSORS AND THE DATA VOLUMES THEY NEED, DATA CENTRES ARE UNDER PRESSURE TO DELIVER SIGNIFICANT COMPUTING POWER AND HIGH SPEED DATA PROCESSING CAPABILITIES IF CUTTING EDGE TECHNOLOGIES ARE TO THRIVE IN THE LONGER-TERM.'

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OZGUR DUZGUNOGLU

HEAD OF ENGINEERING AND DESIGN AT TELEHOUSE

Emerging AI solutions can prevent excess power consumption, facilitate more intelligent real time decisions on maximising energy efficiency and reduce round the clock engineering manpower within the data centre environment. For example, the technology can analyse load patterns and predict where fluctuations take place, or track system performance so preventative maintenance can be deployed.

It can also play a part in reducing data centre carbon emissions. AI driven analysis of energy and water consumption can lead to reductions in both Water Usage Effectiveness (WUE) and Power Usage Effectiveness (PUE), enabling both operators and their customers to strive toward net zero targets. Critical software enabled AI powered approaches have already been deployed at Telehouse North, where we achieved a 461 tonne reduction in carbon emissions, as well as a 10 per cent cooling power reduction.

Density and space are a concern for data centre operators. With data volumes significantly increasing, the amount of power required for one AI computer to process this information could be around 16-20kW. If a customer has multiple AI



computers, power and cooling capabilities must be able to support this high density need.

Higher power densities will make it harder for air cooling systems to reduce excessive heat levels in the data centre environment. Operators are now increasingly moving towards liquid cooling solutions instead,

which can conduct heat more efficiently. Mature data centres that are ahead of the curve, building or retrofitting data halls in preparation for increased power and cooling requirements, will be best placed to meet client demands in the coming years.

‘DENSITY AND SPACE ARE A CONCERN FOR DATA CENTRE OPERATORS. WITH DATA VOLUMES SIGNIFICANTLY INCREASING, THE AMOUNT OF POWER REQUIRED FOR ONE AI COMPUTER TO PROCESS THIS INFORMATION COULD BE AROUND 16-20KW. IF A CUSTOMER HAS MULTIPLE AI COMPUTERS, POWER AND COOLING CAPABILITIES MUST BE ABLE TO SUPPORT THIS HIGH DENSITY NEED.’

Unleashing the power

Manja Thessin of AFL explores the advances of fibre optic cable technology in data centre interconnects (DCI)

Amid our digital era, a remarkable revolution is unfolding, driven by an overwhelming surge of data. The sheer magnitude of data generation and utilisation has reached unprecedented heights, necessitating inventive approaches to effectively manage, store and analyse this colossal wealth of information. Within this dynamic landscape, a groundbreaking paradigm of disaggregated data centres is gaining prominence, with optical fibre cable assuming a central and indispensable role.

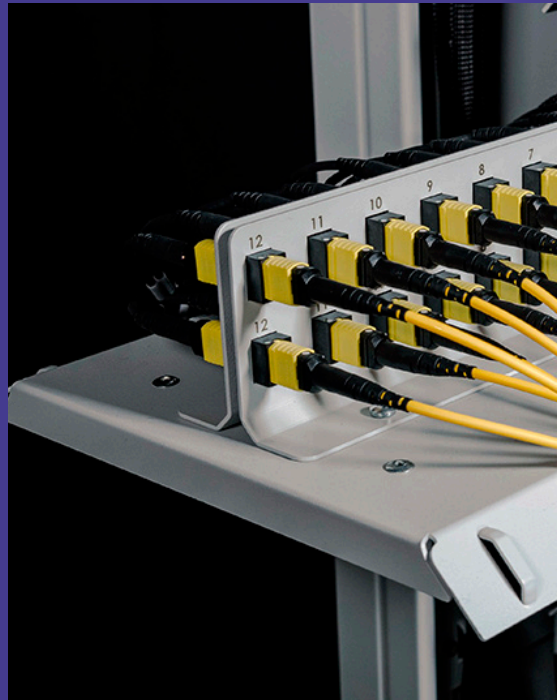
PART OF THE PROCESS

Disaggregated data centres have emerged as a gamechanger, revolutionising the processing efficiency of complex and massive workloads by separating critical data centres and their interconnection, often facilitated by optical fibre cable. This architectural shift optimises data processing and holds immense potential for transforming the landscape of modern data infrastructure.

Considering the prevailing fibre optic age, the trajectory toward adopting disaggregated data centres appears to be an inevitable course of action. Nevertheless, to grasp the true significance of this technology, it becomes imperative to delve deeper into its benefits. By exploring its underlying functionalities and advantages, we can understand how DCIs are poised to revolutionise the efficiency and future proof nature of data centres, propelling us towards a new era of unparalleled data management and analysis capabilities.

WHAT IS A DCI?

A DCI is a direct link between two or more data centres designed to facilitate high speed, secure and reliable communication and data transfer between these facilities. This technology plays a critical role in allowing multiple data centres to operate as a single logical data centre, which contributes to improved efficiency and resilience.



DCI has undergone a major transformation in recent years. Previously, it was mainly used for business continuity and disaster recovery purposes. However, today it plays a vital role in enabling data

ver

centre operators to effectively manage resources and undertake crucial load balancing tasks across multiple data centres. This has become more important than ever before, as internet traffic continues to grow and cloud migration becomes increasingly essential. The surge in east-west traffic refers to data moving within and between facilities, and has become a key factor in driving the need for optical connections in data centre architectures.

purposes including the synchronisation of resources, enabling real time data replication, load balancing and distribution of workloads. This helps mitigate potential data loss or downtime risks, while contributing to overall efficiency.

For large and hyperscale data centre operators, DCI has become a key efficiency driver, enabling them to extend their layer two or local area networks. This allows them to operate multiple data centres as a single logical data centre, realising benefits such as expandability, workload mobility, resource optimisation and support for multi-tenant environments across a broader set of distributed resources.

KEY ENABLER

The importance of cable in a DCI link cannot be overstated. It serves as the backbone for the ultra-high fibre count network, connecting buildings and facilitating seamless communication. The cable can be placed in cable baskets or ducting and can span distances ranging from 100m to as far as 10km. The high speed fibre used in the DCI backbone can achieve speeds of up to 400Gb/s, ensuring a highly efficient and flexible network. This is a testament to the remarkable strides made in the field of telecommunications and the increasing need for reliable connectivity.

When selecting cables for DCI, it is important to consider factors such as bandwidth requirements, distance and cost. The fibre infrastructure between buildings should be able to keep up with the introduction of new connections and bandwidth capabilities without requiring repeated civil engineering work. This can be



JOINING FORCES

DCI is typically deployed using high capacity fibre to connect multiple data centre buildings over a wide campus area. These connections serve several critical

‘The fibre infrastructure between buildings should be able to keep up with the introduction of new connections and bandwidth capabilities without requiring repeated civil engineering work.’

achieved through duct space optimisation, which involves using small diameter ultra-high fibre count cables with ribbon technology to maximise cable density and fit more fibres into existing duct space. These small diameter, high fibre count cables can be installed 60-75 per cent faster when using mass fusion splicing compared to single fibre splicing.

Alternatively, they can be factory connectorised to create high density, high performance trunk cables that can be installed swiftly and efficiently without the need for splicing – thereby reducing cost and deployment time, and maximising efficiency. These pre-connectorised assemblies provide a viable alternative to traditional splicing solutions, substantially

SAFETY FIRST

In addition to bandwidth and infrastructure considerations, DCI cable selection should also consider the reliability and security of the network. For critical applications, it may be necessary to choose cables that can withstand harsh environmental conditions and provide added protection against challenges such as flooding.

To address this, choose multi-listed cables that are suitable for both indoor and outdoor use, making them versatile for any part of the data centre infrastructure. Using these cables eliminates the need to switch from an external to an indoor rated cable, which saves money on labour and reduces splice losses. The cost of the cables should also be balanced against the potential risks and consequences of network downtime or failure.

By carefully considering these factors, organisations can ensure that their DCI cables meet their current and future connectivity needs.

PRACTICAL CHALLENGES

Installing DCIs can be challenging, with a range of factors to consider such as the most appropriate method, organisation of labour and

reducing deployment times and installation costs. When these assemblies are presented in a patching frame, they offer users the flexibility to reconfigure the links as needed.

machinery and regulatory requirements. Ducting or aerial installation can be used, each with unique difficulties, such as the risk of fibre damage during pulling or the need for special equipment in blowing and



jetting when dealing with duct installations. Maximising fibre count within existing ducts, while avoiding overcrowding that might damage fibres or hinder future expansion, is important.

When it comes to fibre installation, there are four main methods to achieve your goal – pushing, pulling, blowing and jetting. When considering which method to use, several factors should be considered.

Ducting distances can vary greatly, as can the shapes and sizes of the cables being run. Additionally, the conduits can be straight or winding mazes under cities. Pushing is the simplest method of cable installation, but it is best suited for short runs and smaller cables due to friction. Pulling involves threading a pull line through the conduit and attaching the cable to it, making it ideal for longer runs and larger cables. However, caution must be taken to avoid damaging the cable.

Blowing uses compressed air to float the cable through micro ducts, which minimises the risk of cable or duct damage, and is perfect for navigating long distances and multiple bends. Jetting is air assisted and uses a parachute or cable carrier to pull the cable into the conduit, making it a versatile method used for various cable types.

While blowing and jetting are the most common choices, when deciding on a method of fibre installation it is important to consider the distances, size of cables and the type of conduit being used. Pushing and pulling are best suited for shorter runs and smaller cables, while blowing and jetting are ideal for longer runs and multiple bends.

MOVING FORWARD

Over the last 12-18 months, innovations in fibre cable have allowed for more streamlined deployment, simplified

maintenance, flexibility and convenience of DCIs. Such advancements are expected to drive more significant gains in the future, creating more automated, efficient and reliable communication, and data transfer between data centres. In the future, DCI is expected to evolve to meet the growing demand for faster, more reliable and more efficient data transfer. With the emergence of modern technologies such as 5G, IoT and AI, DCI will need to be more flexible, scalable and secure to handle the massive amounts of data generated by these technologies. ■



MANJA THESSIN

Manja Thessin serves as enterprise market manager for AFL, leading strategic planning and market analysis initiatives. She has more than 20 years of ICT experience in the field, as well as in design and engineering, and project management. Thessin has managed complex initiatives in data centre, education, industrial/manufacturing and healthcare.

Networks Centre and Comms Centre

Selecting the right fibre optic cable for a project can be a bit of a head scratcher. There are many variables to consider – here’s just a few:

- Fibre count where future proofing – from a single fibre up to hundreds.
- Transmission distance and data capacity – OM3, OM4 or singlemode fibres.
- The installed environment – loose tube, dry loose tube, tight buffered or ribbon constructions, as well as Construction Products Regulation (CPR) rating.
- Choice of armouring – PE sheath, metallic, CST, SWA or non-metallic.
- Does it need to be pre-terminated to ensure optimum build quality and performance?



- And, of course, price and lead time!

Networks Centre and Comms Centre have served the UK market for fibre optic cables and components for over 25 years. We stock the most extensive range of fibre cables and components in the UK and have

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accumulated a huge amount of knowledge to help customers select the correct fibre solution. We also have in house pre-termination facilities.

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Huber+Suhner

Fibre to the home (FTTH) rollout can be an expensive and resource intensive process, as well as challenging to coordinate. RESA, developed by Huber+Suhner, addresses these concerns by simplifying installation for carriers and end

need to coordinate multiple appointments with each property owner. For the second phase, the subscriber digs a trench in their garden then seamlessly installs the last part of the FTTH connection.

Reducing the carriers’ time, costs and resources spent coordinating FTTH installations, RESA can also significantly shorten the subscriber waiting list. Its plug and play functionality allows for easy, individualised adaptations based on connectivity demands.

RESA revolutionises FTTH rollouts through simplified deployments and increased subscriber flexibility. To learn more

CLICK HERE.

www.hubersuhner.com



customers alike.

With RESA, installation is split into two phases – homes passed and homes connected. In the first phase, carriers pre-install the RESA splice closure box underground in the deployment area at the border of each property, eliminating the

Excel Networking Solutions

The ExpressNet panel and cassette system by Excel Networking Solutions offers a modular and flexible solution. Users can choose from splice, MTP connectivity or LC presentation, as well as Category 6 or 6A copper modules.

The system is perfect for engineers. With its colour coded LC adaptors, they can easily identify the optical fibre grade

installed before even opening the rack. There is heather violet for OM4, aqua for OM3, blue for OS2 UPC/LC adaptors and green for the APC/LC variant.

Manufactured in chrome, these quality



panels come in 1U four slot and eight slot options, allowing for high density deployment whilst keeping U space usage down. The cassettes come in 12F



presentation, seamlessly merging into the Excel Enbeam MTP 12F method B solution, Excel standard offering, allowing the panels to

work brilliantly with customers deploying Gigabit Ethernet and 10 Gigabit Ethernet systems today, and migrating to 40 Gigabit Ethernet and higher in the future.

For more information [CLICK HERE](http://www.excel-networking.com).
www.excel-networking.com

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Making the grade

IS GAINING CERTIFICATIONS, QUALIFICATIONS AND ACCREDITATIONS REALLY WORTH IT?

Prevention is better than cure

HOW CUSTOMER REQUIREMENTS ARE DRIVING CHANGE IN DATA CENTRE SECURITY AND ACCESS CONTROL

Sizing it up

DOES THE GROWTH OF EDGE DATA CENTRES MARK THE BEGINNING OF THE END FOR HYPERSCALE FACILITIES?

EDP Europe Distribution

Flexible end to end Huber+Suhner data centre optical fibre connectivity solutions are available from stock at EDP Europe Distribution.

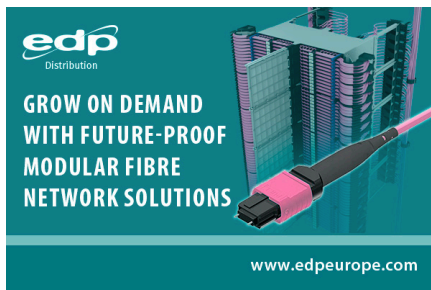
From bulk fibre that can be cut and supplied to length, cabling distribution racks (CDRs) that provide backbone and meet me room connectivity, through to high density 19-inch IANOS modular connectivity and a flexible MTP offering that enables polarity flipping and pin reconfiguration, EDP Europe can support your data centre fibre network with future proof technologies – off the shelf.

Data centres can scale their growth

efficiently and cost effectively by deploying leading edge, scalable, modular connectivity systems that provide future proof solutions from day one. The flexibility offered by Huber+Suhner's CDRs, IANOS and MTP Pro solutions provides a comprehensive foundation from

which a data centre can grow on demand and in parallel to its customers' current and future requirements.

For more information call 01376 510337, [CLICK HERE](#) to send an email or to visit the EDP Europe website [CLICK HERE](#). www.edpeurope.com



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HellermannTyton

HellermannTyton provides a complete range of multi-dwelling unit (MDU) solutions designed for the smallest of properties, the largest of properties and everything in-between.

HellermannTyton's full range of MDU optical fibre distribution enclosures adds strength, flexibility and multiple options to its FTTH product portfolio. The extended range of MDU enclosures offers a full end to end last mile fibre solution, providing installers, engineers and network designers with a wide choice of products to suit their fibre project.

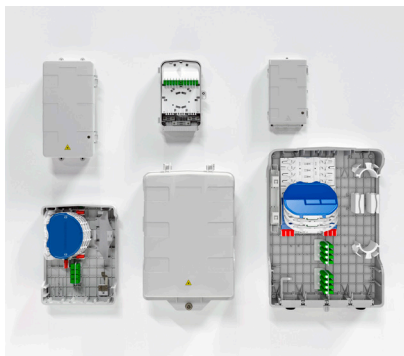
The full MDU S comprises six fibre enclosures, each offering different options depending on the building and the network

design. The largest S5 option presents capacity and pre-connectorisation, meaning high fibre count installations can be completed more quickly and easily.

The S4 and S3 are the mid-range options and can be either connectorised or splice only, accommodating up to 240 fibres (S4) or 96 fibres (S3). The S2 now comes in both a 24 and 32 customer fibre drop, whereas

the S1 and S1XS are perfect for the smaller install with up to 12 fibre connections.

To find out more [CLICK HERE](#). www.htdata.co.uk



Trend Networks

The FiberMASTER series from Trend Networks is designed for when speed and accuracy matter. It offers high performance alongside the dependable test results you need – all with minimal user training required.

Choose the FiberMASTER optical time domain reflectometer (OTDR) for Tier 2 certification, which helps users to test, troubleshoot and certify more quickly and easily. One of the smallest OTDRs available, it provides dependable accuracy at a cost of around 50 per cent less than equivalent premium models. Ideal for experienced and novice users, simply turn on and start testing. Quad, multimode,



singlemode and passive optical network (PON) models are available.

The FiberMASTER Power Meter and Light Source Kit for Tier 1 certification enables users to instantly get results on cable loss. It measures attenuation, troubleshoots multimode and singlemode cabling, and can be used with the FiberMASTER Inspection Probe, which is an essential for fibre optic measurements and troubleshooting. It also makes it possible to easily identify dirty connectors so you can clean them, instead of wasting time on unnecessary repairs.

To find out more [CLICK HERE](https://www.trend-networks.com).
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Siemon

Fibre optic cabling has become the dominant connectivity medium in today's data centre environments and continues to grow in importance for intelligent building and LAN spaces. Driven by an increasing range of applications and technologies, all demanding higher bandwidth and lower latency transmission, the challenges keep stacking up.

With Siemon fibre, you don't have to compromise.

We pride ourselves on our engineering heritage, innovation and our data centre pedigree. We've taken this passion and focused it into a truly world class portfolio of advanced fibre optic solutions, which



have been designed from the ground up to support our customers' ever changing requirements now and in the future.

Backed-up by Siemon's industry leading performance, quality and reliability, they combine to help users connect with confidence while reducing risk, maximising uptime and successfully delivering new applications and services at speed.

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Leviton

Data centres are rapidly evolving to address rising volumes of network traffic.

Faced with increasing bandwidth demand and the need to adapt and scale quickly, many organisations with small or medium data centres have moved to cloud service providers or have outsourced to colocation facilities.

In addition, many large enterprise data centres with traditional three tier architectures are changing to 'flatter' leaf-spine architectures, creating lower latency and more scalable designs. As these data centres adapt, one trend has become clear – while both cloud data centres and large enterprise data centres invest heavily

in next generation network infrastructure, they deploy different types of optics and cabling systems.



Leviton's optical fibre platforms provide performance options for installations small or large, simple or

complex. The OPT-X solutions are versatile to meet specific network demands, ensuring migration options for future bandwidth growth. You can rely on Leviton fibre cabling systems that meet your requirements.

To find out more **CLICK HERE.**
www.levitonemea.com

Centiel leads industry with sustainable UPS to help data centres achieve net zero targets



Centiel UK has launched its new StratusPower uninterruptible power supply (UPS) to provide complete peace of mind in relation to power availability, while helping data centres to achieve net zero targets.

Centiel's latest innovation leads the industry, as StratusPower shares all the benefits of the company's award winning CumulusPower three phase, true modular UPS including nine nines (99.9999999 per cent) uptime. It effectively eliminates system downtime and has class leading 97.1 per cent online efficiency to minimise running costs, true hot swap modules to eliminate human error in operation and also includes long life components to improve sustainability.

David Bond, chairman at Centiel UK, confirms, 'Data centres burn massive amounts of energy and use huge volumes of water to cool equipment, so it is essential that we work towards developing more sustainable solutions. Historically, Centiel's innovation has led to the creation of one of the most efficient and available UPS solutions on the market in CumulusPower. For the past four years we have been working to ensure our latest UPS is as sustainable as possible too.

'Like all our UPS, StratusPower is

manufactured at our factory in Switzerland. However, uniquely, it includes even higher quality components, so instead of replacing filter capacitors and cooling fans every four years, they now need replacing every 15 years, or just once during their entire 30 year design life. As a data centre has a design life of typically 25-30 years, StratusPower will last as long as the data centre. Furthermore,

at end of life, StratusPower can also be almost 100 per cent recycled.'

The three phase modular UPS StratusPower covers a power range from 50kW-1,500kW in one cabinet and can be paralleled for 3,750kW of uninterrupted clean power,

which is perfect for data centres. Like Centiel's whole range of UPS solutions, UPS cabinets are designed with scalability and flexibility in mind, and future load changes are easily accommodated by adding or removing UPS modules as required. A data centre will never outgrow a well specified StratusPower UPS and it can be constantly rightsized to ensure it always operates at the optimal point in its efficiency curve.

CLICK HERE for further information about Centiel.

www.centiel.co.uk



The times they are a changin'

Gary Bernstein of Siemon takes a closer look at the latest developments in artificial intelligence (AI) and examines what's required from the physical IT network infrastructure to cope with these new demands

▶ Hardly a day goes by without the latest developments in AI technology hitting the headlines. Back in November 2022, OpenAI introduced the ChatGPT large language model, in April 2023 GPT-4 from Microsoft's Azure OpenAI Service was released and just this May Google introduced its new Bard AI chatbot. There is no doubt AI has tremendous power to change our everyday lives. From chatbots to facial recognition to autonomous vehicles and an earlier diagnosis of diseases, the myriad of applications that AI is, or could be, deployed for seems endless.

INFINIBAND VERSUS ETHERNET

According to Statista, the global AI market is valued at 142.3bn in 2023, with finance, healthcare and the high tech/telco markets taking the lead in adoption. Taking a closer look at data centres, AI is already being utilised for the monitoring of data centre assets, for proactively detecting faults and for improving energy efficiency through better management of Power Usage Effectiveness (PUE). What we are seeing today is that AI is being utilised not only by hyperscalers, but also by many large enterprise companies.

Many of the networks supporting AI today are using InfiniBand technology. This is an interesting development given



that Ethernet is the global standard for most data centres and InfiniBand currently only holds a very small percentage of the market, traditionally for high performance computing (HPC) networks.

Now there is a battle starting between the InfiniBand market leader, Nvidia, and many of the leading Ethernet switch and chip manufacturers like Cisco, Arista and

Broadcom. Broadcom recently introduced the Jericho3-AI StrataDNX chip that will build AI clusters with Ethernet instead of InfiniBand. Regardless of the protocol, both InfiniBand and Ethernet have high bandwidth and low latency requirements that need high quality and high performance optical fibre cabling solutions.

SKYROCKETING DEMANDS

Two of the key challenges that data centres

bandwidth connections.

Nvidia's latest GPUs require anywhere from 6.5kW to more than 11kW per 6U box. When comparing these figures to a fully loaded data centre cabinet, where the average power consumption circles around 7-8kW, with a max of 15 to 20kW per entire cabinet, and you will understand how power hungry AI really is.

In terms of bandwidth, these GPUs typically require up to 8x100Gb/s (EDR) or 200Gb/s (HDR)

connections. With each GPU providing eight connections, the total bandwidth can amount to 8x200Gb/s per GPU. Jensen Huang, CEO of Nvidia, recently stated in datacenterfrontier.

com that 'Generative AI is driving exponential growth in compute requirements,' and that 'You're seeing the beginning of a 10 year transition to basically recycle or reclaim the world's data centers and build it out as accelerated computing.'

COPING MECHANISM

Extreme power and cooling requirements are forcing network managers to rethink infrastructure design and implement changes. This typically includes changing

are facing relate to extreme power needs and the associated cooling requirements for the equipment, as well as the exorbitant bandwidth needs of the graphics processing units (GPUs). Supercomputers with GPUs that run AI applications, such as Nvidia's DGX platform, draw immense amounts of power and require several high

network designs and spreading out GPU cabinets more, possibly using end of row (EoR) topologies to better cope with rising temperatures. This means that the physical distance from switches to GPUs must increase.

To facilitate longer switch to GPU connections, data centre operators may



‘Innovative new fibre enclosure systems on the market can flexibly support different fibre modules including Base-8 and Base-12 with shuttered LC, MTP pass-thru modules, and splicing modules. They allow for easy access and improved cable management.’

need to utilise more fibre cabling in addition to the typical structured fibre cabling for switch to switch connections. With these longer distances, direct attach cables (DACs) are unlikely to be a good option since these are limited to 3-5m maximum for these speeds. In addition to fibre cabling, active optical cables (AOCs) are also a viable option, since they can cover longer distances compared to DACs. The benefits of AOCs include much lower power consumption than transceivers and improved latency.

FLICK THE SWITCH

Switch to switch connections in the data centre backbone will require parallel optic technology to support rising bandwidth needs. Many of the current parallel fibre optic technology options utilise eight fibres in connection with multi-fibre push-on connectivity (MPO/MTP)

fibre connectors.

These Base-8 MPO solutions allow the adoption of either multimode or singlemode fibre and allow for easy migration to higher speeds. Enterprise data centres should consider a Base-8 MPO OM4 cabling solution when migrating to 100Gb/s and 400Gb/s, whilst cloud data centres should opt for a Base-8 MPO singlemode cabling solution when migrating to 400Gb/s and 800Gb/s speeds.

SUPPORT STRUCTURE

Innovative new fibre enclosure systems can flexibly support different fibre modules including Base-8 and Base-12 with shuttered LC, MTP pass-thru modules, and splicing modules. They allow for easy access and improved cable management.



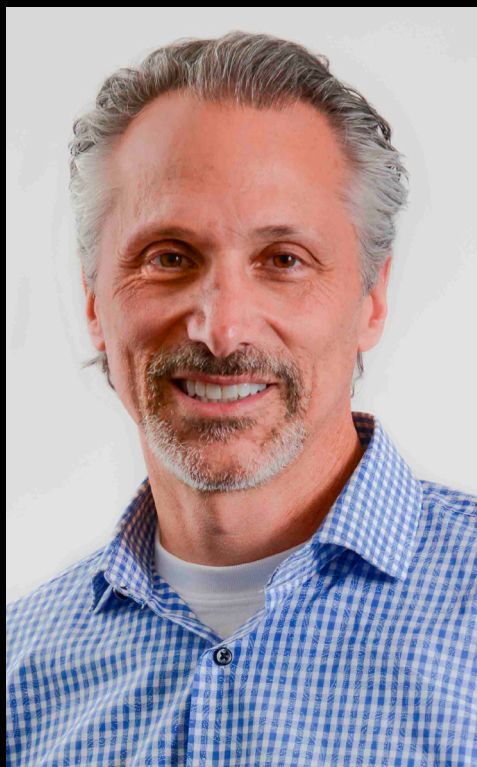
With latency becoming critical in AI applications, AI ready solutions utilise ultra-low loss performance and MTP/APC connectors. Ultra-low loss fibre connectivity should be considered when newer short reach singlemode applications (supporting 100Gb/s, 200Gb/s and 400Gb/s speeds to distances well beyond 100m) are being deployed. Ultra-low loss connectivity supports the much more stringent insertion loss requirements that AI applications demand, improving overall network performance.

Angled physical connect (APC) fibre connectors such as the MTP/APC connector for certain multimode cabling applications, in addition to singlemode, are recommended. The angle polished end face geometry of the APC, when compared to the UPC connector, improves reflectance for better fibre performance.

GET READY

AI is a disruptive technology, but it also has the potential to revolutionise the way we live and work. Data centre operators need to be prepared for the demands of AI and should start planning now. They should consider solutions that enable fast and easy migration to higher data speeds, whilst also considering how to improve the power efficiency of their data centres. Data centre operators that are prepared for the demands of AI

will be well positioned to capitalise on the opportunities AI will bring as it evolves and is adopted. ■



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 optical 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 IEEE802.3 task forces and study groups. Bernstein has spoken on data centre cabling at several industry events and authored several articles in industry trade publications.



BT lands multimillion pound British Army networks contract

BT has won a five year contract with the British Army to deliver a managed Wi-Fi service – referred to as MoD Wi-Fi. The deal will see BT provide managed secure Wi-Fi across 162 UK army sites, with the potential to expand the contract to other defence customers including the Royal Air Force and Royal Navy.

The new contract will expand on the existing 200 Ministry of Defence (MoD) sites that BT currently manages in the UK, Cyprus and Germany, following over a decade of partnering with the MoD for its Wi-Fi network requirements. It will deliver a huge digital infrastructure boost, with a managed



firewall built-in for enhanced security.

Soldiers, who may currently struggle to receive connectivity in remote base locations, will now benefit from enhanced contact with loved ones and have the ability

to relax during their downtime through access to digital platforms thanks to free, fast and reliable internet. The connectivity will also provide the foundation for smart bases to begin rolling out

over the next 12 months, enabling sites to improve the digital experience for military personnel.

Kao Data partners with Zayo to expand lit and dark fibre connectivity options

Kao Data has signed a partnership with Zayo to expand the connectivity solutions at its data centre campus in Harlow. The partnership will

see Zayo deploy two new points of presence (PoPs) at Kao Data's KLON-01 data centre, which will directly enable new multi-gigabit lit and dark fibre capabilities. The new network

connectivity will also allow enterprise organisations to connect directly from the US to Europe, while bypassing London's busy internet routes via Zeus – Zayo's ultra-

low loss subsea fibre optic cable, which runs from the UK to the Netherlands.

As one of the world's leading carriers,

Zayo operates one of the industry's largest fibre networks, and owns a Tier 1 IP backbone spanning 141,000 miles across North America and Europe. Its network provides business and mission critical connectivity to support the digital economy,

and its capabilities will further strengthen Kao Data's mission to provide a suite of world class connectivity options at its Harlow campus.



Black Nova gets the green light with Proximity Data Centres

Black Nova Designs has migrated its servers to Proximity Data Centres' Edge 7 facility in Swindon. For minimising network latency, Black Nova wanted a data centre locally based in the Swindon area, with the power and space available to scale-up web hosting and infrastructure as a service (IaaS) solutions as the business grew in line with future demand. A further prerequisite was demonstrable sustainability credentials.

The transition to Proximity's facility in Swindon was facilitated by its modular design. This allowed Black Nova's racks to be quickly and easily accommodated in a secure, dedicated 'pod', while also ensuring



energy efficient cooling. Additional 100 per cent renewably sourced power to rack is also readily available, along with further space and increased network bandwidth when required.

Proximity's 89,000ft² facility in Swindon provides capacity for up to 2,000 racks and has a Power Usage Effectiveness (PUE) of 1.3. 7MW of power is currently available with potential to increase to 14MW. With excellent road and rail infrastructure and easy access to digital fibre routes connecting London to Ireland and the USA, the Tier 3 facility is ideally positioned to serve businesses along and near to the M4 corridor.

PROJECTS & CONTRACTS IN BRIEF

Boldyn Networks and ASM Global have created the UK's first 5G neutral host arena. This collaboration brings high speed, high capacity mobile connectivity throughout the entire venue, revolutionising the visitor experience.

Nokia and Telefónica have formed an alliance to accelerate digital transformation for enterprises in Latin America, working together to offer and deploy Nokia's complete end to end portfolio of industrial grade private wireless network and digitalisation platform solutions.

Numerous departments and colleges of the University of Oxford have deployed Juniper Networks' cloud delivered wireless access solution driven by Mist AI. It supports central administration, libraries, student rooms, colleges and department buildings, optimising the user experience for many students, staff and visitors.

Work to upgrade South Tyneside's digital foundations with fast, reliable and future proof full fibre network connectivity is now underway after CityFibre started construction works in the Laygate area of the town.

Fluid motion

Jason Matteson of Iceotope assesses the impact of liquid cooling on modern data centre design

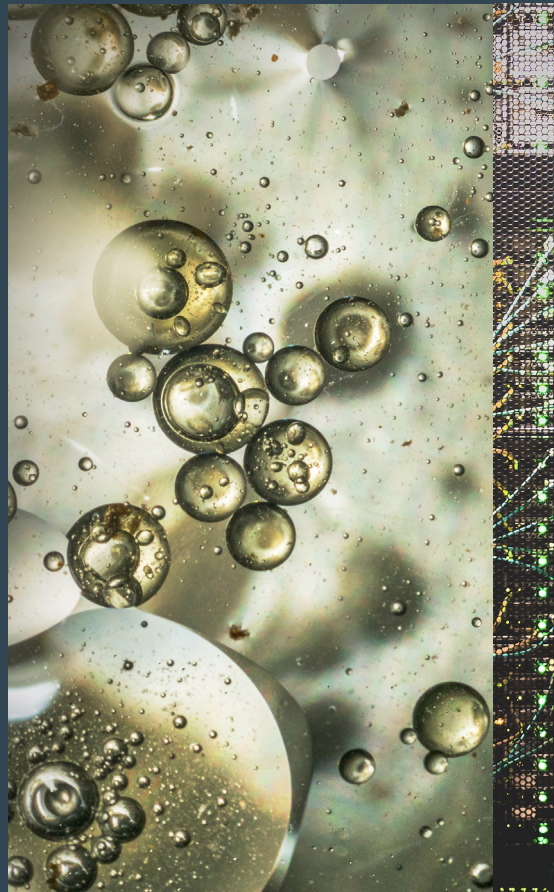
▶ The rapid advancement of high performance computing, artificial intelligence (AI) and machine learning has led to an increase in data centre rack power density. According to the Uptime Institute's 2022 Global Data Center Survey, the largest data centre facilities at 10MW and above – predominantly used by enterprise and cloud service providers – now have over half of their racks operating at power levels exceeding 20kW. Shockingly, one in five racks run above 40kW, with some even reaching a staggering 70kW. These escalating rack densities and compute intensive workloads are placing tremendous demands on data centre cooling systems. Traditional air cooling technologies are no longer sufficient to handle the processing requirements of these applications.

OVERCOMING THE OBSTACLES

I recall a time when addressing power density meant using bigger fans and larger heat sinks. By the early 2000s we were designing solutions for central processing units (CPUs) up to 80W. The struggle to cope with power density had begun, with many engineers viewing it as a cooling problem within the facility. Instead of filling a 42U rack with 1U servers, they would half populate with ~20 1U servers because they were running out of power and cooling. We found ourselves constantly pushing the limits of air cooling technologies as densities increased. Mechanical, power and acoustic restrictions became significant obstacles.

Today, where liquid cooling was once

an option, it is now essential. Data driven applications are demanding increasingly high performance processors, and the top end of the market is witnessing the deployment of CPUs and graphics processing units (GPUs) with power levels regularly exceeding 300W-400W. It is highly likely that these power levels will double or even triple in the next 5-7 years.



Intel researchers have even envisioned a future where chip density increases tenfold, paving the way for a trillion transistors on a single chip package by 2030. Considering these projections, there is an obvious convergence point with industry sustainability and net zero targets.

DRIVING DEMAND

The driving force behind the demand for liquid cooling is the emergence of new applications. While all data centres, including colocation facilities, can benefit from increased density and efficiency, specific sectors stand to gain even more.

For instance, in banking and finance, shaving off a fraction of a second from an electronic trade through the application of AI and machine learning algorithms can result in substantial savings ranging from hundreds of thousands to millions of dollars.

The healthcare industry provides another compelling example. AI powered solutions are addressing routine and administrative tasks on a daily basis. Advanced AI algorithms are being developed to analyse multiple sources of data, identifying patterns in diseases and providing insights for treatment and care. Soon, healthcare systems will have the ability to predict an individual's risk of certain diseases and recommend preventive measures.

NEED FOR SPEED

For oil exploration, which often takes place in harsh conditions, high performance computing is crucial. These environments require the rapid processing of massive amounts of data. With edge networking supported by advanced processing and maximum efficiency cooling, these high performance applications can be located on the drill rigs, allowing analytics to be carried out at the data source.

Smart cities rely heavily on edge computing generating, collecting, consuming and analysing data through an extensive network of interconnected devices. For instance, autonomous vehicles rely on sensors to learn from drivers and analyse road hazards, communicating with other devices linked to traffic signals, central control systems and emergency services in real time. Processing data at the edge necessitates secure and



efficient cooling technology with minimal maintenance requirements.

NEW APPLICATIONS

While liquid cooling is most frequently thought of in the context of servers, it's also addressing challenges in storage infrastructure. High capacity hard disk drives (HDDs), typically found in a 3.5-inch form factor, are the preferred choice for storing 90 per cent of exabytes in cloud data centres due to their cost effective scalability. The current top of the range HDD has a capacity of 20TB, but it is expected to reach 120+TB within the same form factor by the end of the decade,

across the rack height, with lower devices benefiting from cooler airflow from the floor upwards.

SOLUTION PROVIDER

Liquid cooling provides a solution to mitigate these variances and enhance consistency. A Meta study conducted in 2022 demonstrated the efficiency of precision liquid cooling in re-engineering an air cooled, high density storage system. The results showed a mere 3°C temperature variance across all HDDs, regardless of their location within the just a bunch of disks (JBODs) or the rack. HDD systems could reliably operate at rack water inlet

'As data storage increases, spinning disks, higher speed motors and more actuators consume more power and generate additional heat.'

according to Seagate.

The growing storage demands pose thermal cooling challenges. As data storage increases, spinning disks, higher speed motors and more actuators consume more power and generate additional heat. Helium filled drives, introduced in the last decade, have improved performance by reducing disk drag and providing a sealed unit.

Traditional air cooling methods for high density HDDs draw air from the front to the back of the system, leading to significant temperature differentials between the disks. This can result in variances of up to 20°C depending on the drive's capacity. Inconsistent temperatures lead to uneven wear and tear, increasing the risk of unpredictable drive failure. Similar temperature gradients can exist

temperatures up to 40°C, with the cooling power accounting for less than five per cent of total power consumption.

As the demand for data storage continues to rise, hyperscale data centre providers must find efficient cooling solutions. Precision liquid cooling for high density storage offers a viable alternative, ensuring consistent temperatures, reducing fan vibrations, consuming less power overall and improving environmental, social and governance (ESG) compliance. Embracing this technology not only benefits the environment but also aligns with business objectives in the face of increasing energy efficiency and sustainability demands.

THE NEXT ERA OF COOLING

Businesses, governments, ecologists and

the public are increasingly concerned about sustainability, making it a top priority. Liquid cooling has emerged as the preferred solution for efficiently and cost effectively managing increasing heat loads.

Understanding the different types of liquid cooling is crucial. Direct to chip cooling offers the highest performance at the chip level but still requires air cooling. Tank immersion solutions require a complete reimagining of data centre design. Precision liquid cooling, on the other hand, can eliminate nearly 100 per cent of the heat generated by electronic components, while reducing energy consumption by up to 40 per cent and water usage by 90 per cent using familiar form factors.

Precision liquid cooling utilises a small amount of dielectric coolant to accurately target and remove heat from the hottest components of a server, ensuring maximum efficiency and reliability. This approach eliminates the need for traditional air cooling systems and provides greater flexibility in designing IT solutions. There are no hotspots that could impede performance, no wasted physical space dedicated to unnecessary cooling infrastructure and minimal water consumption. Most importantly, it uses the same rack based architecture as air cooled systems and fits to existing deployed infrastructure.

MAKING A MOVE

The transition to liquid cooling is well underway as the data centre industry strives to meet sustainability demands with enhanced efficiency, flexibility and scalability – all while satisfying the performance requirements of advanced

computing workloads. The question now is whether we are ready to embrace these new technologies to overcome the challenges facing the industry. I firmly believe that we are prepared and liquid cooling will play a leading role in helping us achieve our goals. ■



JASON MATTESON

Jason Matteson is director of product strategy at Iceotope. Prior to being with Iceotope, he spent 22 years in the electronics cooling industry, working at IBM, Lenovo and Vertiv. In addition to development roles, Matteson contributes to several industry consortiums and his roles within ASHRAE TC9.9 have included chair, vice chair, voting member and IT subcommittee member. He has 72 US patents and has authored, or co-authored, several intellectual property publications, and given several presentations about industry power and cooling trends at various technical symposiums and conferences.

EcoCooling

As electricity costs rise and demand for data and digital infrastructure increases, data centres are looking at ways to reduce energy usage. Removing refrigeration and installing fresh air cooling is an option and can help save up to 90 per cent on your data centre cooling energy costs.

Manufactured in the UK, EcoCooling's award winning plug and play CloudCooler range utilises direct fresh air cooling. The free cooling capability provides maximum energy savings the majority of the time in the UK, while the ultra-efficient adiabatic cooling



eliminates the need for refrigeration on hot days.

With over 250 installations across the UK, EcoCooling is the go-to cooling provider for Europe's most efficient data centres and telecommunications facilities. If you're thinking about an install, our engineering team can work with you to ensure EcoCooling is the right solution for your facility and budget, providing estimates

for running and capital costs.

To find out more [CLICK HERE](http://www.ecocooling.co.uk).
www.ecocooling.co.uk

EDP Data Centre Solutions

With more than 30 years' experience in the data centre space, EDP Data Centre Solutions (DCS) designs, manufactures and installs bespoke aisle containment systems for use in retrofit, new build and hyperscale projects. Operating out of multiple locations in the UK, Netherlands and USA, EDP DCS can support its clients across the world.

Aisle containment is a recognised solution for optimising data centre airflow management and cooling systems, and plays a central role in operational performance and energy efficiency. Custom engineered hot aisle

containment and cold aisle containment systems are designed to be supported from a raised floor or suspended from

overhead structural ceiling grids. Modular designs enable customers to scale with growth on demand, with solutions integrating with other critical data, power and fire suppression services.

All EDP DCS aisle containment systems utilise our advanced aisle containment doors, which provide greater stability, a synchronised sliding action and full 1200mm aisle opening.

[CLICK HERE](http://www.edpeurope.com/dcs) to find out more, call our sales team on 01376 501337 or [CLICK HERE](mailto:info@edpeurope.com) to send an email.
www.edpeurope.com/dcs



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 the 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](http://www.austin-hughes.com).
www.austin-hughes.com

Panduit

Panduit has extended its FlexFusion range with the new XGL Series cabinets. Designed for network and server equipment, and providing maximum capacity to manage high cable density in data centre, enterprise or colocation deployments, they are available with lockable door solutions, offering a secure cabinet for 19-inch rackmount IT equipment. They also have extensive cable management options and are suitable for hot aisle/cold aisle or thermal containment deployment.

Manufactured in welded steel, the cabinets come in fixed configurations of 600mm and 800mm widths, 1,070mm and 1,200mm depths, and 42RU and 48RU heights.



The front single hinge door and split hinged rear doors provide 80 per cent open perforation, maximising the cooling airflow to the IT equipment, while maintaining strength and rigidity.

Offering a 170° door open angle to minimise aisle obstruction, they have horizontally split side panels for ease of interconnection in a side by side configuration. Meanwhile, a brush cable top on the cabinet entry points greatly reduces air leakage. They retain maximum scalability for future moves, adds and changes, and offer a massive static weight capacity of nearly 1.6 tons and a rolling load of up to 454kg.

To find out more [CLICK HERE](http://www.panduit.com).
www.panduit.com

Direction of travel

Paul Mellon of Stellium Datacenters looks at where the data centre sector can go with liquid and immersion cooling

▶ There are almost 3,000 data centres in Europe alone, with another 3,000 in North America. These are made up of cooling platforms that deliver Power Usage Effectiveness (PUE) ratings from +2.0 to sub 1.3.

GRAND DESIGNS

There are a number of methods of cooling these facilities:

- Direct exchange (DX) cooling – optimum cooling capacity of racks sub 15kW
- Chilled water using computer room air conditioning (CRAC) units (many using adiabatic) – optimum cooling capacity of racks sub 15kW
- Indirect air (many using adiabatic) – optimum cooling capacity of racks sub 15kW
- Direct air (many using adiabatic) – optimum cooling capacity of racks sub 15kW
- In-row/rear door/on-chip cooling (using sealed cooling circuits) – optimum cooling capacity of racks sub 200kW
- Immersion cooling (using sealed dielectric cooling fluid circuits) – optimum cooling capacity of racks sub 200kW

As a backdrop to considering the optimum cooling solutions for data centres, the industry has experienced unprecedented growth over the last 18 months following

the Covid-19 pandemic. In addition, Europe has been imbedded in the political crisis in Ukraine, which looks like it will not end any time soon. This has resulted in an energy crisis in Europe, which besides causing considerable energy supply issues, has resulted in European countries accelerating the programme of eliminating carbon emitting electrical generating stations. The data centre industry has been responding very positively to the zero carbon emissions programme.

HOT TOPIC

Climate change has resulted in higher temperatures during summer months, causing numerous data centre failures



in regions where these excessive temperatures have exceeded design operating parameters. Traditional client platforms demanded we present cooling air to the rack at 24°C. There was always some scope to push the input air envelope to the ASHRAE standard of 27°C, but for those in the colocation business that leaves no scope for alert/response to potential temperature breaches.

High performance computing (HPC) now demands a different approach to temperature in racks. With core chip operating temperatures now at +90°C, we can now contemplate presenting cool air to racks at +35°C.

THE COOLING CHALLENGE

Going forward, what are the options for the 3,000 or so existing data centres in Europe

that find themselves facing the challenge of zero carbon, high energy prices, higher temperatures due to climate change and client migration to HPC applications?

• Chilled water

This offers a wide range of options within what is very much a traditional data centre solution. This is based around central chillers, pumped ring main and CRAC units. Add to this the HPC scalability that comes with in-row cooling, rear door cooling and on-chip cooling, and this becomes a very flexible solution.

Traditional chilled water cooling solutions will achieve PUEs of 1.3. When you drop in the HPC requirement into this solution you can get a PUE of sub 1.2. This solution can deal with rack densities up to 200kW. All this without going down the road of immersion cooling.

Even combined with rack power densities of 100kW, the rack weight remains within the capability of standard raised floors. For higher power densities there are raised floors now capable of 25kN and more, at prices pretty close to 12kN raised floors. This solution fits many/if not all the data centres with subfloor infrastructure.

Hybrid and free cooling chillers can be easily swapped for existing infrastructure. The chilled water solution provides those existing data centres with a route to zero carbon using tried and tested systems and processes. They are not bespoke and can be adapted to a wide range of power density applications.

• Indirect and direct air

Whilst they have inherent power density limitations from 15kW and above per rack,



‘HPC now demands a different approach to temperature in racks. With core chip operating temperatures now at +90°C, we can now contemplate presenting cool air to racks at +35°C.’

they are very efficient. Both systems still have a place in the industry for low density racks up to 15kW per rack. They do depend heavily on adiabatic and mechanical direct expansion (DX) cooling for the higher climate temperatures and will continue to do so.

Their dependency on both water and refrigerant cooling will have them on the zero carbon target list. That said, they are very efficient and can deliver a PUE of 1.2. Most direct and indirect air cooling solutions do not have suspended floors and a quite low finished floor level to the ceiling, so will struggle to superimpose an additional cooling solution overhead. Overhead is not the optimum solution for wet cooling solutions with the potential for leaks and space for hybrid chillers and/or free cooling chillers will be a problem.

• Immersion cooling

For this to work across a European base of 3,000 data centres it would require concurrently an evolution and revolution. Colocation, by its nature, has to be many things to many clients. Immersion cooling demands a lot of change and is quite inflexible to an industry that demands flexibility.

From a historical perspective, immersion cooling has evolved from bespoke mainframe computer applications. These go back several years when the cooling was largely immersion within almost a standard rack framework. These ranged in power density from 90kW racks up to 125kW racks. It employed direct cooling, where the servers were immersed in a dielectric liquid that was pumped around the server and resulted in removing heat within defined parameters. The coolant was delivered at 35°C and taken away at 45°C.

The racks typically were 1,500kg-2,000kg in weight and so demanded



substantially more than a normal data centre 12kN suspended floor. Things have improved substantially in terms of racks, now up to 200kW. PUEs of sub 1.2 are easily achievable. There is a wide

range of immersion solutions, many of which are tanks (not IT racks) containing the dielectric fluid to take away the heat. These have very specific requirements for connecting power, IT comms and dielectric fluid. Even the dielectric fluid in many applications has unique properties that demand careful consideration of floor covering, cable insulation material, as well as human health and safety.

Remote hands support for colocation providers takes on altogether different services and timescales for immersion cooling. I envisage the application of immersion cooling will remain a bespoke application to particular IT HPC applications.

• DX cooling

This is at the bottom of the list in terms of efficiency and green credentials. There will always be applications for DX cooling but they are getting fewer, mainly due to refrigerant gas and efficiency.



LEARNING CURVE

One of the significant questions is how the implementation of HPC will change the landscape of data centres of the future. For instance, a 20MW HPC requirement corresponds to 250 racks. This equates to a single 900m² data hall but the external engineering platform of several similar data halls.

However, this particular story is not yet complete. Several projects are running continuously in the industry to drive the revolution to zero carbon emissions. Many of these are around what happens

in the rack from a client's perspective. Therefore, we must continue to participate, observe and digest industry output to find the optimum route forward in terms of practicality, efficiency and zero carbon emissions.

ADAPT AND SURVIVE

Since we are not likely to abandon all 6,000 of the existing European and North America data centres, we need to consider charting the design and engineering route to optimise the performance of these facilities. ■



PAUL MELLON

Paul Mellon is operations director at Stellium Datacenters. He has more than 25 years' experience of facilities management in mission critical environments, with considerable experience in the design, implementation and operation of large scale data centres in Ireland and Europe. Mellon has also developed processes to support uptime requirements for Tier III+ data centres, and has implemented service operations to ISO 9001, OHS 18001, ISO 14001, ISO 22301 and ISO 27001 standards.

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Data Center+IT Collaboration To Cut Carbon is a white paper from **Serverfarm** that looks into why it's time to end siloed thinking and actions to tackle sustainability across data centres and IT.

CLICK HERE to download a copy.

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Progress at your own

Stephan Robineau of Alcatel-Lucent Enterprise looks at how network as a service (NaaS) can help ensure a smooth digital transformation

▶ When the Covid-19 pandemic hit, the focus on network systems to support business priorities increased drastically. A greater reliance on digital connectivity meant the safe scaling-up of systems for more efficient remote working and secure communications became a top concern.

MONEY TALKS

As wariness of an economic slowdown grows, the cost of digital transformation can be overwhelming. Capital expenditure (CapEx) based solutions often come with a higher upfront fee in order to provide and install the equipment necessary to bolster enterprise networks. This large instant investment is not always in the budget for businesses, especially if they are still trialling the options available and searching for the solution that works for them.

With an array of solutions to choose from when transforming an organisation's network infrastructure, selecting the most suitable option for a specific business model can take time. This hesitation may result in organisations missing out on prime opportunities to scale-up network operations and make processes more efficient for end users. Risk taking in a fluctuating economic business environment is critical in keeping the pace of acceleration with digital transformation. Otherwise, the inroads that businesses made towards

cloud, internet of things (IoT) and other advanced tech to cope with the influx of demand during the pandemic would grind to a screeching halt.



n pace

GROWING UP

Without the appropriate level of investment into digital innovation, an organisation's opportunity to grow its own functionalities and features suffers. In fact, declining any opportunity to install new networking equipment to scale



business could leave an organisation and its customers open to malfunction, downtime or even cyberthreat.

Digital transformation remains, therefore, a high priority for businesses across many industries. However, to get the most out of the transformation, it is crucial that organisations review the options available to revolutionise network infrastructure and implement the solutions that fit best within their trajectory. The upfront costs and installation of CapEx solutions might not be the best offer for all organisations that would prefer to spread the expense. A more agile and flexible alternative for organisations grappling with the challenges around CapEx comes in the form of NaaS.

WHAT IS NAAS?

NaaS is an offer that rolls the requirements of network equipment – whether hardware, software or services – into a flexible subscription model. NaaS increases the accessibility to superior connectivity services by spreading the costs over time, and allows continued investment towards digital transformation.

It prevents the need for a large, one time, CapEx of a new infrastructure – including installation and maintenance – which can be cost prohibitive for some organisations. NaaS subscription models can be tailored to the individual business. Some packages allow the monthly fees to be fixed for the duration of the subscription, which provides a huge benefit in periods of inflation and economic crisis. It also means that the environment is consistently up to date and secure, with options for both hardware and software support available.

Furthermore, NaaS can take the pressure

‘Adoption of NaaS also allows businesses to maintain connection with current customers by deploying services faster, experimenting with new technologies and developing new solutions.’

off IT teams that need to keep pace with the widening reach of their employer – whether it’s keeping employees around the world connected centrally or offering a secure system that’s robust enough to handle user requests. Under the terms of a subscription, organisations can outsource the management of their network to their partner, saving precious people hours, which can be used to manage their own value added services.

wireless LAN equipment hassle free and with no or minimal hardware cost, allowing rapid access to the newest technology. This lessens the need to readjust budget allocations, which can force organisations to choose between up to date network infrastructure and other business priorities.

FEATURES AND BENEFITS

Businesses looking to implement ambitious digital transformation can feel more secure in doing so with NaaS. Some of the risk and cost involved is tied to the efforts required to evolve network architecture. NaaS removes that particular unknown by being clear on costs and services provided.

The flexibility of a NaaS approach means IT teams can make changes to the network easily. This allows them to scale-up network requirements to meet increased demand, and to shift back down when capacity isn’t stretched. NaaS also allows them to refresh their network technology more frequently. For example, when it is time for businesses to implement Wi-Fi 7, IT teams will be able to swap



KNOWLEDGE IS POWER

Because NaaS is an ongoing operating cost rather than an advance capital outlay, IT teams can more confidently budget for other requirements within the business without the guesswork attached to expansion costs. Shifting networking capabilities from the CapEx column to operational expenditure (OpEx) can provide more justification for investing in infrastructure expansion as a priority. It can allow businesses to save money on a set-up that still keeps operational requirements and strategic objectives on track.

Adoption of NaaS also allows businesses to maintain connection with current

customers by deploying services faster, experimenting with new technologies and developing new solutions. They are able to free-up resources to help teams feel like they can innovate, rather than play catch-up with a network that's ineffective. It means their work towards improved systems and processes, such as an IoT enabled production plant or artificial intelligence (AI) empowered order picking process, can continue.

Creating efficiencies internally also means they can benefit customers – whether that's more dedicated people hours or more control over costs and ability to absorb changes. Freed from the constraints of outdated network architecture, IT teams can better enforce cybersecurity and work in a more agile way to solve problems and fix other issues faster.

PAVING THE WAY

Digital transformation paves the path toward improved customer

experience, organisational agility and an empowered culture in the workplace itself – whether working at home or in the office. NaaS opens potential to create opportunities to drive efficiencies, while working within acceptable organisational and budgetary constraints. ■



STEPHAN ROBINEAU

Stephan Robineau is executive vice president of the Network Business Division at Alcatel-Lucent Enterprise. Throughout his 20+ years in executive positions, he has delivered growth and innovation to transform organisations and processes for business driven automation, simplification and quality. During his time at Alcatel-Lucent Enterprise, Robineau has also innovated organisational processes with fully automated system quality assurance and agile research and development cycles to ensure repeatable quality and content adherence for hardware and software releases.

Siemon

Siemon has released an innovative upgrade to its EagleEye infrastructure management software. Siemon's EagleEye Red automated infrastructure management (AIM) software helps users better document and manage their IT network and devices.

Compliant to ISO/IEC 18598:2016 and TIA ANSI/TIA-5048 AIM standards, EagleEye Red offers a highly intuitive experience, providing a range of graphical views for rack and floor layouts, and infrastructure node hierarchies. Its network discovery protocols allow users to easily scan and find all IP based devices and position assets at their correct locations. When used in combination with Siemon's MapIT G2 connectivity hardware, both physical layer and network device



connections are updated automatically and provide an invaluable end to end circuit trace allowing users to easily

monitor, manage and maintain their network infrastructure.

A real time database provides an accurate picture of the IT infrastructure, which minimises troubleshooting time and maximises equipment and

rack utilisation. Network security is also enhanced via the detection and notification of unauthorised physical network or network device activity.

CLICK HERE to learn more about the new EagleEye Red software, Siemon's broader AIM solutions and to request a product demonstration.

www.siemon.com

CNet Training and Fluke Networks

CNet Training is strengthening its partnership with Fluke Networks with a new electrical installation and appliance testing training program.

The one day program, which is delivered at CNet Training's dedicated facility or on-site at a customer's premises, equips learners with the skills and knowledge to test electrical installations. This ensures that they are safe and guaranteed to work, and compliant with BS 7671. The program enables participants to carry out practical exercises in a hands-on environment so that they can apply this new knowledge immediately in the workplace.

The number of highly knowledgeable and experienced electrical installation test technicians in the UK has seen a significant

decline in recent years. Factors such as experienced staff approaching retirement age and being replaced by technicians learning their trade, as well as the increased deployment of temporary workers, mean that training and skills development are more important than ever before.

CNet Training and Fluke Networks are providing businesses with an opportunity to address these challenges and offer operators the action based learning needed to acquire the skills and knowledge to work accurately and safely. The training also enables businesses to prove that installations have been carried out safely and comply with industry standards.

To find out more **CLICK HERE**.

www.cnet-training.com

Allied Telesis

Allied Telesis has introduced its IE220 Series of industrial grade switches – ruggedised for enduring performance in harsh environments. These switches are hardened to withstand difficult environmental conditions such as electromagnetic noise, wide ranging temperatures, high humidity and vibration.

The IE220 Series is designed for many vertical markets and related applications, such as:

- **Building automation.** Facility management including security and access control, fire protection, energy management, heating/ventilation/air conditioning (HVAC) and lighting control.
- **Smart cities.** Public space and urban infrastructure that provides safety and security, parking management, environmental metering, lighting and information kiosks.



- **Roadway transportation.** Adaptive traffic control, telematics and preventive maintenance.

IE220 Series switches deliver high performance gigabit connectivity without compromising performance or throughput. This is thanks to dual 10Gb/s optical fibre uplinks and PoE++ gigabit interfaces offering up to 95W per port. There are two models in the IE220 Series – the IE220-6GHX, which has four PoE++ gigabit copper ports and two SFP+ 10Gb/s uplinks, and the IE220-10GHX, which has eight PoE++ gigabit copper ports and two SFP+ 10Gb/s uplinks.

For more information [CLICK HERE](http://www.alliedtelesis.com).
www.alliedtelesis.com

Fluke Networks

There are many reasons why cabling certification is more important than ever.

Every time you complete the installation of a structured cabling system, you can choose whether to certify it. All links in the system should be tested in some way to make sure that they're connected properly, but is it necessary to measure and document the performance of every link?

All cable suppliers say that if you want a long-term warranty on your installation, certification is required. There are other



benefits for the installer, too – protection in case of disputes, quality control, even your reputation among your customers and the competition.

Let's look at the value of certification for your projects in different situations. [CLICK HERE](http://www.flukenetworks.com) to learn more about cabling certification and why it's so important.
www.flukenetworks.com

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Look before you leap

Chris Wellfair of Secure IT Environments offers some food for thought regarding data centre builds

▶ When the time comes to build or upgrade a data centre, it can be quite a daunting process. On one level you understand the technology involved and the need for the data centre, but how do you turn that into a plan that can be presented to the business and has a chance of securing the budget and senior support required to make it a reality?

FIRST STEP

The starting point must be asking whether the existing data centre could support the long-term plans, energy efficiency, carbon footprint reductions and wider aspirations of the business. There are also any additional risks to the business to be considered. Sometimes the costs



of mitigating existing risks in the current infrastructure can be uneconomical, especially if they are just pushing the need for a new data centre down the road. That project will only get bigger the further away it is pushed – and inevitably more expensive.

Any new data centre project needs to be closely aligned with the future plans of the business, whether that be changes in offering, ways of working, growth targets or a desire to be seen as a more sustainable enterprise. Each of these will impact the role of the data centre, which is why it must be designed to support them, rather than just addressing an immediate technical need. Going through this process of risk assessment, business continuity and strategic planning will help determine whether an upgrade or new build is the best course of action.

PLAN OF ACTION

The next step is to build a business plan around the goals of the data centre, and this is true whether refurbishing or building new. Other parts of the decision making process need to be able to understand the value the data centre will bring, if they are to evaluate any proposition fully.

The plan should also provide an explanation of the costs included in delivering the facility, but this should be in the context of the value it will deliver and over what time that will be realised. If a data centre is linked to a specific event in

‘Where your data centre will be located is a convenient location. Planning laws and floodplains, power and other connections are deciding location and the best form of

the business, such as moving to a new site, then the need is clear. However, one of the biggest challenges for senior IT



ed is not just about choosing a
and building control regulations,
ctivity availability will all play a role in
factor to use.’

decision makers and data centre managers
is securing budget where the value gained
from the investment is less clear.



BIGGER PICTURE

One of the most often overlooked aspects of designing a data centre is that you are not just designing the physical data centre infrastructure and building it. From the day the data centre is opened, training, certification and ongoing maintenance need be in place, along with processes to ensure its smooth running and that the correct actions are taken when a problem occurs.

Choosing the right partner to support the design, build and maintenance of a data centre is key. An experienced partner can bring decades of experience to the project, as well as offering support and optimisation services that can help ensure the data centre runs at maximum efficiency and mitigates ongoing risks through proactive maintenance. Do your research – choose a partner you can be sure is financially secure and able to support the lifetime of your new data centre.

KEY CONSIDERATIONS

Whether you are upgrading an existing data centre, expanding or

starting a brand new data centre project, the following considerations should be a key part of determining your needs and requirements. Depending on the goals of the project, there will be other areas to consider too, but the following areas will be great starting point:

- Pre-planning

Where your data centre will be located is not just about choosing a convenient location. Planning laws and building control regulations, floodplains, power and other connectivity availability will all play a role in deciding location and the best form factor to use.

- Redundancy

Is your data centre mission critical, or is it a redundant mirror? Whether N, N+1 or even N+4, this has a significant impact on the space requirements, cost and design. Redundancy is not an area to compromise on.

- Physical security

Is your data centre going to be in an existing building room, a compound, a freestanding unit or even at an isolated and unstaffed location? From CCTV to biometric door entry and resistance to attack of panels and doors, physical security is as important as cyber and data security. Make sure your data centre reaches the right levels of the LPS1175 1-5 security level specification to protect your investment.

- Think long-term

A data centre is a long-term investment, so how does the design fit in with the long-term plans of the business? Will the business be relocating or expanding either its people or into new service areas?

These all impact the design and careful consideration of the correct solution can save substantial sums of money in the future.

- Form factor

The traditional idea of a data centre is long gone. You can fit all the traditional elements of a data centre in a cabinet that will fit silently in the corner of an office or under a desk, in an extreme location, as a modular room or even fully equipped stackable containerised units. Each has its benefits, depending on the needs of your project.

- Cooling

From efficient cold and hot aisle to liquid cooling and even submerged cooling, there are a myriad of ways to cool your data centre. It is one of the costliest aspects of a project in terms of installation and running costs. It's critical to make the right choices early in the design phase.

- Energy efficiency

Every component in a data centre has a role to play in energy efficiency – but how you use the components matters more. Environmental controls and management systems can dramatically improve efficiency and lower costs, while getting the software, sensors and configuration right can be an artform.

- Ongoing maintenance

Once your data centre is up and running, you need to look after it. Make sure you have access to training resources and the time to develop operational processes that reduce risks in the data centre, and provide preventative and proactive maintenance programmes. If you are working with a

partner, they should be doing this as part of the project and data centre handover.

CLEAR THINKING

It can be challenging to design and build a data centre, especially if the strategic direction of the wider business is unclear. Add to this the rate of change in the IT industry and new use cases coming along, such as artificial intelligence, which is seen very much as the star of the industry right now. It can be easy for these to hamper your desire to start and change will always be a barrier if you let it. Modern data centres are extremely flexible and energy efficient, so don't put off work that could lead to additional risks for the data centre and business. ■



CHRIS WELFAIR

Chris Wellfair is projects director at Secure IT Environments. He has over 20 years of experience in designing and delivering data centres in mission critical and challenging environments in a wide range of sectors including healthcare, financial services, retail and the wider public sector.

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