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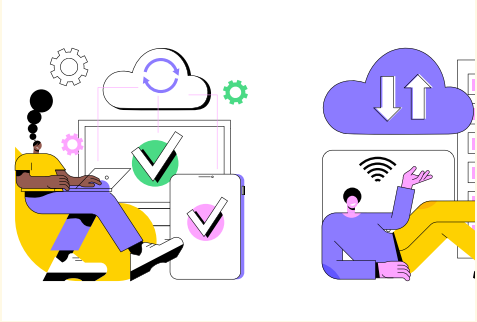

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For over 15 years The Green Grid's Power Usage Effectiveness (PUE) metric has been the go-to method of benchmarking a data centre's energy efficiency and identifying ways to improve it. Getting as close to the figure of 1.0 has become something of an industry obsession, which has led to some data centre operators making spurious claims about low PUE ratings by 'reinterpreting' the way that it should be calculated.

Sadly, despite the good intentions behind it, in many respects the PUE metric has been so misunderstood, misapplied and abused that its credibility has been severely dented. Furthermore, it only measures the energy used for the IT rather than the entire facility and doesn't consider how the electricity is sourced, the heat generated or the amount of water used for cooling.

Nvidia has now thrown its views into the mix, stating that in the era of artificial intelligence (AI), the calculations offered by the PUE metric are no longer sufficient and that a new way of measuring and improving energy efficiency is needed. So, is it time to move on? In this issue's Question Time we've asked a specially selected panel of industry representatives to answer that and suggest the best way for data centre operators to accurately assess their energy performance and efficiency.

Edge data centres continue to offer numerous benefits including reduced latency by processing data closer to the source, which improves performance for real-time applications. We take an in-depth look at the latest developments in this area and Chad McCarthy of nLighten examines how edge data centres are fuelling the energy transition and bringing carbon free heat closer to customers. Chad is joined by Chris Coward of BCS, who discusses how edge solutions promise to benefit a wide range of sectors, while Mark Lewis of Pulsant explains how adopting an edge architecture can help to implement the lessons of the CrowdStrike outage.

We also have a special feature dedicated to sustainable network infrastructures with two excellent articles. First up, our old friend Brian Duval looks back at nearly two decades of being involved in Siemon's environmental efforts and offers his view of how long-term sustainability goals can truly be achieved. Dean Boyle of EkkoSense then goes on to explain why establishing clear accountability around data centre sustainability reporting is so important.

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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UK's data centres designated as critical national infrastructure


Peter Kyle

The UK government has designated data centres as critical national infrastructure (CNI) to bolster their protection against cyberattacks and IT blackouts. This move reflects the nation's increasing reliance on data centres for essential digital services, making their security and resilience a top priority.

The elevation of data centres to CNI is the first designation of its kind in almost a decade, since the space and defence sectors gained the same status in 2015. The UK now recognises 14 sectors as CNI. A dedicated CNI data infrastructure team, composed of senior government officials, will be established to monitor and anticipate potential threats. This team will ensure prioritised access to security agencies including the National Cyber Security Centre (NCSC) and coordinate with emergency services in the event of an incident.

'Data centres are the engines of modern life – they power the digital economy and keep our most personal information safe,' commented Peter Kyle, secretary of state for science, innovation and technology. 'Bringing data centres into the CNI regime will allow better coordination and cooperation with the government against cyber criminals and unexpected events.'

Almost all organisations now recognise the crucial role of AI


David Terrar

Appetite for the potential of artificial intelligence (AI) projects is at an all-time high, according to research conducted by the Cloud Industry Forum, which revealed that 42 per cent of businesses now consider it to be their most important IT project. It ranks ahead of other considerations such as security, IT sustainability (both 40 per cent) and controlling costs (38 per cent).

AI's prominence in modern business is also supported by the finding that 96 per cent of organisations believe it will be at least somewhat important to their organisation in the next five years. This figure is a significant increase from 2023, when 86 per cent of organisations reported the same.

David Terrar, CEO at the Cloud Industry Forum, said, 'As with any new technology, AI was met with some scepticism during its rise to prominence. The data from this year's report indicates that much of the remaining scepticism has been entirely quashed. Businesses are now further informed and fully on board with AI's ability to reduce costs, save time and enhance their offerings.'

Electrotechnical and engineering services companies still struggle to find suitably qualified candidates

The latest Building Engineering Business Survey, carried out by ECA in partnership with BESA, SELECT and SNIPEF, has revealed that electrotechnical and engineering services businesses struggle to find suitably qualified candidates to fill vacancies. Of the 125 businesses surveyed, 46 per cent are currently looking to fill vacancies in their organisations. Of those respondents, 47 per cent said that candidate pay expectations are too high, and 46 per cent said applicants consistently lack sufficient knowledge or skills for the job.


Andrew Eldred

Considering these findings, ECA has welcomed recent comments from education secretary, Bridget Phillipson, encouraging more young people to consider apprenticeships as a viable alternative to university. The ECA's chief operating officer, Andrew Eldred, said, 'For her statements to have any sort of impact, her government must work closely with industry leaders, educators and business owners, and listen to electricians themselves about what to do to make this happen.'

Carbon3IT secures building deal for its National Data Centre Academy

Carbon3IT has secured a lease for a building in Leamington Spa for its National Data Centre Academy. Assisted by the Data Centre Alliance, Innovate UK, TechUK and other trade partners, it will offer practical training to new graduates, existing data centre personnel, military veterans and those with transferable skills looking to move into the growing data centre sector. The currently disused office building is in the process of being converted to provide three technical training areas, classrooms and a showcase environment.


John Booth

John Booth, managing director at Carbon3IT, commented, 'The growth of cloud computing and artificial intelligence (AI) means more data centres and digital infrastructure will have to be built. What we're doing aims to reduce the environmental impact of these facilities and make data centres more sustainable in the long run. We're already working on several projects relating to data centre energy efficiency and sustainability and the National Data Centre Academy is a natural extension of our activities to date.'

67 per cent of IT decision makers now blend public cloud with on-premise solutions


Stewart Laing

Asanti has found that 67 per cent of IT decision makers favour a hybrid hosting infrastructure over a cloud-first strategy and 94 per cent of businesses using public cloud would take a different approach to migration, given the challenges they have faced when moving it. This indicates that many organisations now view blending public cloud with on-premise solutions as the optimal approach to managing IT infrastructure.

Asanti's research surveyed 100 senior IT decision makers, with 77 per cent of respondents reporting that operating costs in the public cloud were higher than anticipated, and 63 per cent stating these costs exceeded those of their previous non-public cloud models. 98 per cent said that they faced difficulties during their migration to the public cloud, with 57 per cent reporting that the move to public cloud took longer than expected, often leading to disruptions in business operations and escalating costs.

Stewart Laing, CEO of Asanti, commented, 'With such a high percentage of organisations bringing applications back to on-premise or colocation data centres, you have to wonder what exactly cloud providers were promising when they sold these packages. It's clear now that defaulting to a cloud-first strategy may not be the best approach.'

Demand for specialised AI tech talent surges across North America


Colin Yasukochi

Demand for tech workers in artificial intelligence (AI) has increased, despite slower tech talent job growth overall last year, according to CBRE's annual Scoring Tech Talent report. For the first time in the report's 11-year history, non-tech industries hired more tech talent workers than the tech industry.

US tech talent employment grew by 3.6 per cent in 2023, down from 7.3 per cent in 2022. Strong demand for AI software and hardware developers has resulted in higher wages in top tech talent markets. Tech industry wages are 17 per cent higher than the US average and software developers at tech companies saw wages increase 12 per cent year-on-year, despite layoffs in the sector. The San Francisco Bay Area, Seattle and New York Metro had the highest average annual tech wages in 2023.

'Increased demand for specialised skill sets in AI has fuelled tech talent job growth across all sectors,' said Colin Yasukochi, executive director of CBRE's Tech Insights Center. 'We anticipate more tech hiring to take place this year and into 2025 as companies further develop and adopt this technology.'

Optical fibre industry mourns the loss of Richard Ednay


Richard Ednay

It was with great sadness that Inside_Networks received news of the death of Richard Ednay, renowned optical fibre expert and technical director at Optical Technology Training (OTT). He was much loved and admired by his wife Sarah, his family, friends, partners, industry colleagues and competitors, and the many people he trained around the world.

After university, Richard was employed as a software engineer with York Technology – a spin-off from the Optical Research Centre at Southampton University. He then spent time in a commercial role in the cable manufacturing industry at TCL, before setting up OTT in 1989. For many years Richard was heavily involved in standards, as chairman of the BSI committees on fibre optics and fibre optic systems. He was also on several international standards bodies and received the IEC 1906 Award for fulfilling the role of liaison officer.

Over the last decade, Richard dealt with the ravages of myeloma, long-term chemotherapy and its related side-effects. Throughout this period, he often made it look so easy to juggle the demands of his illness and his work that people forgot he had an incurable cancer. He also remained relentless in his commitment to driving up quality in the field of optical fibre.

Rob Shepherd, editor at Inside_Networks, said, 'Richard was always willing to share his views and opinions, as well as his incredible knowledge about optical fibre. I asked him once what his guiding principle was and he quoted Albert Einstein, who said, "Everything should be made as simple as possible, but no simpler." People from across the network infrastructure sector had huge respect for him and his work, and as a regular contributor to Inside_Networks I will greatly miss his insight and perspective.'

NEWS IN BRIEF

A study from Juniper Research has found quantum technology commercial revenue will rise from $2.7bn in 2024 to $9.4bn in 2030. However, the study also predicts the number of quantum computers deployed by 2030 will only reach approximately 300, reflecting the very early stage of the market and high set-up costs.

Nokia and OTE Group have achieved two new optical transmission rate world records using Nokia's Photonic Service Engine (PSE-6s) technology. The field trial, which used Nokia's 1830 PSI-M optical transport solution, ran over OTE Group's national dense wavelength division multiplexing (DWDM) network, connecting IP core data centres and routers in Greece. 800Gb/s on a single channel over 2,580km and 900Gb/s over 1,290km were achieved. The companies also demonstrated 1.2Tb/s transmission on a single channel over 255km.

Ramboll has acquired i3 Solutions Group. With this strategic acquisition, which follows the previous acquisition of EYP Mission Critical Facilities in 2022, Ramboll cements its position as a full-service data centre consulting company.

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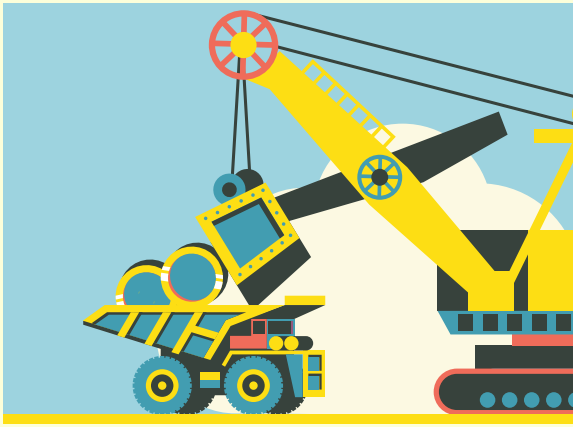
The environmental cost of

Hi Rob



The world is in the midst of an artificial intelligence (AI) gold rush. Tech giants like Meta are pouring billions into developing increasingly sophisticated models, promising to revolutionise industries from healthcare to transportation. But this relentless pursuit of AI supremacy is casting a long shadow on our planet.

The energy consumption associated with training these massive AI models is staggering. From powering data centres to the computational demands of the models themselves, the environmental footprint is immense. For example, a single training run can consume as much electricity as a small city in a year. As AI models grow larger and more complex, so too does their energy appetite.

The implications for climate change are profound. The increased demand for electricity to power these models is contributing to greenhouse gas emissions, exacerbating global warming. If left unchecked, the AI industry could become one of the primary drivers of climate change.

It's not just the training phase that's problematic. Once deployed, AI models continue to consume energy as they process data and make predictions. This ongoing energy consumption adds up, further increasing the industry's carbon footprint and greenhouse gas emissions.

Take Elon Musk, for example. His decision to halt Bitcoin payments for Tesla purchases due to its substantial environmental impact, which stems from immense computational power, raises questions about the potential ecological consequences of his own AI ventures. If the energy intensive process of cryptocurrency mining was deemed unsustainable, how can we reconcile this with the likely even greater computational demands of his AI ambitions, which could significantly increase greenhouse gas emissions?

While the potential benefits of AI are undeniable, we cannot afford to prioritise technological advancement at the expense of our planet. The time has come for the AI industry to reckon with its environmental impact.

Transparent reporting of energy consumption is a crucial first step. Companies should be required to disclose the energy used to train and operate their AI models. This would allow for greater scrutiny and accountability within the industry. Investing in green AI is another essential component of a sustainable future. Research and development into energy efficient AI algorithms and hardware must be prioritised. By developing more efficient models, the industry can reduce its energy consumption without compromising performance.

the AI gold rush

Governments also have a role to play. Implementing stricter environmental regulation for the AI industry is necessary to curb emissions. This could include carbon taxes, emissions caps and incentives for the development of green AI technologies.

The UK is a significant hub for AI and development, with companies like DeepMind driving innovation in fields such as natural language processing and healthcare. However, this rapid growth is straining the nation's energy infrastructure. The immense computational power required for AI model training places significant demands on the grid, exacerbated by underinvestment in renewable energy and grid upgrades. This escalating energy consumption poses a critical challenge, threatening to hinder the UK's AI ambitions unless there's a concerted effort to bolster the nation's energy capacity and transition to sustainable power sources.

The carbon footprint of AI training is a complex issue. Whilst it's true that AI could revolutionise energy efficiency and reduce greenhouse gas emissions by finding inefficiencies and improvements, the substantial energy consumed during its development raises concerns. The question remains whether the long-term environmental benefits of AI-driven solutions will outweigh the immediate carbon costs of training these models.

A delicate balance must be struck between harnessing AI's potential and mitigating its environmental impact.

The future of AI is in our hands. We have a choice – continue down the path of unchecked growth and risk catastrophic climate change or build a future where intelligence and ecology coexist. It's time to prioritise sustainability and ensure that the AI revolution benefits both humanity and the planet.

Russell Crampin
Axians UK

Editor's comment

It's evident that the environmental impact of AI is substantial, primarily due to the energy demands of training large language models. As Russell also explains, running AI algorithms in data centres consumes significant energy, leading to high carbon emissions. On the positive side, AI can also support environmental solutions, enhancing energy efficiency and forecasting climate changes, offering both environmental challenges and opportunities for a more sustainable future. It's clearly a subject that requires significant investigation if the environmental pros of AI are to outweigh the cons.

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Time for a change?

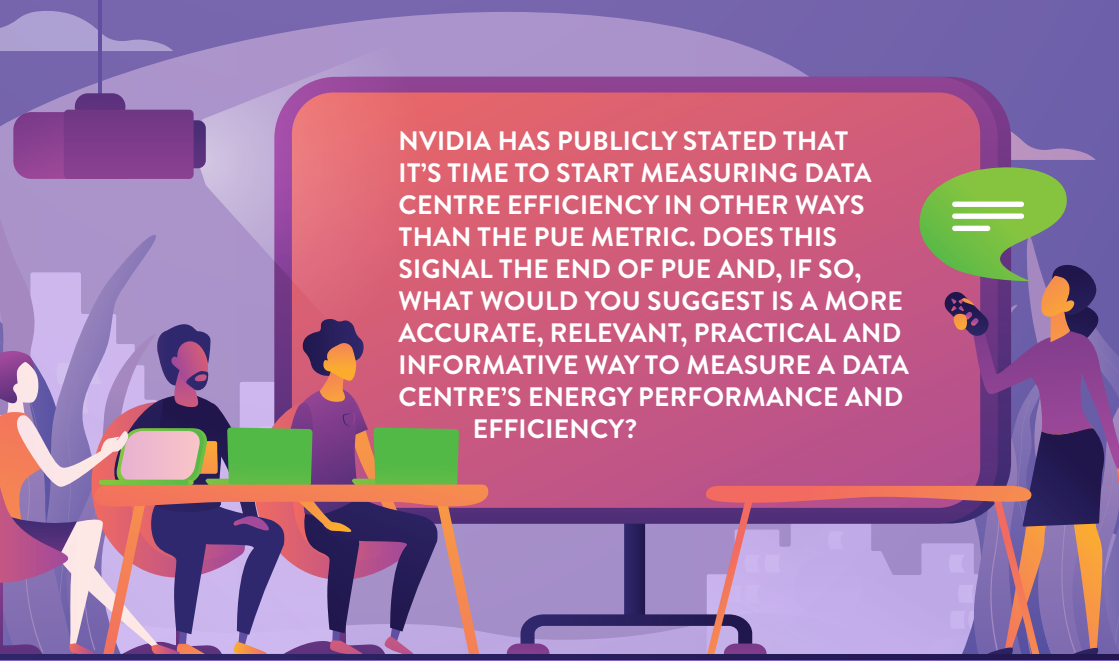
Nvidia has become the latest high-profile company to state that it's time to move on from the Power Usage Effectiveness (PUE) metric. Inside_Networks has assembled a panel of industry experts to examine whether this signals the end of PUE and suggest what could replace it

In 2007 The Green Grid introduced the PUE metric. Designed to help data centre operators measure their energy efficiency and identify areas for potential improvement, PUE is calculated by dividing the total power entering a data centre by the power consumed by the computing infrastructure within it, with the goal of achieving a ratio as close to 1.0 as possible.

Despite its widespread adoption, PUE has often been misunderstood or misapplied – sometimes deliberately. PUE measures the power delivered to the data centre infrastructure but does not account for how effectively that power is used by the IT equipment. This limitation means that PUE can sometimes provide an incomplete picture of a facility's overall energy efficiency.

Nvidia recently suggested that it may be time to move on from PUE, stating that 'Over the last 17 years, PUE has driven the most efficient operators closer to an ideal where almost no energy is wasted on processes like power conversion and cooling. But it's insufficient in today's generative artificial intelligence (GenAI) era, when workloads and the systems running them have changed dramatically.'

To assess if it's time to move on from PUE, Inside_Networks has assembled a panel of industry experts to discuss the issue.



EMMA FRYER

DIRECTOR OF PUBLIC POLICY EUROPE AT CYRUSONE

The data centre sector is unusual in that it makes such a fuss about measuring infrastructure overhead when few other industries bother. But we are absolutely right to do so. Applying a metric like this to a car journey should make you think twice if you are moving two tonnes of car around purely to post a letter. But we measure cars on MPG, not by useful activity. So PUE, or an equivalent, will continue to be an important metric. However, I think PUE is hugely problematic for the following reasons.

Firstly, we are overdependent on it. PUE is very limited in application, yet is often positioned as the ultimate source of truth. It tells you nothing about IT efficiency and is purely energy focused, so ignores wider sustainability criteria like water, embedded energy and pollution.

Secondly, although the methodology for calculating PUE is now firmly standardised, there is still variation in the way it is measured. Thirdly, PUE is expressed illogically, as a ratio, when it should be a percentage overhead. If the 1 relating to IT never changes then what on earth is the point of including it?

It is clearly confusing policymakers and we can already see the negative impacts. For instance, regulators in Germany implementing the Energy Efficiency Directive changed the PUE requirement from 1.3 to 1.2. This may not seem that ambitious to the lay observer but it actually requires an infrastructure efficiency improvement of 33.3 per cent.

In the UK, the government pushed Climate Change Agreement participants for a 15 per cent reduction in PUE. At a starting PUE of 1.5 a 15 per cent reduction would reduce target PUE to 1.275 and impose a 45 per cent infrastructure improvement. For sites with very high PUE this approach may work, but it disproportionately punishes better performing facilities. Both cases exhibit a worrying deficiency in understanding of PUE's limitations and the underlying maths.

In my view a PUE of 1.3 should be expressed as a 30 per cent overhead. A PUE of 2 would represent 100 per cent overhead, and so on. This would reduce confusion without changing the methodology in terms of what is and what is not included. Going one step further than Data Centre Efficiency (DCE), it also segregates the infrastructure element and allows the straightforward application of percentage reductions without the IT getting in the way and confusing everybody. Simples.

'PUE IS VERY LIMITED IN APPLICATION, YET IS OFTEN POSITIONED AS THE ULTIMATE SOURCE OF TRUTH. IT TELLS YOU NOTHING ABOUT IT EFFICIENCY AND IS PURELY ENERGY FOCUSED, SO IGNORES WIDER SUSTAINABILITY CRITERIA LIKE WATER, EMBEDDED ENERGY AND POLLUTION.'

JON LABAN
FREELANCE CREATIVE SYSTEMS THINKER

Why is Nvidia pushing hard for new energy efficiency metrics for data processing centres? To answer this question, I recommend reading the Nvidia Sustainability Report for fiscal year 2024 and this headline statement on page one:

'Accelerated computing took workloads that previously required tens of thousands of general-purpose servers, consuming 10x to 20x more cost and energy and compressed it into something incredibly dense. Each graphics processing unit (GPU) server is more costly and consumes more power, but an order of magnitude fewer servers are needed.'

This is a perfect example of environmental business advantage (EBA) marketing. However, this Nvidia EBA story does require some unpicking to reveal the Scope 3 greenhouse gas emissions in its environmental sustainability Pandora's box, and being aware that a single eighth GPU socket accelerated server may set you back $400,000.

PUE has been a useful metric to improve the energy efficiency of data centre mechanical, electrical and plumbing infrastructure. PUE can be useful in the future but we need to get things into perspective. With PUE we are only dealing with the mechanical, electrical and plumbing energy efficiency that is today 10-15 per cent of the total energy used by the data centre facility.

Methinks it's best to do a Pareto Analysis to find the 20 per cent of items that are contributing 80 per cent of the problems. Then start actioning these items that are causing the biggest problems to achieve the maximum returns on investment.

I would recommend investigating Hardware Utilisation Effectiveness (HUE), which can have a dramatic effect on reducing hardware and total energy. HUE improvement could involve increasing workloads on servers so that you can reduce server count by 80 per cent. Software optimisation can also produce 80 per cent reductions in server nodes. I explain these examples in my conference keynotes which are now available as on demand YouTube videos.

Another approach that will lead you to both energy and hardware efficiency is measuring and reducing greenhouse gas emissions. The data centre with the lowest greenhouse gas emissions whole life footprint will result in the best efficiency and utilisation, and the lowest financial cost with the smallest environmental footprint.

'PUE CAN BE USEFUL IN THE FUTURE BUT WE NEED TO GET THINGS INTO PERSPECTIVE. WITH PUE WE ARE ONLY DEALING WITH THE MECHANICAL, ELECTRICAL AND PLUMBING ENERGY EFFICIENCY THAT IS TODAY 10-15 PER CENT OF THE TOTAL ENERGY USED BY THE DATA CENTRE FACILITY.'

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CHAD MCCARTHY
CTO AND CO-FOUNDER AT NLIGHTEN

PUE has had a leading role in driving data centre operators along the path to greater energy efficiency. But with the increasing convergence of high-performance computing (HPC) and AI, and the resultant huge demands placed on power, PUE is no longer enough.

Its total facility energy divided by IT equipment energy formula still has a purpose, but this only looks at power consumption (electrical), not production of energy (heat) and does not distinguish between how power is sourced (fossil or renewable). Furthermore, over the years it has been open to interpretation. While it's been widely adopted across the industry, there's no absolute rule on how it should be calculated.

Nvidia says modern metrics should focus much more on quantifying the 'useful work' data centres do with the energy they consume. The jury is still out on what these metrics should look like and, as Nvidia admits, defining useful work is somewhat subjective.

However, whatever new metrics come to the fore in measuring IT/data centre energy productivity or efficiency, let's not overlook that it's not just about energy consumption. Data centres also generate substantial heat because of the operational intensity of IT equipment, especially now with GenAI workloads. But this comes at a cost – both financial and in emissions – as cooling systems may consume a considerable amount of the overall energy in a data centre facility.

Therefore, being able to precisely monitor, capture and measure the significant excess heat that IT servers generate and that can be successfully further exploited, usually displacing carbon rich sources must also be a key energy efficiency and performance consideration. Excess heat is increasingly being channelled into carbon free heat reuse applications, as part of energy sector coupling initiatives between data centres and energy providers.

Integrated Carbon Free Energy (CFE) key performance indicators (KPIs) will be a game changer for modern data centres in terms of establishing their consumption and carbon intensity effectiveness, as they increasingly transform into producers/suppliers of energy – not just consumers. This requires more holistic CFE scoring metrics.

'NVIDIA SAYS MODERN METRICS SHOULD NOW FOCUS MUCH MORE ON QUANTIFYING THE "USEFUL WORK" DATA CENTRES DO WITH THE ENERGY THEY CONSUME. THE JURY IS STILL OUT ON WHAT THESE METRICS SHOULD LOOK LIKE AND, AS NVIDIA ADMITS, DEFINING USEFUL WORK IS SOMEWHAT SUBJECTIVE.'

CARSTEN LUDWIG
MARKET MANAGER DATA CENTRES AT R&M

PUE is determined by dividing the total amount of power entering a data centre by the power used to run the IT equipment within it. The resulting ratio shows how much energy is spent on primary data centre processes in relation to secondary processes and offers insights into energy efficiency.

However, PUE doesn't help ascertain the data centre's overall effect on the environment. PUE doesn't account for the source of electricity used, for example, or the amount of water used for cooling. It doesn't consider lifecycle performance or operational practices that impact sustainability and doesn't make comparisons between data centres easier. Two data centres with identical PUEs could have vastly different carbon footprints depending on the energy sources utilised.

In short, PUE focuses on energy consumed by equipment but does not assess the efficiency or utilisation of that equipment. Underutilised servers, for example, can waste energy without reflecting negatively on PUE. To get a clearer picture, I'd suggest incorporating more factors in, or alongside, PUE measurements.

Metrics based on data gathered by data centre infrastructure management (DCIM) technology can identify inefficiencies. This helps reduce energy consumption and operational costs, supports compliance with environmental goals and legislation, and helps understand the impact of energy initiatives on key performance indicators (KPIs).

By precisely syncing power distribution unit (PDU) metering to measurements of Mb/s flowing through servers' access points, for example, you can precisely work out 'power usage per Mb operated' at server level. Based on such insights, you can pinpoint the best optimisation measures.

Incorporating AI into data centre asset management can enhance resource utilisation and decision-making. Data centre design and building can be optimised using digital twins and simulation modelling. Overall operational efficiency improvements help reduce carbon footprint.

The resulting metrics can tell us a great deal about data centre power usage that is currently not integrated into PUE. Of course, integrating analytics tools with existing management systems and workflows, and breaking down data silos to allow comprehensive data analysis, is complex and time-consuming. A holistic, cross-departmental, approach across systems, looking at every part of the data centre and its unique requirements, is key!

> 'PUE FOCUSES ON ENERGY CONSUMED BY EQUIPMENT BUT DOES NOT ASSESS THE EFFICIENCY OR UTILISATION OF THAT EQUIPMENT. UNDERUTILISED SERVERS, FOR EXAMPLE, CAN WASTE ENERGY WITHOUT REFLECTING NEGATIVELY ON PUE.'

JOHN BOOTH

MANAGING DIRECTOR AT CARBON3IT

It's a shame that Nvidia continues to propagate that PUE is a measure of data centre efficiency. It is not and has never been a measure of data centre efficiency – it is an improvement metric. You measure, implement some energy efficiency best practices such as those found in the EU Code of Conduct for Data Centres (Energy Efficiency) and then measure again.

PUE is the ratio between energy entering the data centre and the energy used to power the ICT equipment contained within – and the ideal number is 1. This means that all the energy used is directed toward the ICT and is not used for cooling and other supporting infrastructure.

PUE is also one of eight other ISO/IEC 30134 (EN 50600-4-X) data centre key performance indicators (KPIs) that cover Renewable Energy Factor (REF), IT Energy Efficiency (ITEE), IT Equipment Utilisation (ITEU), Waste Energy Reuse (ERF), Cooling Efficiency Ratio (CER), Carbon Utilisation Effectiveness (CUE) and, finally, Water Utilisation Effectiveness (WUE).

Even though the metrics suite has been available as ISO/IEC and EN standards for nearly a decade, it is rare that any operator reports more than the PUE number. This will change because of the EU Energy Efficiency Directive Delegated Act for Data Centres, which is highly likely to be adopted in some form by the UK in the near future and requires PUE, REF, ERF and WUE to be reported as per the actual standard.

Nvidia is wrong to suggest that a new metric is required, as we already have a suite of metrics. Operators just need to measure, understand what they are measuring, and then implement measures to improve the numbers. This will drive efficiency.

It should also be noted that that not all data centres are created equal – every one of them is somewhat unique or, as planning officers like to say, 'sue generis' or 'of its kind'. They all provide digital services each with their own energy profile to varying types of users, at varying levels of efficiency. So, is Nvidia searching for the unobtanium?

'NVIDIA IS WRONG TO SUGGEST THAT A NEW METRIC IS REQUIRED, AS WE ALREADY HAVE A SUITE OF METRICS. OPERATORS JUST NEED TO MEASURE, UNDERSTAND WHAT THEY ARE MEASURING, AND THEN IMPLEMENT MEASURES TO IMPROVE THE NUMBERS. THIS WILL DRIVE EFFICIENCY.'

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PANDUIT™

STEPHEN BOWES-PHIPPS

VICE PRESIDENT EMEA DATA CENTRES AND CLOUD AT STATE STREET

As most people who use PUE know, it was originally designed by the Green Grid in the mid-2000s to be a simple way of measuring improvements in the ratio of energy used purely for the IT, as opposed to the whole of the facility. Its simplicity is also its downfall:

- No account is made of differences between data centres and so comparison of PUE values is meaningless. Not that that has stopped marketing departments and/or the ignorant from doing so.
- Anything measured on the 'IT side' of the equation that is not IT (such as server fans or power over Ethernet (PoE) will skew the result.
- If your 'sustainability programme' includes consolidation and virtualisation of IT services and applications, your PUE is likely to go up rather than down – even though the proposed efficiencies may have been gained.
- Some people have tried to argue that recouping energy or reusing waste heat allows them to remove those figures from the facility load and even send some PUE values negative. There are separate key performance indicators for that.
- I have even seen some people try to calculate PUE based on the cost of energy rather than actual kWh values. If you're not using ISO/IEC 30134-2 (2016) to calculate this metric, then it's not PUE.

A real-world approach is necessary to really understand how efficiently a data centre operates. For a given number of IT services and business volume, reduced energy usage across the facility would suggest IT and data centre sustainability efforts are having a significant positive effect.

Showing PUE movement across the same timeframe means that an erroneous focus on reducing PUE as the only relevant measure is removed but it's still worth tracking because it does demonstrate how flexible your mechanical and electrical infrastructure is to fluctuating IT demand. Ideally, as your IT demand lessens, so your PUE either stays the same or, better still, reduces.

A final word though, is that measurement of energy usage, performance and efficiency isn't confined to a single data centre. An IT architecture paradigm that includes multiple data centres (whether on-premises or cloud-based) in delivering critical services would require a more holistic approach to be undertaken.

'NO ACCOUNT IS MADE OF DIFFERENCES BETWEEN DATA CENTRES AND SO COMPARISON OF PUE VALUES IS MEANINGLESS. NOT THAT THAT HAS STOPPED MARKETING DEPARTMENTS AND/OR THE IGNORANT FROM DOING SO.'

RICHARD COLLAR
TECHNICAL DIRECTOR AT KAO DATA

AI is forcing an evolution in data centre design and, with it, the infrastructure required to host all forms of intensive, power-hungry computing. The high-density nature of graphics processing unit (GPU) powered compute has necessitated a need for new power and cooling architectures and, in future, may require an evolution in performance and efficiency metrics.

PUE has long been recognised as the primary measure of data centre efficiency. Operational power remains a subjective term though and can include power at the gate, power to the white space and power to a customer. This creates a host of variable complexities with regards to the components or topologies chosen by the end-user.

The advent of water or liquid cooled AI clusters, for example, still has no widely agreed upon efficiency metric, and inevitably requires new and additional calculation methodologies. There is continued discussion as to whether components such as cooling distribution units (CDUs) should be included within IT power or facility power.

Nvidia's hypothesis that data centres and supercomputing users require new energy efficiency metrics is not without merit. It is a logical response to what could become a problematic issue for the sector, especially with continued efforts to refine energy efficiency and reach sustainability targets. Indeed, while PUE has been an excellent indicator of efficiency, it falls short in reflecting the overall performance of IT equipment and necessitates new metrics that consider both the input and output of data centre operations.

One avenue is the development of digital twins, integrating computational fluid dynamics (CFD) with IT equipment to allow for real-time optimisation of data centre efficiency, while considering the performance of fans and critical components at the rack level. Another is to track the processing capabilities of IT equipment as GPU run parallel compute, opposed to serial compute for a central processing unit (CPU).

The shift from traditional systems to GPU driven computing requires a more accurate and comprehensive metric – Watts per Arithmetic Cycle (WAC), for instance. This measures total energy consumption – including cooling and power distribution – against computational output to provide a holistic view of data centre efficiency that surpasses the limitations of PUE.

'NVIDIA'S HYPOTHESIS THAT DATA CENTRES AND SUPERCOMPUTING USERS REQUIRE NEW ENERGY EFFICIENCY METRICS IS NOT WITHOUT MERIT. IT IS A LOGICAL RESPONSE TO WHAT COULD BECOME A PROBLEMATIC ISSUE FOR THE SECTOR, ESPECIALLY WITH CONTINUED EFFORTS TO REFINE ENERGY EFFICIENCY AND REACH SUSTAINABILITY TARGETS.'

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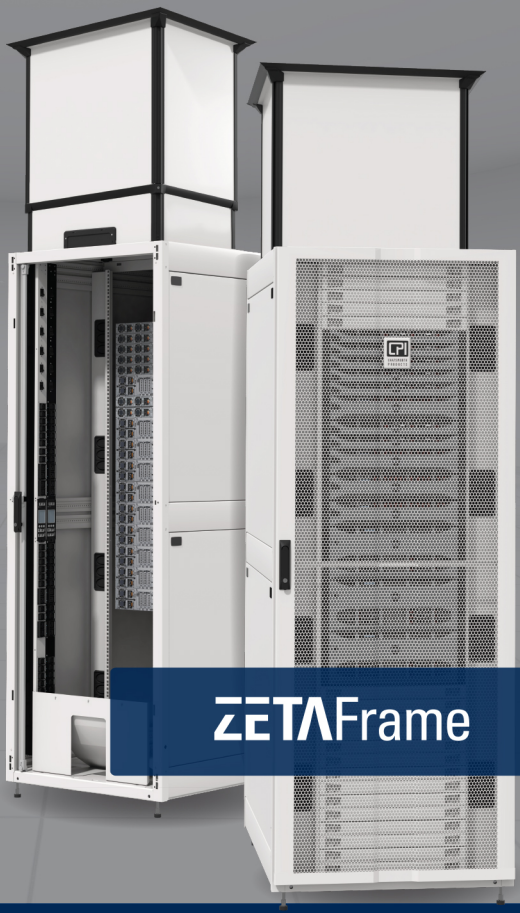

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Making a move – taking a dynamic redeployment

Dynamic redeployment is a way of moving uninterruptible power supply (UPS) modules between systems, helping data centres save on the capital expenditure (CapEx) of purchasing additional modules. Centiel's John Kreyling explains more

Most UPS suppliers require data centres to pay for a trained engineer to visit their site, armed with laptop and software, to move modules and set them up in a new system. At Centiel we don't restrict our clients in this way and have purposely designed our award-winning, true modular UPS with safe hot-swap functionality. This means any in-house team member with the appropriate first level response training can safely swap a module within a running load by themselves.

Sweet spot

This has a number of advantages. Data centre teams can manage their load better, ensuring UPS are always rightsized and that they operate at the sweet spot of their efficiency curve to save on ongoing running costs (OpEx). It takes just moments to safe hot-swap a module from a Centiel UPS which is lightly loaded and add it to another, in another part of the building that requires more capacity for another tenant.

Similarly, in the rare instance that a module incurs a problem, the faulty module can easily be swapped and sent for repair, avoiding any system downtime and the need to wait for an on-call engineer to visit the site. This can work particularly well for remote sites. Of course, Centiel offers comprehensive service contracts for clients who would prefer to work with our on-call engineers – the key is that our customers have more choice and we are led by their individual requirements.

Put in its place

For in-house teams to take advantage of dynamic redeployment, the correct infrastructure needs to be put in place. A 60kVA module cannot be redeployed into a 40kW system. Therefore, the overall system needs to be designed to enable load management with rated modules of the same size from the outset.

Furthermore, Centiel makes in-house dynamic redeployment possible because our true modular UPS eliminate single points of failure using Distributed Active Redundant Architecture (DARA). DARA's Distributed

advantage of

centiel
continuous power availability

Decision Making (DDM) technology means no single component makes decisions for the complete UPS system. DARA's architecture also ensures that any module being added to a system can be fully isolated and tested safely within a running frame before it accepts any load, giving it the ability to identify any potential problems before integrating with the rest of the system.

Response mechanism

As well as system design, to take advantage of dynamic redeployment, in-house engineers need to be trained in first level response. At Centiel we offer basic product management training, which covers remote monitoring through to more enhanced training to enable clients to monitor the performance of their UPS more closely.

When it comes to safe hot-swap of modules, this is actually a very simple process. Clients can be trained in the procedure to operate the keypad, giving them the ability to move modules as appropriate.

Plan of action

At Centiel, we work as trusted advisors and help data centres plan optimal power protection strategies right from the conceptual stage, which can include dynamic redeployment. We are led by clients and can provide as much or as little support as required to help them manage total cost of ownership and avoid risk, while not compromising on availability.

For more information, or to arrange a no obligation evaluation and discuss the best UPS to protect your organisation's critical power, CLICK HERE.

www.centiel.co.uk

Let's get serious

Dean Boyle of EkkoSense explains why establishing clear accountability around data centre sustainability reporting is so important

I've spent the last decade and a half working to develop innovative, energy efficient data centre cooling optimisation and management solutions and software. It's therefore exciting now to see environmental, social and governance (ESG) programmes, sustainability and the whole shift towards greener data starting to have some real momentum behind it in the data centre sector.

NO SURPRISES

Corporate ESG initiatives and net-zero activities often seemed to be giving data centres a pass because of their business-critical nature. But there has been a growing acceptance that if organisations are really serious about their public net-zero commitments, then every aspect of their business operation has to be considered from a sustainability perspective. Given that data centres are widely acknowledged as one of the largest corporate consumers of energy, this should come as no surprise.

There's also a recognition that the global demand for graphics processing unit (GPU) intensive generative artificial intelligence (GenAI) training and inference workloads are imposing huge challenges on today's data centre infrastructure and operations teams. Access to power, and an escalating landgrab for space, is attracting attention and placing an increased focus on the wider sustainability of data centre operations – both within organisations and externally.

We also need to consider that even though data centres became more efficient in the 10 years or so following the introduction of the Power Usage Effectiveness (PUE) metric in 2007, the last five years has seen this improvement stall. This suggests that perhaps PUE shouldn't be the only way of tracking a data centre's energy efficiency.

CLIMATE REPORTING

In the past, ESG initiatives were generally seen as part of corporate social responsibility (CSR) activities, where companies voluntarily chose to implement different measures that enhanced their

brand. However, recent regulations are increasingly evolving ESG from a voluntary effort to a mandatory requirement.

Worldwide, governments and regulatory entities are introducing new compliance criteria mandating that businesses disclose and work to reduce their environmental impact. We're now seeing a range of standards, directives and rules focused on equipping organisations with a clearer accountability framework around climate reporting and the detailing of Scope 3 emissions. Examples include:

- The European Union's Corporate Sustainability Reporting Directive (CSRD) that requires large companies and listed small to medium sized enterprises (SMEs) to produce regular reports on their environmental and social impact activities. It takes effect on 1st January 2025, with data collection required to start from 1st January 2024. CSRD will require evidence-based reporting and precise measurement of greenhouse gases data and Scope 1, 2 and 3 emissions.

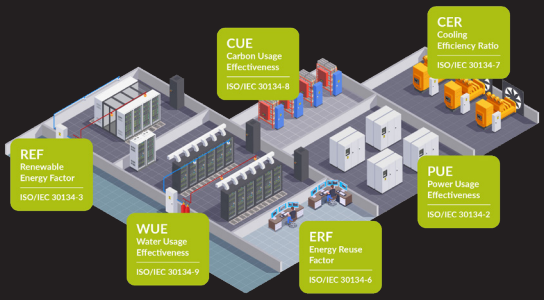
- The European Commission's Energy Efficiency Directive that was adopted in September 2023 is focused on reducing energy consumption. It includes a new obligation to monitor the energy performance of data centres, with an EU-level database collecting and publishing data. Data centres operating in the EU that use more than 2,780MWh of energy each year will be required to report publicly on their energy performance.

- The German Energy Efficiency Act (EnEfG) came into force in October 2023 and sets special targets for energy consumption effectiveness. The act sets obligatory PUE targets for data centres based on when they first began operation. If a data centre was operating before 1st

'It's difficult to unlock the kind of performance improvements that are needed to handle greater workloads and secure energy savings unless you know exactly what's happening in your data centre in real-time.'

July 2026, then it will need to have a PUE metric of 1.5 from July 2027 and 1.3 from July 2030. For those facilities operating from 1st July 2026, the PUE target will be 1.2.

- The California Climate Corporate Data Accountability Act (SB253) impacts $1bn plus revenue businesses that conduct business within the state. It requires organisations to report on their Scope 1 and Scope 2 greenhouse gas emissions for their prior fiscal year starting 2026, and Scope 3 greenhouse gas emissions by 2027. The act also requires companies to get third-party assurance of their reports.



BALANCING ACT

Data centre operators now faced with new compliance pressures to reduce their energy and carbon consumption know that this will be challenging, as they were already having to accommodate growing data centre workloads. Corporate digital transformation demands meant that their data centres were busier than ever, and this was before the further massive workload spike introduced by the advent of GenAI. The introduction of entirely new generations of high-density AI computing hardware, requiring potentially 10 times the power used by current IT racks, only serves to make the requirements of ESG compliance and carbon reduction even harder.

New sustainability legislation will require quantifiable, evidence-based reporting across the entire greenhouse gas emissions chain. While carbon offsetting and trading has formed a significant component of many organisations' sustainability and ESG programmes to date, the latest ESG directives will open this up to more rigorous justification. There will be much more focus on organisations cutting their own Scope 1 and 2 emissions, with an additional requirement to understand exactly how their activities impact other parts of their value chain through Scope 3 emissions.

For data centres this will require a comprehensive and sustained commitment to performance optimisation, with operations teams working to unlock every possible area of improvement across their own data centres, colocation service partners and edge facilities. Achieving this will require new levels of insight into existing thermal performance, power provision and capacity management – levels of insight that simply cannot be achieved by relying on traditional legacy data centre infrastructure management

(DCIM) and building management system (BMS) tools.

MAKING THE INVISIBLE VISIBLE

Reporting publicly on data centre carbon emissions will serve as a powerful driver towards improved energy performance, particularly as sustainability and ESG pressures will increasingly drive customers to data centre operations that are seen to be meeting their ESG and net-zero targets.

It's difficult to unlock the kind of performance improvements that are needed to handle greater workloads and secure energy savings unless you know exactly what's happening in your data centre in real-time. Unfortunately, a lack of insight into actual data centre cooling, power and capacity performance means that operations teams often have to over-cool because of this uncertainty. Adopting this approach on an ongoing basis effectively prevents data centre teams from sensing the true levels of performance optimisation that are achievable.

That's why it makes more sense to gather massive amounts of data from right across the facility, with no sampling. The good news is that all the relevant thermal, power and capacity data and metrics are out there, ready to be collected – operations teams just need to capture them.

DOING IT RIGHT

If data centres are to get ahead of their ESG compliance reporting requirements, it's also essential that they don't rely on outdated or manual energy performance tracking methods. We've encountered many operations where, despite extensive investment in BMS, DCIM platforms and electrical power management systems, they still have teams of people taking manual measurements in data centre halls and then manually re-entering that data into spreadsheets for ESG reporting. That's simply not a sustainable approach. ■

DEAN BOYLE

Dean Boyle co-founded EkkoSense in 2013 to help organisations resolve the thermal risks their data centres face from inefficient cooling strategies. As chief executive officer (CEO) he has a clear mission to help organisations optimise their data centre cooling costs, run leaner, and support corporate ESG programmes through quantifiable carbon savings and automated energy reporting.

Panduit

Panduit's latest power distribution unit (PDU) series – G6 PDU – integrates a best in class, low profile form factor with enhanced onboard intelligence into one data cabinet device – providing faster performance and additional power, environment and security functions, as well as cybersecurity improvements. G6 PDU can handle power up to 44kW and therefore supports the current requirements of artificial intelligence (AI) applications, also based on cabinet installation of graphics processing units (GPUs).

The low-profile design improves airflow around the rack space, while a unique outlet design offers increased density of rack IT equipment and is guaranteed to withstand temperatures of up to 60°C for extended periods at full load. This quality build allows the G6 PDU system to be offered with three-year standard and six-year extended warranty.

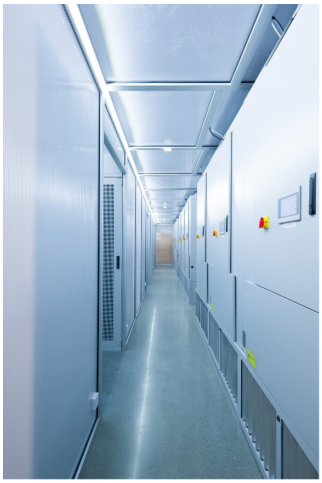
The G6 PDU has a hot swappable network module with power share for simple upgrades, and includes a high visibility OLED, two sensor ports, a serial port and quick navigation and access buttons. It provides real-time monitoring of power, environmental and physical access security through a user selectable range of environmental and rack access digital sensors that continuously scan for anomalies.

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

EcoCooling

Incorporating free or adiabatic cooling into a data centre can cut cooling electricity usage by up to 90 per cent, significantly reducing total facility power consumption.

With the recent demand for computing power increasing exponentially, fresh air cooling provides a cost-effective, green alternative to computer room air conditioning (CRAC) units, aligning with net zero strategies. Eliminating the need for refrigerant-based cooling in most European locations, fresh, filtered air is used to cool a data centre.



EcoCooling's range of direct fresh air coolers and simple infrastructure solutions are installed in some of the world's most efficient data centres. Suitable for new build or retrofit installations, they can be easily configured to run alongside existing heating, ventilation and air conditioning (HVAC) systems to achieve desired environmental conditions.

CLICK HERE to speak to us about free cooling your data centre.
www.ecocooling.co.uk

HellermannTyton

For 20 years HellermannTyton has been a pioneer in pre-terminated infrastructure with its RapidNet solution. RapidNet is the pre-terminated, pre-tested cassette-based plug and play system developed by HellermannTyton and is designed to deliver high performance and improve the ease and speed of infrastructure deployments.

HellermannTyton has now launched RapidNet Ultra, taking the existing data centre optical fibre solution beyond today's requirement. It offers an even greater fibre density, while accommodating very small form factor connectivity and supporting tomorrow's requirements for high bandwidth, advanced network architectures and Ultra Ethernet.

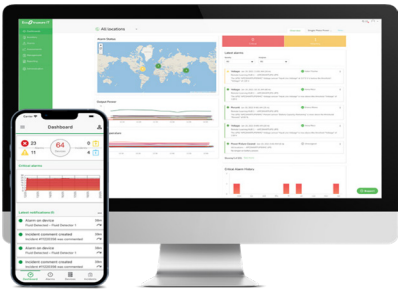
With a range of cassette formats and fibre assemblies, RapidNet Ultra delivers high performance and fibre capacity to meet the demands of the modern data centre.

To find out more about RapidNet Ultra **CLICK HERE.**

www.htdata.co.uk

Schneider Electric

Schneider Electric has model based, automated sustainability reporting features within its EcoStruxure IT data centre infrastructure management (DCIM) software. The release follows three years of strategic investment and rigorous testing and development as part of Schneider Electric's Green IT Program.



Available to all EcoStruxure IT users, the enhanced reporting features combine 20 years of sustainability, regulatory, data centre and software development expertise with advanced machine learning. Customers have access to a set of reporting capabilities, which traditionally required a deep understanding of manual data calculation methods.

The model offers customers a fast, intuitive and simple to use reporting engine to help meet imminent regulatory requirements including the European Energy Efficiency Directive (EED). With the download function, organisations can quickly quantify and report at the click of a button – making it faster and easier to harness the power of data to reduce the environmental impact of their data centres.

CLICK HERE to find out more.

www.se.com

Going on an efficiency drive

Brian Duval looks back at nearly two decades of being involved in Siemon's environmental efforts, and offers his view of how long-term sustainability goals can truly be achieved

My first efforts on sustainable business operations started about 17-18 years ago. I saw an article about a major manufacturer working towards 'zero landfill' and thought it would be worth gathering the data to see where Siemon stood. It turned out, the company was already 99 per cent non-landfill and a simple change got us to zero. I figured if our general 'waste not, want not' approach had us one per cent away from zero landfill without even knowing it, there could be other environmental wins only needing someone to shine a light on them. I ran Siemon's first internal carbon footprint analysis in 2007, and have since overseen our annual EcoVadis submittals, as well as our Science Based Targets initiative (SBTi) commitments and data capture efforts.

BOX TICKING

Two years ago, I moved from marketing to outside sales and recently spent some time reflecting on how my views about sustainability efforts have evolved since then. The sad realisation for me, at least here in the north-eastern United States, is that sustainability, and specifically environmental sustainability, is not a major day-to-day consideration among key cabling infrastructure decision-makers unless someone up at the executive level tells them it is.

For installers and distributors at the implementation and sales level, it only becomes critical if the end customer writes sustainability requirements into their specs. In those cases, the channel is understandably looking for documentation that ticks the right boxes.

At the end user level, network infrastructure teams are almost invariably responding to executive level edicts and are similarly more interested in a document that satisfies those edicts than actual sustainability details. This is not to say that they are indifferent to environmental concerns. All things being equal, they will almost invariably choose the more sustainable option – but all things are never equal, and they are facing functionality and bottom-line challenges that likely outweigh most personal commitments to sustainability.

INTANGIBLE BENEFITS

For most of the two decades that I had my hands in sustainability, I saw the main drivers shift from a combination of corporate altruism and potential marketing differentiators to altruism and organised customer/vendor pressure based on quantifiable third-party metrics. I believe we are still in that latter phase.

While there is plenty of altruism and legitimate business pressure to improve sustainability, the real environmental benefits of the evolving sustainability goals and targets are still somewhat intangible to ground-level network infrastructure decision makers. There are boxes dutifully checked and documents collected, but the efforts can be disconnected from the larger end goal.

This is exacerbated by the amount of upstream and downstream resources and time that must be dedicated to programs like the SBTi. Sure, carbon zero in 25 years is a noble goal that people are willing to pursue but driving those changes through an organisation's entire supply chain is a monumental task. There's task fatigue that can turn into frustration, which leads to employees going through the motions to meet an impersonal corporate target.

SPEAKING TERMS

I have always believed that sustainability – again, specifically environmental sustainability – efforts at a business level would be better served if we replaced terms like sustainability and green with efficiency. Ultimately, the vast majority of environmental sustainability improvements are a matter of improved efficiency, and people in the network infrastructure world understand efficiency.

As an example, it is much easier to work towards reducing power consumption in the data centre than it is to reduce data centre greenhouse gas emissions. We know intellectually that they are almost the same thing, but emissions are a few steps removed from the real-time kWh power data they have at their fingertips. A data centre manager can shut down some network equipment or adjust the cooling

'For most of the two decades that I had my hands in sustainability, I saw the main drivers shift from a combination of corporate altruism and potential marketing differentiators to altruism and organised customer/vendor pressure based on quantifiable third-party metrics.'

system by a couple of degrees and see the immediate impact, whereas calculating the impact on emissions requires a few imperfect and often shifting calculations.

Distilling larger, long-term sustainability goals into tangible acts of improved efficiency will move the needle. And that concept has some new horsepower. With the advent and exponential growth of high-performance computing (HPC) and artificial intelligence (AI), many companies have moved from 'let's save some money and help the planet by reducing computing power consumption' to 'Dear God, we're running out of power!'.

Suddenly, network teams have immediate, tangible power targets – they know what they have, they have a growing idea of what they are going to need to support HPC, and they know that the delta directly impacts their ability to deliver critical network services to their organisation. Power efficiency is no longer simply a nice goal or operational expenditure coup – it is an existential challenge – at least from a computing perspective.

DRIVERS OF INNOVATION

I personally have customers that have been forced to sideline planned HPC clusters based on a lack of power availability to run and cool the processors. If necessity is the mother of invention, desperation is its entire family.

However, that desperate need to power the HPC upon which organisations increasingly rely does have a potential silver lining, as it will put real change into action up and down the network supply

chain – from chip component makers and active equipment manufacturers to cabling suppliers to cooling vendors and software developers. Everyone will need to innovate at some level to tackle the pending power crisis. And a rising tide floats all ships.

BRIDGING THE GAP

Personally, my goals haven't varied much over the years. After seeing how sustainable Siemon's operations were based largely on general business efficiency efforts, I realised that the best way to truly drive meaningful sustainability improvements was to focus on both financial sustainability and environmental sustainability – and the concept that bridges those two targets is efficiency in all business actions. Reducing waste of any kind is equally profitable for business and for the planet. ■

BRIAN DUVAL

With over 25 years of wide-ranging industry experience, Brian Duval carries a unique perspective on the network infrastructure market. Having held leadership roles in marketing communications and analytics, channel management and corporate sustainability before moving into outside sales, he has learned the industry through the varied perspectives of technology innovator, manufacturer, distributor, contractor, system integrator and end-user. Duval has authored dozens of published articles, white papers, case studies and opinion pieces on topics across network technology, infrastructure deployment, business and manufacturing automation, sales channel development and environmental sustainability.

Stellium Datacenters, Submer and ExxonMobil join forces

Stellium Datacenters has formed a strategic Open Compute Project (OCP) collaboration with Submer and ExxonMobil. Closely aligned with the OCP's aim of accelerating data centre innovation and efficiency through the development and sharing of open source hardware designs, the partnership marks a significant milestone in the pursuit of sustainable and efficient data centre solutions.


Ed Bissell

Submer's state-of-the-art immersion cooling technology will be seamlessly integrated into Stellium Datacenters' infrastructure, enhancing energy efficiency and overall performance. ExxonMobil DC 3235 Super, a cooling fluid validated and endorsed by Submer, will demonstrate how its heat transfer capabilities and material compatibility effectively contributes to this advanced immersion cooling solution.

Ed Bissell, sales and marketing director at Stellium Datacenters, said, 'Being one of only two OCP data centres in the UK, Stellium is excited to be working with Submer on customer-driven solutions that will leverage our respective expertise to advance the OCP's objectives. This collaboration exemplifies our dedication to providing sustainable and efficient data solutions that align with industry best practices.'

Opengear appoints Patrick Quirk as senior vice president and general manager

Opengear has appointed Patrick Quirk as senior vice president and general manager. He will oversee Opengear's global operations, driving the company's strategic growth initiatives – further enhancing its leading position in the data centre and network management markets.


Patrick Quirk

Quirk brings a wealth of experience in operations management, strategic partnerships and technology leadership to his new role. He joins Opengear from Nautilus Data Technologies, where he served as chief technology officer, spearheading the company's transformation from a data centre operator to a pioneering technology provider.

Commenting on his new role, Quirk said, 'I have long admired Opengear for its innovative approach to network resilience and management, especially during my previous tenure, where I closely observed its positive impact on the industry. Joining Opengear at this stage is an exciting opportunity to build on its strong foundation and drive further advancements. I look forward to working with the talented team to continue delivering exceptional value to our customers and expanding our global footprint.'

Schneider Electric's David Abrahams becomes new chair of the iMasons Armed Forces Meeting Resources Group


David Abrahams

David Abrahams, key client manager cloud and service providers at Schneider Electric's Secure Power division, has been named the new chair of the iMasons Armed Forces Meeting Resources Group (MRG). The iMasons Armed Forces MRG is a strategic initiative, formed to increase the number of military veterans, military spouses, guards and reservists working in data centres and digital infrastructure.

Abrahams replaces Mike Eytle and is appointed to lead alongside Lee Kirby, executive chair and global sponsor of the Armed Forces MRG. He will build upon Eytle's work by leading the initiative locally in the UK and Ireland, and champion iMasons support for veterans seeking employment in technical, engineering and operational roles. As a member of the Royal Air Force Reserves, Abrahams' ambition is to connect the iMasons with other industry veteran support groups and bring together the digital infrastructure ecosystem to support veteran employment opportunities.

'The technology industry has a plethora of initiatives underway to help engage with graduates, apprentices and early talent, but it is also calling out for highly experienced technical and operational personnel, who can provide a valuable contribution to the ever-growing data centre industry,' said Abrahams. 'Being appointed chair of the iMasons Armed Forces MRG provides us with a valuable opportunity to give back to those who have served, while helping to address the skills shortage by building the data centre workforce of the future.'

CHANNEL UPDATE IN BRIEF

Mark Atkinson, former Gloucester Rugby player, has joined Emerge Digital as its new business development director.

Saft has commissioned a new line at its Jacksonville factory in Florida to produce the lithium-ion (Li-ion) battery containers that form the heart of energy storage systems. This investment enables Saft to address the booming US demand for energy storage system projects by offering a solution with domestic content. It will also create new job opportunities, both direct and indirect, as well as strengthening the national supply chain.

Riello UPS has announced its merger with Constant Power Services and Powertecnique. The merger will take effect from 1st January 2025 and aims to enhance service offerings, expand customer support and drive innovation.

Vertiv has named Frank Poncheri as the new chief human resources officer (CHRO), reporting to CEO, Giordano Albertazzi. He will lead human resources strategy, development and execution, further reinforcing Vertiv's strategic priorities and behaviours.

Quick clicks

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

An Introduction To Data Centre Heat Reuse is a white paper published by the **European Data Centre Association (EUDCA).**
CLICK HERE to request a copy.

The AI-Enabled ICT Workforce Consortium has released a comprehensive report on the impact of generative AI on essential ICT job roles.
CLICK HERE to download a copy of The Transformation Opportunity Of AI On ICT Jobs.

Power Over Ethernet (PoE) Technology And Cable Selection Considerations is a white paper authored by Ian McKiernan of **Excel Networking Solutions.**
CLICK HERE to read it.

The Power Conundrum: Cooling To The Rescue? is a white paper written by Carrie Goetz on behalf of **Accelsius.**
CLICK HERE to read it.

How Data Cabling Affects Internet Speed: Myths Versus Realities is a blog from **Millrose.**
CLICK HERE to read it.

IBM's Cost Of A Data Breach Report 2024 has revealed that the average cost of a data breach has hit a record high of $4.88m.
To download a copy **CLICK HERE.**

Navigating Liquid Cooling Architectures For Data Centers With AI Workloads is a white paper from **Schneider Electric.**
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Delivering the goods

Chad McCarthy of nLighten examines how edge data centres are fuelling the energy transition and bringing carbon free heat closer to customers

Pivotal to edge computing's success is the expansion of connected edge data centre platforms. Strategically located near dense economic and industrial zones, their key benefits are increasingly well-known to enterprise businesses, systems integrators and content distribution networks (CDNs), as well as cloud and network service providers.

NEAR THING

Edge data centres reduce network latency by allowing the storage and processing of data locally. Moving data faster to users enhances experience and unlocks the potential of time-sensitive applications. Furthermore, reducing the distances and network hops involved, combined with optimised bandwidth, can deliver a reduction in data transfer costs. Security is enhanced by limiting the transport of sensitive data – also addressing data sovereignty.

This decentralised model can also distribute computation workloads across multiple locations for greater scalability and resilience – providing a more flexible infrastructure model than a single large-scale centre. However, the proliferation of edge data centres in densely populated regions can deliver other benefits including contributing to the net-zero commitments of the industry and the carbon free energy transition objectives of the wider energy sector.

After all, in our digital economy we are now as dependent on data as we are on established industrial utilities such as power, water, heating or cooling. The transition toward weather dependent renewable power generation makes the energy sector dependent on energy storage and recovery. Our utilities are all in a state of change to protect the environment and data centres are a part of this as both a significant energy user – and contributor.

EFFICIENCY DRIVE

Sector coupling integrates data centres into the community infrastructure. It redefines the data centre as a lever to environmental improvement, lowering aggregate emissions and enabling higher overall efficiency across the interconnected energy users.

This can be achieved via direct heat export, recovering server heat from data centre cooling systems and transferring it to displace more carbon intensive heat sources in the surrounding community. Another method is grid stabilisation, whereby data centres can help compensate deficits and surpluses of renewables at times when weather conditions are other than forecast.

These initiatives are aligned with the Carbon-Free Energy Compact which, in the context of data centres, is aimed at ensuring they always operate on carbon free energy sources. This is also directly linked to a range of legislation including the European Green Deal, the Renewable Energy Directive (RED II) and the Energy Efficiency Directive (EED).

EXTENDING THE METRICS

There is a growing consensus within the data centre industry and beyond to consider 24/7 carbon free energy as one of the most suitable indicators of the transition towards decarbonisation. However, the energy transition requires increased transparency of energy procurement and a higher level of accountability for any environmental claim. With this, a new methodology for calculating the carbon footprint of energy consumption for data centres is necessary, as the energy demand from information and communications technology is expected to grow significantly. It is therefore important for the sector to adopt strict rules on carbon emissions.

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This is why nLighten collaborated with the Fondazione Eni Enrico Mattei (FEEM), a leading international research centre for the study of energy and environmental issues. Unlike conventional carbon free energy indicators that focus solely on electrical energy, our approach has extended the analysis to include both carbon free electricity and heat produced by our data centres. It then integrates waste heat recovery into sustainability metrics, which extend beyond the data centre perimeter to encompass coupled buildings or systems. With this initiative, the aim is to provide a transparent measurement of environmental impact and contribution to decarbonisation efforts. Key metrics introduced in the study include:

- The Integrated Carbon-Free Energy score (ICFEn), which combines both carbon free electricity and heat scores to measure the aggregate percentage of carbon free energy. This can be performed for the data centre in isolation or for a system of multiple energy users, such that the community effect of sector coupled data centres becomes apparent.
- The Integrated Avoided Emissions metric, which quantifies emissions reductions achieved through sector coupling of the data centre and other utilities such as heat

reuse, renewables generation and grid stabilising.

The ICFEn is intended to advance the concept of 24/7 carbon free energy by adopting a holistic perspective that includes heat reuse, grid stabilisation, on-site generation and power purchase agreements (PPAs). By integrating all these components into the ICFEn, the metric measures the improvement in efficiency and emissions our data centres can make within the community infrastructure.

PUTTING IT INTO PRACTICE

Connecting local heating systems to data centres helps surrounding communities with meaningful reductions in carbon emissions from reliable and sustainable heat sources. For example, in Eschborn, near Frankfurt in Germany, we have successfully partnered with local entities, leveraging their innovative heat reuse solution.

The latest generation of cooling systems at the data centre absorb heat from the servers and raise it to temperatures directly suitable for district heating. The sector coupled data centre will provide Eschborn's public indoor swimming pool, as well as a nearby office building, with carbon free heat.

UNLOCKING THE BENEFITS

Edge data centres are key to realising the benefits of edge computing. However, looking to the future, the implementation of close coupled energy solutions in collaboration with the local community also makes them ideally positioned to deliver effective sustainable solutions to climate and energy challenges. This will help the data centre industry, its customers and the wider energy sector to achieve environmental, social and governance (ESG) goals and obligations. As part of this, more innovative and comprehensive carbon free energy scoring methods will provide greater insights for improving and demonstrating the decarbonisation efforts of data centre operators. ■

CHAD MCCARTHY

Chad McCarthy is chief technology officer (CTO) and co-founder at nLighten. He is a veteran of the European data centre industry and has held leading positions internally and as a consultant for some of the world's biggest colocation players. He was most recently Equinix's global head of engineering development and master planning, and was instrumental in the development of Equinix's xScale hyperscale platform.

The time is now?

Chris Coward of BCS discusses whether edge is about to have its day

Not that long ago many of us believed that edge computing would become the next big thing. And whilst there has been some activity and deployments, it hasn't quite lived up to its promise. I think there are a number of reasons for this. Firstly, the global coronavirus pandemic put a stop to a lot of innovation as the world paused to see the outcome, then noise about artificial intelligence (AI) drowned out almost everything else. Finally, there was a backdrop of 5G and 6G advancement, which looked like it might stunt the growth of edge.

HOLD ON

Despite these events, in recent months we have seen a considerable increase in interest in edge solutions from our clients all over the world. This has been echoed by PricewaterhouseCoopers (PwC), which has predicted that the edge data centre market will grow to $13.5bn this year – up from $4bn in 2017. Looking ahead, MarketsandMarkets predicts the edge data centre market will grow to $29.6bn by 2028.

We started talking about edge way back in the 1990s and it is not just AI that is driving its comeback – the recent surge in data traffic generated by internet of things (IoT) devices is creating demand too. By 2025, IDC estimates that there will be 41.6 billion IoT devices, capable of generating 79.4ZB of data.

Edge is well suited to supporting this as, in simple terms, the speed that this data needs to be collected, often real time, means that it is more efficiently processed

when the computing power is close to the thing or person generating it. For example, sectors such as automotive, healthcare and manufacturing have several endpoints and the old model of sending all that data from the source to a centralised data centre is becoming less feasible due to latency and associated costs. The integration of IoT, AI and smart city technologies is creating an explosion of data, particularly high-resolution imagery and video, as we connect millions of sensors to create intelligent environments.

TAKING THE ADVANTAGE

The numerous benefits of edge are, of course, well documented and include security, scalability, control, resilience and latency. The solutions can be deployed practically anywhere – on rooftops, in extreme locations and in rural, underserved areas. Moreover, it can be up and running quickly.

It offers the option of having a standardised turnkey design to facilitate a fast and compatible deployment across regions, alongside benefits of economies

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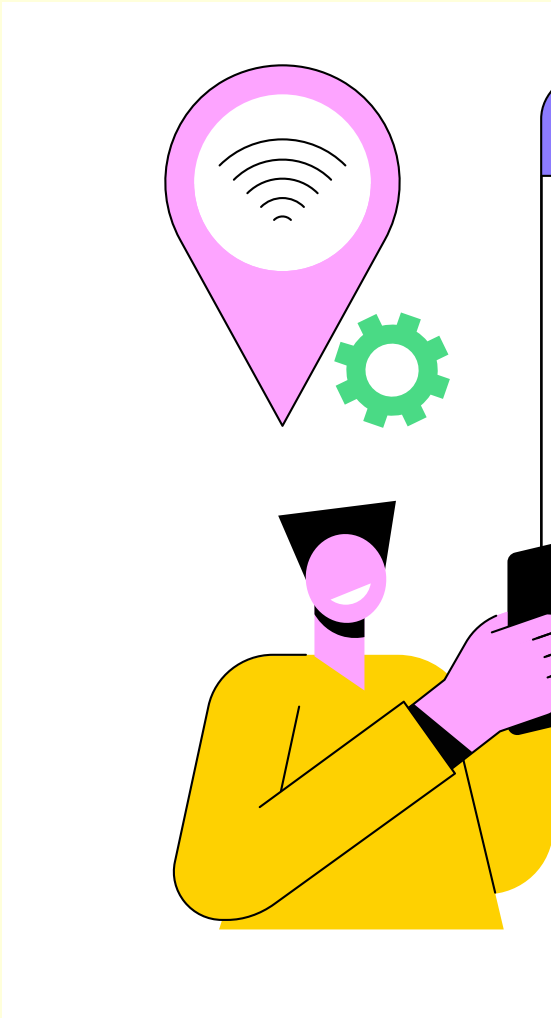
of scale. Edge data centres can also help service providers and colocation providers to rollout capacity quickly wherever demand emerges, while also using them to plug coverage gaps in smaller markets.

For end users, edge computing puts more emphasis on the IT architecture and how it can be leveraged by the customer. For some organisations it can unlock innovation, new services, new revenue streams and help them gain a competitive advantage.

IS IT GREENER?

There is no doubt that the number one challenge is power availability, and we are working closely with many clients on projects that consider how to redesign or optimise facilities to keep up with demand in a more sustainable way. Edge data centres may help address this as they have a lower power footprint than hyperscale facilities and can be more efficient.

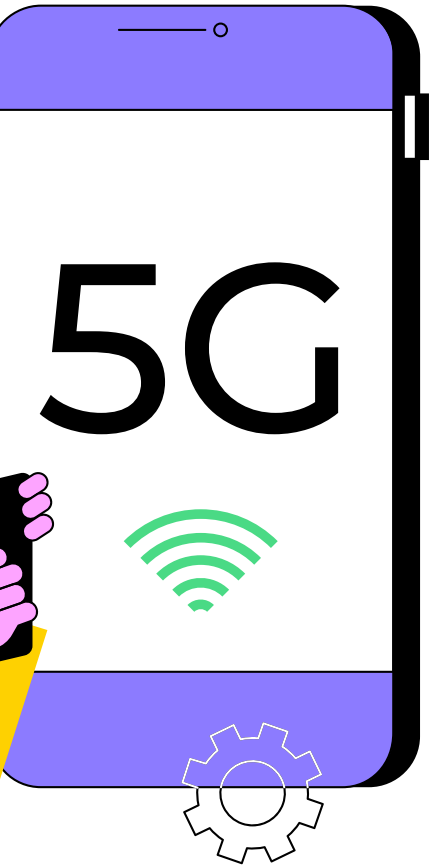
Although in some cases the requirement to be near to a highly populated area could be problematic as resources are in high demand, this also opens the doors to renewable options and improved sustainability through initiatives such as heat reuse for nearly communities. There is also the option of microgrids as a way of building-in both sustainability and resilience to power supplies. This can enable organisations to get their site up-and-running more quickly without having to worry about grid connection. This also repositions the industry as a hero that can alleviate the broader power challenges by starting to help upgrade the existing power



infrastructure and giving back power where possible.

FORWARD THINKING

Moving forward, it is clear that edge solutions promise to benefit a wide range of sectors. This has coincided with the need to release capacity for the overstretched data centre sector and to help ease the burden on centralised data centres, making room for more high-density AI requirements. This could be an answer – at least in the short-term. ■



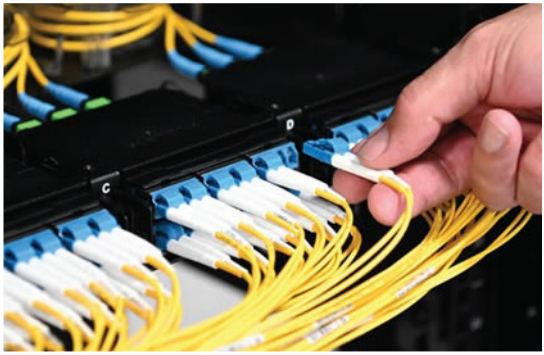
CHRIS COWARD

Chris Coward is director of project management at BCS. His career includes roles across the UK and mainland Europe, predominantly working for leading wholesale data centre providers. The projects he has worked on have involved complex new build data centre campuses, high performance computing, IT migration, mechanical and electrical upgrades, diesel generator installations and white space fitouts.

Siemon

Managing a large number of critical optical fibre and copper connections within space sensitive application environments has proven a key challenge for many network professionals.

With this in mind, Siemon has designed its LightVerse copper/fibre combo patch panels, which occupy only a single 1U of rack space and ensure swift, cost-effective and efficient deployment of critical connectivity. These panels seamlessly accommodate up to 96 fibres or 48 copper connections, as well as any desired combination of the two, offering organisations unprecedented versatility to tailor connectivity solutions to their unique needs.



Providing the best of both worlds, the copper/fibre combo patch panels support Siemon's existing industry-leading LightVerse singlemode and multimode fibre, as well as Z-MAX shielded Category 6A and unshielded Category 6A/6 copper connections. The panels are available in flat and angled configurations and offer optimised cable management options, with removable toolless front and rear cable managers, and an elegant fibre spool kit.

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

Portus Data Centers

Portus Data Centers was formed in 2023 with the acquisition of European Data Hub (EDH) in Luxembourg and a modern Tier IV data centre in Munich. Portus Data Centers has since acquired IPHH in Hamburg, which has added two more data centres to the current portfolio.

As part of Portus Data Centers' active buy and build strategy to develop a regional and edge platform of high-quality data centres in Western Europe, significant expansion projects are now underway at all three of these locations to meet and serve the growing demands of customers.

Portus Data Centers' vision is to become the preferred place for organisations looking to deploy digital infrastructure securely and efficiently – IT, connectivity or other services – in the general area of their place of business, whether to satisfy their own and their customers' needs, or to serve the local community of enterprises, government and other users.

For more information **CLICK HERE.**
www.portusdatacenters.com

Pulsant

When we embrace new ideas, tech and client demands, the possibilities are endless. Edge technology connects data and computing to supercharge innovation.

Pulsant is here to give UK businesses the edge infrastructure they need to thrive. With platformEDGE you can enhance app performance, adopt 5G, machine learning (ML) and the internet of things (IoT), meet data protection rules and boost sustainability using regional edge computing.

The Pulsant portfolio of 12 strategically located data centres puts digital infrastructure within two hours of every major population centre in the UK. Connected by our low latency, resilient private network, platformEDGE makes computing, storage and connectivity easily accessible to businesses in every region of the UK.

Bringing colocation, connectivity and distributed compute together, platformEDGE enables enhanced infrastructure flexibility, delivering lower latency and reduced connectivity costs.

To find out more or to speak with a Pulsant expert **CLICK HERE.**
www.pulsant.com

R&M

R&M's 19-inch modular Freenet cabinet system includes the heavy-duty Freenet Superior, which is suitable for installing a larger number of heavy devices. A basic frame can be upgraded to the Superior version with a load capacity of 1,500kg.

Areas of application are enterprise, edge, modular and colocation data centres. The cabinet system makes it possible to flexibly plan infrastructures in computer rooms and adapt them to new requirements. R&M inteliPhy net data centre infrastructure management (DCIM) software can also support infrastructure planning.

Freenet Superior cabinets can be screwed together to form seamless rack rows, and R&M has developed electronically controlled and mechanically operated door systems. Air guide plates for individual cabinets can be used to strictly separate cooling air and waste heat. Closed cold aisle corridors and cubes can be set-up in combination with sliding doors, roof elements, cable runs, screens and bulkheads.

For further information **CLICK HERE.**
www.rdm.com

Prevention is better than cure

Mark Lewis of Pulsant explains how adopting an edge architecture can implement the lessons of the CrowdStrike outage

The impact of technology disruption never makes for easy reading, but the 19th July CrowdStrike outage has redefined the scale by which such interruption is measured. Microsoft has estimated that over 8.5 million systems crashed, grounding more than 1,000 flights and hitting health services across the US and Europe. The faulty update to the Falcon Sensor security software is estimated to have cost US Fortune 500 companies over $5.4bn, and that is excluding Microsoft itself.

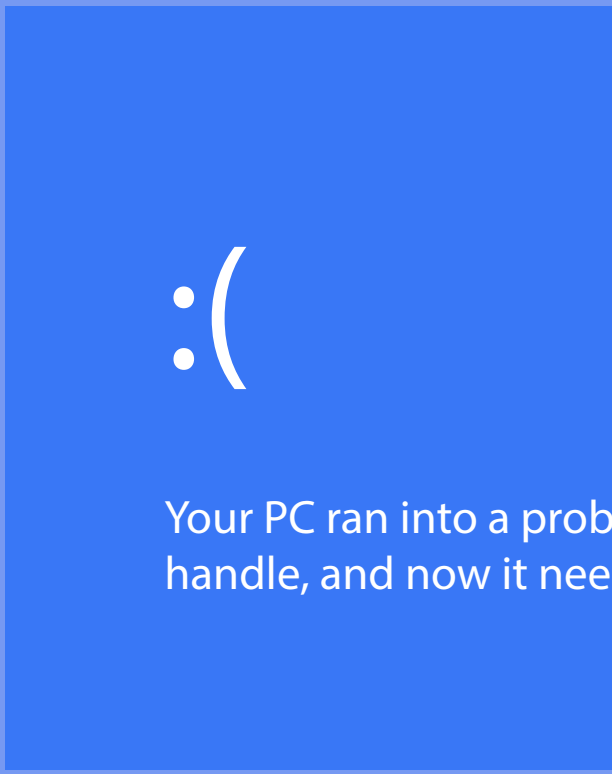
REELING AND ROCKING

Whilst CrowdStrike was swift to reassure customers and investors alike and promises greater software testing, businesses have been left reeling. Research from Parametrix Insurance suggests that the disruption will cost airlines $860m, whilst software and IT-related services companies will take a direct financial loss of $560m.

As a result, the technology industry finds itself considering how to minimise the threat that depending on a single supplier brings. For critical infrastructure businesses, the concept of single points of failure has been an historical bête noire. One part of the response to this risk has been the development of decentralised architecture involving the use of resources at the edge.

DECENTRALISED EDGE

At this point we must be clear – a data centre is never going to prevent faulty software, nor does being in an edge facility guarantee immunity from the effects



of an issue such as the CrowdStrike outage. Yet, having a strategy that seeks to decentralise compute resource, diversify suppliers and partners, and thus mitigate risk, is easier to achieve in edge colocation facilities.

A distributed approach places compute resources in the locations best suited to their workloads, ensures system resilience and optimises performance. Putting the heavy lifting compute functions in a core data centre, and latency sensitive, real-time, applications in regional edge facilities, helps spread the risk. Hyperscale public cloud providers use 'availability zones' to do something similar at global scale. The core principle of 'the right workload in the right place' works everywhere.

> 'Using a platform that connects services across a diverse geography, supplier base and network connectivity environment can help make recovery faster if the worst happens.'

An added benefit of locating data intensive workloads at the edge is the potential to reduce network transit costs and cloud ingress/egress fees. As the user experience inevitably drives towards increasingly responsive applications, locating these at the edge now will also help to future-proof performance.

However, undertaking an edge approach to resilience is not without its challenges. Multiple facilities mean multiple cost bases, security requirements and a need for technical integration that should be carefully considered. The good news is that much of this cost increase can be mitigated by the second benefit of edge – diversification.

lem that it couldn't
ds a restart.

DIVERSIFIED EDGE

Utilising colocation facilities in edge locations for the placement of specific workloads can open secure access to a wide range of suppliers. The ecosystem of partners that a colocation facility offers is just a cross connect away. New suppliers can be spun up, or down, swiftly

and securely from within the data centre operator's footprint. Not only is this more agile, but it also helps control costs, boost performance and improve security.

If this all sounds a little Utopian, the good news is we know it can be done. Our Edge Fabric connects our 12 regional data centres, with geographically diverse, low-latency connectivity, ranging from 10Gb/s-100Gb/s. This enables access to hundreds of connectivity and service partners across the world including private and public clouds such as Amazon Web Services (AWS) and Microsoft Azure. Using a platform that connects services across a diverse geography, supplier base and network connectivity environment can help make recovery faster if the worst happens.

'The ecosystem of partners that a colocation facility offers is just a cross connect away. New suppliers can be spun up, or down, swiftly and securely from within the data centre operator's footprint. Not only is this more agile, but it also helps control costs, boost performance and improve security.'

LIVE AND LEARN

Following major outage events, businesses need to learn how to better build better resilience for the future. Easy access to wider supplier diversity and embracing distributed workloads can play an important part in these mitigation strategies. Edge offers one route to a more resilient digital infrastructure. By distributing computing resources and fostering an interconnected, multi-vendor ecosystem, organisations can significantly enhance their flexibility and lessen the impact of sever disruptions. ■

MARK LEWIS

Mark Lewis joined Pulsant in 2022 to guide the development of its edge proposition and wider commercial growth. He is an experienced marketing strategist and digital marketing expert with a passion for customer insight. With more than 20 years of experience in technology marketing, Lewis began his career at 3Com Corporation and has held senior marketing positions at Vodafone, Sony and Criteo. He spent five years leading growth, through corporate and field marketing, at Interxion and Digital Realty. Prior to joining Pulsant, he was responsible for the commercial development of the data centre ecosystems business at Iron Mountain.

The Pirbright Institute transforms viral research computing with new data centre from Schneider Electric and APT

Schneider Electric and Advanced Power Technology (APT) have deployed a new modular data centre at The Pirbright Institute, enabling it to stay abreast of new technological advancements including artificial intelligence (AI). The data centre offers a scalable, resilient, flexible and energy efficient infrastructure that ensures the highest levels of availability and continuity.

The Pirbright Institute is at the forefront of global viral research, operating as one of the UK's leading diagnostics and surveillance centres. It is a world-leading centre of excellence for research into the control and surveillance of diseases of farm animals and viruses that spread from animals to humans.

Using components from Schneider Electric's EcoStruxure for Data Centres solutions portfolio, including the EcoStruxure Row Data Center system, APC NetShelter racks, InRow cooling, Symmetra uninterruptible power supplies (UPS) and APC NetBotz environmental monitoring, APT was able to pre-configure the data centre's design, delivering the project in three phases and within a strict timeline of 12 weeks.

Solar farm proposed to support Blackpool Airport and Silicon Sands data centre campus

Initial proposals for a solar farm on land south of Blackpool Airport's main runway have been submitted to Fylde Council. The proposed 20MVA solar farm would allow the airport to generate its own renewable electricity, reducing energy bills and its carbon footprint, while also enabling Blackpool Council to reduce its overall net electricity consumption by up to 75 per cent.

It will also support plans for Silicon Sands, a high-performance data centre campus. Silicon Sands aims to construct a series of renewably powered data centres to create quality jobs on the Fylde coast. The development would also aim to promote carbon friendly data centre practice through use of liquid immersion cooling and reusing waste energy in a district heat network.

A screening application for the solar farm has been submitted to Fylde Council, which could lead to it being operational by the latter end of the decade. The screening opinion submission to Fylde Council is the first stage of the planning process to determine whether an Environmental Impact Assessment is needed and residents near the solar farm development will be invited to see the plans in more detail.

Portus Data Centers announces planned delivery of new Hamburg site

Portus Data Centers has announced the planned availability of its new data centre (IPHH4) located on the IPHH Internet Port Hamburg Wendenstrasse campus. Phase 1 construction work will begin in the first quarter of 2025 and be completed in the fourth quarter of 2026.

The data centre is designed for a Power Usage Effectiveness (PUE) rating of 1.2 or under and will have a total IT load of 12.8MW. With a white space area of 6,380m² and grid connection capacity of 20.3MVA, the facility is already fully compliant with the new German Energy Efficiency Act (EnEfG) requirements and liquid cooling will be available for high performance computing (HPC). In addition to IPHH4, adjacent to the existing IPHH3 data centre at the main Wendenstrasse location, IPHH operates two other facilities in Hamburg.

PROJECTS & CONTRACTS IN BRIEF

Secure IT Environments has completed an air conditioning upgrade project on the main mission critical data centre at Royal Free Hospital, part of the Royal Free London NHS Foundation Trust. The project was commissioned to replace end of life cooling infrastructure and improve the energy efficiency of the data centre.

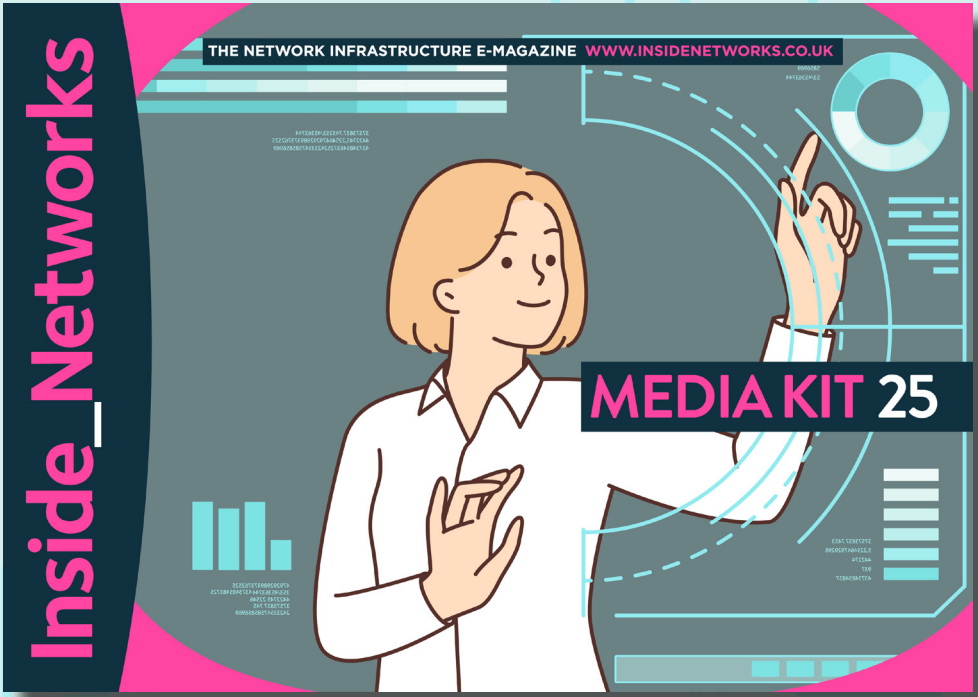
Serverfarm has acquired two Houston, Texas, data centre campuses, which are positioned to deliver near-term capacity to the market through sustainable modernisation of pre-existing buildings. Through Serverfarm's expertise in adaptive reuse, infrastructure modernisation and sustainable redevelopment, HOU1 and HOU2 will rapidly scale to address the underserved, high demand Houston market with hyperscale data centre capacity.

Evolve has provided connectivity support at 116 of Asda's new petrol forecourt sites including essential infrastructure, state-of-the-art technology and dependable managed connectivity services.

NTT Data has been selected by the City of Brownsville, Texas, to deploy its private 5G wireless connectivity. The city seeks to enhance citizen services, increase public safety, achieve sustainability and effectively manage growth by leveraging real-time data analytics and artificial intelligence (AI) empowered by a seamless and secure wireless network.

Freshwave has worked with The Princess Alexandra Hospital NHS Trust (PAHT) to provide 4G connectivity to The Princess Alexandra Hospital in Harlow. Freshwave will also provide ongoing support via a managed service of the 4G distributed antenna system (DAS).

All you need to know



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How much do you really know?

Richard Sorosina of Qualys provides an overview of the challenges around network security and offers insight into zero trust architecture (ZTA) in data centres

The concept of zero trust security has been with us for years, since it was first published by John Kindervag of Forrester to describe how to improve security around data centres. Since then, the concept of ZTA has grown as companies have adopted more IT platforms, services, architectures and application designs to fulfil what they need at the time. It has also been codified by the Cybersecurity and Infrastructure Security Agency (CISA) in its Zero Trust Maturity Model Version 2.0 and the National Institute of Standards and Technology (NIST) as SP 800-207.

HEART OF THE MATTER

At the heart of ZTA is the concept of not fully trusting any device, user or service and curtailing access to external and internal resources or networks until you can reliably establish that the asset is what it says it is. However, many of us do not have insight into what is installed and running in our data centres, in our networks and on the devices that connect to the network.

While we might think we know the number of servers or storage assets that the organisation should have, those figures can be based on out of date or incomplete information. Getting a single overview of every asset and keeping that list up to date are significant tasks in their own right.

At the same time, the addition of operational technology (OT) assets and industrial internet of things (IIoT) devices makes it even harder to get a

full understanding of everything that is connected to the network. Network segmentation is an effective way to secure things, but it can make it harder to see and understand asset inventories, especially when teams run in silos and don't communicate with each other.

PROCESSES AND PEOPLE

There is no single product or service that can deliver zero trust, even though it might be tempting to reach for the cheque book to try and make this happen. Instead, we must focus on the processes and people around security.

In NIST SP-800 207, zero trust starts by treating all data sources and computing services as resources. All communication between resources, and between resources and users, has to be secured regardless of network location. In other words, just because two of your servers are in the same data centre, you should still encrypt traffic between them.

Access to each of these resources is granted on a per-session basis, and based on dynamic policy and observable state information. This access must be authorised and authenticated, and this has to be strictly enforced over time. The integrity and security posture of all your assets must be monitored at all times, and you should collect as much information as you can about the current state of all assets too.

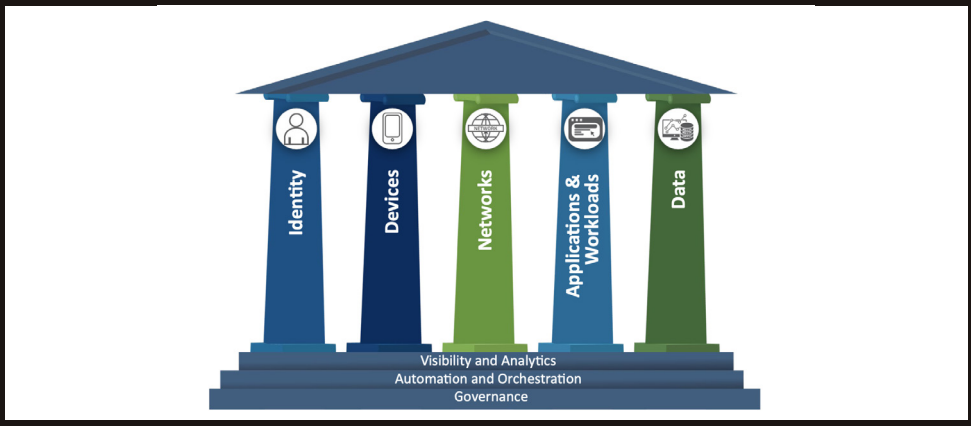
'At the heart of ZTA is the concept of not fully trusting any device, user or service and curtailing access to external and internal resources or networks until you can reliably establish that the asset is what it says it is.'

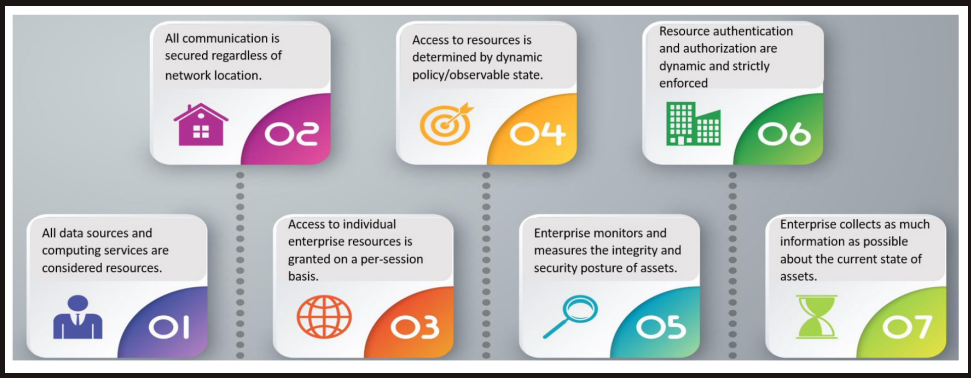
FIVE ALIVE

Alongside this, CISA sets out five pillars for zero trust security across identity, devices, networks, applications and workloads, and data. All of these areas represent best practices for security that then complement each other.

Identity covers how users access any IT or computing resource, and any user should have phishing resistant multi-factor authentication as part of their process to work. On the device side, your team should maintain a full and accurate list of all assets that are implemented for work purposes. To secure these devices, you should be able to know their status over time, understand the risk that any issue represents and prevent any issues by deploying patches to those resources. Alongside this, you will have to detect and respond to any incident that affects a resource device in a prompt and effective manner.

Alongside encrypting network traffic, security teams should treat all applications as if they are running on the public internet and apply appropriate security practices. These applications should be regularly tested for potential issues in how they operate, as well as providing a route for external or third-parties to provide information on potential vulnerabilities that are discovered. Lastly, all data across the organisation should be logged and categorised, so that the appropriate





security controls can be deployed or checked over time.

FITTING IN

To achieve zero trust, you will have to evaluate the range of vendors that you work with, and how they fit into an overall architecture. This should then provide you with a route to more integrated capabilities. Technology is part of zero trust, but buying siloed point products to fill the gaps around your network and data centre security is not a good approach to achieving your goals. For example, to improve in your approach you will have to move from manual lifecycles, processes and static implementations to more automated processes that build on and improve what is already there.

The biggest challenge in this remains knowing what is in place across the data centre and network environments. For many teams, the single source of information around assets is their configuration management database (CMDB). The CMDB should include detailed information on all the assets that the organisation has in place, from hardware, software, databases and networks through to locations, services and facilities.

However, keeping a CMDB up to date across devices is hard, let alone all the other elements defined as resources in zero trust programmes. For example, at one company I spoke to in the last 12

months, they found 1,000 more servers installed in their data centre environments than they thought they had, due to growth on projects and implementing more servers for testing than originally estimated.

ASSET MANAGEMENT

OT assets often sit on a segregated and separate network. For IT teams that don't have direct responsibility for those assets, how do you know that they exist or that their records are up to date? The assets themselves may be difficult to track with standard IT asset management approaches where you rely on installed agents alone. OT assets like machinery or robotics cannot host agents, but they do produce network traffic that can be understood instead.

To get the continuous insight needed for zero trust, you may have to look at getting information around what is installed across your network in multiple ways. Alongside agent-based installs that provide data on servers or endpoints, you will require passive traffic scanning that can provide information on the other resources on the network, like IIoT or OT devices. Lastly, you may also have modern application deployments that run outside your data centre in software containers or in the cloud. Adding insight into these environments is essential if you are going to implement zero trust and maintain a dynamic security posture across all your resources.

RISK REDUCTION

Whatever approach to security you take, implementing zero trust will improve your posture and reduce risks. It relies on getting data in to show you that your processes are effective and that you have the right dynamic security rules in place to ensure that everyone has all the access they need, but no more. By getting accurate knowledge of what you have in place, you can achieve your goals around applying the right security rules, wherever and whenever those rules have to be applied. ■

RICHARD SOROSINA

Richard Sorosina is the chief technology security officer EMEA and APAC for Qualys. He has a deep background in cybersecurity spanning more than two decades. He has previously been the head of cybersecurity practice for Macquarie Telecom and the founder and principal consultant for Verus Data Security.