

Data Centre Review Magazine

Issue: November 2019

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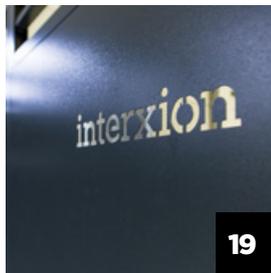
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AI & Machine Learning

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Editor's Comment

As tends to be the way with technology, trends within the data centre industry are ever evolving. Although still a hot topic, cloud no longer appears to be centre stage, with the hype generally having shifted to the 'edge.' However, there is a new kid on the block and that is AI.

AI is now being implemented in a myriad of different areas, making waves in both the transport and finance industries, as well as helping to save lives in the medical field – we are even starting to combat flooding with 'smart' sewers.

In September, for the first time in the UK, AI was used in job interviews, with facial analysis software analysing the language and tone of a candidate's voice and their facial expressions as they were videoed answering identical questions. Whether this will speed up the recruitment process or simply reinforce inequality is a matter of opinion, but google "successful manager" and the results are hardly awash with diversity.

Regardless of AI's ethical implications – and believe me there are many – the data centre industry is now steadily climbing aboard the bandwagon, with implementation having increased fourfold over the past four years.

Artificial intelligence has the capacity to monitor server performance and network congestions, helping to predict and stop data centre outages before they happen. It also gives data centre personnel a much-needed break from monotonous IT tasks that could otherwise be automated, freeing up valuable resources and ultimately cutting costs.

But unlike edge and cloud vying for the spotlight, AI can happily play nicely with the two. In this issue our AI feature focuses on AIOps (Artificial Intelligence for IT operations), which can apparently make migrating your data centre to the cloud a walk in the park, what's not to like? 'Edge for AI' is now also a thing, with those organisations building AI platforms close to where the data resides deriving the most value. Smart move.

On paper, utilising AI within the data centre seems like a no brainer, with benefits coming out the ying-yang. Even Gartner (and we trust Gartner) says that more than 30% of data centres that don't deploy AI and machine learning won't be operationally and economically feasible by 2020. By my reckoning that gives enterprises that haven't yet succumbed approximately one month to get a wriggle on, so chop chop.

In other news, entries to our ER and DCR Excellence Awards are now open, so if you'd like to be in with a chance of winning a nice, shiny award (and of course the opportunity to bask in the glory), head on over to our website where you will find a nice, simple awards form that even your gran could fill in. As always, I'm forever on the lookout for new faces and contributors, so if you'd like to get involved in any aspect of DCR whether it be print, online or even awards-related, please don't hesitate to get in touch via clairef@datacentreview.com.

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News

The latest highlights hitting the headlines



UK Government plans to hire both a chief data officer and chief digital information officer

The UK Government is continuing to press ahead with plans to hire a chief data officer, despite recently advertising for a newly created role of chief digital information officer.

The two roles were confirmed during recent parliamentary questions, with Simon Hart, the Cabinet Office minister with oversight of the Government Digital Service (GDS), noting that the new role will not replace the chief data officer role. That role has remained unfilled, despite the government having first committed to appointing a chief data officer back in 2017.

According to Hart, while the two roles are similar, the chief digital information officer will be responsible for shaping and delivering innovation and transformation strategies, and will be a more senior role – at second permanent secretary level. Meanwhile, the chief data officer will be responsible for delivering on the agenda set by the chief digital information officer.

Cost of data breaches predicted to hit \$5 trillion in 2024

A new report from Juniper Research has found that the cost of data breaches will rise from \$3 trillion each year to over \$5 trillion in 2024, an average annual growth of 11%. This will primarily be driven by increasing fines for data breaches as regulation tightens, as well as a greater proportion of business lost as enterprises become more dependent on the digital realm.

UK GOVERNMENT PLEDGES £120M TO ALLEVIATE SKILLS GAP



The skills gap is a major issue facing the IT sector, and while there's no instant fix, the government has pledged £120 million to help alleviate the problem.

That £120 million will go towards eight new institutes of technology, which will join the existing 12 locations that deliver higher level technical training at level 4 and 5 in STEM subjects. The subjects will be in key areas within the IT sector, such as digital skills and AI, all areas where we're not seeing enough skilled workers.

Microsoft extends support for Windows 7 in light of 'today's economy'



Microsoft is extending support for Windows 7 until January 2023, giving businesses more than three years to complete their switch to Windows 10. There is one caveat, however, as Microsoft has confirmed that businesses still requiring security updates and patches after January 2020 will have to pay for the privilege.



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UK ORGANISATIONS RISK FALLING BEHIND THE REST OF THE WORLD ON AI



UK organisations risk falling behind global competitors unless they act now to accelerate their use of AI technology, according to a new report unveiled by Microsoft UK. The report reveals that organisations currently using AI are now outperforming those that are not by 11.5% – a boost that, in the face of unprecedented economic and political uncertainty, UK businesses can ill-afford to pass up.

Despite this opportunity, the report, conducted in partnership with Goldsmiths, University of London, finds that less than a quarter of UK organisations (24%) have an AI strategy in place.

Three-quarters (74%) of the nation's business leaders doubt the country has the socio-economic structures in place to lead in AI on the global stage. This puts in doubt the UK's ability to compete with countries such as the United States and China, implementing AI at pace on a greater scale.



Apple puts the final nail in plans for £738 million data centre in Ireland

Apple is giving up on its dream of building a £738 million data centre in Ireland, after it was reported by *The Times* that the site is now up for sale.

The proposed Derrydonnell data centre in Athenry, County Galway, was due to be home to one of Apple's largest data centres in Europe. The company planned to hire 150 people in the local area to staff the data centre, but still received quite a lot of local opposition, causing Apple to finally cancel the project in 2018.

Many had hoped that Apple would revive the plans at a later date, after all the company still owned the site, but the iPhone maker's attention turned to building a facility in Denmark. That's why it's now decided to put the Irish site on the market for an undisclosed sum.

The site is being advertised as a 'ready to go data centre development site', as Apple had already secured full planning permission for buildings totalling 320,000ft². The site is being sold by commercial real estate firm Binswanger.



Dutch police shutdown 'bulletproof' hosting company and Mirai botnet operator

Dutch police have successfully taken down a 'bulletproof' hosting company that used servers in an unnamed data centre in Amsterdam. Two of the seized servers were also being used as a control for a version of the Mirai botnet.

Investigators from the National Criminal Investigation Department in the Netherlands tracked the servers using information from the National Cyber Security Centre. After arriving at the data centre, the police took the servers offline and confiscated all the servers associated with the 'bulletproof' hosting company.

Two of the servers taken offline were responsible for controlling thousands of devices that were infected with the Mirai botnet and made more than one million requests per month to infect more. The network of devices largely consisted of Internet of Things products, including smart thermostats and refrigerators, that were all used to launch DDoS attacks against websites and payments services.

In addition to seizing the servers, the Dutch police also managed to collar those responsible for running the botnet. A 24-year-old man from Veendam and a 28-year-old man from Middelburg are now facing numerous charges, including, but not limited to, computer intrusion and spreading malware.

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DCR World

Who's doing what and where they're doing it
- Global news from the data centre world.

SUSTAINABILITY COMPETITIVENESS: A WORLD VIEW

With sustainability climbing high on agendas the world over, the dark areas on the map depict high levels of sustainability competitiveness while the lighter shades indicate the opposite.

Of course out of 180 countries, making up the top 20, only three are not European, with New Zealand ranking at number 13, South Korea 16 and Japan sitting at 20.

Scandinavia unsurprisingly covers the top five rankings, with Sweden leading the way followed by the other four Scandinavian nations.

The top 20 is dominated by Northern European countries, including the Baltic states and Slovenia. Germany ranks 14, the UK 22, and the world's largest economy, the US, is ranked at 29.

Of the large emerging economies (BRICs), China is ranked 32, Brazil 42, Russia 43, and India 121.

WALES: NGD

Legal & General is reportedly set to acquire Next Generation Data's 750,000 sqft data centre facility in Newport, South Wales. The acquisition will come as part of the company's push into digital infrastructure investments, with The Telegraph reporting that the firm is using the deal as a stepping-stone before entering the smart city market.

The data centre is notable, as it was the first in Europe to be powered by 100% renewable energy, while it was also the first to guarantee clients a perfect power usage effectiveness (PUE) ratio.

This isn't the first time Legal & General has invested in the data centre market however, with the firm already having committed £115 million to the expansion of the Kao Data Centre Campus in London.

GOOGLE: SOUTH CAROLINA

Google is set to cut the environmental impact and energy costs of its Berkeley County data centre campus, after the company received the green light from South Carolina's Department of Health and Environmental Control to use 549 million gallons of groundwater to cool the facility. While the company says that the use of water will be better for the environment as it leads to a decreased need for energy, environmental campaigners have criticised the move.

DELOITTE: EGYPT

Deloitte has named Egypt as a 'golden opportunity' for data centres, thanks to its 'unique geographical' location overlooking the Red Sea and the Mediterranean, enabling the country to become a regional digital hub, in addition to its strong network of submarine cables, and the high quality infrastructure in tech parks.

Deloitte predicts that due to the white spot of data centres in the region, establishing data centres in Egypt would save at least 250ms of latency from the US to APAC. Global management consulting firm TKearney has also identified Egypt as number 14 on the list of top global services location in June 2019.



CYXTERA: AMSTERDAM

Cyxtera Technologies has officially opened its latest European data centre in Amsterdam, although the facility is not set to commence business operations until the first quarter of 2020. The new data centre, dubbed AMS1, is located at a data centre campus in Polanen Park and offers 3MW of power and 29,000 sqft of space. That brings Cyxtera's global footprint to 2.9 million sqft, offering a total of 248MW of power.

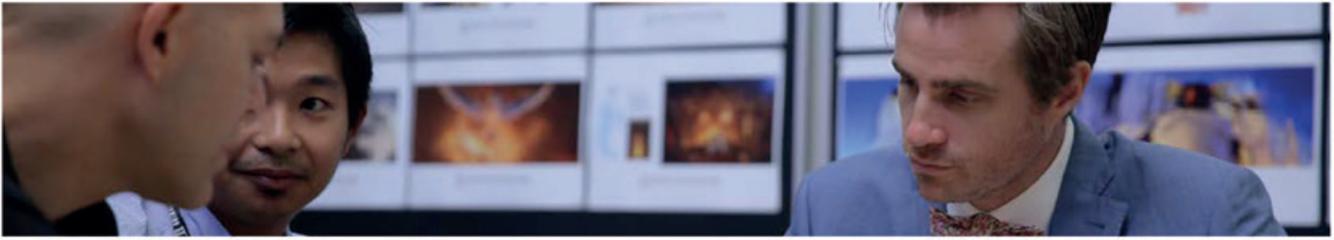
Amsterdam is also home to AMS-IX, the world's fourth largest internet exchange by number of members, and third largest in Europe, behind the Deutscher Commercial Internet Exchange and the London Internet Exchange.

SAP: SINGAPORE

SAP Commerce Cloud users in the Asia Pacific region should begin to see better coverage, as the company has just switched on a new data centre in Singapore. This will complement SAP's existing data centres in the APAC region, which includes facilities in Australia, China and Hong Kong. SAP says it selected Singapore for its geopolitical stability and its adherence to data privacy, which seems like a good choice considering the current political turmoil in other areas, such as Hong Kong.

ARCHTIS: AUSTRALIA

The Australian Criminal Intelligence Commission (ACIC) has signed up to use Kojensi Gov, a cloud-based platform from software company Archtis. The platform will be used to assist with the development of the Australian Government's National Criminal Intelligence System (NCIS), with it making it easier for NCIS members to share and collaborate securely on information needed to create a 'truly national, unified picture of criminal activity' across states and territories in Australia.



Bringing characters to life for the silver screen

With over 25 years experience, independent Australian company Animal Logic has been at the forefront of creating digital content, award winning visual effects and animation for the film and television industries.

The studio recently delivered work on Guardians of the Galaxy Vol. 2 (2017), Alien: Covenant (2017), The LEGO® Batman Movie (2017), The Great Wall (2016), and The Master: A LEGO® Ninjago Short (2016). Animal Logic is currently in production on The LEGO® Ninjago Movie (2017), Peter Rabbit (2018), and The LEGO® Movie Sequel (2019). Other film credits include: The LEGO® Movie, Avengers: Age of Ultron, The Great Gatsby, Legend of the Guardians: The Owls of Ga'Hoole, 300, and Happy Feet.

Animal Logic Entertainment (ALE), is the development and production arm tasked with establishing a strong slate of innovative, commercially minded, story driven projects stamped with the visual and technical innovation that has become the hallmark of the studios' work.

Most recently, Animal Logic Entertainment announced a joint venture with Imagine Entertainment to develop, produce, and finance 6 feature length animation and hybrid animation projects over the next 5 years.

Animal Logic is one of the world's most highly regarded digital production studios with locations in Sydney, Los Angeles and Vancouver — leading to a larger need under pressing industry demand — for the perfect data center.

Data needs and deployment speeds

Alex Timbs, Head of IT at Animal Logic, explains the Animation studio's growth challenge: "Because our business is cyclical in nature, the demands of the productions we're working on dictate how many people we have working for us, and how much infrastructure we need. So, speed of deployment for our data center environments is absolutely critical to our success."

Alex provides perspective on the need for high-density data capacity: "Around 90% of the data center houses high-density compute, which is used for the process of rendering images ... the other 10% is high-capacity storage used for production, which houses the images that are generated by that render process."

Animal Logic prides itself on dreaming big for the big screen and as a result their data center solution needed to be equally as ambitious. Alex says he chose a Schneider Electric prefabricated data center solution because it allows for customization, has a reputation for flexible engineering, and promises fast deployment.

Goal

Align data center infrastructure strategy to meet business needs.

Approach

Deployment of a modular scalable data center architecture based on Schneider Electric's customizable prefabricated data center solution.

Story

Increasing demands of high performance computing resources. Business impact of latency bandwidth costs and security and increased data sovereignty demands forcing Animal Logic to come up with an alternative solution.

Results

- Animal Logic experienced a massive boost in animation productivity; the direct result of deploying a render farm with an average operations speed of 1.25 petaflops per second for their most common workloads, all within a 30 kW per rack power density.
- The on-premise system is more reliable than their prior one, removing creative "bottlenecks," reducing latency, and reducing their utility bill.
- With our services supporting the present and future of Animal Logic's data center, they're operating in peak condition.

The new state of Animal Logic's data capacity

Understanding Animal Logic's unique needs for capacity and delivery, Schneider deployed a custom prefab DC in just under four and a half months. The new infrastructure delivered a major boost in data processing, which in turn enabled greater performance and operational agility.

For example, the newly implemented 30 kW per rack power density empowers Animal Logic's facility to process 1.25 petaflops per second on average — exactly the depth of capability the graphics house required for advanced animation production and design.

Alex said, "We selected a high-density Schneider prefab for the purposes of meeting the new business requirements. We needed an extremely high capacity, highly dense solution. We selected Schneider Electric based on their engineering capabilities and ability to meet the businesses needs quickly."

Furthermore, a data center infrastructure management (DCIM) software was deployed to provide complete visibility across the facility, improving planning and operational performance. StruxureOn™, a cloud-based monitoring service offers Animal Logic maximum protection of critical equipment. It features 24/7 remote monitoring, remote troubleshooting,



and data-driven insights that provide visibility and live metrics — right to their smartphones.

A partnership secured

Within four and a half months, Animal Logic's prefabricated data center arrived. They soon began experiencing the returns from investing in a Schneider Electric™ prefabricated data center as their compute capability quickly grew and business-risky latency shrank. The prefab unit will continue to power the studio's movie-making magic. "Schneider was the only vendor to be able to deliver in that four and a half months, and has very rapidly become what we call a partner in creating these fantastic images that you see on screen," says Alex, "Schneider Electric is our partner in making movies."

"We selected Schneider Electric based on their engineering capabilities and ability to meet the businesses needs quickly."

— Alex Timbs, Head of IT
at Animal Logic

Animal Logic Sydney is currently in production on LEGO Ninjago (2017) and Peter Rabbit (2018) while its Vancouver studio is currently working on The LEGO Movie Sequel (2019). Keep an eye out for their continuing contribution in Hollywood animation.

For more on Animal Logic's work and persona, click these:

<http://animallogic.com>

<http://www.animallogic.com/About>



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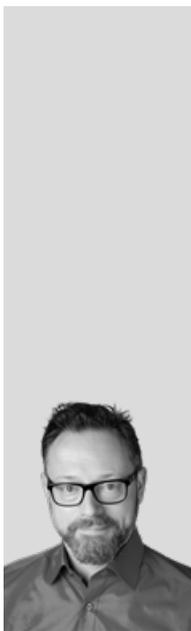
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Lighten the load



With new technologies to master, their own skills to brush up on, as well as the smooth running of their facilities to contend with, data centre professionals cannot afford to have vast amounts of their time eaten up by mundane day-to-day IT tasks. **Sascha Giese**, head geek at SolarWinds, discusses what processes should be prioritised in order to free up precious time, and examines how DCIM can help ease the pressure.

Today's organisations are hungry for data, and for good reason too. Whether it's providing customer insights, highlighting performance issues, or enabling better decision making, the real business value of data is huge. This means the data centre is a critical factor in the success of any organisation, and data centre professionals have a lot to contend with. Fully accountable for the process, control, and maintenance of the data centre sites they run, organisations rely on their skillsets and expertise to ensure critical data is monitored, accessible, and secure.

With first-class data centre performance so imperative to an organisation, these individuals need to be able to analyse data, spot anomalies, and resolve them quickly to prevent any issues from escalating. However, with the growing complexity of the data centre, thanks to hybrid approaches and virtualised environments, they're facing an increasingly uphill battle.

Providing data centre professionals with the correct training – to ensure they feel confident in these increasingly complex environments – is essential. Yet despite a need for confident, certified, and expert data centre professionals, there's a significant labour and skills shortage needing to be addressed. IT professionals are well aware of this shortcoming



It's important to remember technology isn't implemented to make roles redundant, but to improve the way in which we work

as highlighted in the recent *SolarWinds IT Trends Report 2019: Skills for Tech Pros of Tomorrow* – 70% of all tech professionals aren't 'completely confident' they have the necessary skills required to manage their IT environments over the next three to five years.

Waning confidence amongst professionals doesn't stem from any unwillingness to learn the necessary skills, though. In fact, tech pros are inquisitive by nature and have an appetite to prioritise career development to enhance operational efficiency – but nearly 80% say their day-to-day IT tasks eat into time earmarked for professional development. This skill gap really must not go unnoticed. But what processes must data centre infrastructure managers and their bosses prioritise, to ensure they stay competitive, deliver the service and experience their customers expect, and crucially continue to progress their own personal development?

Adopt, adapt, and automate

The rate of change in the IT industry continues to grow quickly, leaving data centre professionals faced with an overwhelming number of emerging technologies to experiment with, master, and adopt – such as hybrid cloud, automation, and AI. Each of these new technologies pose significant benefits for improving data centre scalability, lowering capital expenditure, and improving reliability. Perhaps most importantly, this technology can reduce manual, time-intensive tasks slow to yield actionable insight and impede the data centre professional's access to training for personal development.

Quickness and openness to adapt to change is therefore paramount.

It's important to remember technology isn't implemented to make roles redundant, but to improve the way in which we work. According to the report, 31% of organisations surveyed are using automation to address the skills gap and point to similar business investments as new methods of assisting their staff in developing skills.

Skills in data analysis continue to be in high demand, but with such huge amounts of data to analyse within the data centre, the task can seem daunting. However, employing automation to separate and sort data-based on keywords or events can seriously expedite the data analysis process.

Eliminating time-intensive data collection and providing a more holistic view of system behaviour through monitoring tools, will enable data centre professionals to quickly spot and resolve issues. As many are lacking the skills to appropriately deploy automation, or other emerging technologies, there's an issue. Particularly as this aspect of career development will be central to improving the data centre workforce.

Facilitate transformation

Finding ways to fuel digital transformation within organisations continues to be a big industry focus. The ability to provide insightful analysis continues to be in high demand for these projects. More specifically, the ability for tech and data centre professionals to apply this to security, is what many professionals (55%) believe will be most important to their organisation's transformation over the next three to five years.

Considering data is widely considered to be one of an organisation's most valuable assets, securing data is crucial in ensuring businesses do not breach regulation and risk facing crippling fines. The continued success of the data centre industry therefore relies heavily on data centre professionals developing key skills in SIEM (security information and event management) and threat intelligence. Again, many of the processes surrounding threat detection can be automated to provide greater visibility, but managing and analysing anomalies will still require a human touch and the ability to deploy and manage this technology.

Manage the future

Data centres are also struggling to recruit and retain staff with the appropriate qualifications. In such a booming industry, it's hard to stay current when training new talent, particularly training individuals in educational institutions.

Data centre professionals also need to effectively be trained as managers. Only then will they be able to nurture new talent, which is vital for the good of the industry. Put simply, organisations need to begin investing in this type of training to future proof their workforce. 64% percent stated their top requirement is to become confident managing current and future environments. There's clearly an appetite to prepare for the future – and organisations will need to invest in this, for their own sake.

Talent won't train and retrain itself, which means time is of the essence for data centre professionals. In an industry that doesn't sit still for a second, success will be greatly influenced by the prioritisation of skills training and the efficient allocation of resources – like investments into transformative tech – allowing individuals to develop their careers. It's all well and good, identifying the skills needing to be addressed, but if time can't be made to accommodate necessary training, then data centre professionals will continue to fight a losing battle. 📉

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Playing our part

Lex Coors, chief data centre technology and engineering officer at Interxion, outlines why sustainability is ‘critical’ to the future of data centre business.

Sustainability is a challenge every industry is grappling with at the moment. It has not only become a business-critical issue, but it’s also one that is capturing consumer attention and impacting purchase behaviour. Such is the weight of the issue, that we have seen major global protests in recent weeks urging individuals, organisations, and governments to do more.

The data centre industry is no different. We have our role to play in ensuring a sustainable future. In fact, some would argue, that given the amount of energy the world’s data centres consume, we have a significant responsibility to address sustainability challenges. I am one of those individuals. It’s not a straightforward task, I admit, but there is a lot more we can be doing.

As the rate of digitalisation continues to increase, so too does the energy needed to power our ever more connected world. Current research estimates global data centre electricity demand at 420 TWh, or around 3% of global final demand for electricity. And while newer infrastructure technology and more efficient data centre configurations are currently able to offset the increase in energy demand, this is not something that can hold indefinitely.

Customer demands

Energy is a fundamental component of the services this business delivers to customers. We’re already using 100% renewable energy to power our data centres, because it’s something customers demand and expect us to deliver on. For many customers, if the data centre isn’t powered 100% renewably, they don’t even want to hear anything else about it – they’re not buying.

We are fortunate that, as an industry, there are resources and people to talk to about these issues, learn from and share best practice. The Technical Committee and the Advisory Council of The Green Grid, the leading energy efficiency and sustainability association for the data centre industry, as well as the EC Joint Research Centre on Sustainability are invaluable in that regard. They’re not just talking shops, but collections of like-minded people coming together to tackle a common problem.

But this still isn’t enough. New challenges continue to present themselves as the industry continues to deploy more complex, data intensive workloads to solve more problems and answer bigger questions. We don’t yet know how much this will impact overall energy use.

Cool running

One of the key reasons for such high levels of energy use in data centres is cooling. Moving data around between compute and memory is an energy intensive process, but it’s also inefficient and much of that energy





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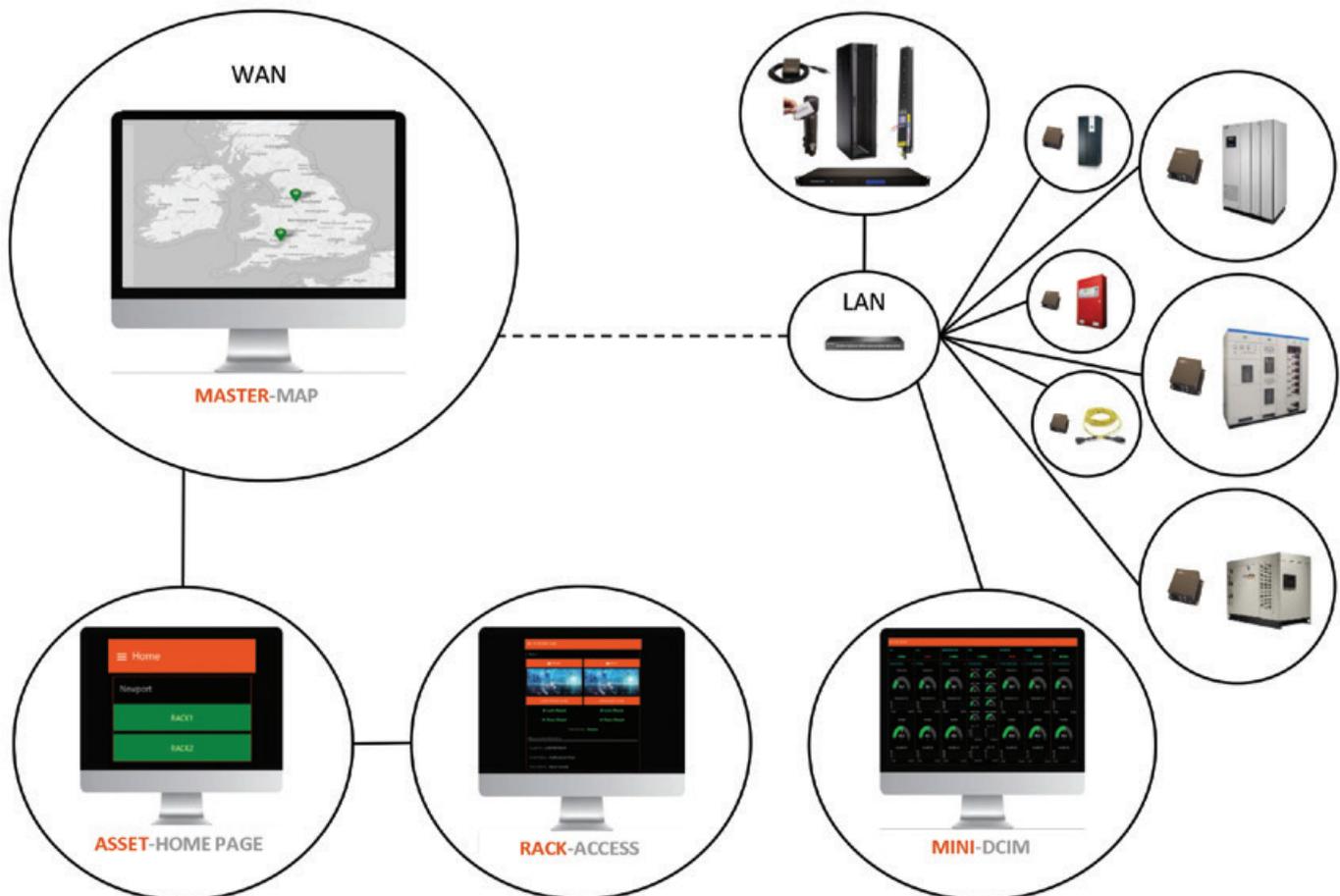
R-EDGE-E • POE enabled • Monitors the status of rack or room • Temperature & Humidity Sensors • Easy to read dash board with live 24 hour display • On-board trending graphs for reports

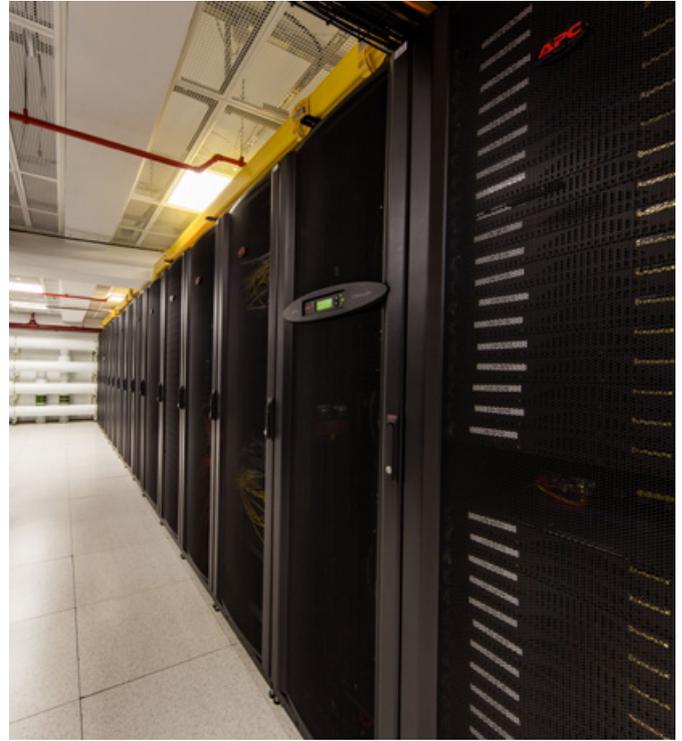


R-EDGE EAC Server Rack Electronic Access Control • Utilizing retrofit electronic swing handles with integrated RFID readers our unit controls and monitors access to server rack • Onboard CCTV camera with image capture function. Environmental sensors monitor rack temp/humidity front and back • SNMP Data from PDU's can be imported into the dashboard • Easy to read live dashboards with remote access functions • Trending page displays historic data in graph format • Email and SMS notifications.



MINI DCIM Using a combination of our **R-EDGE** devices to monitor your equipment and their environment we can create a cost affective solution **MINI DCIM** with no ongoing license fees. Featuring an easy to read live dash-board, which will alert you via email and or SMS instantly.





is lost from the system as heat. Because of this, and the fact that data centres contain hundreds, if not thousands, of server racks all moving huge amounts of data around, this heat is a major issue.

As we all know, most data centres are therefore carefully designed to regulate temperature, often in naturally cool locations – in colder climates, underground – and with sophisticated systems to ensure temperature doesn't deviate from an optimum window.

There are several different ways to approach the issue of cooling. New and innovative solutions such as liquid-to-chip cooling are starting to become increasingly common. While liquid and electronics don't usually make the best bedfellows, data centre engineers are now beginning to realise the benefits of liquid cooling systems. It is little wonder considering the relative efficiency of air/liquid heat exchangers.

But improved cooling and moving away from small, inefficient data centres towards much larger and more efficient cloud and hyperscale data centres, will only get us so far.

Architecting change

There is currently some fascinating work being done on new computing architectures which may reduce energy consumption further still. As the race to exascale computing continues at pace, high performance computing specialists are developing systems that can perform one quintillion calculations per second.

The power required to do this with conventional architectures is equivalent to a small power station, so engineers and technologists are rethinking 70-year-old concepts of computing and turning architectures on their head – placing memory, not processors at the centre – to reduce the need to move data between components, and therefore the energy needed to power these systems. While these architectures are only deployed for niche use cases today, they could become much more pervasive in the future.

All of these potential solutions have one thing in common. They are all conceived of our own industry. Data centres are used by so many businesses, sectors, and industries that should also play a part in addressing this issue. Large corporates are already investing heavily in renewables, energy efficiency, and sustainability initiatives, but this is still barely moving the needle.

“ For many customers, if the data centre isn't powered 100% renewably, they don't even want to hear anything else about it – they're not buying ”

Finding answers

As the industry continues to grow, evolve, and use ever more power, I believe our institutions need to play their part and contribute to a wider collaborative effort to solve this shared challenge. There are numerous ways this could happen. One option, I believe should certainly be explored, is an EU-funded programme of academic research to explore long-term, energy-efficient storage technology. This doesn't necessarily have to be battery technology, but should aim to help tackle the issue of availability of supply of renewable power, the oversubscription of which could lead to significant cost increases as demand continues to rise.

Only a forward-looking programme of this size, scale, and innovation is likely to deliver the meaningful results we all wish to see. 📡

Power of the purchase

Clare Hobby, director of purchaser engagement at TCO Development, explores the unique position of purchasers when it comes to their influence over the development of more sustainable products.



IT product sourcing is no longer just a function of price and performance. Sustainability is increasingly coming into play as a determining factor in supply contracts for computers and other electronic devices. For organisations in the public and private sector, how we purchase, use and handle electronics also connects with big picture sustainability goals for climate, waste reduction and social responsibility. While these topics are on the minds of users and industry alike, purchasers have a unique power to influence the development of more sustainable products.

IT sustainability hot spots: Environmental, supply chain responsibility

From a sustainable procurement perspective, IT products are considered relatively high risk. Supply chains are global, multi-layered and complex, making verification of working conditions challenging, even for the most well-resourced purchasing organisation. Toxic e-waste continues to mount at the rate of around 50 million tonnes per year, with only around 20% recycled. Additionally, the linear ‘take-make-use-dispose’ business model is not sustainable, and we need to shift to one that is more circular.

For product buyers, addressing environmental and social responsibility makes their task even more complex. They need to know they can receive products that meet their desired performance and at the right price, but that are also verified to meet criteria for lower environmental impact and more responsible working conditions in the supply chain.

How can buyer decisions help move industry in a more sustainable direction and impact these hot spots?

The purchaser holds the key

We know from our years of certification experience and ongoing work with the IT industry, purchasers and other stakeholders, that one of the most effective ways to spur effective action on these issues is when buyers raise their voices. The question then becomes, how?

Product specifications and relevant sustainability criteria in policy and contract language are essential in order for the IT industry to deliver an effective response. An important consideration here is that industry responds best when those criteria are relevant, clear and coordinated.

Don't go it alone

Certifications help buyers set criteria that directly affect industry action. When buyers develop their own specific product sustainability criteria, the result is a multitude of diverse specifications and requirements, without a unified message to the industry. This lack of clarity can make it challenging and ineffective for IT brands and suppliers to meet these diverse customer needs, while also delivering large-scale progress on priority targets connected to supply chain responsibility and environmental impact.

With over 25 years of experience, TCO Certified is the global sustainability certification for IT products. The criteria we have developed in TCO Certified are designed to be progressive and challenging, yet realistic for the IT industry to implement at scale for the products volume purchasers demand. An additional benefit is the inclusion of independent verification, which helps strengthen trust in the system from both purchasers and industry. When multiple purchasers use the same criteria, a clear and coordinated message is delivered to industry,

creating conditions for them to respond more effectively and focus on areas where change is needed the most.

In this way, purchasers can know that the criteria they set are driving real, measurable progress, and that independent verification is included. So the more purchasers use the same criteria, the greater the sustainability benefits. When purchasers use their voice effectively, together we take the next step toward a sustainable life cycle for electronics.

What about the circular economy?

Our current, linear way of producing and consuming products is threatening fragile ecosystems, causing the loss of valuable natural resources. For IT, we need to develop a more circular approach. This means keeping existing products and materials in high value use longer, and avoiding waste altogether. Keeping materials in high value use for as long as possible also means lowering reliance on virgin materials. We also need to make sure those materials contain safer substances so as to not present continued hazards.

“When purchasers use their voice effectively, together we take the next step toward a sustainable life cycle for electronics”

Sometimes the short lifespan is due to planned obsolescence where products break easily and are difficult to repair and upgrade. More specifically, virgin materials are extracted at a faster rate than they can be replenished. Once discarded, products are treated as waste and are often incinerated or placed in landfill, leading to the loss of valuable and scarce natural resources. Unsafe ways of handling waste also lead to hazardous substances leaching into soil, water and air. Both the manufacturing and transportation of products lead to pollution and extensive energy use that can be avoided in the circular economy.

For purchasing organisations, there are some concrete steps we can take now:

- Use the products you buy for a longer time period – even adding another year gives substantial sustainability benefits.
- Choose products that are designed for repairing, upgrading and upcycling.
- Don't just look at the sales price — a more expensive product may be cheaper to maintain, which saves money in the long term.
- View the contents of products as valuable resources in the circular economy, never to be discarded.
- Look for trustworthy ecolabels or certifications, compliant with the international standard ISO 14024 type 1. The benefits of using an ecolabel type 1 is that it leads to true environmental benefits. Through these ecolabels, buyers can be confident that when the product is manufactured, social and environmental aspects are addressed and independently verified throughout the lifecycle of the product. They can verify product compliance and go into the supply chains to see what is going on. By asking for ecolabels, buyers make sure the industry accountable. 🌱

Grand designs

Designing and building a data centre can be a daunting task. Where do I start? Where should my priorities lie? Do I buy or rent my equipment? What about ensuring resilience? Efficiency? Sustainability? How do I keep my costs down? With so much to consider, here, **Jason Koffler**, managing director at Critical Power Supplies Ltd answers some of our questions to help un muddy the waters.

When designing a facility, where is the best place to start?

Whenever you are starting to design any type of system it requires a site survey, this survey is used to help gather requirements of what is needed for your data centre. These requirements are things like the desired number and type of servers, what is the current layout of power and network cabling, what preferences would you like for cooling and ventilation. They may also include facilities for data centre management and monitoring to ensure that the data centre is at optimal temperature and performance.

In your experience what is the most important thing to consider when designing a facility?

The most important thing to consider when designing a data centre facility is how efficient the whole operation is. Being just 1% more efficient could save the data centre thousands in energy costs. After this, being able to ensure that there isn't any downtime in the data centre is critical. This means choosing the best backup power systems – a reliable UPS and generator could save thousands in power outage costs and keep servers and other equipment protected inside the facility.

Are there any tips you'd give for ensuring optimum resilience and efficiency?

To ensure resiliency is, as mentioned above, to choose the right backup and redundancy systems, coupled with a trustworthy UPS and generator system, these are key to keeping a data centre up and running. As for efficiency, having ample amounts of cooling is a must, but this can be quite power hungry. Some of this power usage can be offset by installing solar panels or wind turbines on the property to help recoup some of the costs of the power being used by the data centre. Consolidating some of your older systems and using newer and more energy-efficient systems can also help you increase your efficiency while also possibly being able to use a smaller footprint.

Finally, I would recommend having a sufficient monitoring system in place so that you can keep an eye on your data centre while being able to make changes to further increase efficiency.

Should I be looking to buy or rent my equipment? How do I decide?

This honestly depends on the circumstances of the data centre type. Having a data centre and buying the equipment means that you don't have monthly or annual costs and you keep everything. This also means that when it comes to upgrading you can recoup some of the

equipment investment by selling anything that you don't require anymore. This can be used to offset the next generation of equipment that comes in. The disadvantage comes as the upfront cost of each refresh is high and if you want to stay up-to-date with the latest equipment then it can be costly.

On the contrary, renting the equipment you can upgrade more often and you don't have the upfront costs of buying the equipment outright. This means you can always have up-to-date equipment and don't have to worry about the old equipment, since the rental company would take this away. The downside is that you have constant monthly or annual payments that will end up costing more than if you just bought the systems in the first place.

Virtualisation is gaining momentum as the benefits of virtual servers for on-demand services increases and organisations gear up for periods of high demand

If you are looking to be at the cutting edge of technology, then I would suggest the renting option and getting your equipment refreshed yearly or bi-yearly depending on your needs. If you are looking for a solution that doesn't require you to be at the cutting edge of technology, then I would suggest buying and refreshing every three to five years depending on your needs.

Sustainability is climbing ever higher up the priority list, what sustainability options are available when designing a brand-new facility?

This would wholly depend on the budget that you have, there are a lot of different ways a data centre can be self-sustaining and it all depends on what is available at your location. A data centre in Sweden was built around a town called Luleå where the majority of the area's energy is produced by dams where the installed capacity is 977MW. This helps towards the sustainability of the data centre, but also having the facility located in the chilly Nordic air helps cool the thousands of servers at this



location. They also use the heat generated from the servers to heat the offices in the building.

There are plenty of options to choose from to help make your facility sustainable, some of the most common options are solar and wind. These options have made waves in improving efficiency in the last couple of years so by installing solar on to the roofs of the data centre, this can help power your facility while not taking up much more space. Other energy options available include hydro, tidal, biomass and geothermal.

Cooling a data centre can take up to 40% of its power, what measures can be taken to keep the energy bill down?

The first thing that comes to mind is using any excess heat to warm any of your offices. This will reduce your power bill so that you don't have to spend extra on keeping your office spaces warm. Using hot and cool containment in your server rooms can help your cooling be more efficient by keeping your hot and cool air separate. Another possibility is using water cooling to help you cool your data centre – this can be a great way to reduce heat and your energy bill.

Have there been any data centre design 'trends' you've seen from your customers that perhaps weren't as prevalent a few years ago?

Virtualisation is gaining momentum as the benefits of virtual servers for

on-demand services increases and organisations gear up for periods of high demand. The immediate pay back of reduced power and cooling requirements during periods of low usage create an instant environmental win for everybody.

Lithium-ion batteries are also gaining traction in the data centre space as their field life capabilities are becoming increasingly proven and desirable. With design life of up to 20 years for certain products the TCO becomes very appealing over VRLA batteries. Lithium-ion batteries come with low maintenance, and are up to three times more compact and up to six times lighter than their VRLA counterparts.

Finally, do you see any major changes happening in the data centre design arena within the next five years?

I think the next five years of data centre trends will include the following:

- Location: With access to large scale fibre connections and concentrations of users.
- Structures: Building near cheap and green energy sources.
- Environment: As facilities respond to a changing environment and rising sea levels.
- Place: Edge data centres will continue to take off and perhaps submerged data centres for cooling benefits will play an increasing role.
- Storage: With solid state drives pricing coming down we can expect multiple benefits including reduced power and cooling usage. 📦

Trending

Clive Partridge, Rittal's product manager, IT Infrastructure, examines some of the key trends and challenges present in the global IT market both now and in the future.

The growth of artificial intelligence and analytics, digital twins, blockchain and edge are just a few trends that characterise the rapid developments within IT technology.

All of them will have a major impact on the network and the data centre market.

Alongside comprehensive digitisation, these technologies are now transforming every industry sector as well as our homes, so actually they criss-cross our whole society. As a result, they are driving the development of the next generation of data centre technology. Large data centres will continue to be dominant, but we expect edge data centres to grow in number to deal with the flood of data created by these technologies.

The future of cloud, edge and 5G technologies

The IoT and IIoT are going to change the IT landscape dramatically. By 2020, it's expected that up to 43 billion devices will be connected to the IoT (Statista). That amount of data cannot be handled by hyperscale/cloud data centres, which is why we're expecting a significant growth in the number of edge data centres to cope with the volume of data, and to respond and react with very short latency.

5G will be the second major game changer. The GSMA, which represents the interests of mobile operators worldwide, has forecasted that there will be 1.2 billion 5G connections by 2025.

It will have a major impact on private and industrial applications. 5G will be the core technology for autonomous driving cars, VR controlled robots and machines, as well as many other new emerging technologies. It's this combination of extra bandwidth and performance (5G), plus the growth of edge data centres, which will be the foundation of digitisation and new services.

It is important to note, by the way, that edge data centres are always associated with a corresponding cloud; edge and cloud are interrelated technologies.

Regional IT infrastructure assets

The greatest potential for the growth of IT infrastructure assets is likely to be in the North American, European and Asian region – in particular in China. In addition to the traditional hyperscale data centres, OCP technology will continue to grow in importance.

In Europe, with the advancement of IIoT technology as part of Industry 4.0, the edge data centre segment should see above-average growth.

Next steps for Rittal

Rittal has already established itself in the hyperscale/colocation market, and has many well-known IT companies within its customer base. The Lefdal Mine data centre has shown how we can apply our experience to large-scale data centres.

Going forward, the focus will increasingly be on edge data centres in order to position Rittal as a driving force within this segment and it is one where we will continue to contribute our know-how and expertise in order to provide cross-industry solutions.

Further information at www.rittal.co.uk and www.friedhelm-loh-group.com or on twitter @rittal_ltd. 

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You ain't green nothing yet

Jordan O'Brien talks to UKFast CTO **Neil Lathwood** to find out what went into the design phase of its data centres to become carbon neutral.

With climate change at the top of the agenda, it's important that the data centre industry do their part to help lower emissions. UKFast is one company that has gone further than most, with it being the first carbon neutral hosting company in the UK.

Neil Lathwood has been with UKFast for more than 18 years, and he's now responsible for the technology strategy of the company. It's his job to continue pushing forward UKFast's commitment to carbon neutrality.

Since 2010, UKFast has been carbon neutral. What led to the decision to pursue 100% carbon neutrality?

We first started owning and operating our own data centres in 2010. It was a goal of ours from the very beginning to be carbon neutral. As a business we've always felt it was incredibly important to take a responsible and proactive approach to energy usage and take steps to reduce our carbon footprint wherever possible.

▄▄ The CCA requires us to continually monitor our efficiency levels and gives us targets for reducing energy consumption each year

What design decisions have you had to make inside your data centres to ensure 100% carbon neutrality?

We design and build our data centres to be efficient but also resilient. We employ segregation in our data centres between hot and cold aisles, meaning we only cool the servers themselves, rather than the entire facility. This offers a 30% saving on energy compared to some data centres. Energy efficient cooling solutions and UPS systems also help to keep our emissions as low as they can be.

Will UKFast be making any design changes to its data centres in the future to minimise carbon emission output?

The design of our data centres is continually evolving, from adding adiabatic cooling systems to reduce energy use, to regularly servicing

and overhauling the power and cooling equipment. We employ our own in-house facilities management team which is tasked with constantly keeping our equipment in the best of health.

At the moment, offsetting is a common way to become carbon neutral, but do you think there's more the data centre industry can do to reduce their carbon emissions, rather than simply offsetting?

UKFast buys energy from renewable sources and whilst this is more expensive, it proves a commitment to the environment. We also achieved CCA accreditation from techUK for the energy efficiency of our data centres. The CCA requires us to continually monitor our efficiency levels and gives us targets for reducing energy consumption each year.

We further reduce carbon emissions by offering our customers highly efficient cloud and hosting platforms. Thousands of solid state devices minimise energy usage, compared to legacy spinning disc drives. As each new data centre comes online we look to employ the latest technology to virtualise hardware components and reduce power usage and cooling.

What future technologies would you like to see become more common in the data centre market to help reduce energy usage?

The data centre market pushes the engineering boundaries on energy-efficient power and cooling solutions. We're excited to see the development of on-chip cooling, which potentially offers huge advantages.

There is a challenge for the hardware manufacturer to do the same and produce much more efficient systems. The most inefficient element in the data centre environment is generally the compute equipment.

What specifically makes MaNOC 8 your greenest data centre yet, and is there anything you learnt through the design and construction of this data centre?

MaNOC8 is our latest innovation in data centres. We have maximised cooling capacities and airflow to gain greater efficiencies from the space.

We employ modular UPS systems in MaNOC 8, so we only turn on what we need and reduce the physical footprint of power systems. We have monitoring across all systems to accurately measure and predict load profiles, so we don't overcool or oversupply. We learned that by using our in-house design and construction teams, we could save hugely on capital expenditure and deliver on our specific business needs and change requirements, rather than relying on off-the-peg solutions. 📡



Key to the (smart) city

Is the IoT the key to the smart city?

Byron BeMiller, director of Smart Building Applications, Wireless and Sensing Products Group at Semtech Corporation, explores how wireless technology is making cities not only smarter, but more efficient.

The Internet of Things (IoT) is becoming the backbone of a smart city. Already, we are seeing buildings connected via scalable networks and ‘intelligent’ road management systems providing the data which smart cities depend on.

Of course, once a standalone city is fully connected, it is no major step for it to link with another smart city and another until an entire national – and ultimately international – network is created where devices communicate with each other millions of times a second and data is passed back and forth along extensive long range networks.

Armed with the technology that the IoT delivers, building facilities managers are already able to monitor and control a building’s entire central systems, including those that provide heating, cooling, fire detection, room management, lift management, equipment failure prediction, and more. Among the many benefits of having all of this valuable data to hand in real-time, as well as the ability to act on it, are substantial time savings, labour savings and reduced operational costs.

Instead of carrying out scheduled maintenance programmes at set times and checking everything even though it is working at optimum efficiency, building service managers will be alerted via predictive maintenance if anything is likely to require their attention. Since IoT is based around sensors that collect and feed data every second of every day, facilities managers can be made aware of such issues as air quality, smoke detection and even





changes in temperature which may be an indication that something is not right in the building. Apart from equipment not working as it should, alerts can include whether there is a window or door open that should be closed, if there is a leakage of any kind in the building, if there are any unexpected structural vibrations, or even if an unauthorised person is on the premises.

Of course, intelligent building management is not only concerned with overseeing utilities and security systems or operating refuse and waste systems. The efficiency of a building, including where heating, air conditioning or other services would best be targeted, can often be dictated by room usage, office layout and even the location and timing of meetings. Instead of having a reasonable idea of how many people are in a building, where they are and what they are doing, it is now possible to have exact figures and know precise locations.

While some sensors and equipment can be hardwired, it is not practical to install cabling and wiring throughout an entire building in order to connect hundreds or even thousands of sensors (not to mention the cost of powering every sensor). Nor is it sensible for different buildings and various other aspects of a smart city to be connected by cable. There only has to be one broken link to bring down an entire system and finding it among miles of cabling would be nearly impossible. Also, scalability in terms of adding extra sensors is costly and far from straightforward.

The solution, then, is wireless technology. Everyone is used to making connections via cellular networks or Wi-Fi or Bluetooth, but none of these can achieve the distances or provide the degree of security required when connecting buildings and smart cities through IoT. Air quality in a hospital, for example, cannot be allowed to deteriorate or traffic management systems cease to operate simply because there has been a drop in the network signal, or it struggles to pass reliably through a concrete wall.

So far, 5G technology has been found to be suitable for such uses as internal and external vehicle communications, remote healthcare and driverless cars, but no cellular technology on the market, not even 5G, delivers the level of reliability required for full IoT implementation. Another option, narrow-band IoT (NB-IoT) will offer the ability to be used across existing mobile networks and to operate in a licensed spectrum, meaning industry support will be widespread when the technology is available.

However, leading smart cities today are taking advantage of low-power wide area networks (LPWAN) enabling IoT devices and smart networks to operate at optimal efficiency on a local, national or global basis. In addition, a long-range wireless radio frequency technology, which enables

devices to connect with low-power LPWANs, also ensures data security through end-to-end AES128 data encryption and mutual authentication.

This technology enables communication with sensors which operate at distances of up to 30 miles, have battery life of up to 10 years and can penetrate dense building materials. GPS-free geolocation technology means that no extra power source is required, open network technology means users can connect to their preferred network service provider, and since the technology operates in the unlicensed ISM band, spectrum costs are extremely low or zero.

IoT is how the world's buildings and cities of the future will connect and stay connected

In buildings and cities around the world, wireless connection to public and private LPWANs is becoming the technology of choice in IoT applications where data is collected and analysed via cloud-based or enterprise-based systems. Whether a local authority is wanting to save energy through smart street lighting, or a building facilities manager is looking to improve customer service, while saving time and unnecessary costs, LPWANs are recognised as the most efficient way of enabling sensors to communicate via gateways and cloud-based platforms. For example, LoRaWAN has been adopted in more than 100 countries, where it has connected roughly 90 million wireless sensors, actuators and tags.

Practical examples of how LPWAN technology has increased efficiency and cut costs include a local authority's smart waste management system that slashed costs by 83% and boosted recycling by nearly 50%. In another example, the technology enabled a city to increase the output of its solar power facilities to around 750,000 KW/h.

IoT is how the world's buildings and cities of the future will connect and stay connected. To achieve the goal of making cities and buildings smarter and more efficient, scalable communications will need to rely on wireless technologies that operate over long distances, keeping deployment, as well as operational costs to a minimum. 📡

Prevention is better than cure

Years ago, before I joined Centiel, I remember a legacy UPS system that we used to look after under a maintenance contract for a large international airport. The system was pretty old and certainly obsolete in terms of manufacture. It had just a single string of battery blocks and was pretty inefficient with no redundancy and was in desperate need of an upgrade.

However, the client preferred to increase the periodic number of checks on the system rather than invest in new, more efficient technology, and incorporating increased load protection with some form of redundancy. An upgrade would have paid for itself in improved operating efficiency and replacement parts within a few years.

One day, during a maintenance visit, I asked the client what would happen if the UPS actually failed? My contact replied, "We'd be on the national news; it protects the power to the baggage handling system!"

Saving face

Maintenance contracts are an important part of ensuring the availability of a critical power source. However, the hidden costs associated with a power failure by not replacing equipment at the recommended time also needs to be considered, as the consequences in lost revenue, reputation and associated negative publicity could be even more far-reaching and potentially catastrophic for a business.

If you purchase an expensive, high-quality, highly-engineered vehicle you would expect to have regular services to fine-tune the engine and keep the warranty intact. If you buy a cheap car, you might not bother to maintain it quite so well; you may leave it later to change the oil or replace other worn parts. However, you also wouldn't be surprised if it breaks down on a regular basis.

When it comes to protecting critical power supplies there is a strong argument for buying the best, most reliable, highest availability and efficient UPS – and then also maintaining it properly. Then when the power does fail, you have the confidence and peace of mind that the system will do the job it was intended to, rather than land your company in the headlines.

Let's get chemical

Often overlooked as they aren't deemed to be 'exciting' are the batteries. They work as a chemical reaction and by their very nature start degrading from day one. Regular impedance tests, load bank tests or battery monitoring tests will reveal a pattern of gradual degradation where the results can be compared over time.

In an ideal world, 50 batteries should all degrade at the same rate. How-



Mike Elms, managing director at Centiel UK, explains how businesses could save their power and their reputation by simply taking better care of their UPS.

ever, in real life, often one will fail earlier than the others. Perhaps there was a small defect which didn't show up during normal manufacturing end-of-line tests, or it may have been accidentally dropped in transit.

Regardless, if one battery fails, the whole battery string will fail, and so regular checks will identify any weak links in this chain. It is better to replace a year early than one day too late in this case.

Capacitors can fail much more spectacularly and there is a video on the Centiel website created under controlled conditions which shows just how dangerous capacitor failure can be. Most AC capacitors have a shelf life of five to seven years, while DC capacitors usually need replacing between seven to ten years. Maintenance engineers will look for signs of damage: cracks, splits or any drying out which could potentially cause an issue.

Give UPS a home

Environmental considerations also need to be given to the housing of the UPS to keep it in tip-top condition. Ideally, a dust-free, temperature-controlled comms room will ensure the technology lasts as long as possible.

In the past, contrary to our recommendations, I've maintained UPS systems kept in an old underground station and another which was open to the external atmosphere next to a huge car park. Both needed regular cleaning to remove oily deposits.

The UPS next to the car park regularly needed components replacing. By simply moving the system to a suitable comms room this could have been prevented with the associated cost savings.

As for the UPS in the underground station, it was still going strong when our maintenance contract ended but for how long? It was only a matter of time before something shorted and went 'bang'. Here, it is worth taking the advice of specialist maintenance engineers whose goal is to help keep your highly engineered UPS system in optimal condition, so it is ready to respond to the next power outage.

Just as you wouldn't allow people to walk on the roof of your expensive car, you wouldn't let other contractors use the UPS as a ladder to reach other equipment, would you? I've visited installations where footprints on the top of the modules are still in evidence.

In this article I've touched on just a few areas of concern when it comes to maintenance. I think overall, maintaining a UPS properly, is about creating a regime where those responsible take an active interest in the overall health of the system. Long-term, this will reduce total cost of ownership and ensure power remains protected, while also playing a part in protecting the organisation's reputation too. 📢



▣▣ If one battery fails, the whole battery string will fail, and so regular checks will identify any weak links in this chain. It is better to replace a year early than one day too late in this case



Putting power problems in the spotlight

Riello UPS general manager **Leo Craig** looks back at a litany of major recent power failures and asks whether data centres have any room for complacency.

As an industry predicated by power continuity, a rather perturbing pattern has emerged over the last few months. In June, a power cut hit virtually all of Argentina, Paraguay, and Uruguay, plunging more than 50 million people into darkness. July saw a huge blackout in Manhattan, New York, while in August, 10 million residents of the Indonesian capital Jakarta were left without electricity for nine hours.

A network failure in the Central American Electrical System caused a mass outage in September affecting most of Honduras, Nicaragua, El Salvador and Guatemala. While a substation explosion left the whole of Tenerife – including a million residents and holidaymakers – without electricity.

And then last month (October) gave us the unusual sight of power being purposely cut to roughly one million people across California for several days as a preventive measure to try and avoid a repeat of the catastrophic wildfires of previous years.

Closer to home, we had the events of Friday 9 August. Lightning struck a transmission circuit, leading to the sudden loss of generation from two power plants, Little Barford gas station and Hornsea wind farm.

Stripping more than 1,400MW of generation from the grid saw frequency drop below the safe limit. This triggered the defence mechanism known as Low Frequency Demand Disconnection (LFDD). This load-shedding disconnects a proportion of energy users to save the network from complete collapse.

In August's event, around 5% of customers totalling one million people were left without power while the grid frequency recovered.

Even though it took less than an hour to restore the grid to normal, the incident was still the UK's biggest blackout for a decade. Disruption was widespread, particularly for thousands of rush hour commuters left stranded on trains requiring an engineer reboot to override their automatic shutdown procedures.

Of course, it's far too simplistic to link all these events. The causes differ hugely. So too do the electrical systems involved. It's difficult to compare UK infrastructure with power grids in South America or Asia.

However, we now live in a digitalised society that's almost entirely dependent on electricity. And as Britain's power system transitions away from fossil fuels to more intermittent renewable and distributed energy sources, it does raise the question whether the August incident was a one-off or a sign of things to come.

Indeed, in the aftermath of the power cut, a key government adviser on energy policy, Professor Dieter Helm warned, "The very idea that the electricity system could be brought to its knees just because a couple of power stations dropped off at short notice should send alarm bells ringing."

The bigger picture

Shortly before all the power problems outlined above took place, we published our 50-plus page investigation the *Blackout report*. The document explores the likelihood of a complete UK-wide electricity system shutdown. Official government evaluations reveal there's a one-in-200 chance within the next five years. That's still unlikely but not beyond the realms of possibility.

Our report examines the biggest threats which could cause such a failure. A combination of extreme weather (lightning) and system failure (power plants disconnecting from the grid) led to August's outage, two of the obvious risks.

But there's also the growing danger of deliberate cyber-attacks on energy systems similar to the targeting of the Ukrainian grid with malware back in December 2015. That attack shut down 30 electricity substations and left 250,000 people without power.

Leaked intelligence reports reveal state-sponsored hackers – believed to be the Russian-based Dragonfly group – have already infiltrated the UK grid through an attack launched on the day of the 2017 General Election (8 June).

The *Blackout report* also covers the 'Black Start' process of rebooting the grid from scratch, how long it could take for power to be fully restored, and what the catastrophic consequences would be for businesses and wider society.

We're not claiming to have the foresight – or for that matter a crystal ball – to have predicted the August power cut. But many of the key questions and concerns we pinpointed in our report are now firmly at the forefront of government and industry minds.

“ We now live in a digitalised society that's almost entirely dependent on electricity

Does National Grid need to increase its backup reserves to cater for the possibility of multiple smaller-scale generators failing as per August's incident? At present, the reserves only need to be as big as the largest power plant running on the network.

Are the safeguards and compliance regulations strong enough to reduce the risk of small-scale plants inadvertently tripping or disconnecting from the grid? This needs urgent clarification before we become too reliant on renewables-led embedded power generation.

And what price do we as a society put on protecting our power supplies? Around £170 million a year is currently spent on frequency response contracts. It's estimated that doubling this contingency would add around £2 to the average annual household bill. Is that a price worth paying for the added peace of mind?

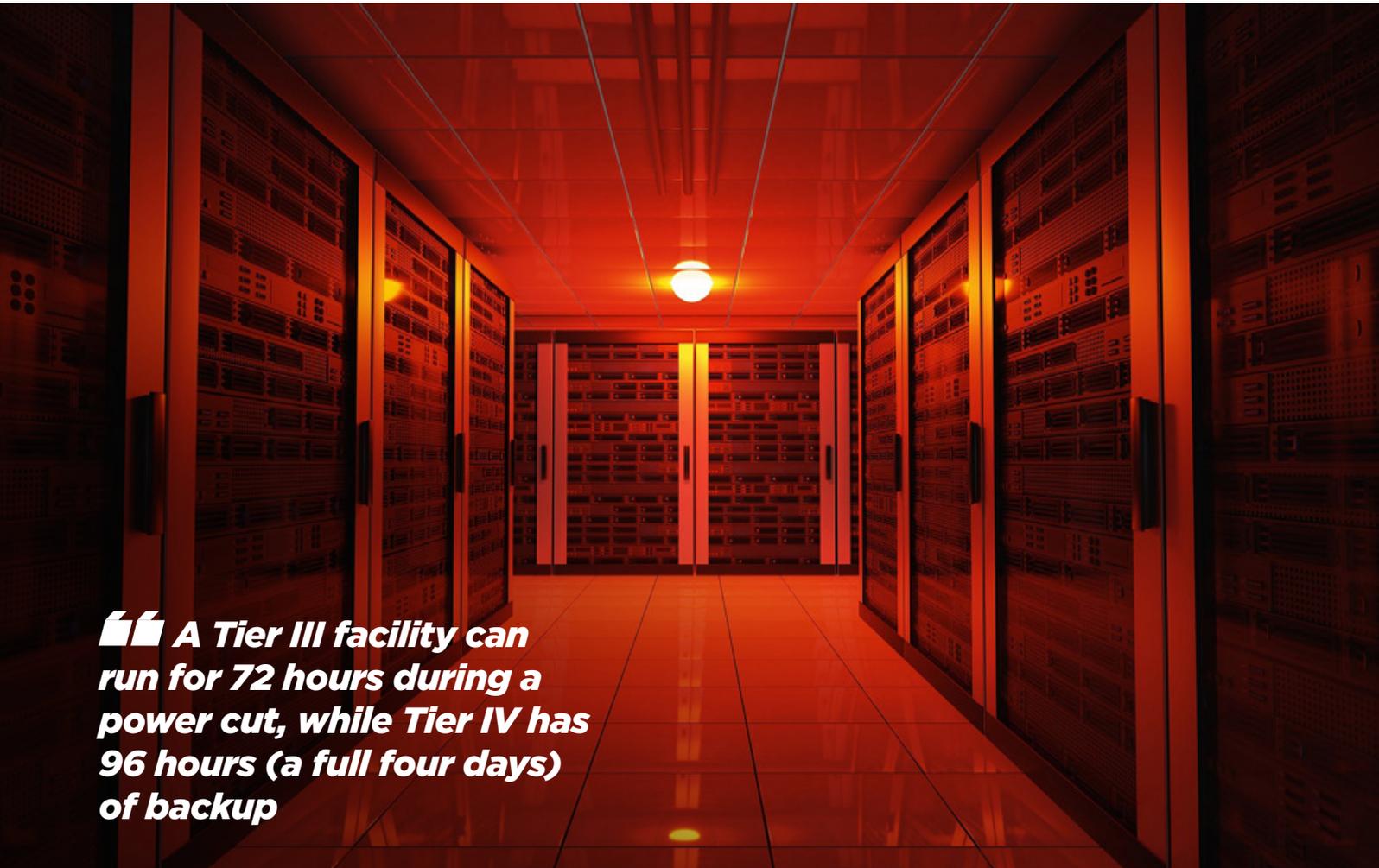
Prepared for problems

Compared to most other sectors, data centres are well-prepared for the possibility of any prolonged power problem. With uptime and availability the overriding criteria for operators, concepts such as redundancy are second nature throughout our industry.

Backup power supplies such as UPS and generators are the minimum requirement even for the smallest Tier I data centre. While the higher up the Uptime Institute's Tier Classification System you go, the greater the precautions put in place.

Tier II introduces redundancy into the UPS, generators, and pumps. While Tier III provides enough redundancy (at least N+1) to enable maintenance and replacement of equipment without the need for system shutdown.

Then at Tier IV there's redundancy for each component across both computing and non-computing infrastructure (a minimum of 2N). Such thoroughness means a Tier III facility can run for 72 hours during a power cut, while Tier IV has 96 hours (a full four days) of backup.



▮▮ A Tier III facility can run for 72 hours during a power cut, while Tier IV has 96 hours (a full four days) of backup

Wider data centre debates

Other sectors arguably have plenty to learn from data centres' uncomplimentary approach to power continuity. But that doesn't mean our industry can afford any complacency to slip in. Is there even a case that operators should do more?

Looking back to August's outage, one reason why supplies were restored so quickly is that National Grid deployed more than 1,000MW of reserve power. Battery storage accounted for nearly half of this backup (475MW).

Such dynamic storage is set to become a fundamental part of the energy mix as we transition to a more decentralised, low carbon, renewables-led model.

On the face of it, data centres are ideal candidates to participate in energy storage and the wider demand side response (DSR) mechanisms National Grid use to balance the network. They have large-scale battery-based UPS systems and generators to provide emergency backup in the event of a mains failure.

But so far, data centre take-up of DSR has been limited to say the least. Conventional wisdom argues that using batteries for anything other than their primary role of emergency backup adds an unnecessary layer of risk.

Does the evidence back this up though? The majority of data centres still use traditional sealed lead-acid batteries. Without expensive battery monitoring systems and thorough testing, it's difficult to determine their exact condition.

Hand on heart can you truly be sure these batteries are 100% guaranteed to kick into action when you really need them to?

On the other hand, any batteries used for DSR and stationary energy storage must be constantly monitored at the individual cell level. Batteries showing any sign of deterioration or damage can be quickly replaced. When they're called upon, there's far greater certainty these UPS batteries will work.

Then there are the wider benefits of energy storage; lower electricity bills, reduced grid network charges and tariffs, and the additional revenue earned from selling surplus power back into the grid or cutting use at peak times. Increased system resilience combined with lower running costs sounds like a win-win situation.

Turning to the type of prolonged power outage we explored in the *Blackout report*, there are a couple of other areas for data centre debate.

Isn't there a case that intensive energy users – including data centres – should be obliged to draw up worst-case plans for incidents of sustained power loss? Such strategies could include a requirement for organisations to minimise unnecessary electricity use during a civil emergency.

A similar concept would involve data centres committing to only running a skeleton service (i.e. only the most critical operations) during a power outage. This would reduce the load on backup generators and ensure precious fuel supplies last longer.

When faced with the choice of complete shutdown or being able to run a paired back, limited service, surely it makes sense for operators to opt for the latter? 🤖

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Levant UPS are now offering a range of containerised UPS solutions to provide emergency, temporary power to your site.

Key points:

- A variety of N+1 units which can be configured in power upgrade mode to support up to 1MVA
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- Internal Switchgear (rated up to 1MVA) for easy connection to your onsite distribution switchgear
- Internal AC Cooling Systems

Our containerised UPS systems are designed for easy delivery and installation to your site in mind. We are able to deliver anywhere in the UK MAINLAND with minimal advanced notice. The Levant 1MVA containerised power unit has been designed with resilience as the foremost concern. The advantage of utilising 2 No. 500kVA units is that we can configure the machines in N+1 mode, if required, thus offering a unique capability to provide 500kVA UPS redundant systems in a containerised setup.

Unlike other 1MVA options, which are often housed in 40ft containers, we have designed our 1MVA system to be contained in 2 x 20ft

ISO containers. This means that we are able to easily transport the systems to your site without the need for escort vehicles or complex craning operations. Each system arrives to site on the back of a HIAB lorry which can quickly position each of the containers on your site with minimal disruption. This also allows us to position the containers accordingly when delivering to sites with restricted access – we can work to the requirements of your site.

Levant understand the need for resilience when it comes to ensuring your business-critical activities are safeguarded against power disturbances. That is why, when not deployed, our 1 MVA containerised systems undergo rigorous maintenance schedules and are routinely overhauled to ensure that upon rapid deployment to your site, nothing is left to chance.

As always, we continue to have a flourishing range of containerised UPS systems ready for immediate hire. Our lines are open 24/7/365 and our engineers are available for rapid deployment to your site at a moment's notice.

Do not let your business be exposed to risk, Levant UPS can help with short- or long-term containerised UPS hire up to 1MVA.



For more information on Levant's Containerised options or for more information on any of our other UPS services please contact us today!

Broadening your horizons



Sameer Padhye, founder and CEO of FixStream, explains how AIOps just made migrating your data centre to the cloud a whole lot easier, whilst at the same time giving you an expanded view of your IT environment.

With measurable benefits such as cost reduction, faster provisioning, and redundancy, it's no wonder more and more organisations are migrating IT resources from their local data centre to the cloud. Oftentimes, many enterprises don't switch to an all-cloud environment, but rather retain a number of systems, applications and sensitive data in-house, resulting in a disparate, multi-layered, interconnected hybrid IT environment that is opaque, complex and ever-changing.

While this proliferation of assets and data architectures can enable new digital business models, it's a challenge to support a sprawling hybrid IT environment generating thousands of transactions on a daily basis – especially with outdated monitoring tools that don't work with each other or provide a clear status of IT resources. And if

By providing a real-time view into resource utilisation and workloads, AIOps can help organisations optimise cloud usage and ensure cost-effective results

there's a system error, IT teams can spend countless hours trying to analyse and repair the problem.

In short, moving your interconnected applications and data centre to the cloud can be a massive undertaking that requires careful preparation, starting with a complete listing of IT resources. Without an accurate updated inventory of assets, including containers and micro services, IT organisations can't identify or understand the relationships or interdependencies between applications, infrastructure and other datasets. And without a precise understanding of the existing IT topology, it's very difficult to execute a successful system upgrade or migration, whether on-premise or to the cloud.

Expand your view with AIOps auto discovery

Fortunately, there are technology solutions to help an enterprise plan and track the progress of a cloud migration. For example, Artificial Intelligence for IT operations (AIOps), an AI-driven software platform that automates and accelerates IT tasks such as system monitoring, troubleshooting, and data analysis, uses auto discovery features to, among other things, identify all the assets and their status within a multi-domain IT ecosystem.

How does AIOps work?

Powered by artificial intelligence and machine learning, AIOps uses the volumes of log and performance data generated by systems, services and applications to identify all the components actually running in the system environment and the processes and dependencies associated with them.

The data is collected from all types of disparate entities, including servers, storage devices, virtual machines, and routers, whether physical, virtual or logical. AIOps can codify an entire hybrid IT ecosystem and highlight the interdependencies among IT entities, with zero blind spots.

Cloud migrations made easy

By collecting data across an enterprise's IT environment, AIOps solutions can glean meaningful insight, such as service information and configuration data, from infrastructure and application entities across IT silos. They can also reveal the system dependencies you should consider when adding new applications and/or planning migrations to the cloud. This improved insight is invaluable for developing and executing a successful data centre migration plan.

Once AIOps has created a complete, accurate, real-time inventory of assets across the IT stacks, IT teams can use the information as the building blocks for efficient cloud migrations with minimum downtime. Also, by providing a real-time view into resource utilisation and workloads, AIOps can help organisations optimise cloud usage and ensure cost-effective results.

The visibility provided by AIOps can even help identify which system applications or components should be migrated to the cloud first, and if there are other parts that should be migrated at the same time. AIOps can determine the infrastructure footprint of an application,

Explore Data Centre Review

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Armed with insight from AIOps, you'll be able to anticipate the effect of adding new applications or devices to your IT environment

enabling you to create logical groups for migration, perform flow analysis, and visualise the business impact of migrating them.

More efficient system management

The AIOps platform can also facilitate patch and change management by forecasting the impact of updates to the system environment. Armed with insight from AIOps, you'll be able to anticipate the effect of adding new applications or devices to your IT envi-

ronment, so you can plan for future capacity needs and hardware/software updates.

This ability to foresee the potential effect of system changes will enable your team to successfully plan system additions and upgrades so they don't affect business-critical applications. It also enables successful migrations, whether you are shifting on-premise applications to the cloud, upgrading or migrating to new on-premise technology, or dynamically managing resource allocations.

Bridging legacy and cloud infrastructures with AIOps

Some AIOps platforms can seamlessly integrate with on-premise and cloud computing services, enabling them to auto-detect issues and monitor all IT assets, even if they cross cloud and on-premise boundaries.

When IT departments struggle with limited insight into their distributed hybrid IT ecosystems, an AIOps platform can provide crystal-clear visibility of IT resources and their status, helping staff members better plan system migrations and pinpoint potential issues – before they hinder system performance. 📊

New addition to the Olson range

Olson is the market leading supplier of specialised power distribution units. As well as standard ranges it has the design and manufacturing capabilities to produce custom solutions for its customers' individual requirements.

Olson's Intelligent Power Management Unit is the newest addition to the Olson range. The intelligent unit allows remote monitoring through a modular system which comprises of a main monitor module with a built-in graphical display and keypad. Offering the option to connect up to four 8x output switching mod-



ules allowing a total of 32 16A switched outputs to be controlled (total 32A).

Olson is in a unique position to be able to

offer even its latest development in customised configurations. Whether you need to match the unit to your corporate colours, have an individual outlet arrangement or add surge protection or a sequential start for added reassurance. Olson can work with you to ensure your requirements are put first.

Additional features include: Monitor energy consumption; remote monitor and switching; external temperature and humidity sensors; programmable UPS and SNMP capabilities.

Olson
0208 905 7273
www.olsondirect.co.uk

Hydrosense: The new standard for business continuity

Showcasing at the Data Centres Ireland show (19-20 November, RDS Dublin, Stand 238), the sophisticated fully-configurable Hydrosense systems from Vimplex have set the new standard for water leak detection.

Hydrosense applies the integrity, control and reliability of life safety and building infrastructure systems to water leakage detection to protect areas where water ingress could seriously damage electrical, communication and computer networks.

It continuously monitors for water leaks around the clock, year in year out, with the facility for 72-hour battery standby in the event of power failure. Vimplex life safety technology provides the reliability and integrity of BSI-approved fire detection systems, meaning there is virtually no risk of failure, downtime and significantly fewer false alarms. All products feature long warranties which are fully supported by Vimplex and its suppliers.

Vimplex
01702 216999
www.vimplex.co.uk



Adaptec Smart Storage first to include open source toolkit for managing data centre storage

Microchip Technology Inc. is the first to offer production-ready open source tools for managing its Adaptec Smart Storage HBA, SmartHBA and SmartRAID offerings in OpenStack data centres.

By investing in and offering readily deployable open source tools and plug-ins, Microchip removes complexity for customers that are connecting storage resources to its Adaptec line-up of storage controller solutions in heterogeneous data centres powered by OpenStack. The prequalified and tested Adaptec Smart Storage tools are scalable and

customisable, simplifying management of large networks of cloud servers within enterprise-class infrastructures.



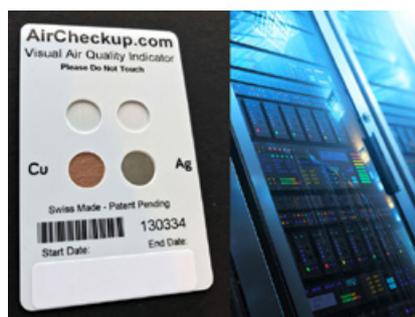
The Adaptec Smart Storage OpenStack tools include three components: 1) a plugin for Metal as a Service (MaaS), a bare-metal deployment tool from cloud industry leader and Ubuntu creator Canonical Ltd.; 2) a scripted service formula, or "charm", created with Canonical's Juju modelling tool and 3) a plugin for the OpenStack Horizon Graphical User Interface (GUI) that allows users to discover, configure and conveniently manage both Adaptec Smart Storage standard adapters and custom embedded solutions.

Microchip
0845 2668773
www.adaptec.com

Visual air quality indicator card for data centres

Technology Care LLC has announced the launch of an air quality card which changes colour when exposed to air particles and corrosive gases. The card can be affixed to data centre walls and inside racks.

AirCheckup DATA provides visual air quality monitoring for up to one year and records air contamination events. The



AirCheckup DATA test report shows if air quality meets ASHRAE TC 9.9 recommendations for data centres including air particulates, copper reactivity and silver reactivity (*2011 Gaseous and Particulate Contamination Guidelines for Data Centres* - ASHRAE).

Technology Care LLC
+41 44 450 85 60
www.aircheckup.com

Efficiency savings and increased cooling capacity with Stulz's new CyberAir 3PRO DX

The new CyberAir 3PRO DX series from Stulz provides the energy-saving advantages of indirect free cooling, and is available with outputs in excess of 100kW. In fact, users can pick output levels ranging from 30kW to 130kW, while the provision of cooling systems with tandem compressors – capable of handling partial loads – offers the potential for further energy savings.

The range also includes units with integrated fans, available with standard ASD (downflow) and ASU (upflow) air conduction. By optimising the design, Stulz says that the units are now considerably more efficient than previous versions.

Flexibility is another significant advantage – the size, cooling capacity, air conduction and control system can be tailored to meet the precise requirements of mission critical facilities. In addition, as the supply air temperatures of the cooling systems lie within the recommended range of between 18 °C and 27 °C, they are fully ASHRAE-compliant.

The CyberAir 3PRO DX range currently provides five different cooling options, with each design optimised to help ensure the highest levels of IT uptime in mission-critical environments, through cost-effective thermal control.

Stulz
01372 749 666
www.stulz.co.uk



Siemon's V-Lock beefs up cabinet security with smart tech

With the V-Lock security system from Siemons, data centre operators are able to granularly control who gets access to which cabinet – eliminating the risk associated with the use of universal cabinet keys. It works by pairing advanced software with a set of smart door handles, that can only be unlocked when presented with the correct authentication method – be it a low-frequency card, high-frequency card, biometric fingerprint or a simple PIN.

The clever thing about the V-Lock system is the fact that an employee's fingerprint can work on a cabinet door one day, while the next that employee finds themselves locked



out. This ensures that the employee only gains access to the cabinets they need to get into, rather than providing unfettered access to all of them. What's more, the software behind V-Lock offers real-time monitoring and maintains logs of events for auditing and compliance regulations.

The new system also facilitates compliance with privacy regulations such as the General Data Protection Regulations (GDPR), the Financial industry's Sarbanes-Oxley and the Payment Card Industry Data Security Standard (PCI-DSS).

Siemon
(1)860 945 4200
www.siemon.com



Plugging the gap

Within the tech sector it is becoming increasingly difficult for employers to find the right person for the job. **Gurvinder Singh**, co-founder of TechRank, answers some of our questions, giving his insight into where we're currently at, as well as a solution that might just help plug the gap when talent is tight.

How prominent do you think the skills gap present within the tech industry is right now?

The explosion of technological advancement over the last couple of decades has brought huge benefits for businesses, but has simultaneously made it difficult for IT professionals to remain on top of their game. It can be difficult for large organisations to find appropriately-skilled technologists and to be sure that the candidates they are presented with actually have the required skills.

The skills gap in the tech industry is larger than it has ever been and is going to continue to rise with the advent of AI, VR and quantum computing.

Do you think we currently have an ageing workforce on our hands?

The tech industry has always attracted lots of young minds and this is no different today. The majority of tech start-ups are founded by young entrepreneurs and this trend will continue to grow in the future. The issue is not so much about age, but about gender. Tech is a heavily male-dominated industry. Over the last two decades in IT, I have met many young people in tech, but very few females. I can't say whether this is a bias in the hiring process or whether women are just not interested in entering this industry.

When it comes to staff having the right tech credentials, do you think companies should consider upskilling their current employees or is new tech talent the way forward?

The right solution will inevitably depend on the business context, but generally speaking, it's wise to take a blended approach to uplifting the tech capabilities of an organisation. Hiring new talent can quickly bring in new areas of expertise, but new hires will not have the domain expertise that current employees have built up over many years.

The secret is to find new talent that can complement and grow the culture of the organisation, so that they bring in new skills in a manner which is viewed as constructive by the incumbent technologists. The cultural question often comes down to leadership, a common set of values and a clear vision for the future.

I have come across some situations where, even very large organisa-

tions, have opted to stand up a completely new technology organisation with predominantly brand-new hires in order to break away from the slow and process-heavy culture of the past. Innovation sometimes requires one to be brave!

What can recruiters do to help navigate the tech skills gap?

Whilst the technology industry has been evolving and innovating on a regular basis for many decades, the recruitment industry has remained almost untouched by any significant innovation.

Having delivered many technology programmes for various clients over the years, I have found first-hand just how arduous it often is to hire new talent. CVs are just not enough to find the right candidates, unless you're happy to spend huge amount of time on hiring rather than on building solutions.

This frustration was the main reason why we founded TechRank. We knew we had to go beyond the CV (which is essentially a sales brochure) and instead test the candidates and rank them on a per-vacancy basis. This enables employers to base their decisions on hard data, rather than simple intuition.

Although a good idea on paper, do you think testing could be off-putting to potential candidates, therefore further narrowing the talent pool?

We've found that experienced candidates are often very happy to do multiple tests as it gives them an opportunity to rise above most other candidates.

We have also found that IT professionals are keen to display their skills in a manner which suits them the most. Writing an effective CV requires a different set of skills and you can very easily get lost in the noise.

Our tests are not the standard multiple-choice tests, which can be very off-putting, but instead we devise real-world problems that candidates solve by using the technology they are working with daily. So, for example, a developer would code in Java to solve a problem, which is then automatically analysed and scored by our algorithms.

We've found that candidates love building their reputation by doing what they do best! 🏆

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Batteries Not Included



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We can't include the batteries, but we can include the labour.



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