DCR
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The Perfect Storm...

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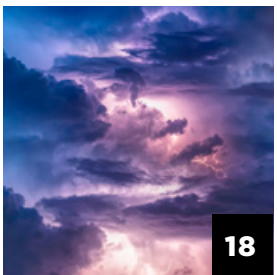
on riding the Edge wave

Industry Insight 34
Russell Pool of Equinix, discusses the issues dominating the data centre and why the quest for sustainability is everyone's business.



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Empowering the dream-makers

How Animal Logic grew their movie-making power with a prefabricated data center

ANIMAL LOGIC - Sydney Australia

Watch the short video

schneider-electric.com/ecostruxure

Life Is On | Schneider Electric

How Animal Logic grew their movie-making power with a prefabricated data center

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.

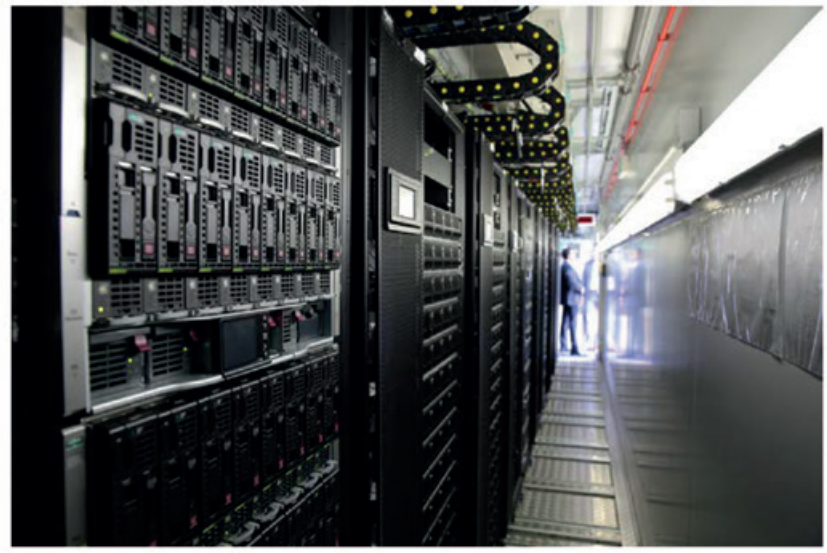
The new state of Animal Logic's data capacity

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."

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

"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

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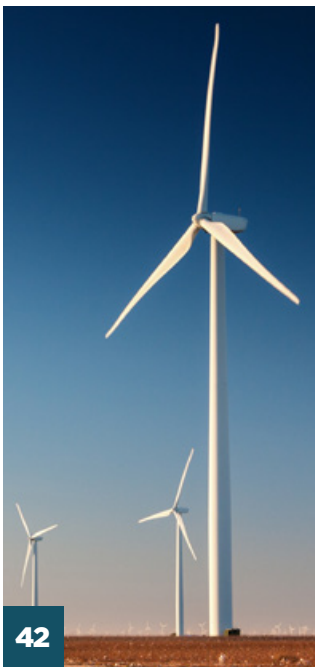

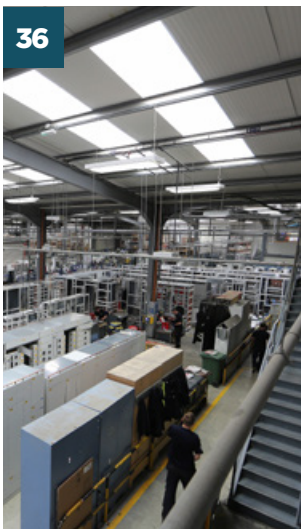

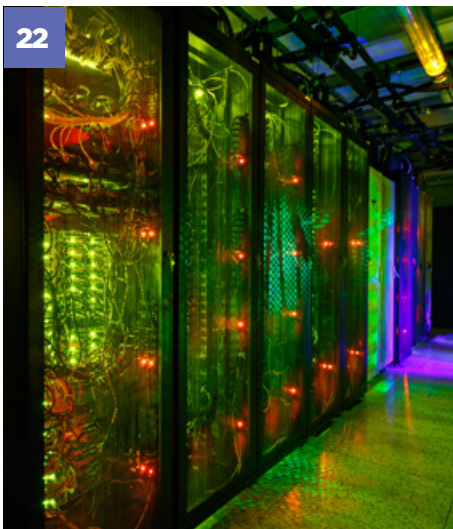

Editors Comment

As I gaze/look angrily out my window at yet more drear up in Newcastle (a place I'm convinced summer doesn't know exists) I sit and hope that by the time this issue goes to press, spring will have finally sprung, and the clouds will have begun to dissipate.

In the data centre world however, the cloud certainly isn't going anywhere, with more than $1.3 trillion in IT spending predicted to be affected by the shift to cloud by 2022 in some way shape or form. And although still very much snowballing, the cloud does appear to have lost some of its limelight in recent months in favour of technologies such as Edge, AI and Machine Learning – the potential for which I quite frankly find both terrifying and utterly brilliant at the same time.

And how could I have gotten this far without mentioning Brexit. I think it's just gotten to the point where people have started screaming 'Brexit' at each other in the street. Brexit is one thing I do not look forward to watching unfold, if by unfold I mean Theresa May simply melting into nothingness much like the Wicked Witch of the West, probably due to the sheer embarrassment of it all (one can only dream).

Anyway, one of the few redeeming factors about Brexit, is that as it stands, it doesn't appear set to affect the UK data centre industry that severely (yet). In fact, it seems to be positively thriving; despite Brexit (and countries like Frankfurt rapidly catching us up) London is pegged to remain the most important European market for data. Well I never.

On the other side of the coin, cybersecurity (or more specifically the lack of it) continues to remain a thorn in the side of us all, and unfortunately, we (especially here in the UK) seem to be severely lacking the skills to remove said thorn. And this may be where Brexit finally gets us.

We have reached crisis point in relation to our lack of tech talent, and I can imagine those that want to use our data for nefarious means are also well aware of this. With our data being leaked left, right and centre with apparently little to compensate us, and companies such as Facebook having been dubbed 'digital gangsters' by Parliament, the outlook is somewhat bleak.

But to end on a slightly merrier note, it would appear that across the board great waves are being made in relation to sustainability efforts. Many data centres are now putting a huge onus on energy efficiency and although going green isn't an easy task due to this type of energy being more expensive to produce, many organisations now are looking into options that aren't only green, but consume less energy. Win win for the world.

Anyway, that's about it from me. As always, I'm forever on the lookout for new faces and contributors, so if you'd like to get involved or have something to say (preferably data centre related) I'd love to hear from you, so please don't hesitate to get in touch via clairef@datacentrereview.com.

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News

The latest highlights from all corners of the tech industry.

London retains top technology investment destination

London has once again maintained its position as the top destination in Europe for technology investment, according to a recent report released by Pitchbook and London & Partners. The UK's capital city saw close to double the amount of investment than its closest rival, Berlin.

In 2018, technology companies in London attracted £1.8 billon in venture capital funding, 72% of the total £2.5 billion pounds raised by UK tech businesses. These figures stand against the backdrop of the UK's departure from the EU, something London's tech sector had previously warned could hinder the appeal of the capital city for companies looking to invest its digital economy.

Across the UK as a whole, investment in AI rose 47% to £736 million, while £1.2 billion went into the flourishing fintech sector. Other growth sectors included big data, blockchain and cryptocurrencies, which also saw all-time high investment numbers.

Global interconnection and data centre company Equinix has been instrumental in developing the UK's digital infrastructure. In November of last year, the US-based firm announced the launch of a new £90 million high performance data centre, LD7, at its London Slough campus. This project forms part of a total new investment in the UK's digital infrastructure of £295 million – an investment that was described by Prime Minister Theresa May as 'a vote of confidence in London's future as the world's premier financial hub.'

Late last year, Equinix launched the second volume of its Global Interconnection Index, a market study that tracks interconnection bandwidth – the private exchange of data between companies, away from the public internet. It found that despite Brexit, London is still the most important market in Europe with regards to data.

A key driver of London's data growth is its strategic positioning, where fintech companies are nearby to a world-leading financial district and health tech companies operate in close proximity to pharmaceutical and life-science firms. London is also a global leader in AI and broader technology, due to its links to world-renowned universities such as Oxbridge and University College London. These burgeoning industries were instrumental in Equinix's decision to build its LD7 data centre in London, enabling businesses old and new to scale up and compete in the global digital economy.

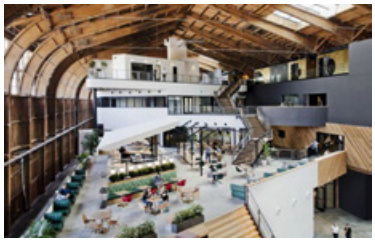
SUSTAINABILITY RISKS CONNECTED TO IT PRODUCTS HIGHLIGHTED IN NEW VIDEO

Sustainability issues such as climate change, endangered species and hazardous emissions continue to make headlines and a growing number of people are aware of how their travel and lifestyles affect the environment. The impact from IT products is less well known, however.

A video from TCO Development wants to change these views with a new campaign. 'This is IT', highlights the issues and demonstrates how a circular approach to IT products is key to a more sustainable world.

Recent UN and World Economic Forum studies concluded that the current yearly global volume of electronic waste is around 50 million tonnes — equivalent in weight to all commercial aircraft ever built.

Google plans further $13 billion data centre investment in the US



Google hired more than 10,000 people in the US last year and made over $9 billion in investments, according to CEO Sundar Pichai.

Such is the growth exhibited by the company that over $13 billion in US data centre investment has just been announced for 2019. "These new investments will give us the capacity to hire tens of thousands of employees," said Pichai.

The investment will also enable the creation of more than 10,000 new construction jobs in Nebraska, Nevada, Ohio, Texas, Oklahoma, South Carolina and Virginia. With this new investment, Google will now have a home in 24 total states, including data centres in 13 communities.

Hyperscale, Colocation, Enterprise.

Time-tested power distribution for every environment.

Starline Track Busway has been the leading overhead power distribution provider—and a critical infrastructure component—for all types of data centres over the past 30 years. The system requires little to no maintenance, and has earned a reputation of reliability due to its innovative busbar design. For more information visit StarlineDataCentre.com/ER.

STARLINE
TRACK BUSWAY

GREEN POWER FOR ICELANDIC DATA CENTRE EXPANSION

Etix Everywhere Borealis has signed contracts with Icelandic providers securing a total of 45MW of green power. These contracts will support the expansion of its HPC and Blockchain data centres in the country.

The contracts have been signed with Landsvirkjun, the National Power Company of Iceland, for 25MW of green power, and ON Power for more than 10MW. The remaining 10MW were signed for in 2016 with HS Orka.

These power purchase agreements will provide Etix Blockchain and Etix Everywhere Borealis with 45MW of renewable and reliable hydro and geothermal power to fuel existing and future HPC & Blockchain data centre sites. The facilities are built to suite for HPC applications using the ambient conditions in Iceland resulting in one of the most cost effective HPC operations anywhere.

Scotland's £6m network will be the most advanced in the UK

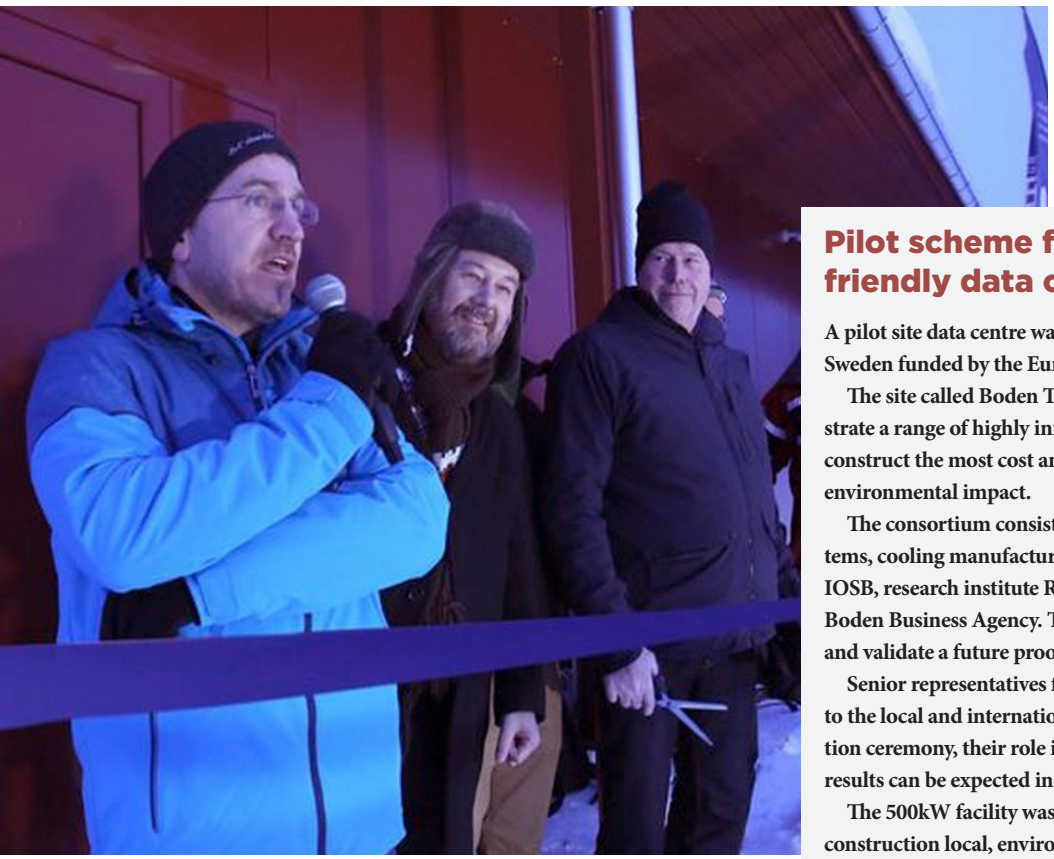
Glasgow-headquartered Boston Networks has launched what it believes is the UK's most advanced Internet of Things network.

IoT Scotland will provide a wide area wireless sensor network for applications and services to collect data from devices and send that data without the need for cellular or Wi-Fi, supporting businesses to develop new and innovative applications, changing the way they work.

The £6m network, which will work using 500 Long Range (LoRa) wireless gateways situated throughout Scotland, is part funded by £2.7m from the Scottish Government, with further support from Scottish Enterprise, Highland and Islands Enterprise (HIE) and private sector investment from Boston Networks itself.

Glasgow will be over 99% covered via 22 gateways which are being installed across the city - making it the most LoRa covered city in the UK, with the potential to become the smartest, a launch statement suggested.

Boston Networks chief technology officer Falk Bleyl said, "We are excited to be leading this pioneering project to build and operate the IoT network and drive the commercialisation of the Internet of Things across Scotland."



Pilot scheme for environmentally friendly data centre of the future opens

A pilot site data centre was inaugurated earlier this month at Boden, Sweden funded by the European Comission's Horizon 2020 programme.

The site called Boden Type Data Centre One (BTDC) will demonstrate a range of highly innovative key engineering principles used to construct the most cost and energy efficient data centres with minimal environmental impact.

The consortium consists of data centre engineering specialist H1 Systems, cooling manufacturer EcoCooling, research institute Fraunhofer IOSB, research institute RISE SICS North and infrastructure developers Boden Business Agency. These companies have joined forces to design and validate a future proof concept.

Senior representatives from the participating consortium introduced to the local and international audience, which attended the inauguration ceremony, their role in the project and gave an outlook of what results can be expected in the future.

The 500kW facility was built in less than five months and during construction local, environmental friendly resources were used. Limited colocation space is available for testing partners that wish to join in.

Get real

Dean Boyle, EkkoSense CEO, discusses why achieving efficient data centre operation doesn't have to be a headache and why moving towards software-enabled real-time data centre optimisation could be the (not-so-complex) solution.

It's difficult for data centre operational teams to properly focus on making their critical facilities run more efficiently, when so much time is taken up with the manual tracking of data centre performance to try and ensure that the right cooling, power and space strategies are in place. It's perhaps not surprising that so many data centre teams view ASHRAE guidelines or working to reduce their PUE metrics as an administrative burden rather than a positive activity.

In response, organisations typically resort to over-cooling data centres in order to reduce the risk of potential failure due to thermal issues. At EkkoSense we believe that's an expensive and wasteful approach and that, instead of simply adding more costly infrastructure and consuming more power, data centres should actually focus on identifying and eliminating their underlying thermal, power and capacity issues. The good news is that this kind of initiative needn't break the bank, and you'll save around 25% of your data centre cooling costs if you get this right.

To achieve this you need to stop thinking that achieving efficient data centre operation is a black art. You shouldn't need over-complex DCIM suites or expensive and often imprecise CFD consultancy to tell you what's going on in your own data centre. Instead, what's needed is a network of the latest low-cost IoT sensors to monitor how your data centre is actually performing thermally – ideally in real-time.

Combine this with easy-to-use, SaaS-powered 3D monitoring, management and optimisation software, and you can quickly gain access to the specific cooling performance recommendations and advisory actions that you can rely on to help monitor, manage and maximise your data centre's operational performance.

Visitors to Data Centre World 2019 in London will be able to learn more about the benefits of a fully-sensed data centre by visiting the EkkoSense Stand - D1020.

www.ekkosense.com

Be Li-ion ready

Mike Elms, sales and marketing director at Centiel UK Ltd address some of the misconceptions surrounding Li-ion and by putting the record straight, explains why Li-ion may well be the battery technology of the future for many years to come.

The use of Lithium ion (Li-ion) batteries to provide back-up power for UPS systems is currently a hot topic of conversation.

Li-ion has a number of advantages over the lead-acid batteries that have been used for many years, namely: they are smaller, lighter, high power density, have a longer life and operate at higher temperatures.

However, one of the main reasons Li-ion has not been introduced across the UPS sector just yet, is cost. However, over the past decade improvements in technology and decreasing costs driven by the automotive industry now mean Li-ion batteries can provide a competitive price alternative to lead-acid.

The initial CAPEX cost of buying Li-ion compared with lead-acid batteries, dependant on project, is currently being calculated at around double the cost. However, Li-ion lasts twice as long and so considerations relating to total cost of ownership (TCO) have now started outweighing concerns about the initial investment.

> ***"Li-ion technology has now been developed to be safe to use in data centres and other facilities requiring critical power protection.***

In a necessarily risk adverse industry such as the UPS sector, safety concerns have also slowed the introduction of Li-ion. There have been some publicised stories about the fire risk of Li-ion technology over the years. However, any technology which is not managed correctly is potentially hazardous. This is why proper procedures need to be followed to ensure the batteries are managed correctly.

Li-ion batteries are more sensitive to how they are charged and discharged and therefore need to be linked to a monitoring and control device. Such a system should provide early warning alarms ahead of any issues and automatically shut down faulty cells if necessary. With lead-acid, you may only know there is a battery problem when you need to use it and if it doesn't work, then it's too late!

In addition, the more modern Li-ion batteries have been developed with a 'belt and braces' approach and can include numerous further safety features such as: steel containers, internal separators that melt at high temperatures to shutdown conductivity, a set up where the current collects from opposite end of its pack, ensuring there are no hotspots at high current density areas and improvements to cathode material which is more stable during overcharge.

Every battery, including lead-acid batteries, are a potential hazard, but managed correctly, Li-ion technology has now been developed to be safe to use in data centres and other facilities requiring critical power protection. Only a handful of UPS systems are set up to manage Li-ion batteries properly. Not all systems are Li-ion ready but moving forwards, they need to be.

If correctly configured Li-ion offers a number of advantages. Size is important! Li-ion batteries typically require less than half the physical space of the equivalent lead-acid blocks and less than 25% of the weight.

Commonly, above ground-floor installations can require structural strengthening of the building simply to house the required battery systems. Logistically, moving many tonnes of equipment in and out of an upstairs comms room, when batteries need replacing, can also present challenges. For data centres looking to increase their power density within the same foot print Li-ion promises a practical solution.

A further benefit of Li-ion is length of life. Ten-year design life lead-acid batteries are normally replaced every seven or eight years. With Li-ion this is 13-15 years. This reduces the TCO of the batteries.

Li-ion also offers some advantages when it comes to the overall efficiency of the comms room. This is because Li-ion can work at a higher temperature than lead-acid batteries, therefore less cooling is needed, and the amount of overall energy consumed can be reduced.

Most IT systems work at >250C and the UPS technology itself can work well up to 400C. By contrast: an industry standard estimate is that for every 10 degrees above 200C, the operating life of a VRLA battery is halved. With growing concerns about reducing the carbon footprints of data centres, being able to decrease and remove the electricity requirement for cooling could become an increasingly attractive and important consideration.

Over time, we believe, there will be an inevitable shift towards Li-ion batteries in the UPS sector. Incorporating Li-ion will inevitably reduce the size and weight of UPS systems overall and the longer useful working life of Li-ion will mean fewer costly replacements. All of which will benefit customers with reductions in both CAPEX and OPEX and make Li-ion batteries a winning solution for UPS applications requiring compact, innovative protection.

For further information come and talk to Centiel at Data Centre World 2019 London, booth D1035.

As can be seen from this internal diagram, Li-ion batteries take up far less space than their lead-acid counterparts.

Powering the edge: **The perfect storm**

Marc Garner, vice president, Secure Power Division, Schneider Electric, UK & Ireland, outlines how enterprises can reap the rewards of an edge infrastructure, whilst staying ahead of the curve.

Firstly, what is Edge by definition?

The most common agreed definition of the edge is a computing facility geographically dispersed to be physically closer to the point of data origin, processing or use. Edge data centres tend to be smaller highly integrated facilities, which typically meet a demand for low latency, rapid connectivity and availability.

However, the terminology implies that edge is also part of an intricate network ecosystem, a three-tier architecture comprised of localised or on-premise micro data centres, mid-sized regional facilities owned and operated in some cases by colocation providers, and larger 'Hyperscale' style campuses occupied by internet giants.

How does an enterprise benefit from an edge infrastructure?

The need for edge arises for several reasons, most importantly to overcome the challenges of latency, application availability and the demand for data in today's business and consumer environments.

Gartner predicts that by 2025, 75% of enterprise-generated data will be created and processed outside of a traditional data centre or cloud. Schneider Electric believes there are three key enablers for edge success.

Firstly you need to incorporate greater remote management capabilities. As edge data centres are often dispersed 'lights out' facilities, with little or no IT staff, traditional remote management and maintenance can become costly and will lack scalability.

Secondly, greater levels of physical security are required to prevent unauthorised access to IT equipment in edge data centres. This should include, physical environmental monitoring, temperature and humidity sensors, rack access control, and use of both audio and video recording.

Finally, greater standardisation and pre-integration are required to enable rapid deployment of edge infrastructure. As more companies utilise edge in remote or unmanaged locations, it's important to ensure that the solutions are standardised, repeatable, and work predictably as planned.

This requires greater collaboration between vendors for pre-configured, pre-integrated IT equipment, comprising server, storage, networking and software, in a single enclosure incorporating the rack, UPS, PDU and cooling system.

Although centralised facilities will always have their place, right now, are you seeing a shift from enterprises in favour of edge?

Edge computing complements larger, centralised data centres; it does not replace them. In the context of a wider data network, edge fulfils the requirement of digital services demanded by today's enterprise and consumer environments.

The retail industry for example, is one of the many sectors driving the adoption of edge and using it to transform the shopping experience. Applications such as 'magic mirrors', allow shoppers to "try on" outfits in a virtual environment, before ordering via Connected or Smart-devices. These customers need local and resilient compute, storage and networking, which creates the perfect use case for micro data centres, something pioneered by APC, before the company was acquired by Schneider Electric in 2006.

Edge represents a shift towards the infrastructure best placed to deliver more widely available digital services, not away from the centre. For best practice, edge data centres should be resilient, standardised, repeatable, quick to deploy, easy to manage and maintain.

As edge technology evolves, what can vendors do to evolve with it to ensure they keep pace with customer demand?

Edge technology has evolved in a number of ways, through standardisation, vendor collaboration, reference architectures and use of cloud-based software. One of our key priorities is to give both customers and partners the tools and technology to capitalise on the advancements in edge.

Schneider Electric makes a significant annual investment in R&D to ensure a continual focus on innovation within the critical infrastructure space. We have a team of experts within our Data Centre Science Centre, who focus on research into established and evolving technologies.

Findings are frequently published in APC and Schneider Electric White Papers, and the data gathered from research has been used to create digital TradeOff tools, which are freely available on the Internet.

These include a Local Edge Configurator and a Li-ion vs VRLA capital cost calculator, which customers can use to build and test solutions, or calculate the total cost ownership (TCO) of different technologies over the lifecycle.

Is a collaborative approach from vendors the key to satisfying customer needs?

Collaboration is essential, as no one vendor can specialise or provide everything the modern enterprise needs for optimal IT function. Interoperability between products in hy-

> *By 2025 75% of enterprise-generated data will be created and processed outside of a traditional data centre or cloud.*

per-converged stacks is driven by common adherence to industry standards as well as formal vendor alliances to ensure compliance. The recent Uptime data centre survey indicated that customers expect vendors to do the integration work on their behalf – perhaps an indication of the skills shortage being experienced.

Standardisation helps us to deliver faster edge deployments with greater levels of reliability, and when combined with vendor-neutral, cloud-based software solutions such as Schneider Electric's EcoStruxure IT, end-users can benefit from increased uptime and reduced maintenance costs.

How can enterprises hope to manage a hybrid cloud/edge architecture whilst still ensuring optimum performance and availability? How has technology evolved to meet these challenges?

Management software has evolved from use of traditional data centre infrastructure management solutions (DCIM), to Cloud-based Data Centre Management as a Service (DMaaS) offers.

Innovative platforms such as EcoStruxure IT provide simplified remote monitoring with real-time visibility of any IoT-enabled infrastructure solution, 24/7, anywhere, on any device.

Combined with the power of predictive analytics and AI, this delivers advanced insights into IT issues, enabling timely and proactive servicing to be performed. Given the dispersed nature of today's edge and hybrid IT environments, DMaaS becomes critical when ensuring both their reliability and availability.

With regards to li-ion technology and the benefits it brings, given the initial cost, how feasible/accessible is this for your average enterprise?

Lithium-ion (Li-ion) offers many advantages despite being more expensive in terms of cost acquisition. Recent developments in UPS systems are focused on efficiency and reliability. The growing popularity of Li-ion batteries for back-up power, and their ability to withstand thousands of charge cycles, opens up the possibility of reducing power consumption by running the UPS in power-saving mode for longer periods, thereby enabling cost and energy savings.

Their smaller size, long operating life, and tolerance for greater charge/discharge cycles mean they often offer a lower Total Cost of Ownership (TCO) than traditional VRLA alternatives. Furthermore, advances in product development and volume production means that they are becoming more affordable to greater numbers of customers.

Finally, what does the future hold for edge computing? What's next?

Demand for services requiring edge will only increase. New technologies such as 5G, IoT and autonomous vehicles demand low-latency services, which will undoubtedly provide a stimulus for more edge infrastructure. Here, greater standardisation will unlock innovation for those customers seeking to harness the edge.

From a power perspective, smaller footprint, greater efficiency and higher compute density will require IT and infrastructure manufacturers to collaborate more closely than ever. Integration and interoperability between products are essential requirements for today's data centre environment.

Finally, cloud-based management software will play a greater role in ensuring the resilience and security of edge facilities, as data and automation proactively influences operating and servicing decision-making.

Knowledge is power

Phil McEneaney of STULZ UK warns that a failure to understand the difference between comfort cooling and precision cooling, is resulting in poorly specified equipment – leading to higher costs, IT failures and increased business risk.

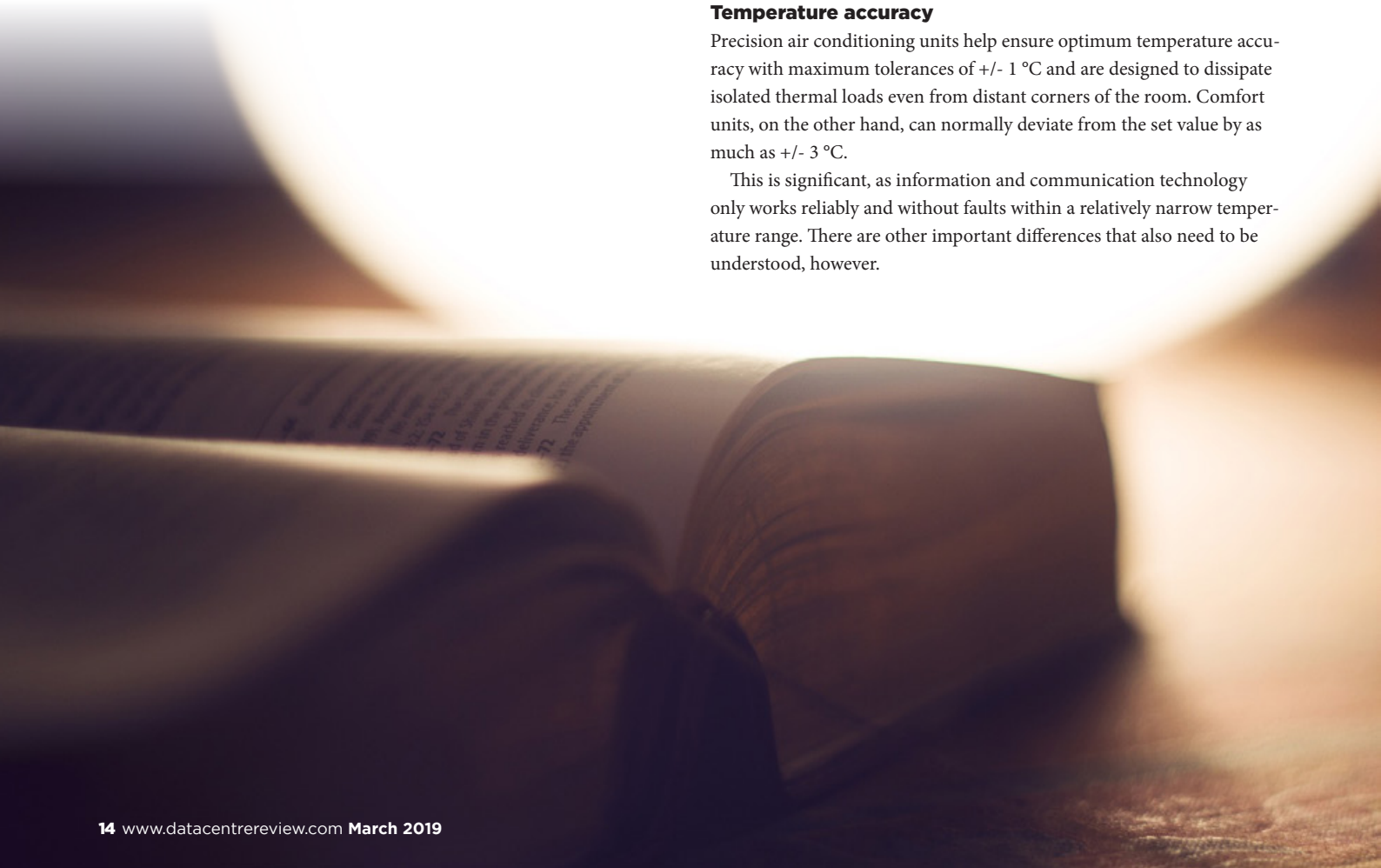
Poorly specified cooling technology can result in erratic climate control; increased operating expenditure, and costly disruption to IT operations. With emerging trends such as 5G, IoT, automated vehicles and digitisation in the industrial sector, there will be a dramatic increase in remote edge data centres and small, localised server rooms – reliability will be critical.

But are installers of cooling solutions prepared for these developments? A lack of awareness of the differences between comfort cooling and precision cooling is impacting the reliability of IT infrastructure, resulting in serious consequences for businesses.

Around half of businesses currently install comfort cooling in small server rooms instead of the correct precision cooling. This is a common mistake; there is a need for education on the importance of precision cooling in delivering resilient IT operations. We are frequently called in to replace inappropriate units installed in technical spaces.

Comfort cooling units are designed for cooling people in offices and retail environments. This type of cooling technology is intended to operate for short periods of time (of around five hours per day, five days per week) and the typical life expectancy for a unit is around five years.

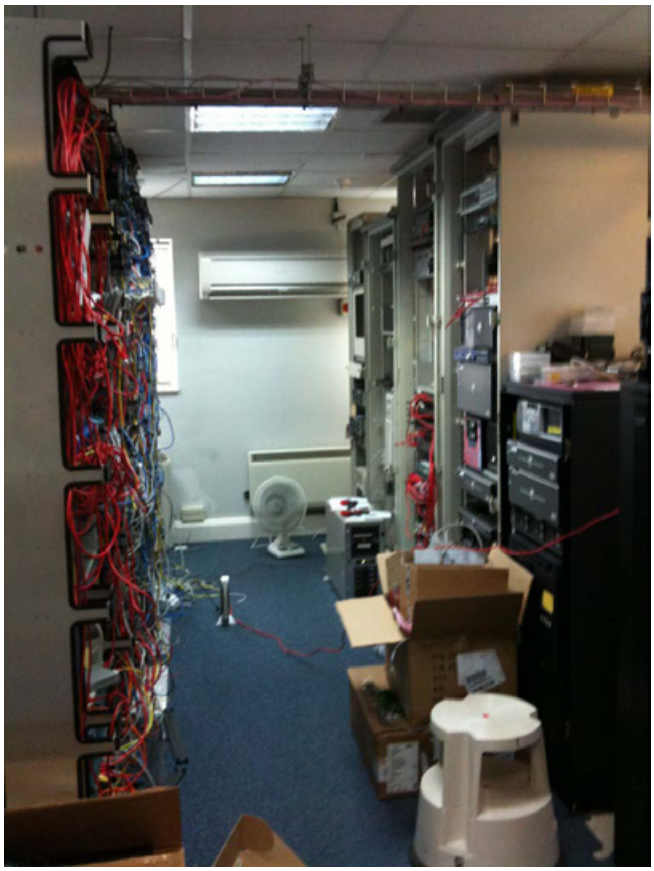
Precision cooling, on the other hand, is designed for use in technical environments, 24 hours per day, seven days per week, and the typical life span is much longer – usually between 10 and 15 years.



Temperature accuracy

Precision air conditioning units help ensure optimum temperature accuracy with maximum tolerances of +/- 1 °C and are designed to dissipate isolated thermal loads even from distant corners of the room. Comfort units, on the other hand, can normally deviate from the set value by as much as +/- 3 °C.

This is significant, as information and communication technology only works reliably and without faults within a relatively narrow temperature range. There are other important differences that also need to be understood, however.



Not cool: An example of server room air conditioning bad practice

> ***A lack of awareness of the differences between comfort cooling and precision cooling is resulting in serious consequences for businesses.***

Comfort cooling units as part of their design are designed to cater for 'latent heat'. Environments that are populated by people (as opposed to technical equipment) produce this type of heat, which contains moisture, while technical spaces (such as server rooms) radiate pure heat – referred to in the industry as 'sensible heat'. A comfort cooling unit will have a typical 'sensible heating ratio' of between 0.5 and 0.6, while a precision unit will have a sensible heat ratio of 1.

Comfort cooling units, which are designed to remove the moisture produced in retail and office spaces, can use up to 50% of their energy for dehumidification. This is an important difference – precision air conditioning units convert more than 95% of the energy used exclusively into cooling capacity. Therefore, the technology required to achieve this pays off quickly in terms of lower operating costs.

A comfort cooling unit rated at 10kW, with a sensible heat ratio of 0.5, will only deliver 5kW of sensible cooling. A precision cooling unit, with a heat ratio of 1, on the other hand, will deliver the full 10kW. This means you may need to specify two comfort cooling units to deliver the same capacity as one precision cooling unit.

Total cost of ownership

There are significant risks associated with inappropriate use of comfort cooling units, which installers need to be aware of. Unlike comfort air conditioning units, precision units feature strictly controlled and accurate dehumidification (tolerance +/- 5% relative humidity), as too much humidity can lead to condensation and corrosion, while too little can cause static charges, data loss and damage to hardware.

If you are removing moisture from the air, via a comfort system, you must be aware that the air will become drier and this can lead to static build-up in the technical space. These static shocks can be quite powerful and lead to failures of sensitive electronic equipment.

We have seen instances where comfort cooling units have been specified, and the client has had to purchase additional equipment to add moisture to the room. Humidification units add an extra layer of cost to the original installation and are very expensive to run – which ultimately increases the total cost of ownership of comfort cooling solutions.

Other factors also contribute to increased expenditure and a replacement compressor may be needed after as little as three years, if the unit is run day in, day out, as comfort units are not designed for this level of continuous operation.

Precision cooling units with EC fan technology can also offer further savings in running costs, however. The technology consumes up to 30% less energy than a conventional 3-phase fan; precision units can also run in energy-saving partial load mode and have a high motor efficiency of up to 92%.

It is a "false economy" to prioritise capital outlay when specifying air-conditioning units: If you install a solution that isn't appropriate for the technical environment, you will have issues. Effectiveness needs to be the primary consideration, along with the long-term operating costs.

Operating features: Comfort vs precision

It is important to note that comfort cooling systems also perform 'oil return cycles', which override the set temperature controls and can lead to intermittent falls in temperature. While this is less of a problem in server rooms, this can present issues in environments such as laboratories, where precise temperatures are critical to the integrity of the testing processes. Precision cooling units do not need this operating feature and therefore do not present an operational risk in this way.

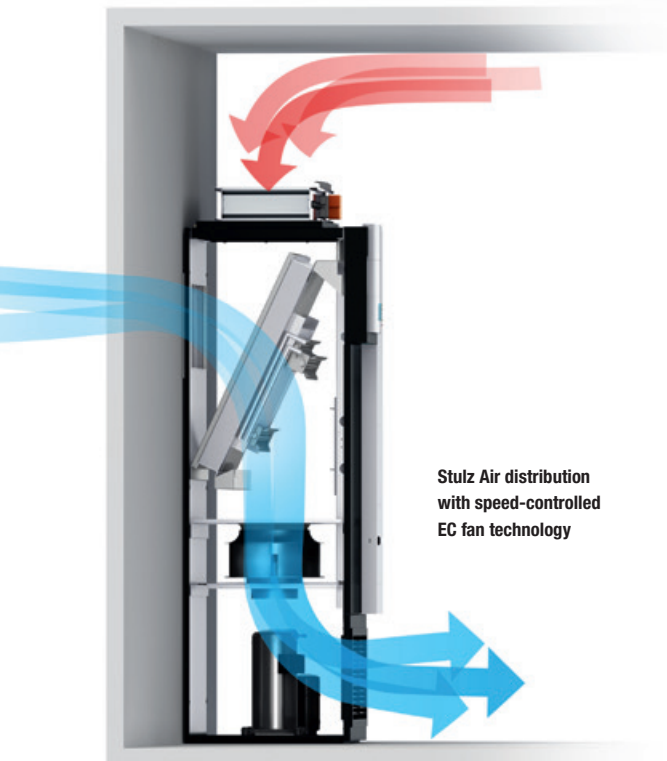
In addition, there is no 'fall off' in capacity on long pipe runs, which presents another advantage over comfort cooling systems. Pipe runs can affect the efficiency of the cooling system, so this is an important consideration when specifying a solution.

> ***"Effectiveness needs to be the primary consideration, along with the long-term operating costs."***

Also, the water collected by comfort cooling units needs to be disposed of and pumped to a drain – this presents further challenges, as there is a potential risk of leaks or flooding in the server room, which could result in significant damage to electronic equipment.

Air filtration is another important factor when comparing comfort versus precision cooling. Precision air conditioning units filter and circulate three times the amount of air as comfort units with the same rated capacity.

Stulz Minispace



Stulz Air distribution with speed-controlled EC fan technology

Other differences are also important to note – for comfort cooling applications, it is less important for the filter to be highly effective in removing small particles; dust circulation has no detrimental effect in a non-technical environment. In server rooms and technical spaces, it is crucial to prevent particles being blown or sucked into technical equipment, as this can shorten the lifespan of IT assets.

Conclusion

Ultimately, rooms subject to high thermal loads need constant climatic conditions in order to work reliably. Fluctuating temperatures, humidity and dust jeopardise both function and data stocks. Precision cooling technology is specifically designed for server rooms and technical environments where reliable thermal optimisation and high availability are crucial business imperatives.

With an increase in remote edge data centres and localised server rooms predicted in the near future, it will become particularly important to understand the differences between 'precision' and 'comfort' when applying cooling for these systems.

Many specifiers and installers fail to appreciate the impact of employing inappropriate cooling technology until it is too late; there is an urgent need for further education to avoid costly mistakes and to prevent the risks associated with poor climate control.

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Cloud vs Colo

David Khan, chief cloud officer at Pulsant, discusses why it doesn't have to be a case of either or when it comes to colo or the cloud and outlines how you can successfully incorporate the cloud into your colocation strategy.

Organisations always strive to access the best technology at the most cost-effective prices and colocation can provide this. It makes sense to use experts for managing your IT security and power requirements. After all, you're not in the energy management industry - trusting a colocation vendor to manage this for you frees up your time to focus on your organisation's core business.

Colocation gives many customer benefits, including high bandwidth access at low cost, disaster recovery in the event of a power loss, increased security in the form of CCTV and lockable rack-cabinets, as well as lower network latency; all resulting in a high level of resilience.

Other advantages include minimising your capital expenditure as you don't need to build a new data centre, allowing you to reinvest these savings in your business.

The promises of lower costs, superior agility, increased resiliency and flexibility that the cloud has to offer may also tempt you to reconsider your colocation strategy. But what if you have workloads that aren't well suited to virtualised platforms, or you're simply not ready to adopt a cloud model yet?

The good news is that while colocation can provide a step towards cloud migration, it doesn't have to be either one or the other. Organisations should step back and adopt a more holistic approach to their cloud journey and use it to inspire a re-engineering of their business.

What are your cloud options?

If you're wary of relying on the public cloud for reasons of security and compliance, but you want to offer high-quality application performance to customers, a hybrid cloud solution could be the answer.

First of all, three questions need to be answered.

- What are your business reasons for moving to the cloud? This involves taking a step back and defining why your journey is necessary in the first place. For example, an ISV may want to start using SaaS offerings.
- What issues do you need to overcome? To continue with the example above, you need to deliver the new cloud and SaaS offerings to your organisation while maintaining compliance with new regulations, including the GDPR and PSD2.
- What solution will help to solve this? You may choose a hybrid solution that is suitable for cloud consumption and maintains compliance. This would give you more control over your data.

Why hybrid?

The private side of a hybrid cloud solution allows you to continue using your existing infrastructure more effectively. It can be configured and reconfigured at will, while maintaining data security and complying with governance and regulations. It also ensures the predictability and reliability of critical applications.

Move specific workloads to the public clouds, and you can enjoy cost-effective analytics and disaster recovery services. Public clouds also allow for surges in traffic by giving you extra capacity when needed.

How do colocation and cloud services fit together?

The question most companies have is how to effectively connect their existing infrastructure to these private cloud access services. This is where colocation providers, and specifically the new breed of managed service providers comes in. Companies who have a heritage of colocation, hybrid and communication infrastructure are far better placed to help companies on this journey than many 'born in the cloud' services providers.

These types of service provider understand the complexities of migrating services, applications and data to multi-cloud environment and importantly have the DevOps, monitoring, security and management skills experience to help take companies navigate what is a far more complex environment than they have today.

Conclusion

Colocation offers the opportunity to consolidate your data centre assets to reduce costs. You can eliminate many of the upfront fees associated with setting up and maintaining your own facility.

While this is colocation in the traditional sense, adopting a colocation to cloud strategy provides you with a strategic advantage and improves the agility of your business. You get to benefit from immediate access to secure cloud storage as well as the ability to replicate your own private cloud off site.

Colocation is still relevant in our constantly shifting technology landscape, but keep an open mind; adopting a colocation to cloud strategy could be a better fit for your evolving business.

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Going Off-Grid

With an evolving energy market leading to increased uncertainty and the prospect of rising costs, **Jason Yates** of Riello UPS explores whether it's possible for large-scale electricity users to break the shackles of the network by going off-grid.

Electricity generation in the UK last year fell to its lowest level for nearly a quarter of a century (1994). The prospect of a fully-functioning Hinkley Point nuclear station can only just be seen on the distant horizon, while another 'Horizon' – the UK subsidiary of Hitachi – seemingly vanished completely when the Japanese giant pulled the plug on plans for a £13 billion nuclear plant in Anglesey back in January.

The way our power is produced is going through radical changes, with coal, nuclear, and thermal being phased out in favour of renewables, which now contribute a record 33% of the UK's electricity.

While this shift towards low-carbon is inevitable, sources such as wind and solar are more unpredictable, giving the National Grid the unenviable task of not just balancing supply and demand, but maintaining a consistent frequency around 50 Hertz.

One of the main mechanisms it uses to do this is called demand side response (DSR). In essence, this incentivises organisations to adapt their energy use from peak to off-peak times, offsetting our power requirements in real-time without any need for additional generation.

This has been complemented in recent years by a boom in battery storage projects, no doubt encouraged by the steady fall in price of premium lithium-ion battery technology over the past decade. Organisations can store power generated from renewables,

on-site heat and power plants, or even the batteries in their uninterruptible power supplies (UPS) and use it as a cheaper, greener alternative to mains supply. Any surplus can be fed back into the National Grid, opening up additional revenue sources.

DSR doubts still persist

However, demand side response hasn't been welcomed with open arms by everyone. Many mission-critical sites such as data centres still view DSR with significant scepticism, even though at first glance they'd seem a natural fit with their backup power systems.

Unsurprisingly, 100% uptime is their core objective and using this emergency backup – their ultimate insurance – is perceived to add in an unwanted layer of risk. Will taking part in DSR undermine resilience when they need it most?

Even if the answer to that question is 'no', there are other sizeable barriers to participation – are the financial rewards lucrative enough to make it worth their while? Is handing over control to a third-party (either the National Grid or a DSR aggregator) a risk worth taking?

Powering on alone

Could there be an alternative for organisations that are interested in battery storage, particularly large-scale energy users, without having to stay tied to the whims and struggles of the National Grid?

Instead of working in an increasingly uneasy partnership with the network, why not break that link and go it alone, taking ownership of your power generation?

Understandably, the term 'going off grid' comes with certain connotations – idealistic lifestyle choices and people getting away from the trials and tribulations of the modern world. But for organisations with sizeable yearly energy bills, going behind the meter could make hard-headed business sense.

> *The way our power is produced is going through radical changes, with coal, nuclear, and thermal being phased out in favour of renewables.*

Opting for on-site generation from renewable sources combined with battery storage, rather than grid-supplied power, has potential to provide greater security of supply and more certainty about cost. Going off grid safeguards against sudden wholesale price rises or increases in network costs, which with energy costs set to spiral by 45% by 2028 is certainly food for thought.

It eliminates the threat of hugely damaging mains supply outages or other power problems, therefore guaranteeing mission-critical organisations a stable and secure flow of electricity that means their servers, machinery, equipment, networks, and production lines are always available.

Behind the meter power generation offers other benefits too. It lowers annual energy bills and carbon emissions. There's also the possibility it could attract ethically-minded customers away from competitors. While in an age of increasingly draconian environmental legislation, it'd help future-proof against any new rules or regulations.

Finally, while on-site generation is mainly about security of supply and reducing reliance on the network, there would still be opportunities to feed back any surplus power back into the National Grid, earning additional revenues in the process.

Seizing the opportunity

So who can 'go it alone' like this? Obviously, you need the on-site generation capabilities in the first place, whether from solar, wind, combined heat and power, or other resources.

To go completely off grid you've realistically got to be a large-scale user of electricity to make it work. Cornwall Insight, the energy market analysts, states there are currently more than 8,000 organisations that spend more than £1 million a year on their electric. There are thousands more with annual bills topping £500,000.

Off grid is a viable proposition to all these sorts of organisations, whether it's an energy-intensive data centre, factory, or hospital, through to the agricultural sector, utilities companies, or telecoms businesses operating thousands of mobile phone masts.

And if the cost of lithium-ion batteries, which are the most effective for energy storage, continues to fall as predicted, the commercial appeal will continue to grow.

Planning applications for battery storage projects soared by 1,653% between 2015 and 2018 as more and more organisations saw the benefits of taking back an element of ownership – or even complete control – of their energy needs.

And with the Government's National Infrastructure Commission banking on up to 15 GWh of battery storage being deployed across the UK by 2030, it'll soon be a very different type of electricity grid keeping our lights on.

From hardware to HCI

Many businesses are keen to reap the benefits of a hyperconverged infrastructure (HCI). But new technology requires new security measures and the methods of old just won't cut it. Here, **Liviu Arsene,** senior E-threat analyst at Bitdefender, outlines how to protect HCI from modern-day security threats.

Network-based security is being made redundant by HCI. This technology is simplifying what was previously divided into compute, storage and networking into a single foundation that incorporates all elements. It enables organisations to shorten the process from hardware to software-based hybrid cloud models — which is very appealing in a high-speed business environment where time is money.

However, it is the speed at which this technology moves that makes keeping up a problem for security solutions, and is causing security professionals to rethink how they approach security.

Traditionally, legacy security agents actually sacrifice 35% of the CPU capacity when converting to HCI, resulting in hindered performance and virtualisation density. In an increasingly digital environment, HCI, which is built around agility and fast deployment on the other hand, means that security systems have to follow the same principle — improved performance.

The end of legacy systems

The end of the three-layer infrastructure (compute, storage and networking) means that more organisations are instead embracing application-based security policies that let workloads work with each other across network segments.

This ensures that security policies are enforced automatically on any network configuration. Unlike traditional infrastructure, this is not based on location but instead, on the workload's role, this makes security more effective and scalable.

Modern enterprises have to adapt to this new way of approaching security. Traditional hardware infrastructures that require full-scale agents running on each endpoint slows systems down and isn't scalable when adding additional endpoints.

In the past, data centres would rely on firewalls but because of HCI's extra endpoints, this doesn't work. That's not to say that existing security becomes useless. Perimeter firewalls and network segments, for example, can both be used in HCI but there needs to be a greater focus on application security rather than hardware.

Application-based security is the first step in keeping HCI safe but as with most technology, machine learning is also playing a part.

Prevention vs diagnostics

Machine learning is a rising trend and one that is having a big impact on data centres. Not just in terms of improving performance but also in how they are protected.

By implementing "smart" infosec tools that use machine learning to identify and address threats, businesses reduce the chances of being compromised. What's more is that smart tools can also be custom built for modern software-defined data centre (SDDC) deployments by creating a layered approach that protects against a range of potential threats.

It might be making serious headway in the cybersecurity space, but machine learning should be viewed only as a tool to improve security and should not be relied on as a single security defence. As it stands, there is no single algorithm that is capable of protecting against all cyber attacks, but because of machine learning's proactive rather than a diagnostic approach, it's a must when protecting data centres.

Automation is also a key part of machine learning because it reduces the time that security teams have to spend on administrative tasks. HCI is attractive because it streamlines the data centre landscape and offers increased ROI on data investment, adding automated security on the top of that means that it leaves more time for IT teams to concentrate on strategic decisions such as planning should there be a breach.

Considering the options

Protecting HCI can be complicated because it requires a fair amount of consideration. Organisations have to find a solution that integrates seamlessly with the infrastructure, while making sure not to burden virtual workloads. If this isn't done properly, HCI won't be worth the time or monetary investment as performance will be poor as a result of not being able to leverage the capability and scalability benefits.

The reason that HCI is so popular with organisations is because of the increased ROI on data investment, the ability to facilitate agile service provisioning and scalability to match high-growth companies targets. The move is generally part of an overall digitalisation strategy, but by not updating the security to go with it, businesses can expect to see little benefit.

Whether it's switching to an HCI model or implementing any technology within an organisation, there is always a risk when it comes to cybersecurity. As fast as an organisation can update its technology, a hacker can create a new way to compromise it. This is why it's critical for businesses to keep security systems up to date.

Moving from hardware to HCI requires IT teams to totally rethink the way they use and store data. It's a lengthy process but one that can be fruitful if implemented properly. However, in just the last few months alone stories like Collection #1 and the Marriot/Quora data breaches show the lengths that cybercriminals will go to get hold of data. It's naive for businesses to not protect it properly.

"Machine learning is a rising trend and one that is having a big impact on data centres. Not just in terms of improving performance but also in how they are protected.

Prime target

When it comes to cybersecurity, data centres unquestionably have it tough. Here, **Dave Klein,** senior director of engineering & architecture at Guardicore, discusses why the data centre is the modern-day hacker's target of choice and what you can do to protect yours.

Over the last three years there has been a shift from hackers targeting individuals, to attacks on enterprise data centres. Whether on premises, in cloud or a hybrid cloud mix, there are core characteristics of data centres that make them higher value targets of opportunity, while also easily penetrable at low risk to the hacker.

THE HIGH VALUE OF DATA CENTRES

Data centres are high-value targets of opportunity because of several factors. Foremost, the applications they host house valuable data and give access to powerful resources:

Personally identifiable information (PII)

Probably the most popular reason why data centres are attacked, PII offers attackers the ability to quickly monetise information about individuals en masse. Why attack individual browsers looking for cached bank account or credit card information when you can get hundreds

of thousands if not millions at a single time? Far too often it is easy for attackers to find unencrypted or weakly encrypted user account information repositories. There are hundreds of markets on the dark web where attackers sell lists to credit card fraudsters.

Powerful infrastructure for repurpose

Data centres have powerful computing resources that often sit on redundant, high bandwidth links. This makes them perfect environments for attackers, some whom market DDoS (Distributed Denial of Service) for hire or RAT (remote access trojans) for hire services to the wider hacker community. As we have seen over the last two years, hackers sometimes use hijacked resources to mine Monero and other crypto currency – at the victims' resources expense. Called cryptojacking, besides being very energy, compute and cooling intensive, it can also damage your data centre gear over time through additional wear and tear.

Industrial espionage

A company's intellectual property is something an unscrupulous competitor might want to get their hands on. This is illustrated by government APTs who seek out military, medical, pharmaceutical and other high-tech intel to pass on to their own industries. Sometimes, the espionage is not "black art" but rather captured communications showing what a competitor is bidding on. Guardicore was called by a customer a few years back with just such an issue. One of their competitors had infiltrated a bidding system by compromising an SFTP server. The attackers knew what the company was bidding on, the bid details and price. The company was put to such a competitive disadvantage that its bottom line was significantly impacted.

WHY ARE DATA CENTRES SUCH SOFT TARGETS?

In the information age, data centres are the heart of enterprises. In addition, most enterprises have adopted DevOps based models that favour speed and agility to meet business needs and to provide competitive differentiation. Often security becomes an afterthought.

Lack of appropriate vulnerability management

Enterprises rely on an ever-expanding list of operating platforms to deliver digital services. Vulnerability management continues to be a major sticking point. With so many vulnerability mapping tools available to attackers, it is easy for them to find vulnerable applications or infrastructure to exploit and to make an initial penetration into a data centre.

In the case of Equifax, a vulnerable Apache Web front end component called Struts2 let attackers in. While enterprises need to do a better job at vulnerability scanning and remediation, they will never totally get ahead.

Furthermore, since most enterprises have interconnected systems with business partners and contractors, they can still be exposed by a weak link in the chain. Target's famous exploited Point of Sale systems attack of a few years ago, started with a vulnerable data centre application of their refrigeration and HVAC vendor – who was tied to the Target network.

Automation that doesn't bring security checks and updates into scripting

One of the most important tools in today's data centres is automation. Playbooks such as Puppet, Chef and Ansible are utilised to provision and spin-up workloads. On the one hand this makes it possible for enterprises to be extremely agile and autoscale services and applications accordingly. On the other, often these playbooks don't include patching, kernel and application update checks. Many enterprises find vulnerabilities are introduced by applications that have been spinning up new instances for several months, or even years, that have become outdated.

Weak authentication

While best practices stipulate authentication should include strong passwords combined with two factor authentication, far too often authentication is still only a username and a password. Many breaches start via brute force password attacks. The 'Butter Attacks' (discovered by Guardicore Labs) are a great example of this. Attackers targeted data centre SSH servers with brute force password attacks, successfully breaking into thousands of data centres globally. And in mid January 2019, the US DHS issued Emergency Directive 19-01, which discussed foreign state actors who utilised a similar attack on US Government DNS servers with weak passwords.

> ***"The Personally Identifiable Information stored in data centres offers attackers the ability to quickly monetise information about individuals en masse.***

Lack of segmentation allows unfettered lateral movement

The three above methods are the most common ways we see attackers establish a foothold within data centres. Once in, they then take advantage of the biggest flaw found in data centre architectures – inappropriate segmentation of internal systems within the data centre.

The amount of time an attacker remains undetected in the data centre (the "dwell time") is often so great because appropriate segmentation was never put into place. Had proper segmentation been implemented, then upon gaining access to an SSH server, an attacker wouldn't be able to move laterally as they would be cut off from the rest of the infrastructure and would only be able to do "allowable things".

IMPORTANT TAKEAWAYS

Better vulnerability management is critical for data centre security. The use of automation, adding OS, application and kernel vulnerability and patch management checks to automated scripts, will assist greatly.

Furthermore, two factor authentication and strong password policies across the board will also help. But the most critical step IT teams should take is to incorporate segmentation within data centres. Even the simplest first steps, segmenting critical components and applications within data centres from other sections, will significantly reduce the data centre attack surface.

Rittal's edge solutions at DCW 2019

The revolution that is edge will be front and centre on Rittal's Stand #D610 at Data Centre World, London, from 12-13 March 2019.

The products on display at this year's London DCW event will include Rittal's Edge Data Centre which offers offer an end-to-end product with standardised, pre-configured IT infrastructure. Also present at the show will be LCP DX cooling solutions and the company's innovative RiMatrix Containerised Data Centre.

The advance of edge computing, which essentially provides computing resources at the perimeter of a given network, has been rapid as a consequence of growing technological demands for low latency, local data processing and high autonomy of infrastructure, system-wide security and high bandwidth. The focus is typically on the immediate processing capacity required at the source of data making it as fast and secure as possible.

The need for edge computing can easily be seen in "smart" production systems, where sensors and actuators continually relay information on the status of processes and infrastructure. This forms the basis for innovative services such as alerts, predictive maintenance, and machine self-optimisation, delivered by the company's IT department in real time. For this to happen, and for quick responses to events and anomalies, it's critical to have low latency between production and the IT infrastructure.

Clive Partridge, Rittal's technical manager for IT Infrastructure advises, "DCW is always a very busy show for us and we're delighted to be able to showcase such an exciting portfolio of products, all designed to

> *For quick responses to events and anomalies, it's critical to have low latency between production and the IT infrastructure.*

help customers take advantage of innovations such as edge computing.

"Our solutions are designed to be implemented rapidly and cost-effectively, thereby paving the way for Industry 4.0 applications. Their modular construction creates huge flexibility for customers. They can be installed in an IT security room, or be containerised like our RiMatrix Containerised Data Centre, allowing it to be located wherever it is required.

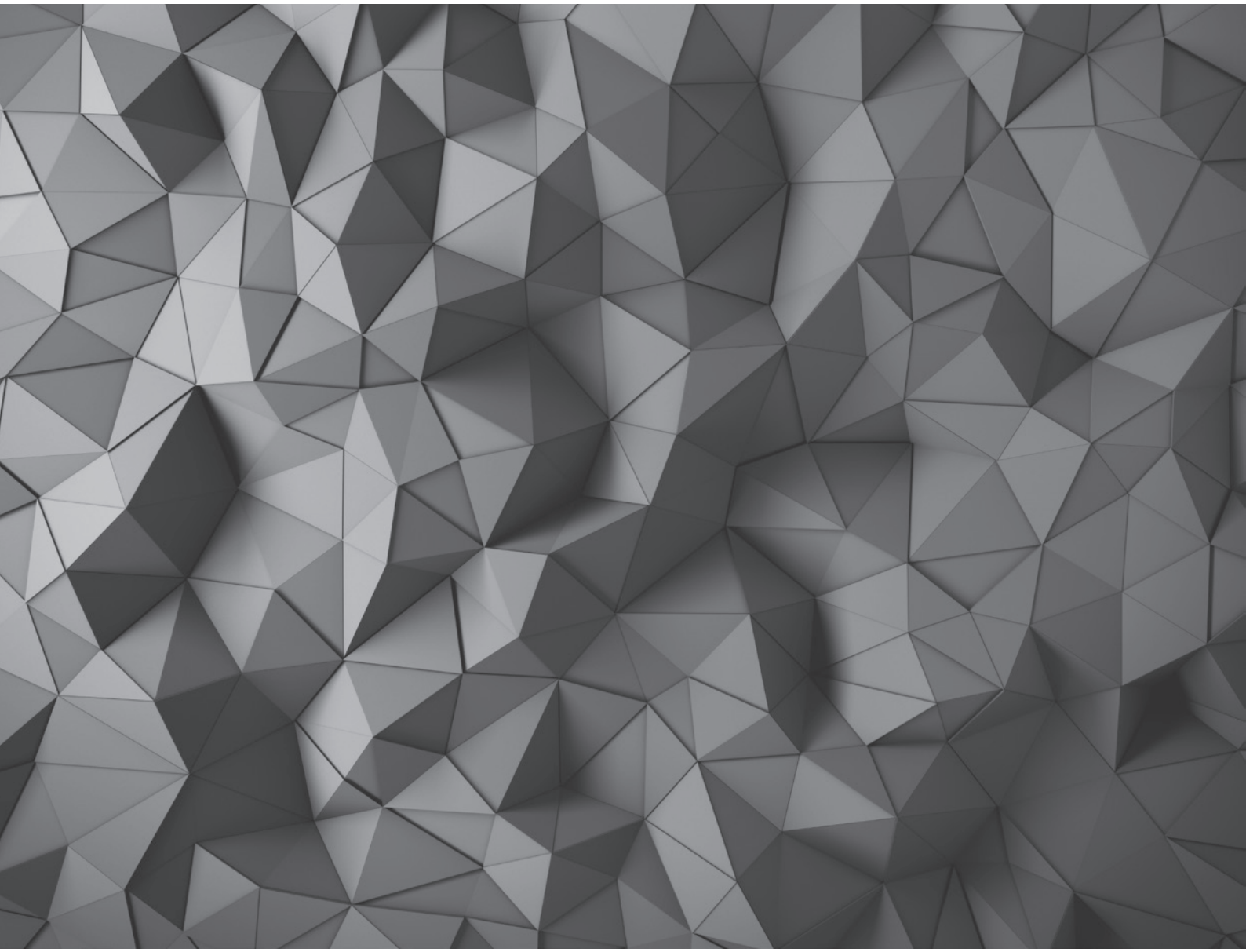
"When combined with the as-a-service offering that Rittal jointly provides with iNNOVO Cloud, the Rittal Edge Data Centre provides a complete, one-stop solution for enterprises of all sizes."

Further information on all Rittal's edge products can be found at www.rittal.co.uk or or on twitter @rittal_ltd.

Visit Rittal at DCW (Excel, London, 12-13 March 2019) on Stand D610 to find out how the industry leading experts can help you deliver your IT requirements.

Edgy

Chris Wellfair, projects director at Secure I.T. Environments discusses edge data centres and how you can make them a reality for your IT infrastructure.



The IT industry loves a new trend and sometimes rehashing an old one. The rate of change is frightening, particularly for those that need to make it a reality in their businesses. Thin client is a pretty good example, very popular in the early days of computing for purely practical cost reasons, then it disappeared, before becoming popular again, driven by the need to support remote workers arguably. Now we're all moving toward cloud-based apps, or apps on mobile devices to perform those tasks.

The cloud has done something not entirely dissimilar for the data centre. Traditionally, companies took a protectionist approach to their IT infrastructure, wanting to keep everything close and under their control.

In time, companies moved more of their infrastructure and applications into the cloud as connectivity and web technologies improved. The cloud has also helped companies address some of their biggest security challenges by putting their data and applications behind technology and skill resources they can't possibly match.

However, it's not without problems. The demand for the lowest possible latency on computing networks, between them and the cloud services that are now so predominantly used by companies has been a growing problem. For many there really have been only two options, either putting everything in the cloud, or to increase the bandwidth of their networks to seemingly outrageous levels.

From the edge looking in (and out)

Neither of those options are perfect, so a middle way is becoming more popular. For a long-time edge computing has been associated with IoT and those networks with naturally distributed networks, such as telcos or industrial networks that connect multiple sites.

Where a company would have previously pushed data back to the corporate network for processing, say from a sensor, and then a corresponding action back to a valve, with edge computing that analysis happens at the perimeter, sometimes in a perimeter data centre, or on the device itself. This would overcome the risks of dropped connectivity, but also enable performance improvements. By processing devices or application data at the extremities of the network, traffic is reduced, and devices can even be given the autonomy to act as a self-contained unit.

Now a similar approach is being adopted to pushing out, away from the corporate network towards the cloud services that we all rely on. By placing smaller data centres as close as possible to fibre backbones, enterprises can address wider problems by reducing network hops, creating redundancy and spreading downtime risk. Primarily this approach greatly reduces network latency by putting corporate servers 'right next to' cloud services providers.

Edge computing and DC form factors

It is very easy to think about taking an edge data centre approach as expensive – but today data centres come in all shapes and sizes. Here's three different ways you can implement your own edge data centres:

The micro option

For decades, organisations with branches have had the 'Comms or Server Cabinet' lurking in the corner of a room to support their connectivity and IT needs. But, with more computing power being squeezed into smaller spaces, and energy needs dropping, that cabinet has evolved into the Micro Data Centre (MDC).

This approach can be particularly powerful for those looking to explore the edge data centre model for a very specific application task, where you need a limited amount of data centre resource. They can be easily placed in co-location sites or ISPs, which can be as close to a fibre backbone as any company can get without huge expense, whilst maintaining the physical security of your data and servers.

Going modular

Building your own data centre affords you the flexibility to design and build a facility that is made to measure, specific to your organisation and entirely within your own control. Modular systems in particular can be built very quickly, at relatively low-cost, and to fit any space.

Going modular does not mean you have to compromise. A well designed and built modular data centre will add capital value to an organisation as well as peace of mind that the IT infrastructure is onsite and within sight – the build is flexible and you have complete control over the intricacies of how it is put together.

Even when space is limited, a data centre can be fitted into 'dead space' within one of your sites – helping you create that edge server environment. Using modular data centre systems, spaces that would ordinarily be wasted can be turned into highly secure IT environments.

> ***"It is very easy to think about taking an edge data centre approach as expensive – but today data centres come in all shapes and sizes.***

Containerised data centres

There are a couple of misconceptions about containerised data centres, the first being that they really are just a temporary solution. This is an understandable reaction, after all they do look like an upcycled shipping container, but the technology in them is the same as would go into a 'normal' data centre build, or at least from the same suppliers.

Containerised solutions can form small data centres where they help resolve space, deployment time, build complexity and cost challenges. But they are very flexible and depending on the internal configuration, can perform very well in high density applications depending on your edge data centre needs.

Standing at the edge

It is an exciting time for cloud and data centre technology with advances happening in both. The current trend certainly seems to be that whilst many companies choose to invest in cloud technologies, the data centre in its many forms, still has a clear role to play in helping companies meet their own IT goals.

Distributing servers may in some regards feel like a flashback, but it's an approach that is allowing companies to get what they want from the cloud, but improve performance, and maintain control over applications and data.

Comfort in the Cloud

The cloud market is growing at an exponential rate, but with so much out there, how do you know which cloud is the right fit for your business? **Bill Fenick,** VP, Enterprise at Interxion discusses the benefits of a multi-cloud approach and believes that when it comes to the cloud, the sky really is the limit.

With the global public cloud services market projected to grow 17.3% this year, it's no longer a matter of whether enterprises will leverage the cloud along their digital transformation journeys or not. Rather, cloud is undoubtedly the future within business – and we're already seeing it evolve.

As businesses' cloud strategies mature, we're seeing them transition to more refined approaches that enable them to achieve parts of what they need from one cloud provider and other parts of it from another.

For example, they may run data analytics or machine learning workloads using one cloud service, while simply storing raw data on an alternative one. This customised deployment approach of leveraging various cloud platforms is known as a multi-cloud strategy. And with it, businesses are able to secure the flexibility they need along their increasingly complex digital transformations.

Businesses that adapt to the evolving cloud and adopt a multi-cloud strategy will gain an edge over their competition, while those that don't will find themselves left behind. So how can enterprises ensure they keep up? First, it is important to understand the benefits a business can reap from a multi-cloud approach.

Say goodbye to vendor lock-in

One major driving trend for multi-cloud is the growing fear of vendor lock-in, as it can be very costly for enterprises to move out of an arrangement they're locked into with a single cloud provider, particularly when they're already using their APIs and other proprietary services. By diversifying their clouds, businesses avoid this fear by no longer putting all their eggs in one basket.

Further, a multi-cloud strategy can offer businesses an alternative to giving any one cloud vendor complete leverage over them. By deliberately dispersing their "eggs" into different baskets (or clouds), businesses

gain greater flexibility with their cloud-hosted workloads, along with a cost advantage by preserving pricing leverage with cloud providers.

Optimise your workload

It shouldn't surprise you that different cloud providers have different specialties, so determining which cloud provider your applications will perform best in and deploying those applications accordingly, will enable businesses to achieve higher efficiency, better compliance, cost savings and deliver greater quality of service.

For example, a business might determine that its AI is supported best by IBM Cloud, but its enterprise workloads perform better on Oracle Cloud Infrastructure. With the flexibility to move workloads and applications to the platform that is the best fit, businesses will reap the performance and efficiency benefits of a multi-cloud strategy.

Deploying the right app on the right cloud, and leveraging multiple clouds for different workloads, enables businesses to bolster reliability as well. By diversifying their workloads and reducing exposure to an outage or data breach, businesses gain greater risk management and have access to a secondary cloud in case their primary cloud experiences any downtime. Secondary clouds can act as a fail-safe solution to keep workloads running at all times.

Bridge a once siloed approach

Early "adopters" who recognised the benefits of leveraging more than one cloud platform were housing one workload on one cloud, and another on a different platform – but these workload strategies were completely disconnected. Over time, businesses have likely determined which clouds are best for their different workloads – but one challenge they still face is determining how to avoid a siloed cloud approach.

Businesses will start to see the true value of a multi-cloud approach once they have the flexibility to move workloads across different cloud platforms. Enterprises that leverage a holistic cloud strategy that ties together multiple different cloud deployments will realise the advantages of multi-cloud – productivity, efficiency and cost savings – all while meeting their growing business needs.

> ***"Businesses that adapt to the evolving cloud and adopt a multi-cloud strategy will gain an edge over their competition.***

Unlocking flexibility

In order to unlock the flexibility advantages that a multi-cloud strategy can afford businesses, organisations need to stop waiting for precision and instead jump into multi-cloud head-on. Enterprises will find they're able to learn much more about what works and what doesn't by doing rather than trying to perfect a plan.

As businesses look to take the leap, the key to success is to have the right connectivity to the various cloud platforms. Carrier- and cloud-neutral colocation environments can help simplify and strengthen a multi-cloud strategy by giving business a better choice for connecting to the cloud.

Businesses gain the benefit of low latency connectivity through colocation data centres that offer direct interconnections to multiple cloud service providers within the same facility, which ultimately translates to better service for customers, even as businesses grow.

Taking the digital leap

ABB's **Henrik Palmgren** reveals how digitalisation can support next generation IT managers in delivering scalable, flexible and automated solutions, taking DCIM and data centre automation beyond the IT infrastructure.

As demand for data continues to grow, together with emerging trends to robotise and use AI (Artificial Intelligence) in data centres, the complexities for IT managers and consultants become ever more intricate. Not only do they need to navigate their way around data ownership, security, safety, storage and maintenance, they also need to be one-step ahead on technical know-how and insight.

In just a few years, the industry has moved out of the back-room closet, where a series of connected products and systems with parameter settings and controls operated, to larger commercial operations, some categorised as mega facilities, with products and systems entwined and housed across several locations.

In a recent report, IDG (International Data Group) projected that "mega-data centres" will account for 70% of construction in the sector over the next few years. Colocation or outsourced data centres are increasing, as more and more businesses in financial services and other industrial sectors are taking advantage of scalability, increased storage and the cost savings they offer.

According to the 'Colocation Data Centre Industry Global Markets to 2020' report, the colocation landscape is anticipated to grow at 15.4% between 2016 and 2020, with an estimated worth of $54.8 billion.

So, what are the key trends in the ever-expanding data highway that data centre managers should get to grips with?

As colocation facilities and outsourced, hyperconverged data centres grow, the need for greater automation across multiple facilities will become more apparent to manage the complex energy and operational needs of the world's ever-expanding information hubs.

Modern data centres already rely on a variety of automated processes (for example, the monitoring and control of cooling units). But as the drive toward lights-out operation continues, we can expect even more automation across the industry, including the ability to manage multiple facilities from a single control centre. This will put a premium on presenting relevant data to operators and on configuring or changing a local network remotely.

Simplicity will also be a key factor in managing the data centre environment by reducing the number of control layers, doing more at a local

level (autonomously, if possible), and reducing latency.

In addition to the need for automation and simplicity, the industry also requires an acute awareness of the macro-economic and environmental need for greater energy and cost efficiencies, with many looking ever deeper and farther afield in search of savings. Already the digital goliaths of Google and Facebook are deploying new AI optimisation and temperature sensors to improve energy consumption when cooling.

But in this short list of key trends, what may not be apparent is the dependence on digitalisation.

Flexible visibility

Intelligent data needs intelligent power. With increasing data demand and complex data systems, digitalisation delivers an elastic infrastructure that can grow or shrink with the load.

It is essential that today's data centres and major system solutions are designed with elasticity in mind, from conception to design.

This smart 'digitalisation' of the power train means operators can do more with their assets because better control leads to better utilisation, with maximum uptime and information.

The peer-to-peer architecture of digital systems will give data centre managers and operators access to best practice benchmarking at the industry-level and greater visibility of cross-industry data. These systems, along with features such as advanced power analytics, intelligent alarm and event handling will provide greater transparency into operations at both device and enterprise level.

This is useful as it allows potential issues to be identified and resolved before they can cause significant damage or downtime.

Maintaining safety

Safety is of course a major concern when high-voltage power systems are required.

Data centre personnel can be insulated from exposure to high voltages during inspections or maintenance activities through digitalisation.

By using diagnostics, alarms and event setting, data centre teams can proactively report and accurately pinpoint issues, thereby reducing the risk of exposure due to human error and further enhancing onsite safety.

Secure operations

As dependence on data centres grows, so too does the need for protection against cybersecurity threats within the data centre itself. The adoption of smart digitalisation can help operators proactively monitor and control the system through deep and granular visibility, to detect and deter threats across the full spectrum of the data centre.

Energy management

Data centres in the European Union consumed 25% more energy in 2017 than in 2014, according to data from Eureca, a project funded by the European Commission to increase knowledge and awareness of data centres and the energy they use.

In addition, the global rollout of 5G, the wireless equivalent of a broadband data connection, will put the growth of digital data into overdrive, requiring ever greater energy-management and operational efficiencies for the data centres of the future.

With data demand refusing to lessen and more operations adopting IoT platforms, providers who manage those energy tasks must do it in a way that provides operational efficiency and reliability for today's businesses. Dependence on sophisticated technology and deep-seated, proactive technical expertise can be delivered through all-in-one automation solutions.

> ***"The colocation landscape is anticipated to grow at 15.4% between 2016 and 2020, with an estimated worth of $54.8 billion.***

Digitalisation for on-premise and hybrid cloud environments provide the possibility of converging both IT and OT through a single pane of glass. This offers complete transparency and interoperability for continuous optimisation and high availability.

Whatever challenges data centre operations may be facing today, whether it's space savings, modularity and flexibility, energy efficiency, continuous operation or safety and security, digitalisation breaks down these parameters, navigates the digital divide and overrides the obstacles of our complex data architecture to keep data flowing.

Industry Insight: **Russell Poole, Equinix**

Russell Poole, managing director for the UK and the Nordics at Equinix, discusses the issues dominating the data centre industry, why the quest for sustainability is everyone's business and what's next on the horizon for Equinix.

What are the biggest changes you have seen within the data centre industry over the last few years?

Over the last few years, there has been huge growth in globally connected devices and systems, and in the number of businesses that are adopting more automated ways of operating across geographies.

This has contributed to a global digital economy, where companies are having to transform to compete. This means businesses are being forced to rethink their IT infrastructures, so they can have the compute power and bandwidth to store, access, process and analyse, this vastly increased data traffic.

This proliferation of data and resulting need for increased Interconnection Bandwidth – the private exchange of data between businesses – will continue to drive growth across the data centre industry.

Data will need to be hosted and accessed at significantly higher speeds, volumes and lower latencies, with data centres ensuring incredibly low latency and an abundance of bandwidth to manage ever-higher volumes of data.

Indeed, Interconnection Bandwidth is expected to grow at a 48% compound annual growth rate (CAGR), according to the second volume of the Global Interconnection Index (GXI), a market study published by Equinix.

The index analysed the adoption profile of thousands of carrier-neutral colocation data centre providers and ecosystem participants globally, and forecast the capacity for private data exchange between businesses will outpace the public Internet by nearly two times in growth and ten times in volume by 2020.

This growth will surely only be boosted by the upcoming implementation of 5G, leading data centres of all kinds to become increasingly vital to the global economy, as the hubs through which the world's most valuable information passes, and on which the digital economy itself is built.

Which major issues do you see dominating the data centre industry over the next 12 months?

Today's business landscape has meant more companies are adopting a cloud deployment strategy that can provide the computing and analytics power required to support digital supply chains – accessing, processing and storing business-critical data as needed.

> ***According to PwC research, AI will spur global GDP to grow 14% by 2030 to the tune of $15.7 trillion.***

To maintain flexibility and utilise the right cloud for the right job, enterprises are increasingly avoiding single cloud service provider lock-in, and looking for platforms to support direct connections to multiple clouds. Data centres can enable this.

Another trend pushing the data centre industry over the next twelve months will be artificial intelligence (AI) – the use of which is continuing to spin-up, greatly increasing productivity. According to PwC research, AI will spur global GDP to grow 14% by 2030 to the tune of $15.7 trillion.

As more data gets generated in this way, needing to be processed and analysed at the edge, we expect to see a direct impact on AI architectures. In 2019, we will likely see more distributed AI applications at local

edge locations, where large amounts of data are being generated. Again, housed in data centres.

Are there any emerging or existing technologies that are perhaps gaining more traction than they once were, or any industry trends you've noticed?

Cloud adoption continued to advance in 2018, leading many Channel companies to realise its importance. As such, this year we'll likely see new cloud offerings being explored and implemented throughout the industry's business strategy.

The time is now, as according to Gartner, more than $1.3 trillion in IT spending will be directly or indirectly affected by the shift to cloud by 2022. And Equinix's recent Global Interconnection Index predicted the direct connections between enterprises with cloud and IT service providers is expected to grow at a 98% CAGR by 2021. Channel partners need to be ready!

> ***"More than $1.3 trillion in IT spending will be directly or indirectly affected by the shift to cloud by 2022.***

Another industry trend which I think will be a huge talking point this year, is 5G. The technology is the cause of much excitement, as it is set to deliver major advances in data transfer speeds, connectivity, capacity, reliability and mobility. But none of this will be effective without data centres in place to support the resulting explosion of data – the industry, Equinix included, needs to be prepared for it.

What, in your opinion, is the most important aspect of a successful data centre?

Security has become an integral part of all commercial and business IT decisions, with the introduction of GDPR, the increasingly public nature of data breaches, and the frequency of cyber-attacks, having created a certain heat on the subject.

Companies must protect themselves against security breaches, and data centres have a critical role to play here. When you consider the businesses living within data centres, you get a sense of the scale of this responsibility.

For instance, Equinix's London data centres house one of the world's largest Internet Exchanges and more than 170 financial services companies. In total, a quarter of European equities trades flow through our sites. Security – physical and cyber – must always be one of our highest priorities.

We deploy a combination of security measures including CCTV cameras, manned guarding and biometric hand geometry scanners at key access points, to meet this need. However, the very nature of our Interconnection offer – where customers can directly connect to each other through private connections, bypassing the public internet – means the threat of cyber-attack is significantly reduced.

With regards to sustainability, with data centres using so much power, how important do you think it is for the industry to do its bit to help the impact of climate change?

It is a well-known fact that the data centre industry is not the most-green – the energy required to power everyone's digital lives is vast. However, steps can be taken to ensure this need is met in the most sustainable and efficient way possible. This is something all industry players should be addressing rapidly and thoroughly. Companies should be prepared to think creatively and invest in long-term solutions so as to greatly reduce their environmental footprint.

Since the early 2000s, energy efficiency has underpinned Equinix's entire design process. In every data centre, we implement energy efficient components and use construction materials that complement our long-term sustainability goal of using 100% clean and renewable energy for our global platform.

We have made great strides in this area, and hope in addition to doing our bit to reduce the impact of this industry on the rest of the world, we can inspire more businesses to follow suit.

What steps could the average facility take to achieve greater levels of sustainability?

Sustainability has to be a big focus for everyone in the data centre industry. And in fact, across all sectors. Green initiatives span a wide range of investment levels and time factors – industry players can look at including aquifer systems to draw from naturally cold wells to cool data centre halls, installing solar panels to generate green energy, implementing rainwater collection tanks for further cooling aids, partnering only with green power providers, and many other things besides.

Equinix has taken big steps to increase its use of clean and renewable energy sources and decrease its global carbon footprint. To push this, we have pledged to power our entire data centre platform with 100% clean and renewable energy, investing in projects involving wind, fuel cells, solar and other renewable technologies. Our efforts to be green have already helped us to avoid using approximately 32,500 kilowatts annually.

> ***"Sustainability has to be a big focus for everyone in the data centre industry.***

What are your company's aims for the next 12 months?

We are working with our customers around the globe to build the data centre of the future. The industry as a whole is developing at a rapid pace and becoming ever more innovative, and we of course want to be at the forefront of that change.

In 2019, we will continue to look for opportunities to expand Equinix's global footprint so we can always be ready to support businesses' ever-growing digital, and therefore interconnection, needs. This year has already seen us announce a new data centre in Seoul – giving us the new market of South Korea, a new site in Hamburg Germany, and a further site in Singapore.

We are also set to open another, LD7, at our Slough campus this year – this new data centre forms part of a wider £295 million investment in the UK's digital infrastructure. You can expect many more exciting announcements from Equinix to follow – our 21st should be another good year!

E+I Engineering

Philip O'Doherty, founder and managing director, E+I Engineering

What does E+I do?

E+I is the largest switchgear and busbar manufacturer in UK & Ireland. We engineer and manufacture complete power distribution systems including MV switchgear, LV switchgear, modular fabrication, busbar systems and energy management systems.

Providing a complete power distribution system, customers are able to deal with one expert supplier throughout the entire duration of the project, making their journey easier.

All four E+I factories, located in Donegal, Ireland, Derry, N.Ireland, Ras al-Khaimah, UAE and South Carolina, USA, are completely vertically integrated. All sheet metal punching, pressing, bending, painting etc are done in house, giving us complete quality control over all products issued.

Who does E+I work with?

E+I is incredibly active within the data centre industry and works with a wide variety of companies. We have relationships with end users from hyperscales and major colocation companies, through to smaller/start up data centres. We also work with contractors and consultants on every aspect of the power distribution design for a project.

However, we aren't just limited to data centres and work across a plethora of other industries including healthcare, commercial buildings, transport hubs, industrial buildings, stadiums and high rise buildings, with many high-profile global projects to illustrate this.

A global company

Boasting four major manufacturing facilities in Ireland, N. Ireland, UAE and the USA, E+I is completely global, allowing the company to work with clients worldwide.

The E+I vision

An indigenous business that has achieved scale, E+I offers high-quality manufacturing jobs, in a regional location, with a cross-border dynamic at work.

We operate a market-led research and development programme and spend significant sums on this every year – developing new products enables us to branch out to new customers and countries.

Major investment

E+I has invested extensively in our BIM/Revit libraries, with information available for down-

E+I in Brief

Date launched: January 1987

Global reach – office locations: Co. Donegal, Ireland; Derry, Northern Ireland; London, UK; Ras al-Khaimah, UAE; South Carolina, USA

Date launched in the UK: January 1987

Key customers: Some global customers include Digital Realty, Equinix, KAO Data Centres, Five Nines

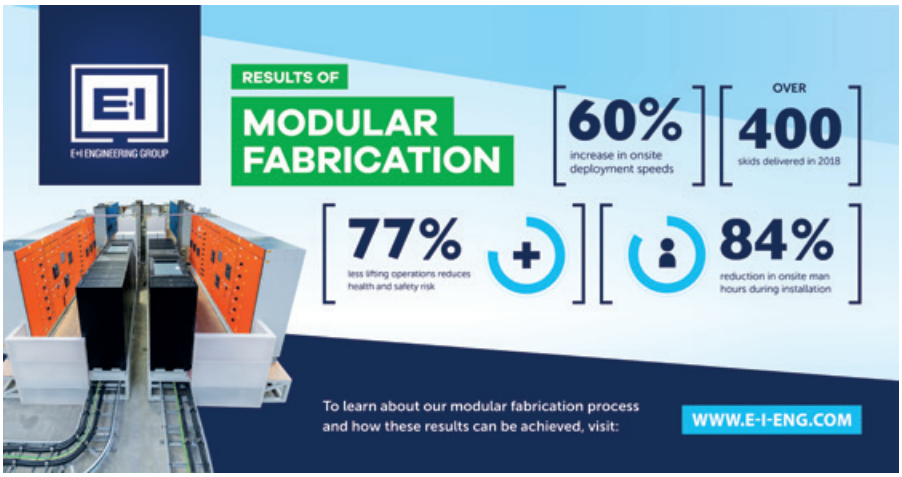
Outside the data centre industry E+I has worked on projects such as Wembley Stadium, Heathrow Airport and The Shard

Number of employees: 2,000 globally

load at: www.e-i-eng.com/bim-content.

We are committed to supporting our clients by providing direct access to our comprehensive BIM library. Architects, contractors, engineering consultants and others are able to directly place specific items into a 3D BIM environment to produce accurate and efficient plans, containment drawings and bills of quantities to form a fully integrated overall project.

We provide our customers with high quality digitised data, available in a range of formats. Our intelligent BIM libraries are regularly maintained and updated to reflect any changes in the products.



Modular fabrication

As of 2017 E+I has invested significantly in modular fabrication, an alternative pre-engineered method of construction developed to help ease the strain of upscaling power requirements.

Data centre managers around the globe are faced with an ongoing challenge to expand their power capacity to meet business requirements and the level of pre-program analysis as well as testing and installation processes can often prove to be challenging.

Modular fabrication allows data centre designers to deliver large amounts of power within a small footprint and a tight timescale. This approach involves the construction of pre-fabricated switch rooms, or open-framed skids, built off-site to meet individual project requirements. Portable switch rooms are then shipped to site, fully built, tested and ready to be installed.

Advantages of modular fabrication

A cost competitive solution, modular fabrication replaces the traditional build method where infrastructure is re-built and re-tested on site, therefore increasing the efficiency of the process and enabling data centres to avail of the following advantages:

- 75% reduction in on-site program – from delivery to 'Yellow Tag' milestone
- Overall program reduction due to off-site fabrication running parallel to site construction
- Improved safety with 84% reduction in on-site man hours during install phase
- 77% less lifting operations
- Improved quality with final solution to factory assembled quality standards
- Significantly reduced potential for on-site damage to equipment from other trades
- Significant savings of Tradtional Install vs Skid Install
- Power skids can acheieve a Level 2/3 completion test tag before being sent to site
- Each skid arrives on site fully inter-wired, commissioned and ready to hook up.

The E+I approach to project management

E+I supports its clients and professional teams through every step of each project, from inception through to completion, including assistance with pre-tender design as well as:

- Scheme design review
- Fault level analysis
- Space planning, room layouts and switch-room co-ordination
- 3rd party interfaces – Generators/UPS
- Metering requirements
- Product selection
- Plant access/maintenance
- Thermal imaging

Our team of highly experienced and qualified Chartered Engineers provide clients with a single point of contact, taking care of delivery, site installation, commissioning, and site acceptance testing, in addition to IST attendance.

Future challenges

In terms of the challenges faced by suppliers and technology providers, the current skills shortage within the industry is a global problem that E+I recognises needs to be tackled.

Although E+I enjoys a very high staff retention rate (with turnover at just 1%) huge investments are being made into our apprenticeship programme, with over 60 apprentices currently enlisted.

We also have a long-standing university bursary programme, as well as ensuring we continually upskill our current staff through in-house training and training in partnership with local colleges and universities.

What's next for E+I?

The company is continuing to expand, through organic growth, targeted R&D programmes and possible acquisitions.

We anticipate that the business in US will continue to grow rapidly, so a lot of time is being spent getting processes, skills etc. up to scratch there.

We have also just completed an extension on our company headquarters in Ireland. We are pleased to invite both existing and potential customers to visit the factory to meet with the team and see the quality of work that we are engineering.

Visit the E+I team on stand D710 at Data Centre World

Contact details for further information:
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Twitter: @engineeringei
Phone: 0044 28 71353030

E+I ENGINEERING GROUP

Q&A: Mathew George, Starline

Mathew George, Starline's sales director, EMEA & SW Asia, believes that it is the brand's technological ingenuity and customer commitment that makes it unique. A busy man, DCR caught up with Mathew between meetings to find out a little more about all things Starline and how this international brand maintains its position as a global leader in power distribution equipment, despite fierce competition.

For someone who hadn't heard of Starline (god forbid) how would you summarise what it is the company does?
Starline has four main product lines: Track Busway, Plug-In Raceway, Critical Power Monitor (CPM) and DC Solutions. We distribute power for the final part of the distribution chain in the data centre and have been doing this for the last 30 years.

Our products both distribute and monitor the power going to the racks and servers. It's a unique way in which we distribute power – with our open channel busway we are able to insert and remove connectors (or plug ins as we call them) when the bus bar is live – something that very few companies can do. We are also pioneers in inventing this technology.

Do you just produce the products or is Starline involved in the installation process as well?
We are rolling out global installation support and service support teams. So yes, we are installing it, supporting it, maintaining it and offering different kinds of warranty and service support to customers if they need it.

The Starline system is maintenance-free, so we don't really need much maintenance, but we do offer installation and checks on the system, for example if a customer wanted us to come and put in critical spare supplies at various locations.

What kind of customers and industries does Starline serve?
Our primary focus is data centres, but we also sell into retail, commercial or office spaces and industrial environments. This is because the same way we distribute power into a data centre, could potentially be translated into a car manufacturing facility, or even Tesco, Sainsbury's or Waitrose, there is a huge scope of possibility.

For example, if a big supermarket needed to change the freezer location, with the track busway system you could do that in a few minutes rather than calling electricians and contractors to rewire everything.

> ***"It's a unique product on the market right now and that's what got us the Power Product of the Year Award.***

If you look at our factory in Reading, it has a complete track busway distribution, so no matter how you want to change the production floor layout, you can do so with ease because the grid is already there, you just need to insert the plug-ins into the busway and there you go, you can change locations in minutes.

Starline has recently won an award for Power Product of the Year, could you tell us a bit more about that?
Yes, that's right. I briefly mentioned before that our system is maintenance free. One of the key reasons we are maintenance free is the way we join our busbars together. We don't have any nuts and bolts in our busway system. When you have nuts and bolts in a busway system or any system for that matter, you need to do periodic maintenance to ensure these aren't coming loose. Since we don't have them, there is no way these can come loose and therefore no maintenance is required.

However, there is one place, where the cables enter our busway system (we call it the end-feeds or cable end-feeds) where the power cables connect to a bus bar – these are traditionally connected with a lug and a nut and a bolt. This is not part of our system, but what contractors connect to our busbar.

This of course doesn't make for a maintenance free product, so we developed a wireless temperature monitoring system that fits on these nuts and bolts, which sends information on the temperature of these lugs to our meters on an hourly basis. This means that if at any time these nuts and bolts become loose, it sends information essentially saying, 'hey it's getting hotter and hotter, someone has to check the system.'

> ***"We take competition positively, the more competitors, the more we continue to grow.***

This enables our system to be completely maintenance free from one end of the system to the other. It's a unique product on the market right now and that's what got us the Power Product of the Year Award.

So, with regards to being maintenance free, alongside the lack potentially problematic parts present in the system, is this an attribute unique to Starline?

That is definitely something unique to Starline and is one of the reasons why we're so popular. When the contractors bring the cables in, there has to be a nut and bolt, which is why we developed our wireless system, which continually assesses the temperature in real-time and alerts the customer to potential problems.

These problems happen all the time too, temperatures build up and there may be a potential issue in the future. With the pre-warning provided by our system, you can find a suitable time to do a maintenance shut down and rectify any issues before they cause a problem. Monitoring the system continuously means you mitigate the risk of one day being faced with a surprise incident, or something blowing up because you weren't aware of what was going on in the environment.

How is this beneficial in the data centre space in particular?

Data centre operators don't want people to be inside data centres. For example, if a facility is fully populated with several other customer's racks and servers, the less number of people walking around in high-vis jackets and contractors, the better for customers. We don't want a lot of people doing maintenance – generally data centre operators prefer a dark empty room, rather than a room full of people.

Starline obviously has a unique and successful product which other companies might try to emulate. How is Starline combating competition?

We have more and more competition every year, which I think is good, but despite this we continue to grow- which is a good sign. We continue to improve our product line, improve our feature set, and be more focused on the customer.

For example, this year we built two factories, one in Reading and one in Singapore, to provide more support locally to where the data centres are. So, the way we go against competition is being more proactive and giving more support to our customers: shorter lead times, better quality and more testing. We take competition positively – the more competitors, the more we continue to grow.

You guys have three facilities, one in Singapore, Pittsburgh and most recently Reading, what spurred Starline into the UK market?

Well we already had a UK sales office and a smaller factory in Slough for a few years, but demand and customer requirements were substantially more than we could handle from the facility in Slough. So, we decided to increase tenfold in size from Slough to Reading. There wasn't enough space to expand in Slough as a lot of data centre customers were filling the Slough trading estates, so we decided to go a few miles west to Reading where there was a big facility available for us.

We are very much a global company too. In terms of global reach, we have offices all over the world – India, China, Japan, the Netherlands, you name it. We can supply to almost any country in the world and deal in almost all local currencies.

Do you see any challenges for Starline in the future that might affect business?

Not really, there are always going to be changes which we are constantly adapting to. We're at a time in the market where it's exciting because there's a lot of activity for both colocation and enterprise data centres.

As a company we're very positive and we are very energetic; the team is young, motivated, and looking forward to taking on the next challenge.

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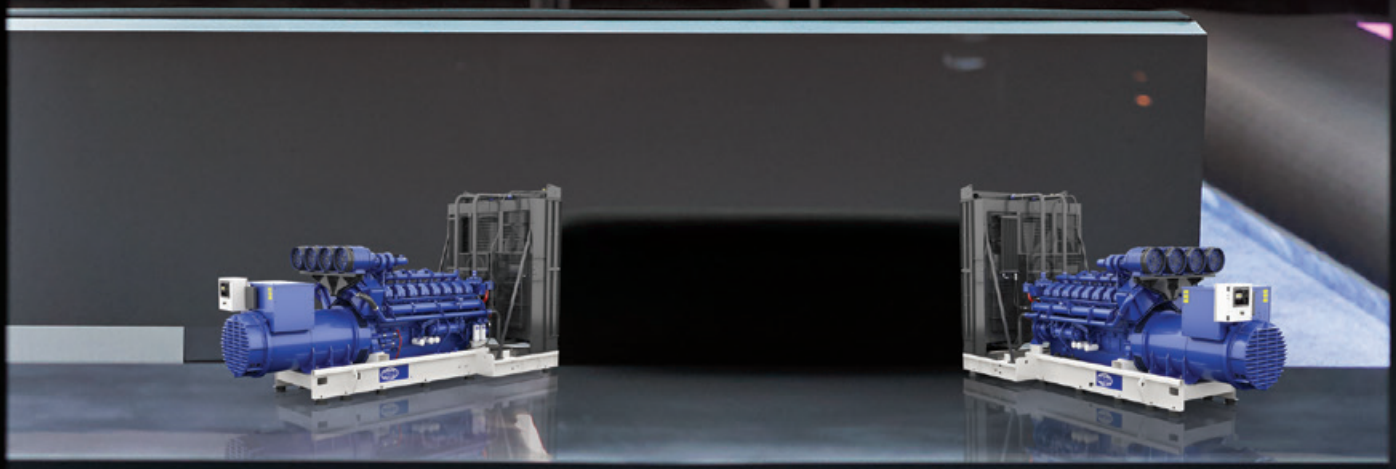

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Luck of the Irish

With sites in both the UK and Ireland, **Atlantic Hub** is uniquely positioned when it comes to the uncertainty surrounding Brexit. Managing director **Brian Doherty** gives DCR an insight into who Atlantic Hub are and gives us his view on how UK-based colocation providers could be impacted should the decision to leave the EU go ahead.

Firstly, what does Atlantic Hub do and where are you based?

Atlantic Hub is a data centre developer based in Ireland's North West region, currently developing two mega scale campuses in Counties Donegal and Derry/Londonderry. Each will offer up to Tier 4 data centre services offering low operational costs and the fastest connectivity available to North America, supported by the GTT North transatlantic fibre optic cable.

What makes Atlantic Hub's offering unique?

The Atlantic Hub leadership has decades of experience in data centre design and development, meaning that each campus is being developed with the knowledge and foresight of industry-leading expertise. This has enabled us to draw on some of the world's most innovative technologies to create an incredibly efficient, sustainable and reliable design.

We are delivering 100% green energy with a 300MW capacity – the largest in the UK and Ireland – and our design will target a Power

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Additionally, we will have the fastest abundant connectivity (8Tbps Multi Terabit) and the lowest latency (under 52ms) transatlantic connection available between North America (Halifax) and Europe (Co. Derry) powered by the GTT submarine cable.

Atlantic Hub seeks to combine production of green energy with delivery of power efficient solutions, to deliver fully resilient information and software applications in both primary and disaster recovery sites for large public and private sector organisations – where data integrity and availability is paramount.

Atlantic Hub is proud to be an Irish project in the North West region, a strategic location for taking advantage of the natural benefits of a temperate climate for cooling. The dual campus location on each side of the border allows for dual redundancy which we know many clients will hugely value.

What is your stance on Brexit in relation to the UK colocation market?

Atlantic Hub is developing sites in both Derry and Donegal, therefore both the UK and Republic of Ireland, ideally positioning itself for organisations operating in both, or either, jurisdictions regardless of the outcome of the changing and unpredictable Brexit landscape.

What we are most concerned about is business continuity for our clients. It's important to us that we can deliver seamless business operations capability, providing our clients with the necessary flexibility for the maintenance of highly reliable and secure infrastructure. In this way we will assist businesses to mitigate the potential obstacles and associated risks of Brexit.

In your opinion, should UK-based colocation providers fear Brexit?

In the current changing political environment, it would be unreasonable and unfair to speculate as to what the final outcome of Brexit and the impact on operators in either jurisdiction.

However, the data centre industry in general is continuously aware that the data needs and hence capacity requirements of companies of all sizes are rising significantly. Latest technology research estimates that by 2022 each internet user in Western Europe will use 98GB per month, up from 36GB in 2017.

The figures suggest that businesses and individuals will be using and storing far more data than ever before. This must be securely hosted and accessed quickly and securely, so it is reasonable to anticipate that as usage requirements increase, so too will data hosting capacity, regardless of the jurisdiction.

Atlantic Hub

DATA CENTER CAMPUS

Atlantic Hub offers up to 305MW of capacity on twin data center campus developments in both Rep of Ireland and N'Ireland, (EU & UK), and offers exceptional opportunities for fully resilient data hosting together with the fastest connectivity available between Europe and North America.

The campus locations in Donegal and Derry offer ultra-low construction and operational costs with ideal environmental conditions.

Atlantic Hub offers a flexible design approach to permit the positioning of multiple buildings and dedicated data center compounds with the option of 'availability zoning' between UK and EU.

Project will be supplied with 100% certified green power and utilising all air evaporative cooling in a resilient N+1 arrangement to attain a PUE < 1.2.

Atlantic Hub offers a unique opportunity with a very low cost 'Total Cost of Ownership' model and a 'Twin Campus' development ideal for large-scale Cloud and Data Hosting providers.

Low Operational Costs

The North West region of Ireland offers very competitive construction costs together with low operational costs due to the prevailing competitive salary levels of the region, low employee attrition rates and lower support services and maintenance costs.

Campus will facilitate:

- 1. Retail Colocation with portfolio of managed services supplied by Atlantic Hub
- 2. Wholesale Hyperscale Cloud
- 3. Multi-National Corporate Wholesale
- 4. High Tech office accommodation

Connectivity

Atlantic Hub offers the fastest abundant connectivity (8Tbps Multi Terabit) and the lowest latency (under 52ms) transatlantic connection available between North America (Halifax) and Europe (Co. Derry) powered by the GTT submarine cable and "available between the contentment's of North America and Europe powered by the GTT submarine cable.

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2. Letterkenny Technology Park, Co. Donegal, Republic of Ireland.
3. 1 Boston Place 26th Floor. Boston, Ma 02108.

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Is Brexit likely to affect international colocation customers? Do you think people will move their data out of the UK if that is a viable option for them?

It is a distinct possibility. In our experience, no two companies are the same, meaning that their requirements are never the same. For some companies it may make more business sense to move their data. For others, holding it in the United Kingdom will be a more effective service.

Whatever the final outcome and the resulting consequences, all companies must now focus on risk mitigation strategies. As with all industries, operational costs, like the cost of energy, and the quality of service provision (latency and uptime) will likely remain major determining factors. That is why we are confident that the Atlantic Hub offering will be well received by our clients.

With regards to your location and Brexit, how will this play out for Atlantic Hub as a business? Will this be advantageous?

The Brexit process is highly complex with many moving parts, several of which will not become clear for some time regardless of which scenario comes to pass on 29 March. The effective working relationship between the UK and the European Union, in particular the Republic of Ireland – its closest neighbour – will not become apparent for some time.

As appears to be the case with much in Brexit from a business perspective, there is certainly risk but also opportunity. We are confident that we have mitigated the risk as much as is currently possible and will continue to do so as the process develops.

There is also great opportunity through the increasing business requirement for high capacity data storage and the need to manage operational costs efficiently. Our proposition will be industry leading, and in that regard, we believe we will have a competitive advantage.

Finally, what's next for Atlantic Hub?

We're very excited about a number of technology partnerships and potential client relationships that we're in the midst of right now. With demand for data centre space showing no sign of slowing, and budgetary constraints affecting the ability of organisations to build their own data centre capacity, Atlantic Hub anticipate a busy few years ahead in the data hosting and managed services sector.

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But we quickly wanted to inform you of our new name.

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Following the success of the inaugural 2018 Electrical Review Excellence Awards, we invite electrical manufacturers, contractors and project owners to enter the 2019 Awards.

The recipients of 2018 Awards included: Noriker Power battery storage facility - Entry by Vertiv; Indectron Shield House data centre - Entry by Sudlows; The Queens Hotel, Penzance - Entry by Chubb Fire & Security; Project Beagle, Ingenuity House - Entry by zencontrol ltd; Chertsey Water Treatment Works - Entry by Danfoss Drives and Heathrow Airport, Electric vehicle charger installation - Entry by R.L. Freemantle Electrical Ltd

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All winning entries will also be considered for two additional awards – Project of the Year and Product of the Year, both presented by Riello UPS – and recipients will be announced during the Awards evening.

The Awards include the following categories:

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Power - Project of the Year
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Lighting - Project of the Year
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Sunny or Amanda on +44 (0) 207 062 2526 or
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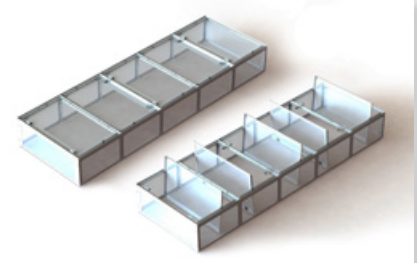
Siemon introduces active cold aisle containment solution

Siemon has announced the launch of its active cold aisle containment solution, featuring roof panels that open automatically during an alarm event to facilitate access to sprinkler systems and other fire suppression systems.



Compatible with all Siemon data centre cabinets deployed in a pod configuration, the active cold aisle containment solution improves efficiency and expands the capacity of a data centre without the need for supplemental cooling while leveraging existing fire suppression systems.

Active aisle containment panels form a horizontal roof across the cold aisle and when used in conjunction with self-closing or manual doors that close off the end of the aisle, the cold air is contained in the aisle to provide targeted cooling to active equipment.

Electromagnets hold the active roof panels in place during normal operation and in the event of an alarm, release the panels allowing them to swing open.

These magnets utilize 24VDC power and are compatible with most standard power supplies deployed in the data centre environment. The power supply connects to the facility fire alarm control panel or smoke sensor output to ensure that the panels automatically open during an alarm event.

www.siemon.com
01932 571 771

Zyxel unveils Cloud Query service for ATP firewalls

Zyxel has announced its new Cloud Query feature for its ATP firewalls — a cloud-based malware scanning service, offering an unprecedented level of threat intelligence from an ever-expanding cloud database to counter malware in the wild before it has a chance to spread.

Zyxel's Cloud Query service is based on a multi-source, continuously growing cloud database that already covers billions of malware samples. In addition to constant updates from trusted third-party sources, the Cloud Query database is enriched with a steady stream of updates for threats identified by every other Zyxel ATP firewall worldwide.

A specialised, AI-driven algorithm classifies and calculates the severity level of each threat, helping businesses identify the most active threats and take appropriate countermeasures.

"The effectiveness of malware scanning used to be severely limited by hardware capacity. Using a cloud database allows for far wider and deeper insight across the entire online threat landscape, and also shortens the response time down to seconds without compromising the firewall's performance," said Rachel Rothwell, regional director for southern Europe and UK at Zyxel.

www.zyxel.com
0118 9121 700

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Rittal has developed a roof-mounted version of its award-winning and highly energy efficient Blue e+ cooling units; these are designed for enclosures of 800 x 600mm (W x D) upwards and deliver a cooling output of 1.3kW.

The new roof-mounted units also feature within the new VX25 large enclosure system as an integrated solution.

Roof-mounted climate control units are the top choice in control and switchgear applications where there is a lack of space on the front and side panels. Air routing within the enclosure is also optimised.

Energy consumption remains low because neither a compressor nor a pump is required when the cooling units are operating on the heat pipe; only the fans that circulate the air by the heat exchangers need an electricity supply.

Overall, depending on the ambient conditions and the application, the cooling units of the Blue e+ series use on average 75% less energy than conventional compressor cooling units.

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EMKA single-factor, multi-factor – front door, rear door linked data cabinet security

EMKA has announced single and multi-factor authentication for linked front and back cabinet doors in data storage environments.

Their 'at the handle' db BioLock fingerprint authentication can be used on its own for biometric level security, or may be coupled with other components to incorporate keycard, RFID, smartcard and/or PIN inputs to provide seamless access control across a complete enterprise.

Where rear door security is required, then

the cabinet may be fitted with the db ELock, which installs on the rear door and works in conjunction with the front door lock to simultaneously unlock the back door once authentication is completed at the front. It may also be used to unlock front/rear doors in end-of-row configurations using the EMKA db Enline.

The BioLock and ELock offer compatibility with third-party systems and cabinets for retro-fit security enhancements, to deliver an indisputable audit trail so that customers may manage their access points around the world and monitor them in real time from a single platform.

www.emka.com
024 7661 6505

Raritan intelligent PDUs with RCM Type B patented self-test function

Raritan – a brand of Legrand – has announced a new range of Residual Current Monitoring (RCM Type B) options for intelligent PDUs.

These new RCM modules include a patented self-test functionality, designed to avoid the need for manual RCM testing by electricians in the data centre, causing potential downtime of the equipment.

"We wanted to simplify the way users deploy Residual Current Monitoring at the rack level by making it easier to test and maintain the circuitry, and ultimately comply with electrical standards.

"Adding RCM to the rack PDUs is the most efficient way to manage potential leakage current risks from the IT equipment," said Michael Suchoff, chief engineer and inventor of the self-test patent for Raritan.

Nicolas Sagnes, global product marketing for Raritan added, "It's our continuous mission to launch products that improve efficiency and uptime, whilst lowering operational cost in the data centre."

"With this philosophy in mind, our engineers designed three types of RCM sensors as well as a neutral conductor monitoring solution to provide our customer with a more reliable infrastructure, and keep the data centre a safe working environment."

www.raritan.com/eu
+31 (0)10 284 40 40

Riello UPS extends power range of super-efficient NextEnergy

Riello UPS has expanded its super-efficient NextEnergy (NXE) range with a new 400 kVA model.

The much-anticipated NXE 400 incorporates the latest transformerless technologies to deliver TÜV-certified operational efficiency up to 97%, while its pioneering Efficiency Control System minimises wasted energy even at partial loads.

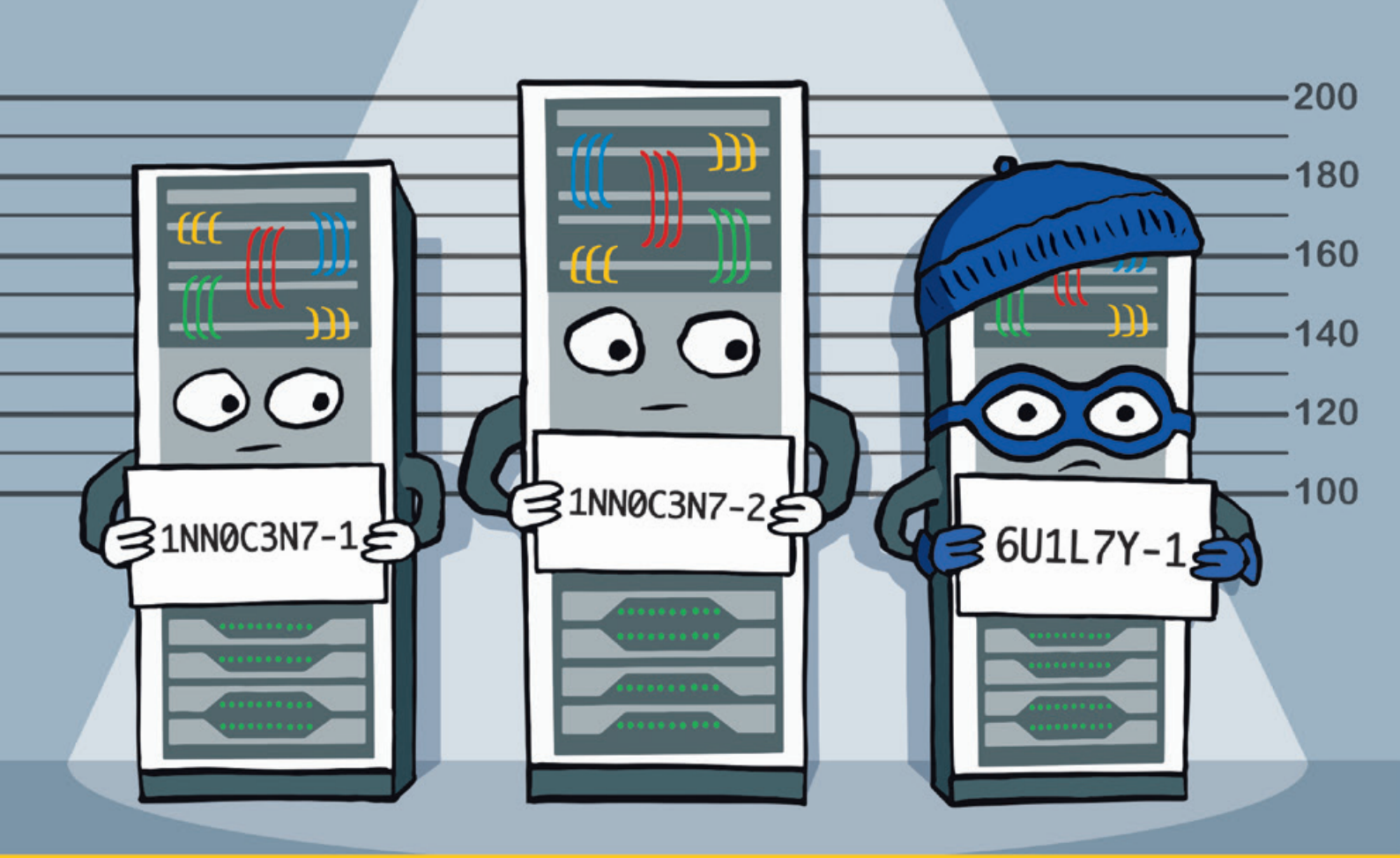
Already available in 250 kVA and 300 kVA versions, the more powerful NXE 400 is a similarly-proven solution for protecting mission-critical applications in a compact footprint.

The three-phase UPS delivers unity power factor and incorporates a whole host of energy-saving features including Eco and Smart Active operating modes that enable 99% efficiency, plus speed-controlled fans that adjust depending on the load level.

Leo Craig, Riello UPS general manager commented, "Delivering category-leading efficiency in a compact footprint, we're sure this increased power version of the NextEnergy UPS will quickly become a firm favourite with our customers.

"Its large touchscreen display makes it easy to check all vital measurements and modify operating modes or settings, putting maximum power at your fingertips."

www.riello-ups.co.uk
01978 729 297



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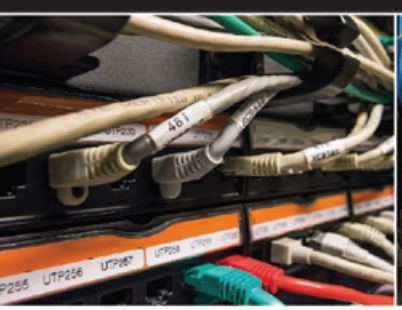

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Mind the Gap

Bridget Kenyon, global CISO at Thales eSecurity, discusses the UK's ever-growing cybersecurity skills shortage and why encouraging young women into the field might be key to bridging the gap.

What state is the UK currently in with regards to the cybersecurity skills shortage? How have we ended up in this situation?

This year, we will continue to see an appetite to engage with, and address, the skills gap that we face in information/cybersecurity. A shortage of competent professionals has been present for some years, but few people saw it as a serious problem. Now, thanks to increasing compliance requirements, and a dramatic increase in threat awareness, we have an accelerating skills shortage in the UK; and organisations are realising it's not just down to technology to solve all of their problems.

Many factors have led us to where we are today. Going forward, we will see a drive towards apprenticeships and lateral movement within organisations; success will lie in shifting cultures and developing innovative approaches.

Do you think GCHQ's new initiative aimed at young girls will encourage them to enter into a career in cybersecurity? How does it hope to achieve this?

It's great that the UK government (specifically GCHQ) has acknowledged the importance of tackling gender disparity in information security. This initiative, while very positive, has to be seen in the wider societal context. A single activity isn't going by itself to change long-held prejudices and attitudes. However, as part of a coordinated approach by government and communities to culture change, it can be a highly effective tool.

We are starting to see a pattern of initiatives like the CyberFirst Girls Competition, as well as mentoring and school visits by women in STEM careers. There are also many "grass-roots" groups such as Women in Tech, which encourage women to get together to improve their prospects, share successes and learn from challenges. However, these initiatives and groups can fall into the trap of "admiring the problem" rather than solving it.

The need for information/cybersecurity talent will continue to grow over the next two to three years, as businesses protect themselves against an increasingly sophisticated threat landscape while having to comply with legislation such as the General Data Protection Regulation (GDPR).

Women may be disproportionately under-represented in security today – but they can play a critical role in bridging the skills gap.

Why is the initiative aimed specifically at girls as opposed to boys as well, surely the more the merrier?

The historical approach has been to offer initiatives to youngsters of both genders. That has resulted in far more boys than girls picking STEM careers. I'm not saying that girl-only initiatives are the magic solution; but if you do more of what you have always done, you will get more of what you have always got!

In my view, the key to getting more women into the cybersecurity and IT sectors is to market technology and information/cyber security as normal careers for women. These careers are already seen as normal for men. This isn't about picking one gender over the other – it is about giving women equal exposure as men in the industry.

If people (men and women) going through school and university see examples of real women with a career in security, not "heroines" or "trail-blazers", then it will not seem unusual - and then it will not be unusual.

What steps do you think the UK must take in order to ensure our cyber safety as a nation? And is there anything the public can do to help matters?

Nations are already looking worriedly at issues around strategic autonomy. As an example, if we rely upon another country to supply systems which clean our drinking water, what happens if they become hostile to us?

There will be an increasing tension between the idealistic notion of "data in the cloud", where location is imagined to be irrelevant, and the reality that all data is somewhere, and the location is governed by the rules of the country it is in.

The reality is that we are all too far down the road of globalisation for any country to "pull up the drawbridge" and isolate themselves from the rest of the world (Brexit notwithstanding).

The public can play a critical role in this. They are the medium which nation-states use to influence each other's political structures and operational effectiveness, through manipulation of the information which people are exposed to, e.g. on social media. The general public needs to become more educated about the possibility of Internet-based information being unreliable or biased.

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