DCR
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The DNA of Data Centre
EFFICIENCY
Wellcome Sanger Institute uses EcoStruxure IT Expert to drive energy efficiency.

Discover how Wellcome Sanger Institute uses EcoStruxure IT Expert to drive energy efficiency.

Read the case study

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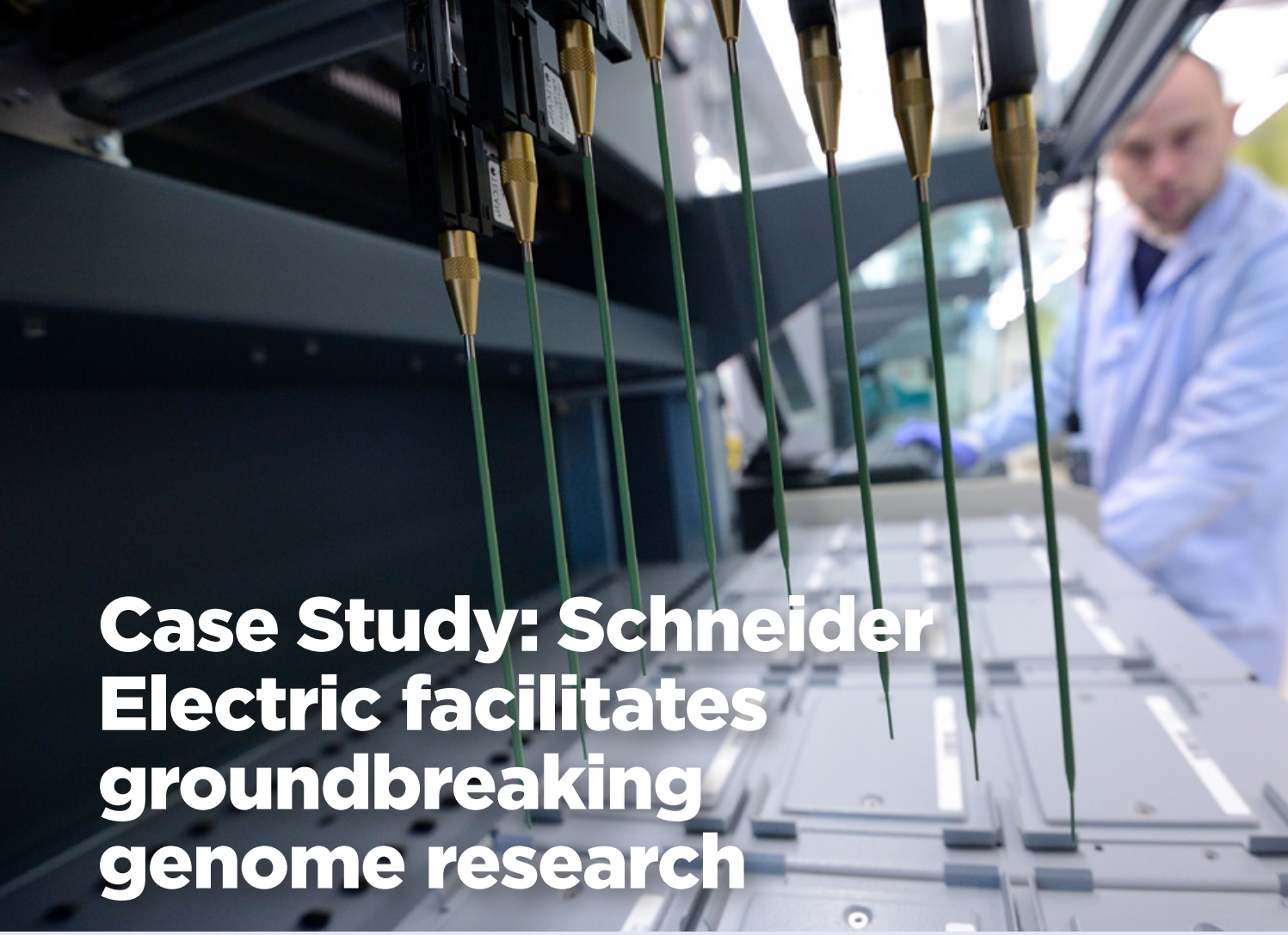

Case Study: Schneider Electric facilitates groundbreaking genome research

The Wellcome Sanger Institute deploys EcoStruxure IT Expert from Schneider Electric, to help drive energy efficiency and ensure more funding for critical genomic research.

The customer

The Wellcome Sanger Institute is one of the world's leading research facilities focused on genomic discovery. Based at the Wellcome Genome Campus, Cambridge and established in 1993, the Institute conducts key research into improving the outcomes of human health using data derived from genomic sequencing, particularly in the areas of cancer, malaria and other pathogens. It also works closely with a wide range of collaborators – both internationally and across the campus – to share the results of its research with the wider scientific community.

The challenges

At the core of Sanger's technical infrastructure are its DNA sequencing machines; a fleet of complex and advanced scientific instruments which generate vast quantities of data that must then be analysed within their on-premise data centre.

The nature of genomic research, a cutting-edge and evolving area of science, means that the demand for data-processing capacity is only likely to increase over time – genomic data is soon set to become the biggest source of data on the planet.

Simon Binley, data centre manager at Sanger states, "The human body is made up of trillions of cells. As we sequence those cells we will also be gathering more genomic data via a greater number of sequencing machines. Advances in today's technology also mean we are gathering data more quickly than ever before. This requires more power availability, greater storage, faster connectivity and higher levels of local compute."

This requirement for local processing to be physically close by the sequencing equipment where data is being generated is an archetypal example of an 'edge computing' deployment.

"Proximity to the sequencing equipment is a primary consideration for the data centre," continues Binley. "The bandwidth and latency requirements for the high volume and velocity of genomic data makes cloud services unsuitable. As such, no other edge data centre is as important to discoveries about human life as the one at Sanger."

Another key considerisation is the DNA sequencing equipment on which the scientific effort depends, which must be protected by uninterruptible power supply (UPS) systems at all times. Downtime within this distributed IT environment would require the chemicals used in the research process to be replaced at significant cost, in addition to lost time and data. Ongoing monitoring of UPS battery health is therefore essential to ensure runtime is available, and makes a major contribution towards the Wellcome Sanger Institute avoiding outages in both data sequencing and research efforts.

The solution: An upgrade delivered via partnership

As part of its on-going demand for greater processing power, Sanger recently made operational a fourth data hall within its existing data centre facility. Comprising more than 400 racks and consuming 4MW of power, the Institute is now the largest genomic research data centre in Europe.

Additionally, the DNA sequencing equipment on which the scientific effort depends is protected by individual APC by Schneider Electric Smart-UPS uninterruptible power supply (UPS) systems. Resiliency within this distributed IT environment is essential, ensuring that the Wellcome Sanger Institute avoids outages and any losses of sequencing or research data.

As part of the upgrade, Sanger worked directly with Efficiency-IT (EiT), a specialist in data centre design and build, and UK Elite Partner to Schneider Electric. EiT specified Schneider Electric EcoStruxure IT Expert; a cloud-based Data Centre Infrastructure Management (DCIM) software platform, which enables the user to manage all of the key infrastructure assets and improve the overall efficiency of the data centre.

Installed by EiT's software experts, the solution provides the Wellcome Sanger Institute with insight into the operation of all key infrastructure assets in the data centre, including APC by Schneider Electric NetShelter racks, APC rack-metered power distribution units (PDUs), Smart-UPS uninterruptible power supplies (UPS) and cooling equipment.

EcoStruxure IT Expert is highly scalable and quick to deploy and install, allowing thousands of devices to be connected and discovered in less than 30 minutes. The software is completely vendor-neutral, allowing the user to manage all of the critical infrastructure assets on their network within a single solution, leveraging data analytics that enable smarter real-time decision making and ensure that any unexpected issues are identified and quickly resolved.

The benefits and results

EcoStruxure IT Expert was chosen because it was considered best in class for the Wellcome Sanger Institute's requirements after examining several competing products. It was well suited to the existing infrastructure in the data centre, most of which has been provided by Schneider Electric, but because of its standards-based open-platform architecture, it can simply and easily integrate with hardware from other vendors.

As well as improving the operation of the data centre itself, EcoStruxure IT's management capabilities can also be extended to other distributed assets throughout the Institute and the broader Wellcome Genome Campus, including its sequencers. Several other communications equipment rooms distributed throughout the Campus are also made visible within EcoStruxure IT's single pane of glass.

Another benefit of EcoStruxure IT is its cloud-based architecture, which enables the Institute to outsource some of its critical IT requirement to third-party colocation providers and still manage the infrastructure internally. The solution provides the institute with complete visibility of IT health, ensuring that both the data centre manager and any accompanying maintenance or service providers, such as EiT, are instantly notified via email and the EcoStruxure IT Expert smartphone application should a power outage occur. In this way it allows all key stakeholders to have visibility, whilst enabling rapid collaboration to help quickly resolve critical IT issues.

The payback for installing EcoStruxure IT will be seen through reduced operating costs, especially in terms of a reduction in energy consumption. The Institute has ambitious targets for improving the Power Usage Effectiveness (PUE) rating for the data centre from between 1.6 and 1.8 where it is now, to around 1.4, which will yield even further cost savings.

"Genomic data is soon set to become the biggest source of data on the planet

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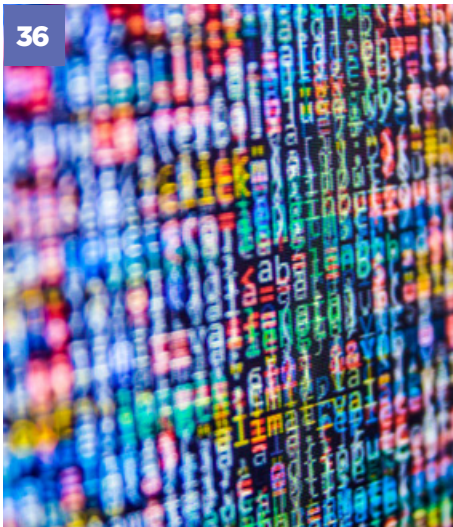

Editor's Comment

Welcome to the very first Data Centre Review of a new decade folks. Since DCR is an elusive creature only gracing us with its presence thrice a year, it is nice to be back in the DCR saddle. To be fair, I've not been doing much else, considering Storm Dennis has made himself quite at home battering my house into oblivion, and today decided to launch a wheelie bin at my car. It's fine, I didn't need my windscreen anyway. But let's hear it for wind power, right?

As always, there's some stuff going down in the DCR calendar. First up, by the time this issue goes to press, we will have had pancake day – I jest, but needless to say this is an essential day and really should be declared a public holiday. What we actually have, is Data Centre World, taking place at the ExCel London 11-12 March, which although lacking in pancakes, will be just as good, but for very different reasons.

DCW is one of the main events of my year as editor, a momentous occasion where I get released from behind my desk and can actually get in amongst the industry. It is a chance for me to mingle, listen to some of the amazing speakers they have lined up and generally find out what's new. So, if you happen to see me milling about the event, please come say hi. Might I add if you have me on LinkedIn, my profile picture is somewhat misleading as I no longer have the purple hair that previously made me so easy to identify at these sorts of events. I have since gone corporate blonde, in a bid for stealth/to match my ever-increasing age.

In other news, is your company excellent? If so, I do hope you entered our ER & DCR Excellence Awards because entries closed on March 6. We now have new awards categories dedicated solely to the data centre space, pertaining to data centre design and build, cooling, and colocation. As an honourary member of the judging panel I am very much looking forward to sifting through our shortlist to help pick out all our deserving winners, so if you entered, best of luck!

This year, our awards will be taking place at the beautiful Christ Church in Spitalfields London on May 21, so I hope to see some of you there on the night, as it's looking to be a good'un. A huge thank you to all of our amazing sponsors, Smart Grid Forums, Omicron, ECA, Vertiv, Centiel, Yuasa (who are in charge of entertainment might I add) and of course our partners for the third year running, Riello UPS.

As always, if you'd like to get involved with the publication, have any ideas for features, feedback, or just want us to cover something in particular, then we want to hear from you, my email address is over there on the right. See you again in June!

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News

Highlights from the tech sector.

Data centre survey from Forbes Insights and Vertiv reveals lack of preparedness

Just 29% of data centre decision-makers say their current facilities are meeting their needs, and just 6% say their data centres are updated ahead of their needs. These are among the findings included in a new report from Forbes Insights and Vertiv.

The modern data centre: How it is adapting to new technologies and hyperconnectivity examines the results of a survey of 150 data centre executives and engineers from various industries around the world.

The survey results indicate a troubling lack of planning and preparation for today's evolving data ecosystem. A closer examination of the results reveals a stark contrast between executives and engineers: 11% of executives say their data centres are updated ahead of current needs while just 1% of engineers say the same.

"As today's data centre evolves to incorporate enterprise, cloud and edge resources, thorough planning and foresight is needed to meet organisational computing requirements and business objectives," said Martin Olsen, vice president of Global Edge Systems for Vertiv.

"It is clear, however, that many organisations are lagging on that front. With that in mind, we anticipate considerable investment and activity among businesses trying to catch up and get ahead of the changes."

Dell offloads cybersecurity firm RSA to consortium of investors for $2 bn

A consortium led by Symphony Technology Group (STG), Ontario Teachers' Pension Plan Board (Ontario Teachers') and AlpInvest Partners has entered into a definitive agreement with Dell Technologies to acquire RSA in an all-cash transaction for $2.075 billion, subject to certain adjustments.

The transaction, which includes the purchase of RSA Archer, RSA NetWitness Platform, RSA SecurID, RSA Fraud and Risk Intelligence and RSA Conference, is expected to close in the next six to nine months.

CISCO APPOINTS DAVID MEADS AS NEW UK & IRELAND CHIEF EXECUTIVE

Cisco has announced the appointment of David Meads to lead its UK & Ireland business. Meads, who recently led the partner organisation for Cisco in Europe, Middle East, Africa and Russia (EMEAR) will take on the role with immediate effect.

Google moves UK data to US amid worries UK government will fail to reach data deal with EU

Google is making some big changes to where it stores the data of its UK users, with the firm notifying users through an update to its terms and conditions. While UK data has been stored with the data of other EU countries, post-Brexit, Google now has plans to shift that data over to the US.

Some are worried that Google shifting UK data could mean a decrease in privacy protection, although Google denies this. It asserts that UK users will have their data processed in exactly the same way as they're used to.

You may be left wondering why Google feels the need to move the data at all. Well, it turns out Google may be worried that the UK will fail to reach a data equivalency deal with the European Union at the end of the Brexit transition period.

Google is asking users to accept the new terms before March 31, so no data has been moved as of yet, but after that date UK users will have their data stored over in the US.

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MICROSOFT, GOOGLE, ALIBABA EAT INTO AWS' MARKET SHARE IN Q4 2019

In Q4 2018, it was estimated that Amazon took the lion's share of cloud spending globally, with the firm commanding a market share of 33.4%. Microsoft followed in a distant second place at 14.9%, while Google and Alibaba both enjoyed less than 5% of the pie. In Q4 2019, Microsoft managed to significantly cut into Amazon's lead, with the firm now holding 17.6% of all global cloud spending, likely helped by things such as the Pentagon's JEDI contract.

Fortunately for Amazon, it only lost 1% market share over the year period, dropping from 33.4% to 32.4%, meaning most of the share gains by Microsoft, Google and Alibaba largely came at the expense of smaller cloud operators. Also, despite its dip in market share, the firm enjoyed a nice boost in actual revenue, bringing in 9.8 billion compared to 7.3 billion in Q4 2018.

UK fails to make top 10 list for most cyber secure country in Europe

The UK government may invest heavily in cybersecurity, having formed the National Cyber Security Centre in 2016, but that doesn't mean we're more secure than many other countries in Europe. In fact, according to a report by Specops Software, the UK failed to make the top 10.

The United Kingdom in fact ranks 17th, due to its high number of cloud attack encounters in comparison to other European countries. The Netherlands is cited to be the most vulnerable European country, with the highest rate of cybercrime. This could be due to the large number of cloud provider incoming attacks (16.28%) to Microsoft Azure accounts across the country.

Amsterdam set to knock London off its tech hub pedestal

Already ranked number four in the world by Savills in its 2019 *Best Tech Cities* report, the ecosystem in Amsterdam is continuing to grow, and the sky is the limit according to Tom Brookshaw, who recently joined data, technology and analytics recruiter, KDR Recruitment, as principal consultant for The Netherlands.

"There are huge opportunities for creative and intelligent people to quickly carve a great career in data science in Amsterdam," he said. "Jobs in the tech sector in Amsterdam are increasing at a rate of 12% each year, which is hugely exciting."

And it isn't just start-ups that are flourishing in the capital of The Netherlands. Huge global names, such as Netflix, Uber and Google have recently moved into the city.

"Brexit is definitely having an impact with these large organisations considering the need for a European base outside the UK," explained Tom. "But other factors are important too, such as the ease of relocating to Amsterdam, fantastic transport links and a population that has an almost universal ability to speak English."

Salaries in Amsterdam are also attractive. The average annual salary for a Data Scientist in Amsterdam is around €69,000, which in Europe is second only to Switzerland.

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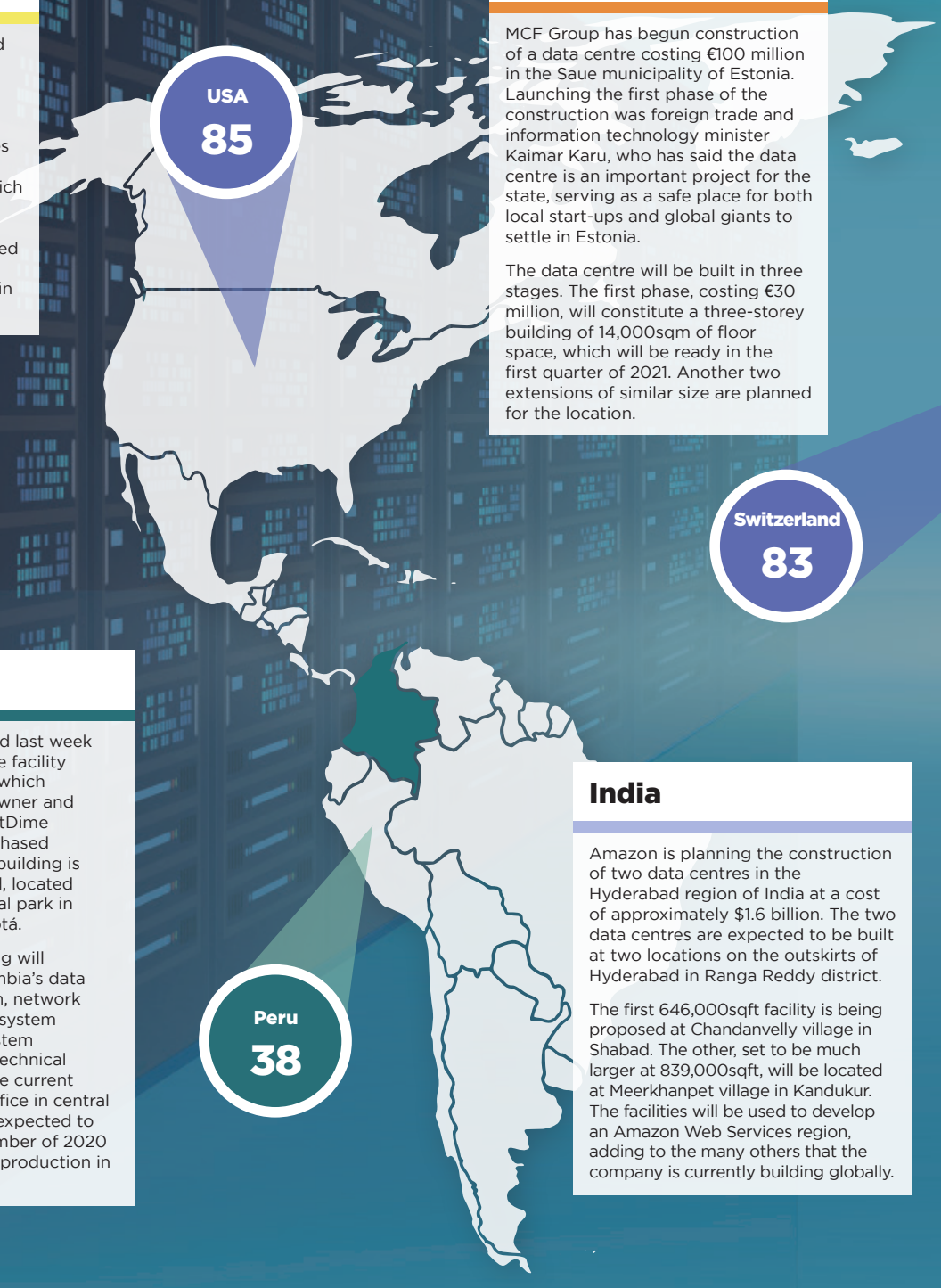
DCR World

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

Germany

Vantage Data Centers has unveiled its expansion into Europe through the acquisition of Etix Everywhere and greenfield developments in four additional European markets. Etix's data centre portfolio includes a 55MW hyperscale data centre campus in Frankfurt, Germany, which is currently under construction. But Vantage isn't stopping there, separately the company has secured land and is planning to develop hyperscale data centre campuses in Berlin, Milan, Warsaw and Zurich.



Estonia

MCF Group has begun construction of a data centre costing €100 million in the Saue municipality of Estonia. Launching the first phase of the construction was foreign trade and information technology minister Kaimar Karu, who has said the data centre is an important project for the state, serving as a safe place for both local start-ups and global giants to settle in Estonia.

The data centre will be built in three stages. The first phase, costing €30 million, will constitute a three-storey building of 14,000sqm of floor space, which will be ready in the first quarter of 2021. Another two extensions of similar size are planned for the location.

Columbia

HostDime broke ground last week on its latest data centre facility in Bogotá Clombia, of which the company is both owner and developer. In 2017, HostDime announced that it purchased the land on which the building is now being constructed, located in an enclosed industrial park in Tocancipá, North Bogotá.

The 65,000sqft building will house HostDime Colombia's data centre operations team, network engineers, build team, system administrators, and system engineers. Other non-technical teams will remain at the current HostDime Colombia office in central Bogotá. The facility is expected to be completed in December of 2020 and commissioned for production in early 2021.

India

Amazon is planning the construction of two data centres in the Hyderabad region of India at a cost of approximately $1.6 billion. The two data centres are expected to be built at two locations on the outskirts of Hyderabad in Ranga Reddy district.

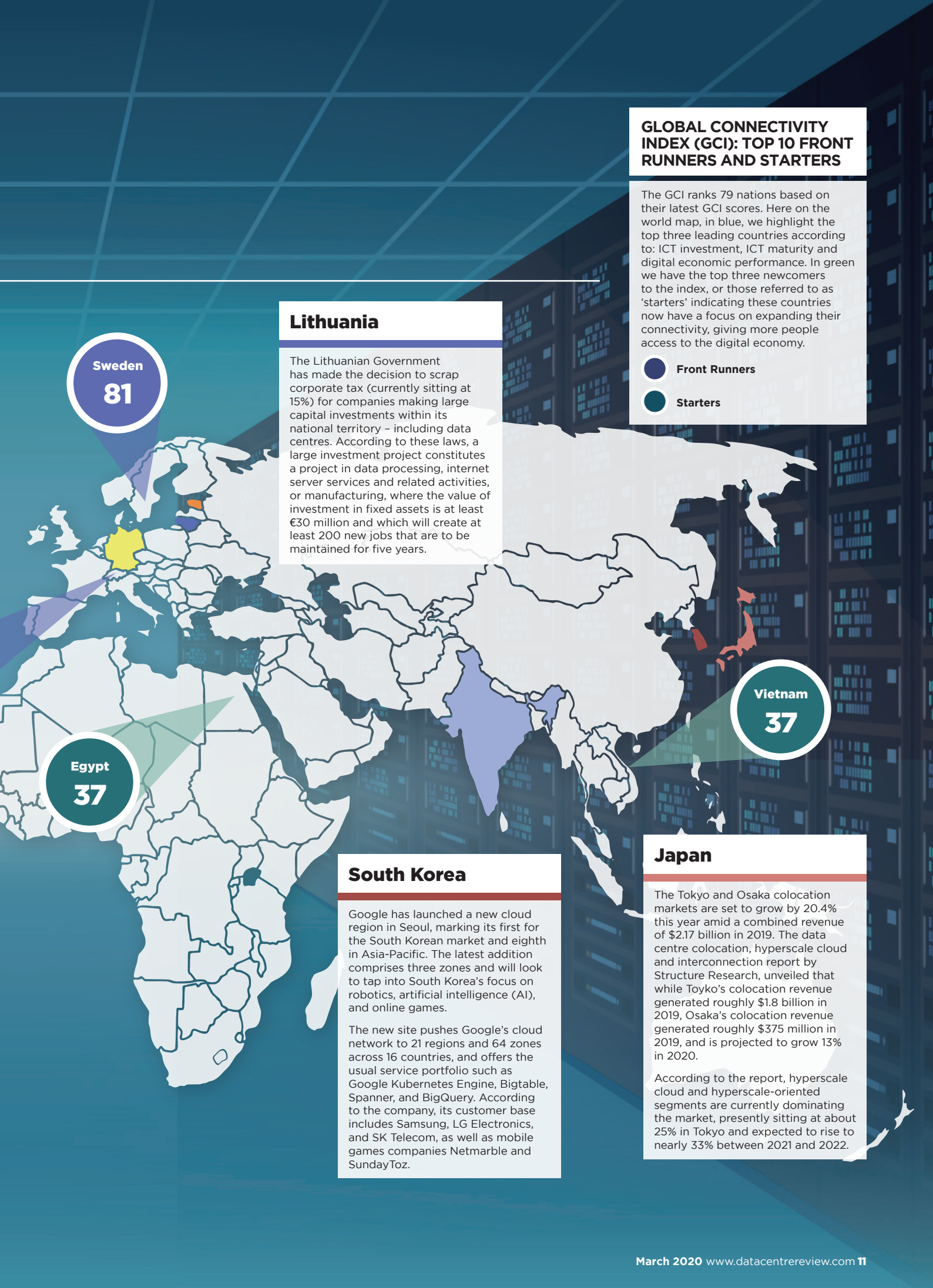
The first 646,000sqft facility is being proposed at Chandanvelly village in Shabad. The other, set to be much larger at 839,000sqft, will be located at Meerkhanpet village in Kandukur. The facilities will be used to develop an Amazon Web Services region, adding to the many others that the company is currently building globally.

GLOBAL CONNECTIVITY INDEX (GCI): TOP 10 FRONT RUNNERS AND STARTERS

The GCI ranks 79 nations based on their latest GCI scores. Here on the world map, in blue, we highlight the top three leading countries according to: ICT investment, ICT maturity and digital economic performance. In green we have the top three newcomers to the index, or those referred to as 'starters' indicating these countries now have a focus on expanding their connectivity, giving more people access to the digital economy.

Front Runners

Starters



Lithuania

The Lithuanian Government has made the decision to scrap corporate tax (currently sitting at 15%) for companies making large capital investments within its national territory – including data centres. According to these laws, a large investment project constitutes a project in data processing, internet server services and related activities, or manufacturing, where the value of investment in fixed assets is at least €30 million and which will create at least 200 new jobs that are to be maintained for five years.

South Korea

Google has launched a new cloud region in Seoul, marking its first for the South Korean market and eighth in Asia-Pacific. The latest addition comprises three zones and will look to tap into South Korea's focus on robotics, artificial intelligence (AI), and online games.

The new site pushes Google's cloud network to 21 regions and 64 zones across 16 countries, and offers the usual service portfolio such as Google Kubernetes Engine, Bigtable, Spanner, and BigQuery. According to the company, its customer base includes Samsung, LG Electronics, and SK Telecom, as well as mobile games companies Netmarble and SundayToz.

Japan

The Tokyo and Osaka colocation markets are set to grow by 20.4% this year amid a combined revenue of $2.17 billion in 2019. The data centre colocation, hyperscale cloud and interconnection report by Structure Research, unveiled that while Toyko's colocation revenue generated roughly $1.8 billion in 2019, Osaka's colocation revenue generated roughly $375 million in 2019, and is projected to grow 13% in 2020.

According to the report, hyperscale cloud and hyperscale-oriented segments are currently dominating the market, presently sitting at about 25% in Tokyo and expected to rise to nearly 33% between 2021 and 2022.

To UPS hire or not to UPS hire?

Adem Kemal BEng (Hons) MSc MIET, service director at Levant UPS Ltd, explores the benefits (and pitfalls) of hiring your UPS equipment.

As demand for global round the clock IT services increases in the form of multi-billion-pound web-based businesses, so does our reliance on uninterrupted power in order to access these services 24-7 from anywhere in the world.

With changing customer demand and unwillingness to commit to high capital expenditure during these turbulent economic times, UPS hire is becoming an increasingly popular choice for those clients who are wanting to exploit the flexibility and non-committal aspect of leasing UPS systems, either on a short or long-term basis.

UPS failures, whilst less common on reliable well-maintained equipment, can and do occur. As with anything else in life, the likelihood is greatly increased with age. For those clients who need immediate access to reliable power protection systems whilst they assess their requirements for either repair or replacement of the failed equipment, a hire UPS makes perfect sense.

Costly repairs of ageing equipment can often lead to a waste of resources, whilst valuable time to assess the requirements and needs for future equipment can ensure that the wrong decision is not taken when

“How many times have you seen a site running a high capacity UPS on as little as 5% load?

selecting the appropriate replacement machines. All diligent companies will understand that their UPS choice is one of the most important decisions that they will ever make when it comes to guaranteeing and protecting the seamless operation of their business-critical processes.

As with most other aspects of any business, the majority of corporate decisions come down to cost versus necessity. Of course, cost cannot just be evaluated in terms of initial outlay, but also in terms of the cost to the business should equipment failure occur and the potential for this to disrupt business activities. The ability to hire a self-contained complete UPS setup means minimum downtime during connection and commissioning, versus the high costs of complicated repairs with no guarantee of a first-time fix on the stricken UPS. Or even worse, a loss of customer confidence in your company.

In recent years, we have seen the widespread and damaging effects of catastrophic failure of IT infrastructure such as that experienced by British Airways and TSB bank. In both cases, severe damage was caused to the brand, not to mention the loss of revenue and huge fines imposed by industry regulators. In the case of BA, the outage was estimated to cost the airline £58 million in passenger compensation claims alone. Whilst TSB has revealed that their massive IT failure cost the bank £330 million, with 80,000 customers switching their account to a competitor. Both cases highlight the ramifications of critical equipment downtime to a heavily IT dependent business.

Furthermore, hiring your UPS means that you are able to operate your power protection system according to market demand. How many times have you seen a site running a high capacity UPS on as little as 5% load? This signifies a vast waste of capital as predicated future expansion can often fail to materialise in quite the way that earlier business predictions may have indicated. Running such large capacity machines on little load is extremely inefficient and having the option to off-hire such a system and replace it with a smaller machine is particularly advantageous. The ability to expand and contract with market conditions is a huge benefit of hiring your UPS system, with extremely low capital expenditure costs in order to do so.

Whilst hiring a UPS has many advantages, there are of course several factors to consider in choosing a suitable vendor. Selecting a supplier with a proven brand of UPS and extensive experience of connecting their hire sets into pre-existing electrical networks (which are unlikely to have given any prior design consideration to this eventuality) is crucial. A competent vendor will be able to identify a suitable point of entry into your existing on-site distribution network with little or no negative impact. The provider should demonstrate that they are able to understand in detail your business requirements and how you require the equipment to perform. This may be in the form of output voltage, frequency, battery autonomy or any other relevant factors.

A good hire company will offer a comprehensive witness testing procedure for your engineering management and consultants, to prove correct and adequate operation of the hire system under simulated load bank tests with mains failure.

The pitfalls of UPS hire mainly centre on clients being able to identify a specific set of criteria for which they want the UPS to conform to. In some instances, non-technical individuals are assigned to source a hire provision, only to be completely out of their depth in ensuring with the provider that the equipment can operate as needed on-site. This can be mitigated with effective communication, cooperation between the provider and client and a conscientious approach by the installer to ensuring that all relevant matters are discussed before any equipment is delivered to site.

While hire UPS systems have long been the choice of clients looking to bridge downtime created by failure of their own UPS assets, many clients are now looking to hire UPS systems with a long-term lease approach which affords them flexibility, low capital outlay and peace of mind to mould their power protection system according to their business needs. This reduces the need to make far-off predictions about future capacity and the potential waste of funds should these expectations not be realised further down the line.

The chink in your uninterruptible armour

Andrew Skelton, operations director at Centiel UK Ltd highlights why your UPS is only as good at your batteries.

When the mains fail, the only thing protecting the critical load is your UPS and your batteries. This is really the only time you will find out if your batteries are up to the job. The consequences of battery failure in this scenario are far reaching, resulting in disruption and damaged reputations. For some organisations in the financial sector it may mean fines, for medical facilities power failure can be literally life or death.

Therefore, it is essential that VRLA batteries are properly commissioned and maintained correctly. Normally, VRLA batteries have a design life of either three to five years or 10-12 years. However, in reality, this can be a lot less even if they are maintained properly.

Regular maintenance and service visits for a UPS include a visual check of the batteries and this inspection is essential. Maintenance staff are looking out for any signs of corrosion, swelling of the blocks and any indication of leaking or other damage. However, they can't see inside a battery with a visual inspection.

Impedance testing once per year is therefore important. Here an AC current is applied to each battery and the internal impedance measured and recorded. This tests each VRLA block and provides a good indication of the general overall state of the batteries.

However, impedance testing doesn't show how long batteries will last. Even if an impedance test was satisfactory, the application of a real load can result in batteries collapsing quickly if there are issues.

For this reason, best practice is to have two maintenance visits per year and to carry out an impedance test to assess the overall health of the batteries during the first visit, and a full discharge test during the second visit.

The discharge test enables assessment of the batteries against a replicated load e.g. temporary load bank. The critical load will need to be transferred to bypass during the assessment, with results showing precisely how the batteries will perform and for how long. Discharge testing in this way also tests the overall installation, batteries, cables and all connections to ensure they are working properly.

Most facilities will conduct a full discharge test during the initial installation of the UPS system. The challenge is that less than 5% of organisations then go on to commission a regular annual discharge test of their batteries. This may be because of the additional maintenance costs involved, however, the consequences of finding out too late that batteries will not support your critical load in an emergency for the required run-time, may cost far more.

Some people may be concerned that discharging batteries may reduce their cycling ability. However, VRLA batteries are designed for approximately 500 cycles, so an annual discharge under test conditions will have little to no effect on their performance.

Switching the critical load to bypass on raw mains for the period of the test, does however carry a small risk and this disruption is often met unfavourably with organisations. Although, again, compare this small risk with the much greater risk of the UPS not being fully functional in an emergency. To mitigate the small risk, you can secure grid onto your building generator or a temporary hire generator, which can pick up the load if there is a mains power cut during the test.

Carrying out both an impedance and discharge test on batteries each year provides detailed information so organisations can 'know their batteries'. Deterioration can be monitored over time, and you would expect to see a small deterioration each year over the life of your batteries. This information helps organisations make informed decisions about the timing of replacements. Having a clear picture of battery health in this way can ensure action taken to optimise functionality and minimise risk of failure.

There is always a small risk associated with any maintenance of a UPS system. However, the risk of the UPS and batteries not performing properly because they have not been tested thoroughly far outweighs this. Your UPS is only as good as your batteries: get them checked on a regular basis. Your power depends on it!

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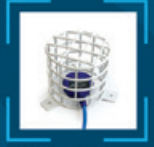
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The smart way to unlock data centre power

Data centre operators will cut costs and enhance system resilience if they ditch their doubts about demand side response, says Riello UPS managing director **Leo Craig.**

Much of the recent focus on 5G has fallen on the fierce debate about the involvement (or not) of Huawei in upgrading the UK's wireless telecoms network.

But there are real questions for us in the data centre sector to consider too. The rollout of 5G places huge pressure to provide the promised low latency processing. And all that processing comes at a great cost – power.

Reading a recent report from the Uptime Institute, it staggered me to learn that every time footballer Cristiano Ronaldo (or more likely his PR reps) post on Instagram, his 200 million-plus followers consume 30 megawatt hours of energy just to view it.

Data centres are already some of the world's biggest energy users. Industry body TechUK claims if you combine commercial and in-house data centres, they account for 2% of all UK electricity use.

The biggest facilities have annual energy bills of £3 million a year and consume the equivalent power of 300,000 homes, roughly the populations of Leicester, Sunderland or Belfast.

Winds of change

This all comes at a time where our electricity network is going through huge changes. Last year saw more UK electricity generated from zero-carbon sources (48.5%) than fossil fuels (43%) for the first time.

Our growing reliance on renewables such as wind and solar, which by nature are more unpredictable than coal or gas, poses major challenges for National Grid. Namely balancing supply with demand and ensuring a stable grid frequency.

It is turning to smart grids, energy storage and mechanisms such as demand side response (DSR) as the answer. The latter incentivises customers to store power and shift their energy use from busy to off-peak periods.

It rewards participants with reduced grid tariffs and energy bills, as well as offering opportunities to sell surplus electricity back into the grid.

Data centres appear an ideal candidate for DSR. They have sizeable battery-based uninterruptible power supplies providing the perfect tool – on paper – to store energy and feed it back into the grid.

But so far operators have been somewhat reluctant to take the plunge. In an industry where downtime and even the slightest service interruption can cost thousands or even millions of pounds, it's understandable that they're unwilling to use their expensive UPS and batteries – their de facto last line of defence – for anything else.

Operators see it as a big risk that isn't worth the reward. But is that argument true anymore?

The Master+ model

We're working alongside RWE Supply & Trading, the energy trading arm of Germany's largest electricity supplier RWE, on a pilot project that transforms a reactive data centre UPS into a proactive 'virtual power plant' that can participate in DSR whilst at the same time enhancing, rather than undermining, system resilience.

It involves one of our Master+ units fitted with a special rectifier that enables power to flow both from and to the grid.

The smart grid-ready UPS is backed with premium lead-acid or

lithium-ion batteries. It's also equipped with RWE's dedicated monitoring and communications software, which allow for real-time condition analysis and two-way interaction with the grid.

Battery capacity is split into two distinct roles. To start, there's a section purely providing the standard UPS safety net of emergency backup power in the event of a mains failure. The remaining 'commercial' batteries feed stored electricity into the Firm Frequency Response DSR scheme, which helps maintain grid frequency within the safe range of 49.5-50.5 Hz.

If there's a power cut, any remaining energy in the 'commercial' batteries tops up the primary backup, offering users longer autonomy.

Rethinking the role of a UPS

Think back to the main stumbling block data centre operators have about DSR. Using a UPS's batteries adds an unacceptable layer of risk.

But it's difficult to monitor traditional sealed lead-acid batteries effectively unless you install hugely-expensive battery monitoring and management systems. Hand on heart, can you be 100% sure they'll work when you really need them?

With the Master+ model, the mandatory battery monitoring system alerts you when there's any deterioration. It identifies blocks that need replacing. So rather than undermining your resilience, it actually improves it.

There are other benefits for operators too. RWE Supply & Trading significantly subsidises the cost of the more expensive premium batteries, reducing the upfront investment. It also takes on the risk of trading on the energy market.

So far, tests at our two pilot sites – one at RWE's HQ in Essen, Germany, the other here in the UK – have proved positive. Based on a data centre with a 1 MW load and batteries providing 10 minutes autonomy plus a 1 MWh 'commercial' segment, installation costs are roughly a fifth lower than a standard UPS, thanks to the subsidised batteries.

While the monitoring software reduces ongoing maintenance costs compared against time-consuming manual servicing, these ongoing savings would add up to tens of thousands of pounds over the typical 10-15 year lifespan of a UPS.

Then depending on the data centre's location, operators could also save up to £6,000 per MW every year through reduced grid tariffs.

The August blackout: Sign of things to come?

Think back to the events of 9 August last year when lightning strikes saw two power stations go offline. The resulting loss of generation sent grid frequency tumbling, triggering load shedding that saw 1.1 million people cut off to save the rest of the electricity network.

Thankfully, the blackout was short-lived. Frequency returned to safe operating limits inside four minutes, with power fully-restored inside an hour.

One of the reasons for this was that National Grid deployed 1 GW of backup power to plug the shortfall in generation. Nearly half of this reserve capacity (472 MW) came from battery storage – around 200 MW from National Grid's own portfolio, with the remainder from various DSR contributors and aggregators.

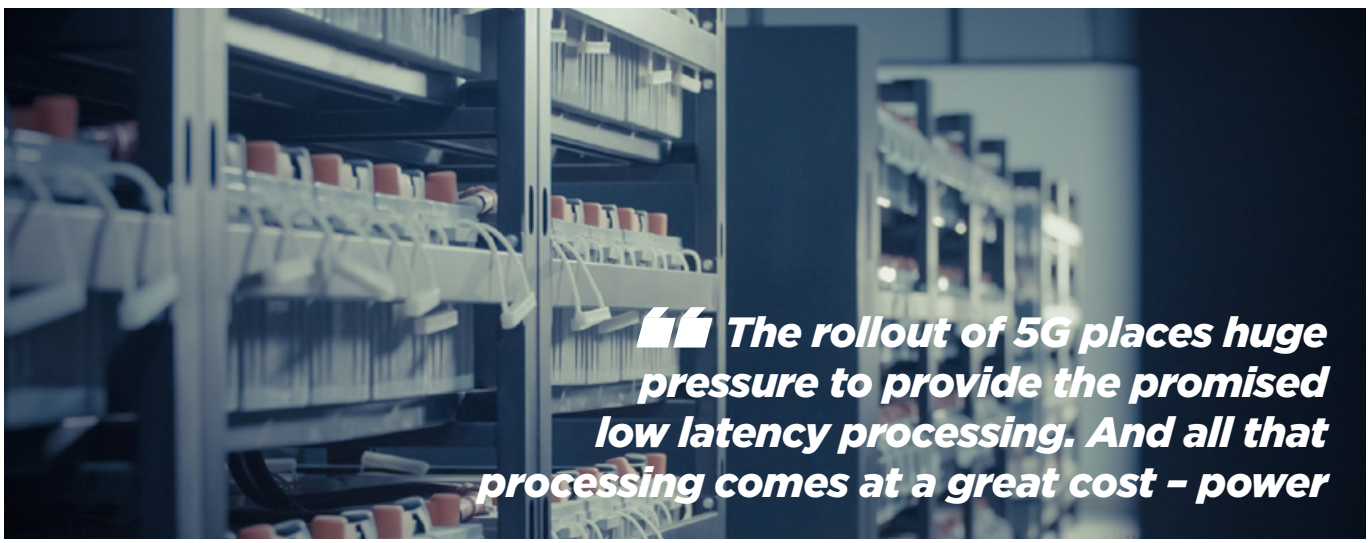
National Grid already spends around £170 million a year on frequency response contracts. One likely fallout from 9 August is that the system operator will significantly increase its reserve capacity to deal with similar incidents in the future.

As we transition towards a more distributed, renewables-led electricity system, battery storage and demand side response will play an increasingly important role in keeping the lights on. And with solutions such as the Master+ model now making energy storage not just feasible but advantageous for data centres, there's no excuse for operators to carry on sitting on the sidelines.

It's time to harness the true power of their UPS systems and batteries. They get the financial and performance gains while boosting the security of supply for society as a whole. Sounds like a smart move to us.

Riello UPS and RWE Supply & Trading will be explaining more about the Master+ smart grid-ready UPS concept during a special seminar at Data Centre World. Join them in the Facilities and Critical Equipment arena from 10:45-11:10 on Wednesday 11 March.

The Riello UPS team will be on-hand throughout DCW on stand D920 to discuss its entire range of uninterruptible power supplies and industry-leading maintenance support. This year's show includes the official UK launch of its extended Multi Power range of modular UPS.



It's gettin' hot in here

Following news that the 2010s were some of the hottest years on record, **Nick Osborne,** data centre specialist at Aggreko, explores how providing sufficient air conditioning equipment is a key measure to avoiding overheating and that dreaded downtime.

As global temperatures continue to rise and adverse weather conditions become more prevalent, controlling and mitigating the vast amount of heat that data centres produce is a more pressing issue than ever for the sector. With over 175 zettabytes of data predicted to be in existence by 2025, it is even more vital that existing and future data centres have the correct infrastructure in place to ensure heat generated by server racks and IT apparatus is balanced.

Cooling systems, both liquid and air-derived, are available to data centre providers to suit the requirements of facilities of all sizes and outputs. However, a survey by Science Direct found that 61% of data centres are running at low efficiency, particularly thanks to unsuitable cooling systems. With this in mind, it is vital that data centre providers understand the requirements of their facility and can benefit from the expertise of a specialist to select the best cooling solution.

Extreme heat causes downtime

Climate change is a contentious topic across all industries, not least the data centre sector. With the market predicted to account for a third of

"Sixty-one per cent of data centres are running at low efficiency, particularly thanks to unsuitable cooling systems

global electricity consumption, as well as 3.2% of worldwide carbon emissions by 2025, the growth of the data centre industry threatens further climate change and ensuing effects on weather and temperature.

High temperatures and humidity that could become commonplace in the future are conditions that spell disaster for data centres. Equipment in these facilities produce vast amounts of heat as it stands, and, with elevated temperatures from extreme weather patterns, the risk of overheating becomes higher than ever.

The large amounts of heat generated by server racks and IT apparatus have been a long-standing concern for companies across many industries. With worldwide spending on data centres hitting $93 billion in 2019 according to Synergy Research Group, it is no surprise that stakeholders want to prevent downtime and the ensuing costs that come from it.

As technological advancement drives further implementation of innovations, such as edge computing, artificial intelligence and IoT, new hardware to satisfy the higher demand of the data centre will produce even larger amounts of heat. Companies investing in advanced technologies to enhance their offering means not only will data centre providers need to construct more facilities, but will also need to more carefully consider how they will cool equipment with more advanced hardware.

The rises in temperature caused by by-product heat within a facility can affect infrastructure performance and lead to potential disruption and plant failure – consequences data centres and businesses reliant on server rooms are keen to avoid. Therefore, it is of paramount importance that IT professionals and data centre managers carefully consider whether their existing cooling equipment is suitable for their business' needs.

Keeping cool

When it comes to removing heat in data centres, the two most common methods currently in use are air or water-cooled systems. As higher temperatures begin to put data centres of all sizes at risk of overheating, it is vital that providers select the correct solution for satisfying the requirements of their facility.

An air-cooled system delivers cold air into the data centre or server room, extracting warm air from the room, mixing both to eliminate hot spots. This approach is most applicable for data centres and facilities with comparatively smaller power load densities, where the power load required for the mixing process is a small fraction of the facility's total power load. Where this is not the case, the system's efficiency declines. Instead of balancing the temperature of the room, a water-cooled system transfers chilled water to exactly where it is required – the server racks and computer banks. This targeted approach is more efficient for companies operating larger data centres or server rooms.

Though cooling systems of these types are usually installed as a permanent fixture within a data centre, temporary rental of cooling solutions may also need to be employed with extreme hot weather patterns occurring more frequently than ever. With data centres already using more and more power than ever before and the resulting impact on the environment a key industry concern, temporary solutions will alleviate the effects of a sudden heat wave without permanently using large amounts of power across a facility's lifespan.

Within a data centre that uses free cooling, a system where cool air is supplied directly from the outside in cold weather locations, such temporary solutions, may be required in unusually warm conditions that may

suddenly occur. As a contingency strategy, the implementation of chiller stab points within the cooling system allows for pre-existing access points for temporary chilling solutions to be quickly installed, ensuring downtime is kept to a minimum.

It must be noted that no two sites are the same, and may be subject to a wide array of changing variables such as temperature, humidity levels and available space. So, before selecting air conditioning and cooling equipment, a site survey should be carried out to clarify the site's power and temperature requirements, and what environmental factors need to be considered.

> ***"With worldwide spending on data centres hitting $93bn in 2019, it is no surprise stakeholders want to prevent downtime and the ensuing costs that come from it***

Finding the right solution

Specifying the right temperature control system can be a highly technical task, usually requiring an expert in heating, ventilation and air conditioning to develop a bespoke plan. With this in mind, it is advisable companies use a third party to carry out this service.

Whether it is a long-term solution for temperature control, or a short-term hire of a system to alleviate the effects of sudden heatwaves or extreme weather fronts, choosing the right cooling equipment for a data centre is vital to avoiding downtime and added cost. Being sure of the facility's demand, the weather patterns in its location and, crucially, consulting an expert of data centre temperature control will ensure such issues do not occur.

Don't screw up at the edge

Iceotope director **David Craig** shines a light on the failings of traditional cooling technologies, and highlights the methods best equipped to handle modern-day cooling requirements at the edge.

The challenges facing edge computing, AI and edge-AI are pervasive once you start to deploy processing and storage capacity outside the data centre, and into non-dedicated environments in close proximity to the point of use.

Challenges including the dense heat loads generated by GPUs to drive emerging applications, power availability and energy consumption, physical security and tamper risks, reliability and resilience in harsh IT environments, and maintenance outside the data centre, are just some of the obstacles that enterprises will need to overcome to deliver real-time value at the edge.

It isn't a simple case of taking what currently works well in the data centre, tweaking it and packaging it up as an edge computing solution. Pushing traditional technologies, such as air cooling, from the data centre to the edge might seem convenient in the short-term, but it may not be effective in the medium-term and could prove to be a big and expensive mistake in the long-term.

The problem with traditional technologies

Traditional air cooling has served the industry well but pushing it to the edge is non-trivial. Once you take energy efficient IT out of the controlled data centre environment that provisions it, you not only lose control, you also lose efficiency. What's more, your once enviable data centre PUE shoots through the roof as inefficiency is a major cause of wasted energy. To compound the problem, the lack of three-phase power supply is already causing concern at the edge.

Fans and moving parts are critical to cooling electronics with air, but are also failure points which need regular servicing and maintenance. The in-chassis vents and holes which enable airflow to remove heat, also expose the IT load to environmental contaminants – and people. Bearing in mind that people will be people and if an error can be made it almost certainly will be. So, you now have a security, resilience, energy and cooling problem at the edge.

Warm water cold plates and similar devices can partially solve the problem of increasing chip densities. However, they still require air cooling to deal with the heat they do not recover – often up to 40%. The new hotter and denser chip technologies which are on the horizon today will impair the effectiveness of these cooling techniques even further.

To overcome these obstacles and enable the edge to deliver its full promise, we need to move on from the legacy mindset which says whatever works now will continue to work in the future. We need to implement new solutions that are edge smart and fit for purpose; technologies that can be deployed resiliently, securely and responsibly. Technology that will deliver the real value the edge offers and not the nightmare of mismanaged implementation.

The answer is chassis-level liquid cooling

Chassis-level liquid cooling combines the pros of both cold plate and immersion liquid cooling and removes the cons of both technologies. Chassis-level liquid cooling uniquely allows your compute to be deployed to the edge in a sealed and safe environment which makes it impervious to heat, dust and humidity, while endowing it with a high degree of "human error resilience" – or "idiot proofing", as more seasoned veterans might wish to define it!

A sealed and silent chassis allows edge IT to be delivered in latency-busting proximity to the point of need with class-leading energy performance from day one. By reducing single points of failure and increasing resilience, chassis-level liquid cooling technologies significantly reduce the cost and risk of servicing and maintenance at the edge.

It is beyond doubt that new and emerging applications will play a major role in advancing our home and business lives. The heart of this is not just the way that next generation microprocessors and software are designed, but also the way that physical infrastructure such as chassis-level liquid cooling is utilised to ensure the scalability, reliability and efficiency of IT services for always-on users.

We can all enjoy the competitive advantages and real-time value that AI and other amazing technologies can deliver at the edge, but we need to do it in a way that keeps our planet safe and our data secure. The future is beckoning; don't screw it up at the edge.

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The roaring twenties

Darren Watkins, managing director at Virtus Data Centres explores why colocation is going to win big over the next decade.

It appears that the demise of colocation may have been greatly exaggerated. While some anticipated colocation would lose out to cheaper cloud computing solutions, analysts are now universally predicting its continued growth into the next decade, thanks to ongoing digital disruption and the leveraging of artificial intelligence (AI) and machine learning.

Organisations have found that by moving on-site IT infrastructure to a colocation provider, they can reduce costs, scale up or down, benefit from more uptime and mitigate security and compliance risks – all without any detrimental effect on performance. And today's high-speed network connections between a company's premises and their data centre ensures rapid access to servers and storage, just as if they were installed on their own site.

Powering budget and growth

On-site servers can be one of the biggest money drains for a business. From employing expert data centre managers and staff, to powering servers and ensuring they're kept at a steady temperature, on-site data centres demand plenty of budget – often preventing organisations from investing in other growth areas.

By colocating infrastructure in an external data centre, businesses can circumnavigate many of these costs while retaining the resources they need to grow. It can help businesses free up physical space for more people, more storage or more facilities, enabling organisations to save on the costs of expanding to new premises – as well as enjoying all of the additional benefits that come from moving their IT infrastructure off-site.

Colocation also offers the high-grade infrastructure needed by the diverse industries that use high density computing. For example, the cloud environment used by companies in the media industry must be able to cope with ultra-high-density applications, which media companies need for digital rendering due to the high compute power needed to layer visual and audio files. The necessary power and associated cooling for the IT hardware to support such applications just isn't reliably available in today's office buildings – and that's where colocation comes in.

Ensuring reliability, uptime and optimum data security

Reliability has always been one of the biggest arguments in the build vs. buy debate. Businesses rely on critical applications and core software

systems in order to operate at peak performance. But – it's not as simple as is appears. Power outages happen, UPS backups run dry, servers can fail, and your technicians may fall victim to human error. However, by colocating to a shared data centre, companies benefit from a professionally managed environment and an expert team whose job it is to keep facilities up and running.

Maximising environmental benefits

Data centres require a tremendous amount of energy that can be harmful to the environment. Data centres in the US alone are projected to consume approximately 73 billion kWh in 2020 – and efficiency and sustainability is a universal challenge that transcends companies, geographies, and workloads.

But, as well as cutting down the number of individual data centres, organisations that embrace colocation providers also benefit from their commitment to continued innovation in this arena. In today's climate, it's crucial for colocation providers – both as individual businesses and a collective industry – to continue to work towards environmental sustainability.

Colocation in a cloud-based industry

When it comes to threats to colocation, there is no question that the rapid growth of cloud is shaking up the industry. But, despite existing misconceptions, the cloud and colocation offerings available today exist in a topology that can be modelled to suit any corporate business objective, including rapid growth, consolidation, simplification, mobilisation or cost reduction.

However, to remain competitive, traditional colocation providers must ensure that their data centres are capable of delivering not only first-class colocation services with flexible contract options, but also offer their customers a clear on-ramp to cloud.

Businesses use public clouds for access to huge amounts of data and massive compute capability, for on-demand computing when needed, or simply for storage. However, organisations still maintain their own private clouds as a way of processing and adding value to their own sensitive data that they collect and to handle complex computations. This is the hybrid world that is the de facto standard, and is something the industry must continue to learn to cope with.

Colocation clearly offers compelling advantages in terms of IT management and business continuity. However, colocation companies can't be complacent – they will need to adapt to emerging technologies such as network functions, virtualisation, software defined networks and Platform-as-a-Service (PaaS) if they are to continue to support the scale and functionality needed by modern and growing businesses.

> ***"By colocating to a shared data centre, companies benefit from a professionally managed environment and an expert team whose job it is to keep facilities up and running***

Best of both worlds

Justin Jenkins, CEO at Next Generation Data, discusses why colocation certainly has not had its day and why it doesn't have to be a case of either or when it comes to colocation and the cloud.

Heading into the new decade, it would be easy to assume that colocation's days are numbered: an industry born over 30 years ago is finally being usurped by the cloud. There again, it's often dangerous to assume.

From what we are seeing, alongside our cloud provider hosting services and in line with market forecasts, nothing could be further from the truth. The signs are colocation can look forward to at least sustained demand for the foreseeable future. The reason: CIOs are now fathoming the enterprise workloads that do, and don't, fit in the cloud from a cost and complexity perspective.

Despite the cloud having a significant and growing role in future planning, analysts predict roughly half of all enterprise workloads will not go into it. Together, cloud and colo will therefore most probably evolve as the most compelling proposition for managing almost all enterprise data processing, storage and applications requirements. They're complementary solutions rather than head to head competitors.

With this, enterprise organisations will have to decide whether to continue investing in privately-owned data centres for non-cloud workloads, or outsource to colocation operators. For many, faced with ever decreasing IT planning windows and the escalating costs, risks and complexities involved in designing, building and managing their own facilities, colocation will be an obvious choice.

But this doesn't necessarily mean it will be an easy ride for colo providers. Times are changing, driven by the power and critical infrastruc-

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ture needed for supporting new technologies such as hybrid cloud, HPC and AI. There is a growing focus on levels of resilience, security, cooling, connectivity, as well as space, energy efficiency and compliance.

As the decade progresses, some operators will probably need to close or completely upgrade smaller or power strapped facilities. Others will build totally new ones from the ground up. Only larger ones, especially those located in lower cost areas where real estate is significantly cheaper, may be capable of the economies of scale necessary for delivering affordable and future-proofed solutions for larger workload requirements.

Reviewing the situation

Providers aren't the only ones needing to review the situation. CIOs of enterprise organisations considering a move to colocation today, or in the next few years, will need to look very carefully at potential providers and facilities.

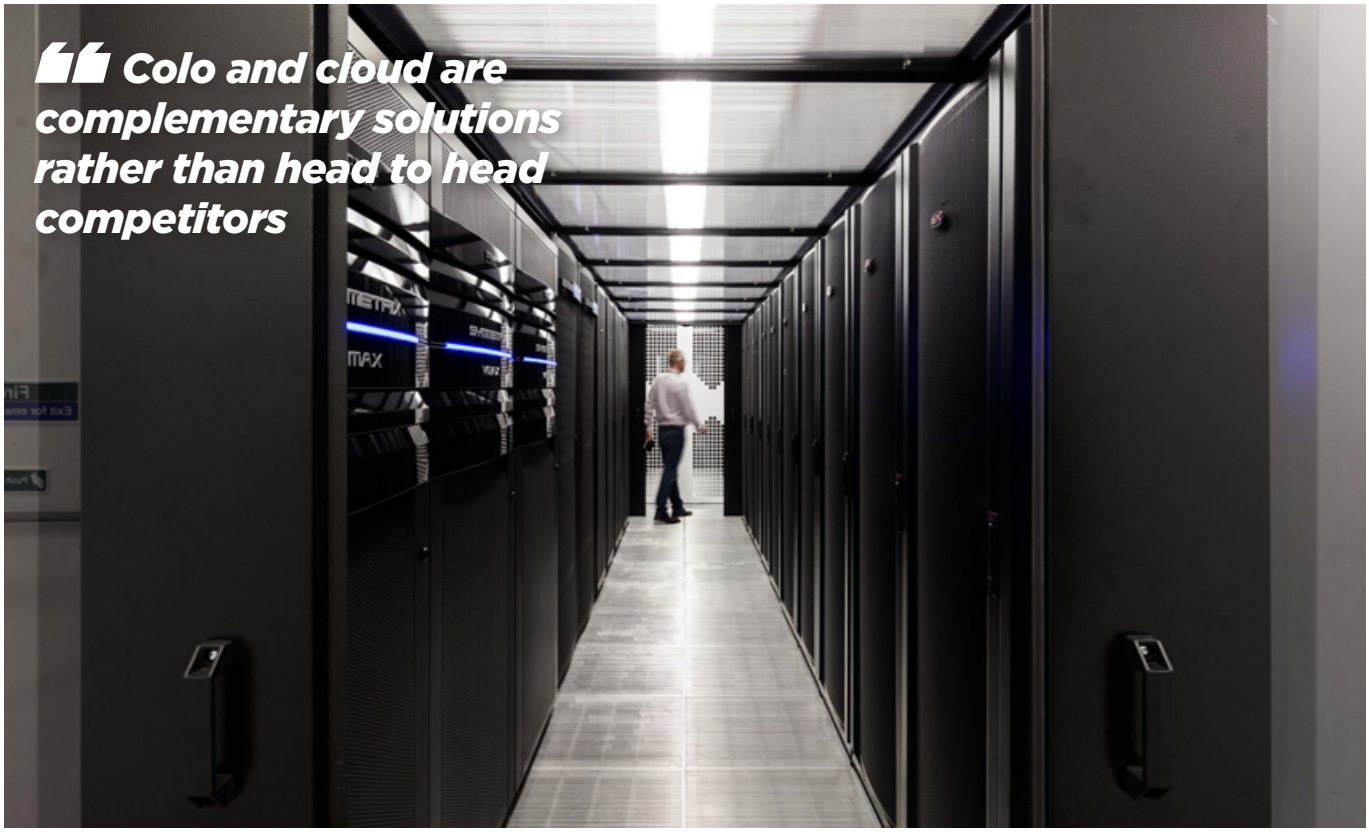
First and foremost, data centre power to space ratio will be increasingly critical. Converged, AI and HPC deployments, for example, are already driving up rack densities; 15-20kW is becoming more the norm, and we are now seeing densities rise to 40, 50, even up to 100kWs. This has called into question a facility's immediate and forwards power availability and ability to provide cooling solutions. But it varies considerably, as does available space and levels of M&E redundancy. So does security. While the latter is a combination of physical barriers, the operational regime and diligence of staff is also inextricably linked. There's also a huge variation in the thoroughness and regularity of relevant testing, planned preventative maintenance and reinvestment – from none at all through to excellent.

Levels of connectedness are a further priority. The best data centres are hyper-connected with a plethora of carrier and gateway options. The worst are isolated sheds with little connectivity. However, connectivity is often overlooked, leading to inconsistent performance, poor user experience and lack of security between public and private cloud environments, and any applications remaining outside of the cloud infrastructure.

Last but not least, data centre location remains an important factor. It's worth evaluating the environmental risk factors such as proximity to a flood plain, flight path, and terror threat level. Space and service pricing is also influenced by location due to the cost of real estate and labour. Out of town locations that are free from the risks and constraints of metro locations are likely to offer lower unit costs. Should an overseas facility be under consideration, geopolitical factors will also have a huge influence on the 'what ifs' and contingencies at a data centre.

Colo evaluation checklist

- Avoid cost being the overriding decision criteria: the data centre is critical to delivering the overall project and its actual cost is often relatively modest by comparison.
- Don't procure to a rigid specification: let the operator demonstrate how they run their facility instead.
- Space and power: ensure availability for meeting future expansion needs.
- Uptime: investigate any historical failures; request a written response on long-term history of service continuity and SLA conformance.
- Check how the critical plant has been invested, architected and operated: meet the people and decide if they have the right attitude and will be good to work with.
- Check the management reporting on service, capacity, utilisation, and compliance is done in a transparent fashion: a good third-party operator should give you more control and insights to manage the service than doing it yourself.



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End of an era

How will Windows 7 End-of-Life affect the data centre? **Daniel Goldberg,** senior security researcher at Guardicore Labs gives us his insight.

On 14 January, Windows Server 2008, Server 2008 R2 and Windows 7 were announced End-Of-Life (EoL). Put simply, this means that unless your organisation is one of a few exceptions – all the machines running the above-mentioned operating systems have now ceased to receive Microsoft security updates.

The next time an attacker finds a vulnerability affecting these operating systems, no security patch will be provided, and the machines will remain defenceless. Of course, many users will rightly upgrade their systems. But for many data centres, upgrading is not an option they can yet consider. In such cases, mitigating the danger from insecure software is a challenging yet mandatory task they must undertake.

The risks to data centres of continuing to run EoL versions long-term is hard to understate. Despite being more than a decade old, these operating systems are still in wide use. The majority of data centres run these operating systems in their production environments, with many assigned critical roles such as domain controllers. Ned Pyle, a Microsoft principal PM, estimates that Windows Server 2008 and 2008 R2 make up nearly a third of all server machines worldwide.

In the short-term, it is unlikely anything drastic will happen to unsupported Windows Server machines. Most software vulnerabilities are not relevant to servers and existing defences will do the job. But the long tail risk is immense; the next BlueKeep, EternalBlue or other remote code execution vulnerabilities will inevitably be used to cut through data centre networks. All that will be required is a foothold inside an organisation and any vulnerable server will be quickly compromised. Such footholds are easy to acquire, as breaches in the UN (Microsoft Sharepoint), Travelex (PulseSecure VPN) and many others make clear.

If upgrading was easy, everyone would be doing it

It is enough to perform a couple of software upgrade cycles to find out that upgrading is never as simple as we wish. Just listing the reasons why this process is complicated could take longer than this article. Rather than giving up, there are a number of steps that can be taken to minimise the danger from new vulnerabilities. New vulnerabilities will be discovered and publicised, but the vast majority of vulnerabilities use the same few common attack vectors.

To start with, we encourage organisations to follow hardening best practices for Windows Server 2008 R2 and Windows 7. Microsoft regularly publishes such guidelines as part of the Microsoft Baseline Security Analyser.

First, wherever possible, disable SMBv1 and enable SMBv2 message signing. This will prevent many lateral movement attacks, including all attacks which use the EternalBlue family of vulnerabilities and many other attack techniques abusing NTLM relaying.

Second, change network authentication settings to block usage of obsolete and weak authentication methods such as NTLMv1 and LanMan. This will eliminate many token stealing attacks employed by popular offensive security tools such as Mimikatz.

Last, to help investigations of any future security incidents and reduce the risk of tampered logs, we recommend forwarding all event logs to a centralised and hardened server. These steps are not complicated to implement in most data centres and will significantly reduce your attack surface from many known attack vectors.

Assume breach and segment

An attacker having a foothold in your network is practically a given, so defences should not only be strong walls but also chokepoints, compartments and other defensive tactics. The strongest and simplest tool is segmentation, separating the network into logical pieces. Applying segmentation, organisations can reduce their network attack surface and lower their risk of being breached.

The classic example of segmentation is a DeMilitarized Zone (DMZ), although this is mostly obsolete in today's connected networks. A more practical example is blocking cross SMB traffic. While servers often communicate with each other, they typically do not use the SMB protocol for this purpose. Blocking it using endpoint firewalls eliminates the attack vector used by the NotPetya worm which nearly brought down Maersk as well as many other organisations.

> ***"Despite being more than a decade old, these operating systems are still in wide use***

Another good application of segmentation is limiting legacy systems' access to the internet. Most legacy system behaviour is well understood and whitelists for their network activity can be created. In such cases, alerting on deviations from whitelisted behaviour is an effective tool to detect compromise of legacy machines. The last point is worth emphasising: early detection of breaches and compromises is one of the primary advantages of segmentation.

Not just Windows

It's not just older Microsoft products within a data centre that present EoL risks. While the transition to web-based software has simplified the life of IT departments in endpoint systems, servers are just as problematic as they were in the past if not more so.

Oracle Database is a frequent culprit of compromise in many organisations, along with Red Hat Enterprise Linux and other old platforms. Routers, considered by many to be supported as long as they work, are frequent targets of high-end attackers and rarely receive software patches.

Get a shovel, dig defences

We cannot afford to get rid of all vulnerable legacy software, no matter how hard we try. Our only hope is creating moats around vulnerable systems and monitoring them for breaches. The latest end-of-life announcements from Microsoft will hopefully help spotlight such systems and help security professionals prioritise these systems for protection.

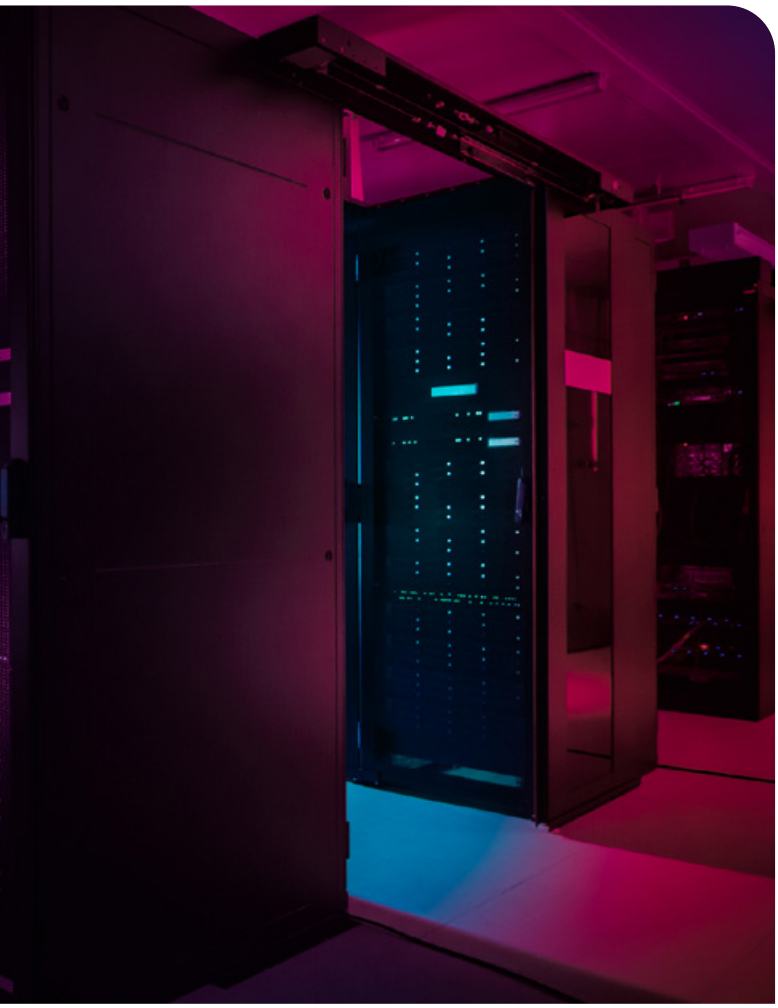
Data centres: The future of cyberwarfare

While cyber warfare may sound like something from a sci-fi film, it's very much a modern-day reality. **Liviu Arsene,** global cybersecurity researcher at Bitdefender outlines the dangers faced by data centres and highlights ways in which we can protect our assets.

In a world consumed by the power of data, cybersecurity is of paramount importance. As attackers become more sophisticated, they will increasingly seek to target data centres due to their importance in storing critical data, as well as the understanding that many of their predominant features can be controlled remotely. Failure to properly secure data centres, something that even large companies have issues with, places data centres at great risk of a breach

When these attacks are successful, one of the most sobering statistics is the cost to companies. Costs that span everything from detection and escalation, notification, post data breach response, and lost business. In fact, the average cost to a business in 2018, according to research sponsored by IBM and conducted by the Ponemon Institute, was $7.91 million.

What is even more alarming than the monetary cost of a data breach



is the amount of data that is at risk each time; on average 25,000 records are compromised every time a cyberattack is successful.

Data centres vs cyberwarfare

So how important will data centres be during an era of cyberwarfare? As the proliferation of IoT (Internet of Things) devices continues, an increasing number of important buildings and power stations management systems and sensors will feature IoT functionality.

The encouragement of such mainstream connectivity between devices has facilitated a rapid expansion of the attack surface, the likes of which the world has never seen before. This has unfortunately introduced unprecedented numbers of attacks, ranging from Distributed Denial of Service (DDoS), buffer-overflow, memory corruption and zero-day against industrial, commercial, military, and consumer systems and devices.

As cyberwarfare becomes a more common form of conflict, cloud infrastructures will undoubtedly be targeted and used to deliver threats or compromise data. It will be more important than ever to ensure that data centres are focused on addressing threat vectors revolving around unpatched vulnerabilities and misconfigurations that can spread across private, public, or hybrid infrastructures. Even something as simple as regularly updating security software will greatly reduce the risk from cyber-attacks.

Cyberwarfare is also an extremely relevant issue given the recent tensions between states, where many cybersecurity experts have warned that the physical conflict could encourage retaliatory attacks from groups of hackers.

With large corporations and important military buildings and bases undoubtedly the target of such attacks, it is certain that cloud infrastructures will likely fall under the "collateral damages" category as attackers will either use the cloud to their advantage or compromise cloud infrastructures belonging to select targets.

Protecting data centres

There are many ways to protect data centres; the same basic rules apply with most technology, with keeping security solutions updated at all times being key. However, with the increase in stacked technologies aimed at boosting productivity, performance, and scalability, the security needed to protect them has changed.

Legacy data centres relied on reducing systems to a single dimension, whereas virtualisation and cloud infrastructures are an enabler for software defined data centres (SDDC). Securing these types of infrastructures involves a policy-based approach that intertwines security with applications, instead of applying traditional network-based security.

> ***"On average, 25,000 records are compromised every time a cyberattack is successful***

This requires organisations to rethink the way they store and secure their data. As a result, new, application-aware security controls are needed. Application-aware security ensures that security policies are enforced automatically across any network configuration, based on the workload's role, and not its location within the infrastructure, as would happen with traditional infrastructures.

The most important aspect of security in these environments is ensuring that the remediation capabilities are not impacted. By fully leveraging the tight integration with hypervisors that control the hardware resources allocated to virtual workloads, new security layers that sit below the guest operating system can offer unparalleled visibility into threats. This can be particularly useful when defending against new or unknown vulnerabilities, such as those seen in cyberwarfare, that aim to compromise virtual workloads.

Coupled with visibility across all endpoints and networks, organisations relying on endpoint detection and response capabilities will have the ability to identify and plug potential data breaches before they cause permanent damages, while also having the investigative capabilities required to paint a complete picture into an attack timeline. Breaking the attack kill chain as early on during a potential data breach requires more than just security, but also visibility capabilities that help organisations during forensic investigations.

Ultimately, data centres are vital pieces of infrastructure. As such, their security, both physical and cyber, is of the utmost importance. Developing new and more efficient ways to ward off cyberwarfare and protect data centres should be a focus for companies from every sector but should also be top of the agenda for governments.

Efficiency at the edge

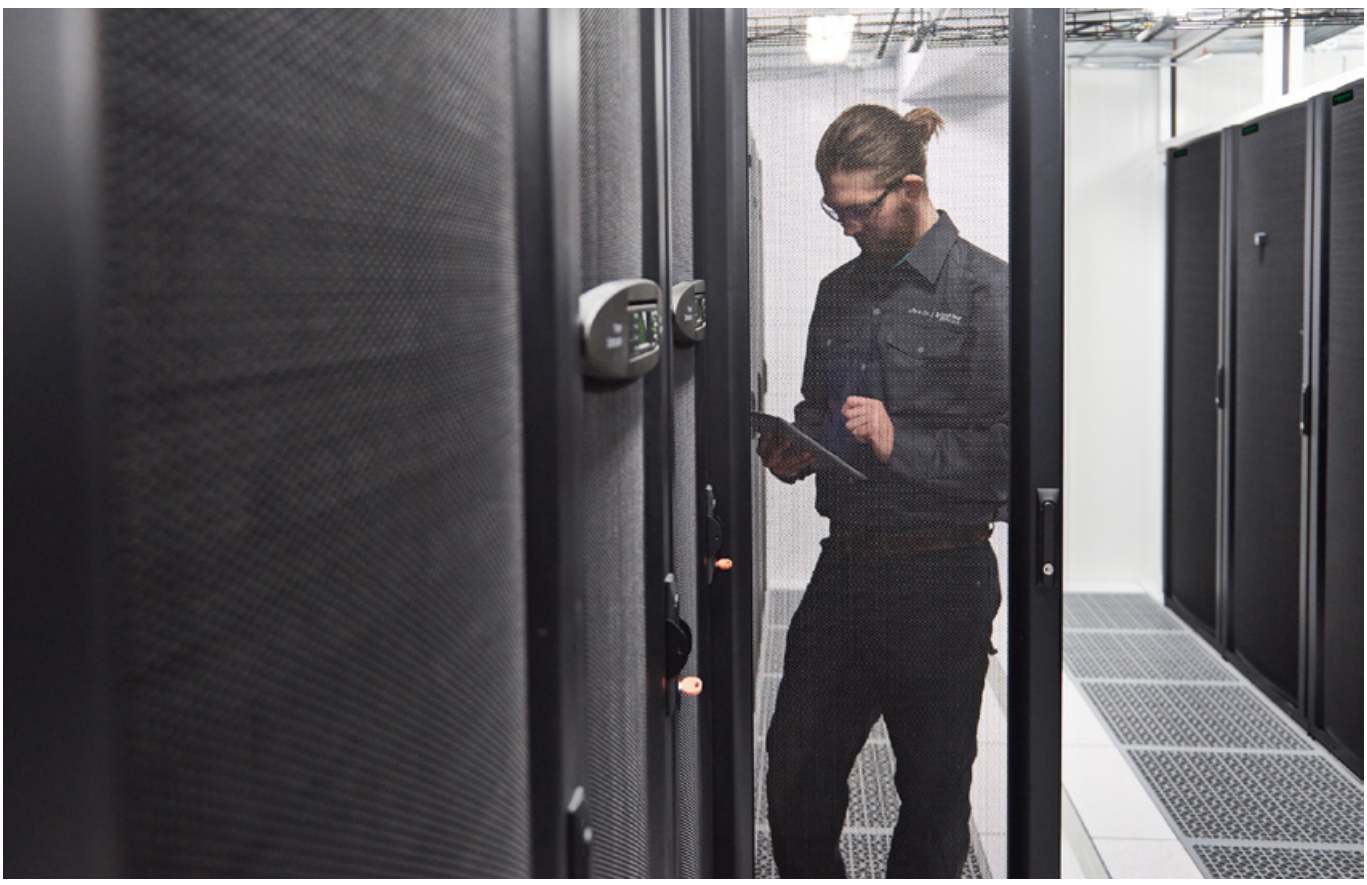
Sustainability and edge computing don't often go hand-in-hand, but as technology continues to develop, this may soon be a thing of the past. **Marc Garner,** vice president, secure power division, Schneider Electric UK&I, highlights some key considerations for achieving energy efficiency at the edge.

Data centres are the cornerstone of today's digitised economy. As the demand for digital services continues to grow, more businesses are deploying distributed IT systems at the edge of the network to increase application reliability and support digital transformation strategies. However, with increased digitisation, there is an environmental trade off to be considered, mainly due to the growing amount of electrical energy required at the edge.

Various analyses suggest that today, the global installed base of IT consumes between 1,000 and 2,000 TWh of electric power, equivalent to 5-10% of all power generated. Additional research estimates that by 2030, IT will consume as much as 30,000 TWh.

Clearly, increasing the capacity of electrical generation in a sustainable way is an issue that is beyond the scope of the data centre industry alone, but it is beholden on such a large consumer of electricity to make every effort to increase the efficiency of its operations and to reduce its impact on the environment.

Today, Schneider Electric is committed to improving energy consumption and reducing CO2 emissions across all areas of its business. This includes reaching carbon neutrality across all of our company sites by 2025; goals to achieve net-zero operational emissions by 2030; and most importantly, to have net-zero emissions throughout our entire supply chain by 2050.



To drive efficiency at the edge, a detailed approach to tackling energy management is essential, where new and evolving technologies such as AI, liquid cooling, cloud-based software, Lithium-ion (Li-ion) and standardised infrastructure systems all play a crucial role.

Digitalisation and the edge

An inevitable consequence of increased digitisation is that data centres themselves will evolve and become more diverse. Large hyperscale facilities, often consuming hundreds of MW of power and located outside of densely populated areas will continue to host data and applications for which cost effectiveness, reliability and security are more important than speed of delivery.

Critical applications requiring ultra-low latency and increased levels of resiliency will inevitably be hosted closer to where data is generated, processed or consumed. This disruptive trend of edge computing comprises micro data centres and hyper-converged architectures, which are smaller, more specialised and located with few or no specialist technical personnel on-site. Use cases include retail branches, industrial, automotive and manufacturing facilities, and healthcare environments, all of which contribute to the Internet of Things (IoT).

The proliferation of distrbuted IT systems will in aggregate consume a great deal more power than today's data centres. Given that each disparate edge computing site will have its own power supply, cooling solution and other infrastructure components, they will be inherently less efficient than larger data centres. In terms of energy, a hundred thousand edge facilities, each rated at 10kW, would consume 1,000MW of power for their IT load alone.

Such a significant increase in energy consumption further proves the need for edge data centres to operate as efficiently as possible, not only for economic reasons, but for the sake of the impact on the environment.

PUE and the edge

Power Usage Effectiveness (PUE) is defined as the total ratio of the overall power consumption of a computing facility to the power required by the IT equipment alone. If those 100,000 edge data centres each had a PUE rating of 1.5, the power would cost somehere in the region of €130 million and generate the equivalent of 800k tonnes of CO2 annually.

Improving the PUE in each case to 1.1 would cut the cost to €100 million and the annual CO2 emissions equivalent to 600k tonnes. That would be a saving comparable to removing 50,000 petrol cars from the roads a year! In order for such efficiencies to be made, this can only be achieved through a synergy between data centre designers, operators and vendors. Power efficiency, therefore, must be at the core of sustainable data centre design.

Great strides have already been made to improve the electrical efficiency of data centres of all sizes, particularly in the area of cooling, which is the largest consumer of power apart from the IT load. Low-power computing elements, proper alignment of equipment in hot and cold aisles and purpose-built containment all help to improve cooling efficiency and reduce power consumption.

Such considerations are typically focussed on air-cooled data centres, but a recent paradigm shift is the re-emergence of liquid-cooling technology. Although familiar in the days of the mainframe and in modern high-performance computing (HPC) clusters, liquid cooling is fast becoming an attractive proposition in data centres, from hyperscale to the edge.

Infrastructure considerations

Today, liquid cooling takes many forms, from hermetically sealed heat sinks, to chasis-immersed configurations. The advantage of liquid cooling, apart from its ability to permit high-density rack deployment, is that it greatly reduces, and in some cases eliminates, the need for fans, leading to immediate savings.

Standardisation, as well as the development of micro data centres, prefabricated modules and reference designs, reduce deployment times, cost and power inefficiency in facilities of all sizes. The continuous development and improvement of such repeatable designs helps to proliferate energy efficient technologies through a rapidly growing industry.

Another crucial factor in efficient and sustainable operations at the edge is next-generation Data Centre Infrastructure Management (DCIM) software, which allows remote facilities to be monitored and controlled from a centralised console as if expert personnel were on-site, a luxury that would be prohibitively expensive in many edge computing deployments.

Creating a more sustainable edge

By utilising IoT, Artificial Intelligence (AI) and data analytic capabilities built within new edge computing components, including racks, servers and Li-ion Uninterruptible Power Supplies (UPS), operators benefit from real-time visibility, allowing them to manage critical applications at the edge and minimise downtime.

Such insights can only be provided via cloud-based software, meaning today's edge sites can be managed with similar levels of operational and sustainable efficiency that are possible in hyperscale facilities.

As edge data centres continue to be the backbone of digital transformation and a digitised economy, it becomes increasingly important that we harness their capaibilities in a sustainable and energy efficient manner. By 2020, Schneider Electric will have helped its customers to save 120 million tonnes of CO2 through its EcoStruxure architecture, such efforts are only achievable through collaborative, standardised and pre-intergrated systems, those that harness the capabilities of AI, the cloud and energy efficient technology to deliver a sustainable edge.

‘The maturity model’

The Panduit EMEA, data centre team explores why a DCIM maturity model is an important step to achieving efficiency and added value.

Data centres are becoming more complex as the need for HPC (high performance computing), data bandwidth and latency outstrip the capabilities of legacy facilities. It is not simply customers generating more information throughput across the infrastructure.

The ability to collect actionable data, analyse and predict outcomes within the technical spaces provides one of the largest opportunities to eliminate energy wastage (up to 50% reduction in cooling energy costs), reduce CO2 emissions and reduce downtime risk. Data’s strategic importance to organisations has placed new pressures on technology networks to work to their optimum performance levels.

Data centre equipment moves or device additions alter the balance of power, cooling, space and connectivity and these have a knock-on effect on the capabilities of the technical space. Without knowing the actual or possible outcomes of change, how can we manage the development of the data centre on an ongoing basis?

Data Centre Infrastructure Management (DCIM) systems have improved considerably over the past few years and now provide the information to not only keep track of physical and environmental changes, but also to generate a live model for the data centre that delivers maximum value to the organisation.

Actionable information

Today’s DCIM offers a host of advantages to the organisations, including real-time actionable information about assets, power usage, cooling, connectivity, rack security, cabling, bandwidth and power delivery. Although DCIM systems vary widely and are available as modular software applications or as appliances, they collect standardised information from connected infrastructure resources and present a comprehensive range of information to administrators using GUIs.

Information is a crucial element to enable effective action. It is essential that a DCIM solution should be paired with intelligent hardware so

that the data centre infrastructure can be monitored and controlled to deliver optimal performance. The interaction between a DCIM solution and a thermal management system, in particular, can yield significant financial and CO2 emissions reduction.

Different equipment will have different thermal characteristics. So it's important that a thermal management system and corresponding DCIM solution recognise those characteristics e.g. the way that Cisco switches operate. With detailed information data centre administrators can optimally place equipment, such as in-cabinet ducting, blanking panels and shades, as well as cool boots, to contain and direct airflow to increase efficiency.

Another example is the ability of a DCIM solution to track connectivity ports and recognise whether they are in use, helping to increase a data centre's flexibility and expandability. Knowledge of port location and availability enables the administrator to quickly and efficiently deploy assets such as servers and storage devices.

Understand the maturity levels with the data centre

DCIM system relies on a wide range of actionable information, starting with the most basic, up to highly detailed data that enables a high degree of control. A process we use with all clients and has provided excellent results is 'The Maturity Model' which allows users to understand their infrastructure – and how to manage it. Our Maturity Model consists of three defined levels:

Maturity level one

Basic information about the amount of resources you have available, such as the amount of cooling capacity you have and how much you're using. With basic information, you are able to set alarm thresholds and alert notifications to reduce the risk of unplanned downtime.

Maturity level two

More detailed information, in context. For example, you are able to monitor power loads to quickly find underutilised rack power and determine the optimal placement of equipment.

At this level, you utilise: live colour imaging depicting data points such as temperature, humidity and sub-floor pressure, overlaid on a floor plan. This enables managers to spot problems quickly.

Monitoring, which provides you the information needed to adjust and react to utilisation trends, as well as to plan for the future. For example, poor placement of blanking panels may create hotspots. If you are able to monitor conditions, you will be able to take steps to avoid failure due to overheating before it occurs. You may also compare the performance of your own data centre to ASHRAE guidelines.

Maturity level three

Still more detailed information, with a focus on enabling immediate action often with the aid of automation. You are able to see the location of each piece of equipment on the plan, and to see specific information about different vendors' gear. You are also able to closely monitor and automatically control infrastructure components to enable the highest level of efficiency.

Conclusion

Data centres are strategic to most organisations operating connected technology whether utilising initiatives such as the 5G, IoT and associated AI and machine learning. These capabilities are expanding business processes, whilst also placing unprecedented demands on data centre capabilities.

To maintain effectiveness of our data centres, every internal change must be met with corresponding changes to the four significant capacity management resources to ensure a high level of performance and uptime, for example:

Cooling: Stranded cooling capacity leads to hotspots and thermally induced downtime. Overcooling, intended to ensure equipment safety, is expensive and wasteful.

Power: Underutilised power/stranded power capacity is due to lack of consumption visibility. Without visibility, it is difficult to provide accurate evidence of carbon footprint and energy consumption for "green" credentials.

Space: Inefficient utilisation and even asset loss due to poor asset tracking can slow deployment and hamper the effective utilisation of rack space.

Connectivity: Lack of connectivity tracking can affect equipment deployment. Disconnections and unauthorised changes cause risk to operations.

A DCIM system that will provide the information you need and allows you to do more with your existing data centre investments is essential. Knowing your maturity level allows appropriate actions to be taken to maximise your data centre's performance and avoid unnecessary costs.

Intelligent hardware that can provide the DCIM with comprehensive real-time information and that can respond to the controls that the DCIM system recommends is also essential. In particular, a DCIM solution working hand-in-hand with a thermal management system.

Energy is the data centres largest expenditure, understanding your infrastructure and how to maintain it effectively will ensure more energy is focused on the customer IT solutions and not simply keeping the lights on.

Getting deep into data

Thomas LaRock, head geek at SolarWinds discusses how anomaly detection can maximise database performance.

Detecting anomalies has come a long way in the last decade. When we observe the data centre of ten years ago, "anomaly detection" comprised a system or database administrator (DBA) receiving a rules-based alert based on a hard value. For example, if CPU spiked to 80%, an alert would automatically generate an email. Unusual behaviour and events were identified by a simple rule-based alerting function.

Then, we started to see more progressive system admins and DBAs put baseline monitoring systems in place. These baselines established the perceived normal state of a data centre and triggered an alert if activity subverted the baseline of normality. While an improvement, it still wasn't true anomaly detection.

Real database anomaly detection is based on data science and machine learning (ML). And what's exciting is today, the accessibility of tech means everyone can move closer to delivering it.

The data rush

The volume of data being produced in today's organisations only continues to rise — to such an extent that Forbes research predicts more than 150 zettabytes (150 trillion gigabytes) of data will require analysis by 2025.

On top of this, all systems administrators are monitoring more applications and systems – when was the last time you heard someone say they're managing fewer? These factors underline the sheer necessity of anomaly detection. System admins and DBAs need a signal to cut through the noise and point to the real issues in need of attention. Those beyond simply subverting baselines.

The risk of missing a critical anomaly grows with the complexity of IT environments. Without anomaly detection in place, missing out on activity in need of attention is increasingly inevitable.

> ***"Forbes research predicts more than 150 zettabytes (150 trillion gigabytes) of data will require analysis by 2025***

No quick fix

With ML, there's a potential to establish intelligent, sophisticated anomaly detection models. But such models aren't always plug-and-play — ignore any vendor saying otherwise. It's just not realistic. System admins and DBAs need to be able to train ML models by pointing out which spikes are normal and which ones aren't. It's only through continuous feedback and development that ML models know what constitutes as an anomaly.

It's also important to remember; the best ML model for my data centre may not necessarily work for yours. Every data centre is configured differently, meaning anomalies look different in each. A one-size-fits-all anomaly detection solution most likely won't cut it.

Taking matters into your own hands

The difficulty of building an ML model for anomaly detection, without using a vendor solution, is the onus is put firmly on the system admins or DBA to build such a model. This requires a full understanding of an environment's workloads to understand which algorithms best suit each.

Once a tailored model is put in place, system admins and DBAs can set modern metrics for anomaly detection better reflective of today's data centres. Traditional metrics assume data centres are physical and on-premises. But, as DBAs will already know, today's data centres are hybrid, a mixture of earthed and cloud. Database workloads are virtualised, and performance is squeezed out of hardware. Improving the latency of modern data centres requires a breakaway from old school thinking — ditching old school metrics is an obvious start.

Once an effective ML model is put in place and working to the right metrics, what benefits will be felt? Fundamentally, it boils down to solving issues faster. Modern data centres produce a lot of noise; a signal cutting through the noise to highlight issues is an invaluable asset. Ideally, these signals will bring attention to issues before they cause any problems for the end-user.

Effective anomaly detection also allows system admins and DBAs to enhance the scalability of their monitoring. The ability to monitor ten machines can jump to 100 — just as long as admins are confident in their anomaly detection model and its ability to catch issues. Ultimately, this equates to more dollars per technician.

Overcoming challenges with knowledge

There are challenges with establishing anomaly detection models all system admins and DBAs should keep in mind. Firstly, as already touched upon, vendors offering anomaly detection solutions should be put under the microscope. Artificial intelligence (AI) is a vague concept at the best of times. "AI-powered" anomaly detection vendor solutions often boil down to nothing more than rules-based recommendations and code, hardly the ML-driven predictive analytics behind real anomaly detection today.

There needs to be a conversation going back and forth between system admins, DBAs, and vendors. System admins and DBAs need to articulate a vision for their ideal model and speak up when a vendor solution isn't providing enough business value. This requires confidence from having enough of an understanding of data science.

This understanding will help system admins and DBAs answer some key questions that crop up in the process of setting up anomaly detection — whether it's via a vendor solution or a unique model. What data needs to be fed into the model? What requires predictions or alerts? How can the correct data be sourced and fed into the model? Answering these questions is vital to making sure models function as effectively as possible.

Inquisitively thinking about data in this way puts system admins and DBAs in a good position to evaluate the overall suitability of IT networks for producing predictive analytics. For example, some legacy hardware (such as certain routers and switches) don't produce any kind of metrics that can be fed into an anomaly detection model. Key benchmarks such as CPU utilisation are left a mystery and — without any kind of API interface or log file metrics — remain a mystery.

> ***"Vendors offering anomaly detection solutions should be put under the microscope***

Answering the key questions and successfully identifying the legacy systems incompatible with predictive analytics comes back to this important point. System admins and DBAs need to be comfortable with data science. This might sound daunting, but it shouldn't; long gone are the days where data science was exclusively reserved to sophisticated and specific roles — mainly in finance and insurance institutions.

Today, any system admin or DBA can use an easily accessible programming language, such as Python, and start applying data science to solve practical business problems through automation. Data science is democratised to such an extent that system admins and DBAs have no excuse to neglect it. With a solid foundation of knowledge, system admins and DBAs can establish truly effective anomaly detection models based on real ML and predictive analytics for the good of the business.

Path to enlightenment

With data centre owners and managers under increasing pressure to make their facilities more sustainable, it is surprising that one of the last areas they often consider is lighting. **Graeme Shaw,** technical application manager at Zumtobel Group, explains the benefits of LED lighting in a data centre, the key specification considerations and the recommendations laid out in the TIA-942-A standard.

LED has an extremely long life, low carbon emissions and excellent light quality. Despite all of these positives, data centres have traditionally been slow to adopt it, perhaps because it is estimated that lighting only comprises 3-5% of a facility's energy load. This is addressed by a combination of increasingly innovative solutions and fast return on investment (ROI), meaning that owners and managers are making the switch to LED and lighting control as a way to contribute to a lower Power Usage Effectiveness (PUE) rating.

Setting the standard

When it comes to standards, BS EN 12464-1:2011 is having a significant impact, as it addresses the design and development of lighting schemes around a task or activity. Likewise, the need for effective lighting in data centres has not gone unnoticed by the Telecommunications Industry Association (TIA) and its TIA 942-A standard recommends the use of LED technology and defines the ideal placement of lighting fixtures above aisles and between cabinets. It also outlines a three-level approach:

- Level 1 unoccupied: Lighting for areas where video surveillance equipment is installed but doesn't need to offer clarity for human vision.
- Level 2 initial entry: A lighting system that uses sensors that activate when a person moves around a facility. Aisles and passageways should be illuminated for safe movement and recognition of individuals on CCTV.
- Level 3 occupied: Designed for activities such as MACs, as well as maintenance and troubleshooting. TIA 942-A recommends that occupied working areas should have 500 lux in the horizontal plane and 200 lux in the vertical plane to enable operatives to clearly see equipment in racks.

Practice makes perfect

A best practice design comprising LED lighting technology, an intelligent lighting control system and a central power system (CPS) to support a dedicated emergency lighting system will have a positive impact on energy usage. In addition, it will reduce associated manual maintenance costs whilst creating a safer, more flexible lighting solution that can be quickly and easily adapted to suit changing requirements.

In addition to LED panels, tubes, battens and high bay lighting, leading LED lighting manufacturers are able to offer continuous row solutions that are tested and approved to perform within higher ambient temperatures. This not only lowers the running costs of a lighting scheme when compared to traditional compact fluorescent lighting technology, but also reduces the operating costs of a cooling strategy, which plays an important role in achieving a low PUE rating. It is, however, important to remember that lighting must be specific to the aisle layout, so enough light is available on the vertical at each rack.

Under control

We are some way from creating truly 'lights-out' data centres, so providing area specific lighting precisely when and where it is needed is an important design consideration. All too often lights are turned on manually across a large space when an operative might only need to work in one small section of a data centre. To compound the issue, lights often remain on long after a technician has left a facility, simply because they thought someone else might still be in the building.

This type of scenario is exactly why the introduction of innovative lighting control can prove beneficial. As additional energy savings of at least another 10% can be experienced

> ***"We are some way from creating truly 'lights-out' data centres, so providing area specific lighting precisely when and where it is needed is an important design consideration***

when LED luminaires are integrated with sensors to manage when and where lighting is used, lighting control should be the rule rather than the exception.

A site-specific lighting control system that utilises the well-established DALI protocol enables each area to be autonomous. This further reduces operational expenditure by allowing lighting to be integrated into a building management system (BMS), with the benefit of off-site monitoring. Just as importantly, this level of integration and engagement allows an end-user to actively prevent issues before they lead to downtime.

Safety first

The final part of a lighting strategy concerns life safety. Data centres present a unique set of challenges in this area, so it is advisable to have a dedicated, addressable emergency lighting system that allows for full automation of testing – excluding an annual duration test.

Cutting edge technology can automatically report the status of an emergency lighting system. As the batteries have a 10-year life expectancy, the potential for human error is reduced and the costs associated with routine maintenance are lowered. Utilising a remote CPS/eBox based system also facilitates the support of higher ambient temperatures, as there is no need for a local battery supply to the emergency lighting, while a self-contained system can be easily extended with additional luminaires as required. When considering a system, always remember that robust is required, aesthetically pleasing is optional.

Next step

In order to achieve the most appropriate, reliable and sustainable lighting infrastructure within a data centre, it is advisable to engage with a solutions provider that can fully integrate all of the various elements outlined above. The pitfalls of a poor quality system can be significant and lead to premature product failure and the associated replacement and maintenance costs, so spending extra time at the specification stage and working with experts will lead to fewer issues in the long-term.

Carel at Data Centre World 2020

Carel will be at DCW20 on stand D1152, showcasing some of its data centre solutions for global energy savings. Particular focus at the exhibition will be on the application of Carel products in micro data centres, which the company believes is a trend we will be seeing much more of.

The solutions on show will demonstrate connected efficiency to the complete data centre chain, plus reinforce Carel's capability in integrated humidification solutions.

Carel's product showcase includes:

- boss and boss mini. A complete range of simple monitoring solutions for medium and small data centres.
- cPCO mini. A compact solution with high connectivity for compact units for energy saving.
- HMI designed to offer an improved user experience, with simplified access to system information.
- Drive for BLDC compressors for high efficiency, supply temperature control and energy saving.
- A complete solution for high precision and short absorption distance, with low energy consumption.
- A wide range of energy saving technologies.

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GS Yuasa to showcase world's first containerised dual-chemical energy storage system technology at Data Centre World

GS Yuasa Battery Sales UK Ltd will be showcasing its innovative dual-chemical energy storage solution at this year's Data Centre World at ExCel, London on 11 and 12 March.

The containerised solution combines GS Yuasa's industry-leading lead acid and Lithium-ion battery technology to feed a power conversion system. Both unique and self-contained, the system is designed to be easily integrated into any renewable energy micro-grid configuration.

The ground-breaking energy storage solution has been constructed and installed at GS Yuasa's battery manufacturing facility in Ebbw Vale, South Wales. The pioneering unit can store and control the release of locally generated renewable energy back into the grid.

A scale model of the container will take centre stage on the GS Yuasa stand alongside a smaller dual-chemical battery system. Despite being only the size of a filing cabinet, the smaller system provides 300kW of power and is designed to be a convenient alternative to VRLA powered UPS systems for data centre and other critical standby power applications.

The battery manufacturer's Yu-Power battery monitoring system will also be on display.

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www.gs-yuasa.com

Schneider Electric equips new short-depth Smart-UPS with lithium-ion batteries

Schneider Electric has announced the availability of 230V models of its short-depth APC Smart-UPS line, equipping the range with lithium-ion battery packs to ensure that critical equipment remains online even in the event of a power outage.

The 230V models with lithium-ion were specifically designed for the European market, as they are compact enough to deal with the limited space available and can handle mixed-use areas for IT systems. Schneider also notes that they are easy to install, access and maintain, while offering an economic solution for edge computing applications and other installations inside and outside purpose-designed IT environments.

According to Schneider, the new APC Smart-UPS line interactive models are able to deliver increased battery life for lower total cost of option. That's thanks to the lithium-ion battery pack, which the company says offers savings of up to 50% when compared with UPSs that utilise traditional VRLA batteries. As expected from most modern Schneider products, the new UPSs also come cloud-enabled. This means users can remotely monitor their UPS or gracefully shut them down using PowerChute Business Edition.

Schneider Electric • 0870 608 8608
www.schneider-electric.co.uk

Dell launches new edge server design, smaller modular data centres and more

Dell Technologies has launched a host of new offerings, including new edge server designs, smaller modular data centres, enhanced telemetry management and a streaming analytics engine. The new product offerings include:

Dell EMC PowerEdge XE2420 server: The new Dell EMC PowerEdge XE2420 is billed as a compact, 'short depth', high-performance server, designed for space-constrained and challenging operating conditions often encountered in edge deployments.

Dell EMC Modular Data Centre Micro 415: Designed to customers' specific requirements,

this new, smaller Dell EMC Modular Data Centre Micro 415 (MDC Micro) offers pre-integrated, enterprise-level data centre IT, power, cooling and remote management in a size shorter and narrower than a parking spot.

Dell EMC iDRAC9 data centre software: The new Dell Remote Access Controller, iDRAC 9 data centre embedded management technology, helps customers meet the requirements for deploying, securing and operating edge environments. Its remote deployment capability promises to reduce administrator-attended time by up to 99.1% per server.

Dell EMC Streaming Data Platform: The new Dell EMC Streaming Data Platform allows for ingestion and analysis of streaming data from the edge. Customers may now simplify infrastructure management to help harvest critical business insights.

Dell • 0800 587 1456
www.dell.com

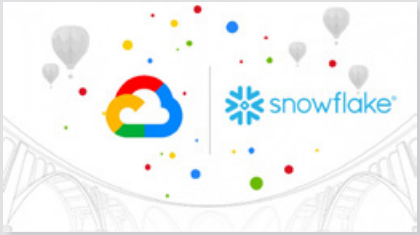
Snowflake announces integration with Google Cloud for US, Europe

Following Snowflake's announcement of its expansion to Tokyo with Amazon Web Services, the company has now announced that it is integrating with Google Cloud, bringing together the cloud-native data platform with Google's capabilities in AI, machine learning and analytics.

Snowflake's integration with Google Cloud is now available in the us-central1 (Iowa) and europe-west4 (Netherlands) regions with additional regions coming later this year. Combined with the new database replication feature, Snowflake allows users to migrate their data to Google Cloud or keep their database data synchronised between multiple cloud providers for business continuity.

In addition to general availability of Snowflake on Google Cloud, the cloud data platform company will launch integrations with Google Cloud's big data analytics platform later this year, including:

- Snowflake Connector for Spark running in Google Cloud Dataproc
- Snowpipe continuous data ingestion using Google Cloud Pub/Sub
- Cloud Data Fusion, Google Cloud's data integration service



- Cloud Dataflow, Google Cloud's fully-managed service for stream and batch processing
- Artificial Intelligence (AI) Platform Notebooks.

Snowflake • 0203 8656 124
www.snowflake.com

IDEAL Networks launches cloud-based test management system for LanTEK IV cable certifiers

IDEAL Networks has introduced IDEAL AnyWARE Cloud, a new test management system which will make managing, editing and sharing reports easier than ever for installers and technicians using LanTEK IV cable certifiers.

The tool makes it simpler for technicians to carry out the tests in the field by isolating only relevant test results for display on the LanTEK IV. Users can easily create complex naming conventions that can be seamlessly transferred as a .CSV file from IDEAL AnyWARE Cloud to a label printer.

With the IDEAL AnyWARE Cloud platform, project managers can pre-configure all project information, eliminating mistakes from manual data entry on-site, which could otherwise prove costly.

As the new LanTEK IV cable certifier now includes Wi-Fi connectivity, field technicians can download the project to the LanTEK IV cable certifier and get testing. With LanTEK IV, all tests up to Cat6A can be conducted and saved in around seven seconds.

Cable installers looking to upgrade to a LanTEK IV certifier and benefit from the IDEAL AnyWARE Cloud are able to take advantage of a special offer. Owners of a DTX tester can trade in their existing model for a new LanTEK IV and save up to £3,000.

IDEAL Networks • 01925 428 380
www.idealnetworks.net

How might Brexit affect UK tech companies?

Brexit will undoubtedly be a complex process for many UK companies, but for those in tech, **Ritam Gandhi,** founder and director of Studio Graphene, provides us with a 'Brexit checklist' highlighting which aspects of preparation we should be focusing on.

After years of back and forth, politicking, hostility and delay, the UK has arrived at a consensus: we are no longer members of the EU as of January 31. The most important moment in deciding this was Boris Johnson's landslide victory in the first December election since the 1920s.

Newfound certainty means business leaders are now able to plan with relative foresight and begin 'Brexit-proofing' their enterprises for the future, but which aspects of preparation require the most attention?

Remember the positives

Brexit means the UK is on course for a radically different economic future. For businesses, this may be daunting. However, there's no need to panic. Indeed, the tech sector appears to be surprisingly buoyant; according to Studio Graphene's recent Tech Tracker survey, a large and growing majority (74%) of UK startups were confident that their turnover will increase over the coming year.

Similarly, around two thirds (67%) had plans to raise investment in that time. This bullish positivity is backed by evidence; in the first seven months of 2019, the UK tech sector attracted an average investment of $1 billion each month. So, whilst change is coming, the sector is keeping its head held high.

Consider an international presence

Of course, every company has its own needs and resources, so opening an office in Europe won't be appropriate for everyone. But if it's within your capability, do consider it. Here at Studio Graphene, we recently planted an office in Lisbon to run alongside our locations in the UK, Switzerland and India, and will allow us to maintain frictionless ties with our European clients. However, you don't need to open a new office to obtain this advantage; building ties with international partners before Brexit is concluded will certainly pay similar dividends.

Make a talent plan

The poll, conducted in Q4 of 2019, was not entirely rosy, however. 69% of businesses surveyed were worried Brexit will make it harder for them to hire the tech talent they need to grow. It's vital for these firms to consider where they will source their people from down the line. But there's plenty of strong options to consider for those without a continental base.

For example, upskilling your current team may be more cost-effective and better for morale than simply hiring new. Or, you could consider some alternative approaches, such as starting an International Professional Employer Organisation, which will allow you to hire abroad whilst minimising the admin.

Analyse and save

The Brexit process is still ongoing and will be for two years during the transition period. As such, it's crucial that tech firms are still prepared for a sub-optimal outcome. For example, rates could increase on certain commodities, so it is worth modelling how this would impact your bottom line. Should you begin saving for a "rainy day" buffer fund or rethink your supply chains? These are the kinds of questions you won't regret answering down the line.

Remember the UK

The UK will still have ample domestic opportunities post-Brexit. Consider switching your supply chains to home soil, for example; this could mean avoiding tariffs and make your production process much more cost-effective.

On the other side of things, if the eventual trade agreements allow us to trade more freely with other markets (such as Canada or Australia), demand for the British brand may grow. Make sure that if this outcome does materialise, your firm is ready to capitalise on the opportunities presented.

Speak to experts

Despite conducting thorough research, the complexities of Brexit can still cause confusion. So, it might be beneficial to seek guidance from an expert. There are numerous Brexit and business consultancies on hand to offer tailored advice to help develop your future strategy. Whilst they will charge for their services, such firms could be a useful tool to assist the growth of your business in a post-Brexit world.

If there's one overriding point for British tech firms, it's that Brexit heralds new opportunities. So long as businesses research and prepare, I have no doubt that the UK technology space will continue to flourish.

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