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NETWORK+

Lessons from SolarWinds

Some tips for enterprises

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Security concerns rise

Approaching identity authentication

Nicole Lin of Synology explains, p7

Protect your data against disaster

Four tips from an expert

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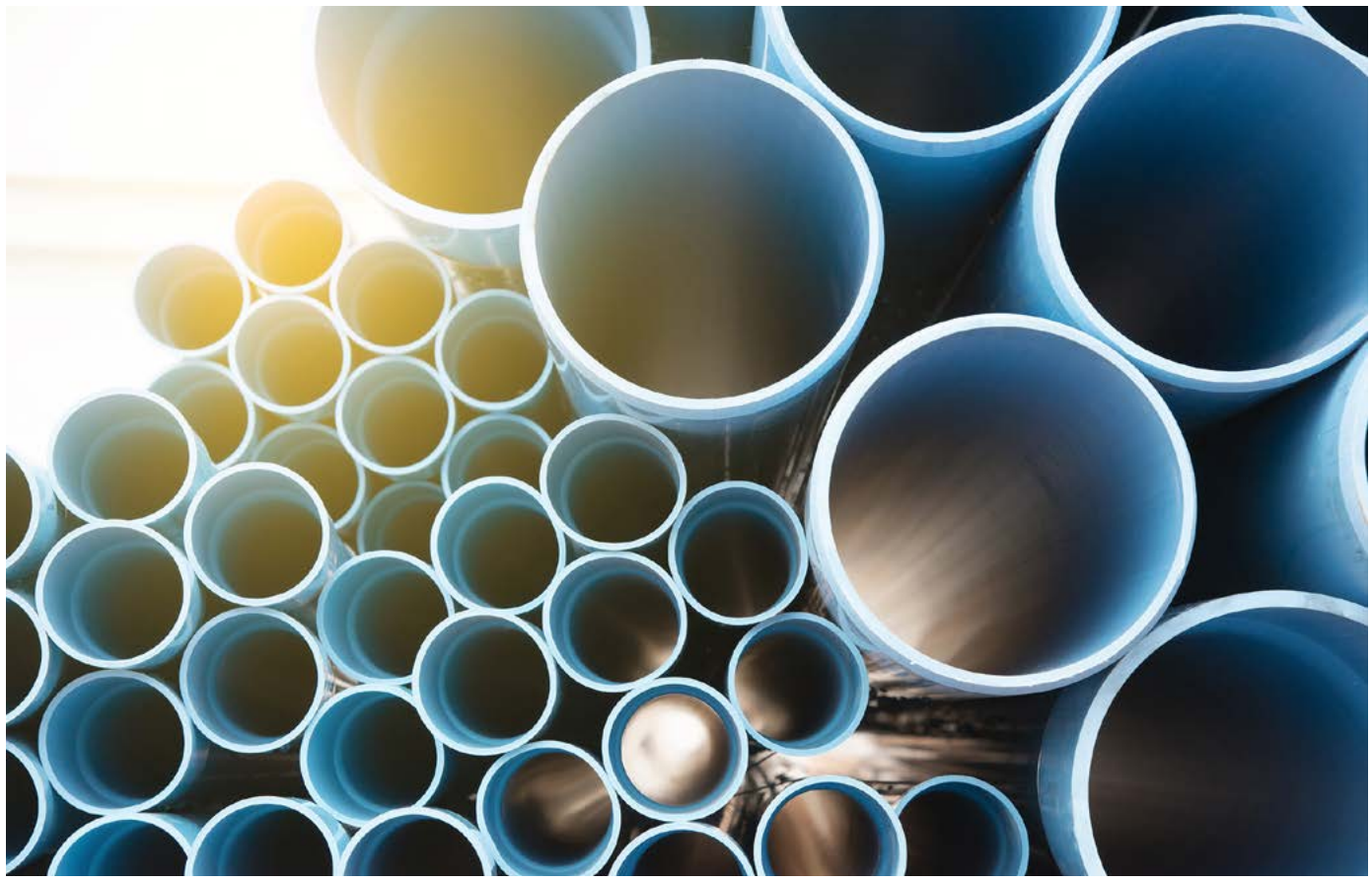
Fibre optic cables ‘fed through water pipes in broadband trial’



Fibre optic cables could be fed through the nation’s water pipes as part of the government’s three-year plan to hasten the rollout of lightning-fast broadband and mobile coverage to businesses in rural areas.

A £4m war chest is being made available for cutting-edge innovators to trial quicker and more cost-effective ways of connecting fibre optic cables to, businesses, homes and mobile masts.

This new scheme is tipped to turbocharge the government’s £5bn Project Gigabit plan to level up broadband access in hard-to-reach areas as well as the £1bn Shared Rural Network, which will bring strong and reliable 4G phone signals to many of the most isolated parts of the nation.

“Broadband underpins the future of economic growth and much of our daily lives, so it is positive to hear of the government’s plan to speed up the nationwide rollout of high-speed internet access,” said Dahwood Ahmed, regional director UK&I at Extreme Networks. “That being said, the scale of this huge national challenge cannot be understated. Ofcom reports that only 14% of UK properties currently have access to fibre broadband.”

Ahmed added that feeding cables through the country’s water pipes is a smart, efficient and creative approach. However, to fully close the connectivity gap, the problem needs to be addressed with more than one solution. “One already proven option is the adoption of AltNets, also known as alternative networks,” he said. “These providers create their own networks to offer last mile connectivity without relying on the UK’s existing copper network. To close the UK connectivity gap once and for all, the government and technology innovators need to work together. Only then will citizens and businesses in the UK enjoy infinitely distributed high-speed connectivity, wherever they may be located.”

The digital infrastructure minister, Matt Warman said the government is “calling on Britain’s brilliant innovators to help us use this infrastructure to serve a dual purpose of serving up not just fresh and clean water but also lightning-fast digital connectivity”.

The fund has been launched after the government in June kicked off a call for evidence on how more than a million kilometres of underground utility ducts could be used to boost the rollout of next-generation broadband.

A consortium, expected to be made up of telecoms companies, utility providers and engineering companies, will be selected to deliver the project. Applications are due by October 4 and any proposal will require approval by the Drinking Water Inspectorate.

Electricity and gas companies, water and sewer networks and telecoms groups have until September 4 to respond to the consultation on changing regulations to make infrastructure sharing easier. Broadband cables have already been deployed in water pipes in other countries, including Spain. ■

Register for Networking+

Fusion Broadband embraces Equinix for global expansion SD-WAN service

SD-WAN provider Fusion Broadband has expanded into Equinix, the digital infrastructure company, as part of its strategy to significantly enlarge its global footprint and offer businesses enhanced performance and more advanced connectivity options.

Equinix operates more than 220 data centres in 26 countries on five continents.

As the networking requirements of global businesses become more sophisticated, Fusion Broadband said it identified a need to support their customers' growth by leveraging Equinix and offering greater WAN connectivity through direct access to a multitude of cloud providers such as AWS, Azure, Google, IBM, Alibaba and Oracle.

Andrew Catchpole, chief executive of Fusion Broadband UK, said the new arrangement with Equinix and Equinix Metal will allow the company to quickly and easily provide dedicated SD-WAN gateways in more than 50 location points globally.

"With our unique SD-WAN orchestration platform customers are able to deploy SD-WAN sites and gateways in minutes, as well as enable direct connections with the majority of the major cloud providers," he said. "They can be self-managed or our team of SD-WAN specialists can manage them for the customer. Dedicated private backbones between regions can also be provisioned for customers adding a greater level of performance and security."

Catchpole added that with Equinix Fabric, Fusion can offer global or national customers faster and more flexible access to all of the cloud services and partners that are on the platform Equinix. ■

Macmillan Cancer Support moves to the cloud

Macmillan Cancer Support, one of the largest British charities, has moved its file storage from traditional hardware into the cloud.

Its 1,500 employees can now access standardised information without the need for replication of workflow data, thanks to cloud storage provider, Nasuni.

Previously, the cancer charity's IT team relied on a time-consuming data recovery approach that involved replicating backups to a second London data centre.

Unstructured data now scales in the Azure Blog Storage, while Nasuni Edge appliances cache frequently accessed files locally, maintaining fast access for Macmillan's end users.

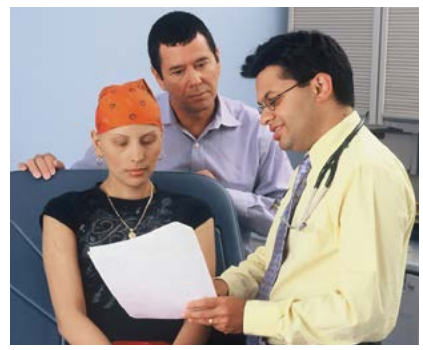
Using Nasuni Continuous File Versioning has eliminated the need for additional backup and makes it easier to recover lost files. The IT team also uses Nasuni Management Console to control and monitor its infrastructure remotely.

"By moving to Nasuni, we consolidated our two main file shares in London and avoided the expense of refreshing the ageing file server infrastructure at our satellite offices," said Tom Steven, Macmillan server engineer. "At the start of the pandemic, we were scrambling to get people working from home as quickly as possible. With Nasuni being in the cloud, and us just having an edge cache in each location, all we had to do was get people onto our VPN and redirect them to Nasuni for their file shares.

"It was very smooth. Nasuni has played a key part in our larger strategic shift to becoming a more agile, cloud-first organisation."

Andres Rodriguez, founder and chief technology officer at Nasuni, added that the business continuity risks and costs associated with operating and maintaining Windows File Servers have caused enterprises to seek low-impact approaches to file storage and disaster recovery.

"Coupled with cloud object storage like Azure Blob, Nasuni has made it easier for data-intensive organisations like Macmillan to store, protect, synchronise and access file data from anywhere in the world," he said. ■



Salvation Army hit by ransomware attack

Christian organisation the Salvation Army confirmed that its UK arm was targeted by a ransomware attack. The Register reported that the evangelical Christian church and charity identified the attack in June and it is believed that its London data centre was affected by the incident. A Salvation Army spokesperson confirmed data was compromised and said it alerted regulators in the UK. However, they did not give any further information, such as the identity of the criminal attackers, or the volume and type of data accessed by them. To date, nothing has emerged on known ransomware gang sites, where gangs typically resell stolen information to other criminals for further exploitation. ■

Infovista Ipanema SD-WAN platform allows critical applications to adapt to real-time conditions

Network solutions vendor Infovista launched its next generation Ipanema SD-WAN platform, designed to deliver different workloads and applications across conventional wide area networks and multiple cloud service providers.

The company said the service "delivers the truly software-defined benefits of allowing critical applications to dynamically adapt to the real-time conditions of the network while prioritising the prevailing business imperatives". It also provides the foundation for any managed network service, leveraging high levels of automation established between multiple cloud instances and multi-cloud on-ramp features.

Ipanema SD-WAN's functions are delivered through partnerships with Check Point, a cyber security firm serving 100,000 organisations of all sizes across 88 countries, and Equinix, the digital infrastructure company – a colocation and interconnection provider with over 220 data centres across five continents.

Integrations with Equinix and Check Point form a full cloud-native SD-WAN platform licensed through a consumption-based model, enhancing business agility and time-to-market requirements. Furthermore, this platform encompasses Equinix Fabric, a software-defined interconnection solution that fuels 'CloudMesh' functionality, focused on delivering automated low-latency full-mesh and multi-cloud connectivity.

The Ipanema SD-WAN platform also comprises Check Point Harmony Connect, a cloud-based networking security system which lays the foundation for 'EdgeSentry' capabilities.

"Our next generation SD-WAN platform is a definitive cloud-first enabler," said Kristian Thyregod, president of Ipanema, Infovista. "This is more than a 'feature release' because with this launch, we shift SD-WAN to a truly on-demand service that can be deployed, consumed, and scaled like any other cloud service." ■

OpenRAN for UK 5G AI smart city deployment

Belgian software vendor Accelleran will supply the 5G radio access network for the Smart Junctions 5G (SJ5G) project under way in the UK.

Led by Vivacity Labs and Transport for Greater Manchester (TfGM), the SJ5G consortium's objective is to develop and deploy a next generation traffic signal optimisation system using artificial intelligence (AI). Real-time data coming from a low-latency 5G private network, which is needed by SJ5G's AI algorithms, will be managed via Accelleran's dRAX software.

AttoCore will supply its Atto5GC Standalone Core to the private network, which will be implemented in the n77 spectrum band (3.8GHz-4.2GHz). Atto5GC is implemented as Docker containers within a Kubernetes architecture and can be deployed in the cloud or at the network edge on low end servers collocated with street furniture.

The SJ5G project will see 10 junctions on a busy 1.5km long route through the centre of the city served by traffic light-mounted 5G small cells.

Data captured by distributed sensor devices will be sent to the cloud via these small cells, so that an AI-based system can then schedule signalling and prioritise traffic flows accordingly. This, in turn, will enable a significant shortening of waiting times, reduce congestion levels during peak periods and also improve the local air quality due to less pollution.

Accelleran is delivering a turnkey OpenRAN network that integrates the dRAX platform with radio units (RUs) and distributed units (DUs) from its OpenRAN ecosystem partners. dRAX provides a highly-scalable, cloud-native and micro-services-based set of software components. Among these functions are the service management and orchestration (SMO), the RAN intelligent controller (RIC), plus control plane and user plane interfacing with the central unit (CU).

"We are excited to be selected for the SJ5G project and will help to make it a success through the delivery of a complete turnkey 5G OpenRAN network," said Stan Claes, CMO of Accelleran. "Our dRAX platform will be right at the heart of this system, controlling the data flows that are essential to the overall operation. SJ5G underlines the suitability of our software technology to address a wide array of different 5G-oriented smart city initiatives, and we expect to see many more opportunities like this emerge in the future," he said.

According to figures published last year by Statista, Manchester is one of the UK's top five most congested cities, with commuters spending an average of 94 hours every year stuck in traffic jams. ■

Communication network and traffic light on highway

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Durham University gets cosmological data on tape

A supercomputing facility at Durham University is using two Spectra tape libraries to store cosmological data about galactic evolution.

DiRAC (Distributed Research using Advanced Computing) is a federated facility, funded by the UK's Science and Technologies Facilities Council (STFC).

It spans four sites at Cambridge, Durham, Edinburgh and Leicester. Durham houses the DiRAC Memory Intensive Service in its Institute for Computational Cosmology.

This high-performance computing system is used for theoretical modeling and HPC-based research in particle physics, astronomy and cosmology, and nuclear physics. The Durham HPC cluster has 812 nodes, 58,700 compute cores, and 230TB of DRAM backed up with 10PB of primary storage. It uses the GPFS and Lustre parallel file systems.

"Collaboration is key at DiRAC sites and we expect it from our technology providers," said Alastair Basden, technical lead for the DiRAC Memory Intensive Service, Durham University. "We have seen Spectra step up to the mark more than once since the deployment of our Spectra T950 Tape Libraries. We've received very good support and advice from the Spectra team at every step of the way."

Moreover, it is anticipated that DiRAC will generate 20PB of stored data by 2022. The data chronicles galactic formation and evolution and will need to be accessible for 15 years. DiRAC staff are using one Spectra T950 tape library to store this data, with a second T950 purchased as part of a general DiRAC phase-3 upgrade.

Both have four LTO-8 drives and media and data is accessed using the LTFS protocol. Atempo's Miria software is the chosen data mover, managing both backup and archive processes from the primary storage.

The LTFS (Linear Tape File System) presents a tape drive that writes files sequentially as if it were a disk-based file:folder device, with files listed for random and not sequential access. There is an index (directory) stored on a tape cartridge which lists the cartridge's contents as if they were in a file:folder structure. LTFS software in a server accessing a tape library reads a cartridge's index and presents it in a file:folder format on screen.

The T950 scales from 50 to 10,250 LTO slots, with loading via ten-cartridge TeraPack trays, and has up to 120 tape drives. ■

Durham University's Ogden Centre for Fundamental Physics houses the ICC and DiRAC

Digital and data centre opens at Exeter College

A brand new digital and data centre has opened as part of a new £10.3m Institute of Technology Digital and Data Centre at Exeter College.

The South West Institute of Technology Digital and Data Centre, affectionately known as SWIoT, is in a flagship building leading the way in helping to widen opportunities in the industry across the region.

It will focus on employer-led education opportunities in the digital sector, including courses around data analytics, cyber-security, software development, esports and providing training for Apple's app development.

"It was an honour to open the South West Institute of Technology Digital and Data Centre at Exeter College," said Gillian Keegan, Under Secretary of State (Minister for Apprenticeships and Skills). "Our Institutes of Technology are the pinnacle of technical education, helping to develop the highly skilled talent pipeline employers will need for the future.

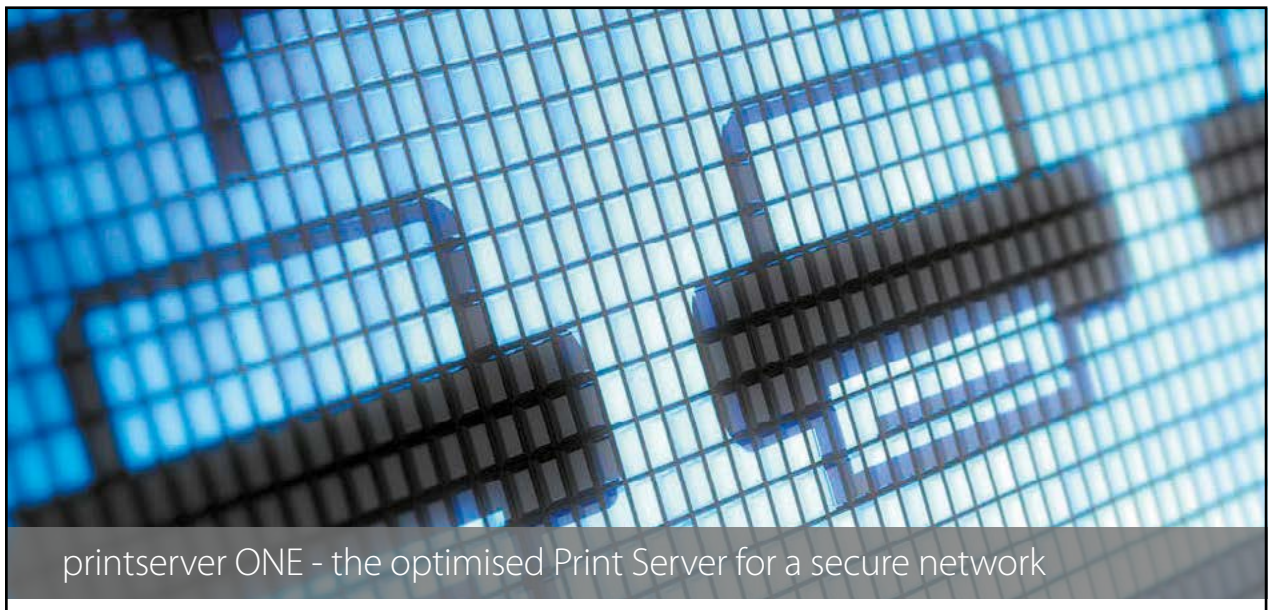
"By bringing together Further Education colleges, universities and businesses, Institutes of Technology are unique partnerships which will help to tackle skills shortages in vital sectors, from marine engineering to software development.

"The South West Institute of Technology is also playing a vital role in our multi-billion Plan for Jobs, which is helping to level up opportunities and support people from across the region to get the skills they need to progress into exciting careers as we recover from the pandemic."

John Laramy, Exeter College's principal and chief executive added: "This is a vital development for our city and region."

The SWIoT draws on expertise from a group of 'anchor employers' who will lead its strategic direction and ensure focus on the latest industry skills – they include Oxygen House and the Met Office in Exeter. ■

Minister Gillian Keegan Officially Opens £10.3m Institute of Technology Digital and Data Centre



A network printer usually has an interface and an additional USB port. In some network configurations it may be necessary to operate more than one network interface on a printer. This is where the printserver ONE comes into play - simply connect it to the USB interface and the second interface is available! Printed matter is received fully encrypted and forwarded to the printer. Hacker attacks can be prevented even on devices with an Internet connection!

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FROM THE COVER

Arcserve attacks Ransomware with Immutable Backup & Archival Storage

Introduction

Data continues to grow rapidly. Protecting against data loss such as accidental data deletion, hardware/software failures or ransomware attacks – is critical for business continuity. Backups help organizations recover data from such events. However, with backup and recovery windows shrinking and data capacities growing, disk-to-disk backup and recovery solutions are becoming essential to keep up with demanding recovery point objectives (RPO). Arcserve offers a scale-out, immutable storage appliance that can be leveraged as a disk-based backup target for your "last-resort" and ever-growing backup data.

Challenges

IT organizations continue to struggle with the daunting task of backing up growing quantities of data within diminishing backup windows. Unfortunately, IT administrators are responding to emergency data restore requests, and trying to maintain the backup infrastructure to keep up with the demands. Organizations are looking into disk-based immutable backup storage solutions. However, current solutions are often based on a scale-up architecture with limited scalability and performance. Once the scalability limits are reached, the only available options are to either add another standalone array with separate management or undergo an arduous task of a forklift upgrade and replace the existing array. The consequences are many islands of backup data that are complex to manage and result in significant increases in the cost of ownership. Typically, these storage solutions are not immutable making them vulnerable to ransomware attacks.

Arcserve for Backup Targets

Arcserve offers an efficient, immutable storage infrastructure for backup and archival: OneXafe. By leveraging OneXafe as the backup target for organizations, it can eliminate inefficiencies and bottlenecks associated with backup infrastructure environments.

OneXafe & OneSystem

Arcserve delivers OneXafe, a powerful, yet simple, immutable scale-out storage NAS appliance, coupled with OneSystem, a cloud-based management service. OneXafe is a purpose-built appliance with all enterprise-grade features built-in, such as immutable snapshots, inline deduplication, encryption at rest, and disaster recovery with WAN optimized replication. It is largely automated with no need for expertise to setup and operate. The unique scale-out appliance consolidates backup, unstructured and archival data in a single, simple to use storage infrastructure.

Conclusion

When data gets lost, corrupted, or damaged, the time required to restore and resume normal business operations is extremely critical. Look no further than OneXafe for on-premises scale-out immutable storage to meet growing data footprints and protection against ransomware.

'Almost half of businesses reported to ICO since GDPR came into effect', says report

Almost half of UK enterprises (43%) have been reported to the Information Commissioner's Office (ICO) over a breach, either actual or potential. This is according to a new report from encrypted storage company, Apricorn, which found that a third of the companies notified the ICO themselves, while a tenth were reported by somebody else. A further 9% of the respondents said they did not know if the breach had been reported or not. Respondents also said they struggle to identify and locate data (33%), understand data obligations (31%) and adequately secure data (25%). Apricorn polled 100 UK IT decision-makers from large enterprises.

Premium comprehensive cloud storage for SMEs

Cloud hosting and services provider IONOS has partnered with Nextcloud to offer UK SMEs a comprehensive cloud storage option. The companies have been working on a professional cloud storage solution that enables collaborative working for small businesses, agencies and self-employed professionals. With this, IONOS has GDPR in mind, with the company guaranteeing the solution will offer efficient teamwork in accordance with European data protection standards, while allowing flexibility when storing, managing and editing data collaboratively.

Herts set for new data centre

Pure Data Centres and Panattoni have been granted permission for a three-storey data centre in Borehamwood, Hertfordshire. The joint project will contain servers and computing equipment to support the operation of the internet, along with 42 emergency back-up generators located at the rear of the site. It will also create 117 jobs in the process. This data centre will be built on the site of the former Sainsbury's frozen food depot. Prior to that, the site was MGM studios.

REvil gang websites go offline

Websites for a Russian-linked ransomware gang accused of attacks on hundreds of businesses worldwide have disappeared from the internet. Monitors say a payment website and a blog run by the REvil group became suddenly unreachable on Tuesday July 13. The reason behind the disappearance is still unclear but has sparked speculation that the group may have been targeted deliberately by authorities. The timing of the disappearance has sparked speculation that either the US or Russian officials may have taken action against REvil - though officials have so far declined to comment and cyber experts say sudden disappearances of groups are not necessarily uncommon.

UK food supply chain vulnerable to cyber-attack, says expert

The nation's food supply is highly vulnerable to cyber-attacks, according to a leading food expert. Tim Lang, professor of food policy at City, University of London, said greater emphasis on domestic production would boost the UK's food security. "If anyone wanted to really damage the British food system, they could just take out the satellites," he added. "Our 'just-in-time' system is entirely dependent on computerised logistics. When you pay for your food at the checkout, the computer isn't just adding up the bill, it's reordering the stock."

Council data centre in Victorian swimming baths

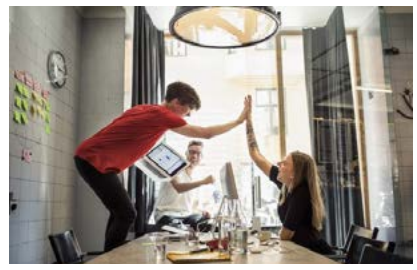
The Ashton Old Baths in West Ashton-under-Lyne has been converted into a tech hub, containing a Tier III data centre that will house local council infrastructure. It was supplied by data centre specialist Sudlows to Tameside Metropolitan Borough Council. It is understood the authority will be moving systems from a Rochdale facility into the new space.

Kao Data first UK DC to transition to renewable HVO fuel

Kao Data has partnered with Crown Oil to become UK's first data centre operator to fuel all its back-up generators with HVO (hydrotreated vegetable oil) fuel in place of traditional diesel. Another major step towards its Net Zero ambitions, Kao will eliminate up to 90% of net CO2 from its backup generators and significantly reduce nitrogen oxide, particulate matter and carbon monoxide emissions. In line with its commitments as a signatory of the Climate Neutral Data Centre Pact (CNDCP), the use of Crown Oil HVO fuel marks another significant step in the company's plans to become a fully carbon neutral data centre operator by 2030.

Vodafone and Cisco launch enterprise-grade broadband and Wi-Fi solution

Vodafone has partnered with Cisco to launch Complete Connectivity, a new broadband and Wi-Fi solution powered by Cisco Meraki. Designed for small and medium businesses (10 – 250 employees), it offers "reliable and secure" broadband connectivity across sites, with advanced security features to ensure SMEs have everything required to stay connected, secure and in complete control. Furthermore, Complete Connectivity provides "simple-to-manage, enterprise-grade hardware and software" without the need for in-house expertise to operate it. Prices start at £70 a month on a three-year term, per site.



Word on the web...

Network infrastructure… where is all the talent?

Ken Hillyer at CNet Training on plugging the skills gap

To read this and other opinions from industry luminaries, visit www.networkingplus.co.uk

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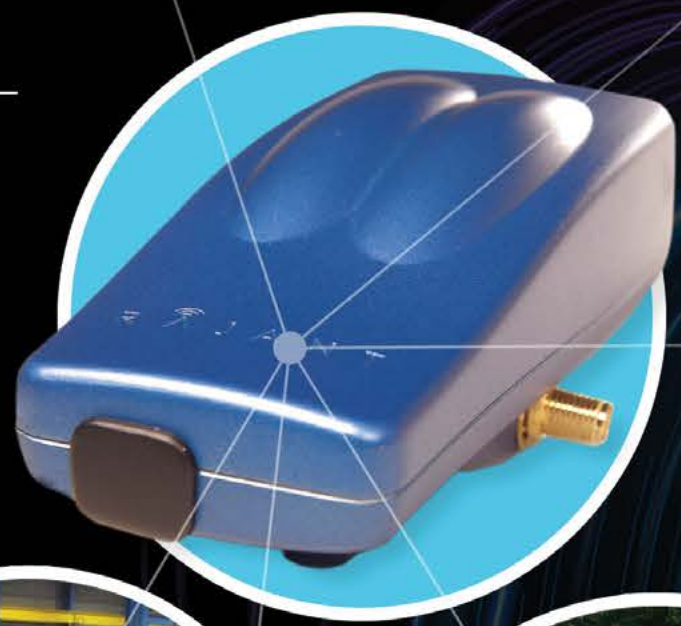

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Lessons from Solarwinds

The Solarwinds attack took the cybersecurity world by storm last year, making all organisations question the security of their networks. Keith Glancey, systems engineering manager, western Europe at Infoblox offers his tips

Commercial enterprises and government agencies alike have been facing off against a highly sophisticated attack targeting supply chain software. IT company SolarWinds announced in December that monitoring products it released in March and June last year may have been compromised through a "highly-sophisticated, targeted and manual supply chain attack by a nation-state". FireEye and Cisco are just some of the high-profile companies believed to have been affected by the SolarWinds hack.

Government cybersecurity agencies have also warned that the attackers behind the SolarWinds hack are believed to have used weaknesses in other, non-SolarWinds products to attack high-value targets, with Russian state-sponsored hackers emerging as the likely perpetrators.

What's clear is that many of the world's biggest technology vendors were caught off guard by the SolarWinds attack. Just like the WannaCry and NotPetya attacks back in 2017, this incident shines a light on how far we still have to go in securing enterprise infrastructure and data from evolving threats. What we know is that the attack targeted SolarWinds' Orion platform, allowing it to distribute malware to its customers.

So, how can organisations firm up their network security to avoid falling victim to the next attack?

Keith Glancey, systems engineering manager, western Europe at Infoblox

1. Build foundational security

This attack shows that relying on one or two security technologies alone is unlikely to provide protection against sophisticated attacks. In addition to following security best practices such as password rotation, account audits and staying on top of emergency advisories, enterprises and customers alike need to use defence in depth for detection and threat containment.

Using a DNS security solution as part of a multi-solution architecture to look at all possible threats using any channel, including network control protocols like DNS, will go a long way to improving an organisations' overall security posture. When an attack like this happens, security solutions across an organisation's DNS can detect anomalous behaviours in the network such as malicious communications, advanced persistent threat activity, domain generation algorithm activity, botnet communications, DNS tunnelling, and data exfiltration. The solution also integrates with Security Orchestration Automation and Remediation (SOAR) systems, ITSM solutions, vulnerability scanners and other security ecosystem tools to trigger remediation actions automatically if any malicious activity is detected.

2. Create resilience with threat intelligence

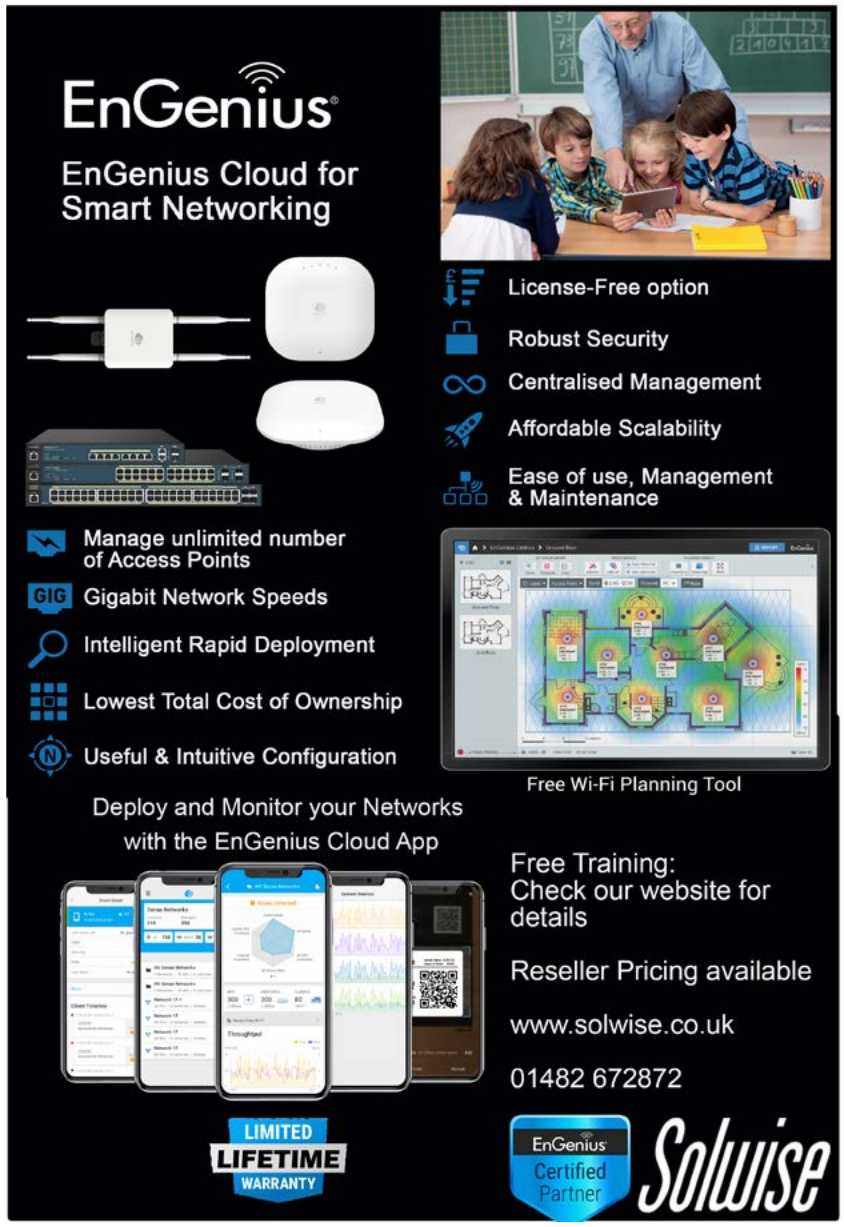
It's near impossible to protect your organisation from cybersecurity threats unless you know what you're up against. Threat intelligence creates timely, reliable and actionable insights that allow enterprises to secure their networks against evolving cyber threats while ensuring unified security policy across the entire security infrastructure.

Not only does it provide actionable insight against current threats, but it also future-proofs an organisation's defence. Highly contextualised and automated threat intelligence will pool insights from trusted sources to help organisations develop immunity to specific attack methods over time, making organisations more resilient to malware and data exfiltration.

3. Uncover the Value of DDI (DNS, DHCP, IPAM) data

Analysing historical DNS logs is an effective way to see any network activity over a longer period of time and find out what resources a client has been accessing. DHCP fingerprint and IPAM metadata provide contextual information on affected devices such as type of device, OS information, network location and current and historical IP address allocations. All this data helps with event correlation and understanding the scope of a breach.

The SolarWinds attack has taught us that no one is safe from the increasingly sophisticated attacks we'll continue to see in 2021 and beyond. There is no question that cybercriminals will continue to exploit network vulnerabilities, so it's up to organisations to stay one step ahead by not overlooking the importance of DNS security in protecting their own, and their customers', entire IT infrastructure. ■



Why choose mesh?

Mesh networks have long been synonymous with the emergency services network, hospitals, schools, public halls and the home to name a few. But how useful is it for enterprises? Robert Shepherd investigates

We all want and need a robust wireless network, regardless of the sector we work in, because it's essential for businesses to maintain broadband connectivity and handle multiple connections reliably. That's a no-brainer – after all, a network with high bandwidth can accommodate modern working and living, which include the streaming of vast amounts of data, voice and video that is commonplace for businesses to function in the best way possible. With that in mind, more and more enterprises are looking to wireless mesh networks because they can deliver more "dynamic connectivity" than traditional network alternatives overcoming obstacles and providing redundancy. Tell me more, you say.

Mesh networks might sound like a new(ish) phenomenon, because they have garnered attention in the consumer/home-working environment in the last couple of years. It makes sense when you think about how most of us are still working from home as companies up around the world, not just the UK, plan a future of remote and flexible working for reasons we really don't need to discuss.

In mesh, all the computers are interconnected to every other on the relevant network. Each device not only sends its own signals but also relays data from other computers. The nodes are completely connected to each other, via a dedicated link during which information travels from node to node and there are N(N-1)/2 links in mesh if there are N nodes. Every node features a point-to-point connection to the opposite node. The connections within the mesh can be wired or wireless.

In fact, it may interest you to know that the concept of mesh networks dates back to the 1980s in military experiments. It then became available in high-end production hardware in the 1990s. However, a combination of cost, complexity, a scarcity of radio spectrum and other limitations in early implementations, mesh didn't gain traction and enter the modern lexicon until the middle of the last decade – 2015 for the pendants. With its arrival came a promise to solve the problems synonymous with Wi-Fi,

> **"The most useful feature of a mesh system is that it can be set up without any wires to connect the satellites"**
>
> *Doug Cheung, Netgear*

improving coverage, speeding up networks and putting an end to a lot of hassle.

> **"Purchasing a mesh system needs to be considered as an investment into the future of an enterprise"**
>
> *Patrick Hirscher, Zyxel*

It also promised to remove the need to place base stations meticulously around a home or small office to avoid those debilitating slow and dead spots.

With mesh, not all the access points (AP) have to plug into the wired infrastructure. Those not plugged in get their network connection wirelessly from a nearby mesh AP. Small mesh networks might require only a single mesh AP plugged into the wired network, while larger networks require multiple mesh APs to be plugged into the network to support those that are connected wirelessly.

Then there's kinetic mesh, the industrial wireless mesh network, enables people and organisations to function where communications infrastructure has been severely damaged, completely destroyed, or to swiftly move networks to places where they didn't exist previously. Real-time mobility across the network is achieved.

Arguably the most prominent player in the kinetic mesh space is Rajant, the US-headquartered firm born from the ashes of the 9/11 terrorist attacks. Along with supplying the services to the underground mining sector in Africa and elsewhere, in the UK, Rajant helped deliver the most suitable network to ensure the safety of

those at two royal weddings, with hundreds of thousands of people flooding to Windsor to celebrate the landmark occasions. The two royal weddings were Prince Harry to Meghan Markle and Princess Eugenie to Jack Brooksbank. "The Thames Valley Police needed to effortlessly provide supplementary CCTV coverage with unfailing resilience and range," says Chris Mason, vice president of sales – EMEA for Rajant. "We had less than a week to create a full-coverage network of specific areas before the wedding ceremony of Prince Harry and Megan Markle. Rajant's rapidly deployed and secure network provided the robust CCTV network the police required to keep everyone safe at all times during the ceremony."

Mason explains how the kinetic mesh integrated with existing communications infrastructure, ensured real-time mission-critical video and data was provided for

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enhanced visibility.

"Utilising multiple high-bandwidth frequencies, the kinetic mesh ensured wireless output from broadcasters and the general public did not prevent transmission of any important imagery," he continues. "The imagery was several seconds ahead of the television broadcasters covering the event, ensuring that Thames Valley Police remained in control. Thames Valley Police also worked alongside Rajant to support security efforts at the Royal Ascot race meeting, with approximately 300,000 people in attendance."

The use cases at the highest level are clear to see, but mesh networks can also be fit for enterprises that need connectivity in settings where it's hard to run cable, outdoor areas, and rented spaces or temporary locations. What's more, Patrick Hirscher, EMEA wireless market development manager at Zyxel, the manufacturer of network devices, says "UK enterprises are finding themselves drawn to mesh systems" for the same reason that they've been so popular domestically. "They're incredibly effective at removing Wi-Fi 'dead zones', are super simple to set up and importantly won't sacrifice connection speeds as you add more nodes to grow your network," he says. "Better still, you can happily move around the business and your device will automatically connect to whichever node produces the strongest signal, saving you the hassle of logging in to different networks."

However, Steve Mace, technical director at Solwise, the antenna manufacturer for mobile broadband and WLAN, argues that mesh is slower than the alternative of good APs cabled back. "Further mesh gets rapidly slower as you add more APs," he says. "Cabled APs runs at full speed all the time. I can't see why a business installation would consider mesh.

Also, it depends on the application, in a wide-open space such as a warehouse or machine workshop, it would work fine, but in an office with lots of bodies and objects to disrupt the wireless, not a great option.

Doug Cheung, senior product line manager at Netgear business wireless, says that typically, a mesh system is most useful in a small professional office with less than 25 employees. "A mesh system, such as the Orbi Pro, can support up to six satellites," he adds. "Each satellite, such as the satellite for SXK80, can cover areas of approximately 3,000 sq ft (300sq metres). Adding the router (or the base), the Mesh System can cover a rather large area.

"We had less than a week to create a full-coverage network of specific areas before the wedding ceremony of Prince Harry and Megan Markle"

Chris Mason, Rajant

The most useful feature of a mesh system is that it can be set up without any wires to connect the satellites. This is both convenient, and flexible for deployment.

On top of that, Orbi Pro has security features that greatly improves the network security for the business."

One accusation levelled at the mesh crowd or advocates is that it's not easy to upgrade the hardware in the system. Hirscher says things have changed.

"When mesh first hit the market in 2015, hardware upgrades could be a tedious seven-step process, as IT professionals manually downloaded the updates for their mesh routers," Hirscher adds. "However, over the past few years, vendors have worked hard to reduce the length of the upgrade process. Now, with the use of cloud management solutions, such as Zyxel's Nebula, business users can monitor and update their mesh systems via their smartphone or tablet."

Cheung goes a step further and argues that systems are actually designed to be extremely convenient to set up. "The base unit and the satellite are pre-paired if purchased in a bundle," he says. "The trade-off is that the satellites are not designed to be compatible with a different mesh system model. For example, the satellite for SXK30 is not compatible with the router of SRK60 or SXK80."

Nevertheless, Mason argues that UK enterprises need to exploit technologies within the Industrial Internet of Things (IIoT) sector, blockchain solutions and big data to ensure they remain ahead of the curve in an increasingly connected age.

"Mobile communication technologies can keep up with the demand and continue to deliver for their customers in an ever more automated age," he says. "Aging and legacy technology will struggle to meet the growing needs of an organization looking to enable autonomous operations."

Furthermore, Mason says that "replacing the existing connectivity infrastructure with a more modernised system", can, in turn, involve costly and time-consuming installations. "This may disrupt day-to-day operations and affect overall productivity," he continues. "An out-of-date system may lack network security capabilities, potentially exposing them to risks and vulnerability. A wired infrastructure may limit its reach and significantly hold back businesses from reaching their full potential."

That's not to say there aren't any other Wi-Fi-aiding technologies on the market. Scour the internet and you'll find companies pushing powerline extenders, boosters, repeaters and other bits of kit all threatening to do the same thing – put an end to blackspots and dead zones. What's more, these technologies are a lot easier on the pocket. With that in mind, why choose mesh?

One argument is that powerline systems will only work well in buildings with clean and quiet mains wiring, which is never a guarantee. Boosters aren't likely to offer seamless roaming and take longer to configure than mesh systems.

Cheung points to the fact that extenders and repeaters are layer two devices, which means they do not perform an internet routing function. "Secondly, they are one-to-one mapping, meaning, you have one powerline socket going to the wall, and one ethernet port that goes to one ethernet device," he says. "It is vastly different from a Wi-Fi mesh system, which serves a large number of end-point devices. A repeater is one single device that extends the Wi-Fi signal from the base unit. It does not have the ability to form a multi-unit mesh network."

That said, Mace adds a repeater network could also suffer the same performance drops as mesh; "at the end of the day" mesh is simply a repeating Wi-Fi network where the nodes decide the best routes for the traffic. "In a standard repeater network you fix the repeating in the setup," Mace continues. "However, with mesh systems, they all seem to restrict usage to the lower, non-dfs, 5GHz channels. This is because the mesh units can't cope if nodes suddenly change channel. If you use fixed repeaters then the option is there to use the extended channels which means less interference and wider bands so better performance. The one advantage of mesh is 'no brain' setup."

Mason argues that while powerline adapters can extend wired connectivity to all parts of the building using existing electrical circuitry, "in contrast", a wireless mesh network can provide the scalability, reliability and robustness needed to provide unfailing connectivity for a business' operations to run seamlessly.

"Wireless repeaters re-broadcast an existing wireless signal, but with a mesh network, the operator can keep all devices on a network directly connected without using a central router or switch," he adds. "UK enterprises may have assets including vehicles and staff constantly on the move across their sites. In that case, it may provide the capability to support numerous mobile devices at once, but this solution is most suited for indoor environments where assets are stationary. Suppose powerline extenders or wireless repeaters are utilised. Operators subsequently have to add multiple access points to keep sprawling outdoor operations covered. The network may not be able to work around interference, which means coverage drops are commonplace."

As the merits of a mesh system become clearer, many enterprises have been deterred by the cost synonymous with it, because, by all accounts, it's not cheap.

"Purchasing a mesh system needs to be considered as an investment into the future of an enterprise," says Hirscher. "While the initial cost of mesh may be on the slightly higher side, once enterprises have invested in the system, their yearly cost of managing and upgrading is significantly lower compared to other wireless access solutions. The benefit of today's mesh systems is that they can be managed directly from a cloud system which, for vendors such as Zyxel, is free for the user. Every firmware upgrade and support service is completely free, and so once that initial cost has been absorbed, mesh becomes one of the most cost-effective infrastructure decisions that an enterprise can make."

"I would also think that mesh products have more margin for the manufacturer"

Steve Mace, Solwise

Mace says there are possibly two reasons why mesh is expensive to run. "A mesh AP has to work harder routing the traffic so, perhaps, a mesh product has a faster process/ram so, perhaps, that means more money," he adds. "I would also think that mesh products have more margin for the manufacturer. Mace also argues that reliable mesh networks need the equipment to be capable of high-speed connections. "I would also think that mesh products have more margin for the manufacturer. You are paying for convenience of not laying cables over a wide area, and in theory a seamless wireless hand-off of clients between nodes."

However, Cheung argues that it's "not particularly expensive" if one considers the features included in the deal. "Take SXK80 as an example, it has tri-band, in each band, there are 4-streams of Wi-Fi (4x4 transmit x receive)," he says. "Altogether, there are 12 streams of Wi-Fi radio delivering 6Gbps aggregate throughput. On the wired interfaces, there is a 2.5Gbps ethernet port, and 4 gigabit ethernet ports in each of the router and satellite units. On top of that, there is a power CPU and memory system to run the mesh system, internet access, and headroom for additional services."

So, what's the verdict?

Hirscher says the scalability factor is particularly important to businesses, as SMBs across the UK increasingly adjust their strategic approach from recovery to growth mode. "For these businesses, mesh systems present a quick and easy solution that is entirely capable of keeping up with their growing headcount and meet the demands of their expanding offices."

The jury is out, but the general consensus is mesh is easier to install and configure than other forms of network infrastructure. They can be particularly useful in enterprises operating on large-scale premises where seamless roaming is useful and important.

As for the cost? It costs money because it saves money. ■

Hacker and online security concerns rise

Nicole Lin, managing director of Synology UK

With online services growing at an exponential rate, requiring us to change our passwords every six months, we must explore our approach to identity authentication and password management in the long run..

Before 2020, remote working was a perk to employees. One pandemic and global lockdown later, led to the entire world scrambling to get to grips with Zoom meetings, cloud storage and VPNs, plus fast-tracking long overdue IT skills updates.

In this global rush to working remote, handling security particularly in the cloud has been a challenge. Smart security providers have sensed an opportunity to market sophisticated tools to protect network infrastructure, and these tools serve a vital purpose. Advanced security gateways, for example, inspect every packet entering your network flagging any potential threat.

Now with that disclaimer in mind, let's address the elephant in the room namely, these tools are like a castle built on shaky foundations if IT admins leave the humans in the organisation to their own devices when it comes to security. Verizon investigation report on data breaches puts things into perspective: 61% leverage credentials. So where have things gone wrong?

Let us put ourselves in the shoes of a hacker. What will require the least amount of effort to breach an organisation's security? Rather than spending hours identifying a system's vulnerability to hit a target with ransomware, "guessing" a password is just as easy and allows entry without creating a fuss.

It is important to consider all aspects around passwords. We are told, reminded, encouraged to make passwords complicated. "123456", anything containing your date of birth, names etc… are too obvious and constitute a risk. Increasing the complexity by making it longer, including special characters, is the logical solution. However, unless one has an eidetic memory, the temptation is great to re-use the same password for Gmail, Windows, Salesforce, Twitter and once one account is cracked, your whole privacy is at risk.

This shows us one thing: passwords have served us well, but an arms race with hackers is not going to end well for corporations without a change of strategy.

So, from an individual's perspective, how can password complexity be enhanced with a growing number to remember as we use ever more online services? Password vaults are a first step, as they also allow us to generate strong, secure passphrases. But the more cynical of us will simply see this centralisation as a single point of failure: gain access to the vault, and every single account is then compromised.

This needs to be combined with a consistent use of multi-factor authentication methods. The concept is quite simple, with unauthorised logins being prevented by adding an extra layer of checks to ensure you are the right person. This is typically another device such as your phone, to which a one-time passcode is sent, and you need to enter within a short period of time to confirm you are not a hacker. Security can be pushed even further with "something you are" in the form of a biometric identifier. Smartphone fingerprint recognition is the most common example.

With two-factor authentication increasingly common in the tech industry, from Gmail to Amazon accounts, one would think hackers would soon be running out of options. Well humans are remarkably creative, and to impersonate you and "something you own", you may have heard of "sim-swapping": Here a hacker fools your mobile provider into switching your SIM card information to a different phone and the hacker is then able to access your verification code.

Since passwords will always present a certain level of vulnerability, the logical conclusion is to move beyond them. Which is what came from a meeting between PayPal and Validity Sensors back in 2009 where when discussing the use of biometrics for identification of online users, it appeared clear that the first bricks for an industry standard would be needed. This would soon become the FIDO alliance, for Fast IDentity Online.

The concept is simple enough: contrary to passwords where authentication is initiated by the user who sends information to the website's servers, the FIDO approach is device-centric, with no personal / biometric information ever leaving the user's device. This is achieved by using a public-key cryptography model. When registering to a website, a public key is provided rather than a password. Later, when the user wishes to log in the website's server will initiate a challenge to the user's device, which can only be solved using the private key which was kept on the device. Security is further enhanced by ensuring that the public / private key is issued for the website in question. Importantly, this removes the threat of phishing scams where a fake website, visually similar to a mainstream one, is used to collect a customer's credentials without their knowledge.

The staggering growth seen since last year in the use of malware, up by 358%, as well as ransomware, up by 435% shows how essential it becomes to spread best practices around online security, be it by standardising extra password complexity and 2-factor authentication, to a more fundamental shift in attitudes with the adoption of public-key authentication methods. To accompany this shift in attitudes, websites and platforms, as well as manufacturers of servers, must make these safer authentication methods available. ■

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A very British story

The Scottish government, a Welsh council and the Ministry of Defence upgrade their systems

Pembrokeshire County Council invests in ultrafast broadband for remote businesses

Pembrokeshire is home to more than 6,000 businesses, with a particular strength in green energy production; more than 20% of the UK's energy was produced in Pembrokeshire in 2017. And with this summer being the year of the staycation, Pembrokeshire's many tourism businesses will also be more popular than ever.

To maximise opportunities for these businesses, and to help position Pembrokeshire as an ideal location for entrepreneurs, as well as the increasing number of work-from-anywhere employees, the local council has committed to levelling up the digital capabilities of the county's infrastructure.

"Without a concentrated effort from Pembrokeshire County Council, businesses would simply not have been on the radar for a full fibre connection," says Cllr. Paul Miller, the Pembrokeshire County Council cabinet member for economy, tourism, leisure and culture. "It could have been a decade or more before real digital connectivity reached rural Pembrokeshire and all the while our communities would have been falling further and further behind, businesses would be stifled by poor broadband experience. We wanted to set our ambitions much higher than that".

Having recently acquired a landmark investment of £200m, Welsh-grown Ogi provided an obvious partner.

Full-fibre broadband

The investment from Infracapital – one of Europe's leading infrastructure investors, together with the support of Pembrokeshire County Council, is allowing Ogi to build a full-fibre to the premise network, unlocking speeds of up to 900 Mbps for businesses in the county. Bringing real fibre right up to the front door of enterprises improves existing fibre networks which often rely on old-fashioned copper wires for the final connection to premises.

"'The majority of broadband connections in the UK have a copper connection into the home, in fact full fibre coverage in the UK is only at 24.33% and in Wales it is only 22.69%," adds Justin Leese, chief technology officer for Ogi. "Unfortunately a lot of internet companies call their copper based internet services "fibre broadband" when in fact the fibre only goes as far as the green cabinet at the end of the street. Ogi is building full fibre broadband connectivity to homes and businesses across south Wales, this means we run fibre all the way into the customer's premise."

In the Pembrokeshire town of Haverfordwest, local businesses could see their broadband speed increase by up to thirty-two times.

Community

"Ogi is a Welsh-grown brand, and they're committed to improving the broadband experience of communities and businesses in Wales. They understand the importance of being connected in places like Pembrokeshire, and they understand the crucial role broadband is going to play in the Welsh economy for generations to come".

Cllr. Paul Miller, the Pembrokeshire County Council Cabinet Member for Economy, Tourism, Leisure and Culture.

Working with the support of Pembrokeshire County Council, Ogi has already been able to begin engineering work on the new network, laying kilometre after kilometre of cutting-edge fibre cable.

"We're totally committed to helping every Welsh community build back better," says Ogi CEO, Ben Allwright. "Everyone prospers when brilliant broadband delivers real opportunities, resilience and sustainability, and we have big ambitions to see Pembrokeshire enterprises flourish." ■

Left to right: Lauren Price, Draupadi Stewart, Lee McSparron, Anwen Bazsdwin (Pembrokeshire County Council), Steve Cooper (chief delivery officer, Ogi), Alan Farmer (regional build manager, Ogi)

Scottish government centralises and secures its network for better customer experience

The Scottish government's network serves several core departments, such as justice and education, along with nearly 40 public agencies in Scotland, as well as in Dublin, London and Brussels.

It was looking to implement processes that would simplify operations, management, and support, and allow it to work as efficiently as possible without network interruptions. To do so, it needed to transform its infrastructure; creating a centralised and secure Wi-Fi network for all departments and agencies, and, by better meeting the connectivity needs of its customers and their institutions, deliver an improved digital experience.

Creating this reliable and resilient network presented a few key challenges that had to be addressed and resolved.

Scotland has a unique situation compared to most of the UK, with some agencies and departments working in remote and sometimes extreme conditions. These environments require a robust network capable of withstanding harsh environments and ensuring consistent reliability.

In common with other Government bodies, it was also concerned about security risks, and resolving vulnerabilities across the network. With users operating across Europe, on land and sea, the Government wanted a way to ensure that all institutions accessing the network could guarantee their data would be secure.

Alcatel-Lucent Enterprise (ALE) joined forces with Freedom Communications – a GCI Group Company, Computacenter and Sol Distribution, to develop and secure the government's network infrastructure and meet the connectivity needs of its agencies and their users.

A combination of products and solutions was introduced to address the challenges it faced:

An Alcatel-Lucent OmniSwitch 6860 and 6900 Stackable LAN Switch, designed for the most demanding Wi-Fi networks, offer high-speed flexible uplinks, 200G stacking, industry leading 95W PoE, and high density 10G multi-gigabit ports ready for Wi-Fi 6, for high performance and extremely low latency.

OmniAcess Wireless Access Points were distributed across the government's more remote institutions and agencies. Ensuring a high-performance WLAN network and Wi-Fi signal in both indoor and outside environments, these Access Points provided uninterrupted connectivity, allowing them to communicate securely via satellite connection to the Wide Area Network.

Furthermore, to address network vulnerabilities and security concerns, ALE introduced user network profiling, meaning that anything new plugged into the Scottish government's network is now challenged. Depending on how the device presents itself, it is given an individual profile that determines the services the device can access and retrieve.

Mark Hagart, head of data centre and network services, ITECS, at the Scottish government, explained why they chose Alcatel-Lucent Enterprise's solutions; "Our previous history with Alcatel-Lucent Enterprise gave us faith in its technology, and faith in our partnership, working with the account managers and the back-up support team that we have in place."

The new technology has successfully enabled the Scottish government to function on a centralised and secure Wi-Fi network and desktop solution.

The installation of OmniSwitches and OmniAccess solutions have particularly transformed network accessibility in rural locations, minimising downtime, and enabling systems to survive power outages. In turn, this has made

rural agencies much more reliable, improving the service they can deliver to their citizens.

Rural locations have not been the only areas to present challenges for the Scottish government. Scotland's marine protection vessels occasionally experienced network unreliability, but the installation of OmniSwitches and wireless connection points allow the service to run via satellite connection and then back to base, meaning the network maintains robustness on both water and land.

Hagart commented on the outcomes of implementing these new technologies: "The robust nature of our network infrastructure has ensured we can confidently support over 40 public services agencies in Scotland. Organisations like Food Standard Scotland, Transport Scotland, Marine Scotland, and Forestry Scotland all use our desktop solution underpinned by Alcatel-Lucent Enterprise technology."

The new centralised systems have also simplified operations, offering IT visibility which has improved project and issue management. In the face of a problem, engineers can now quickly respond with the help of a dedicated end-customer support program.

Crucially, the new solution offers all these technological benefits while guaranteeing security, simplicity, efficiency, and agility. The agile solution also means that the network can change and adapt to the needs of the Scottish Government in the future and is open for future integration and evolution.

Hagart concludes, "Across the board, it's made sense for us to use the Alcatel-Lucent Enterprise solution. Our experience with the platform has delivered previously unattainable levels of uptime and, having been independently benchmarked and surveyed, user confidence in our network has risen to very satisfying levels." ■

Service personnel morale soars with Wi-Fi internet

Nowadays most people take internet access for granted, don't they? Well, yes. Unless, that is, they're in the Armed Forces. For many service personnel on UK military bases, high-speed web browsing used to be beyond reach.

BT terms and conditions stipulate fixed term contracts and cancellation charges: not ideal for service personnel who may be posted anywhere in the UK or overseas at a moment's notice.

"Camps are often too far from the local exchange for conventional broadband," says Simon Bond, MOD client manager in BT global services defence and security team. "There are commercial difficulties too, particularly with providing fixed lines into what is effectively temporary accommodation."

The MOD says it is committed to equality of lifestyle choices for all Armed Forces personnel. A major recommendation from the Defence Estate Review Programme was that all new single-living accommodation at military bases should have internet access. But delivering that promise cost effectively to existing quarters was a real challenge. An innovative approach was called for and BT developed a bespoke broadband wireless internet access solution called MOD Wi-fi. Specifically designed for the Armed Forces it's based on BT Wi-Fi (formerly BT Openzone), the fast-growing public Wi-Fi service.

BT Wi-fi provides fast, secure access to the web without the need for a fixed network connection. Linked by a high-speed broadband network, BT Wi-fi hotspots support fast data transfer for wireless devices within a range of around 100 metres. There are over three and a half million BT Wi-fi hotspot locations across the UK and the Republic of Ireland, as well as public wireless roaming through BT partner networks when abroad.

Featuring more flexible commercial terms, MOD Wi-fi provides high speed wireless internet access with no set up charges. A range of payment options are offered including a one-month rolling subscription with unlimited download, a pay-as-you-go voucher scheme, or a standard 18-month contract. There is even the potential for free access for personnel with existing BT Broadband or BT mobile contracts, including free Wi-Fi minutes from BT Wi-Fi partners such as 02, Everything Everywhere, Tesco Mobile, and Vodafone.

Before starting an MOD Wi-Fi installation, a detailed physical survey of the military base identifies the right locations for the wireless access points for optimum coverage. BT also obtains accreditation for the design via the MOD Site Co-ordinating Installation Design

BT kits out the Armed Forces

Authority (SCIDA). Optical fibre cables, usually in a highly resilient ring, provide fast connectivity – typically between 100Mbps and 1Gbps – to the BT core network. As part of the installation sign off BT provides a "heat map" which shows the strength of network coverage in the different areas of the accommodation.

The first military base to take advantage of MOD Wi-Fi was HM Naval Base Clyde (also known as Faslane) – the nation's primary base for submariners.

As well as surfing the internet and sending emails service personnel can watch catch up TV, visit gaming sites, and carry out personal banking. They can even set up webcam video links over the internet to chat with family and friends.

"Most people are posted here for between 18 months and three years," says lieutenant commander Louise Wooller. "It's very important for them to keep in contact with family and friends as well as conduct personal business. The internet is a lifeline, so the MOD Wi-fi solution from BT is hugely popular. In fact, BT has had to increase available bandwidth to cope with growing demand." ■

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Sensor to satellite sows new IoT seeds for agriculture

Alastair Williamson, CEO at Wyld Networks looks at why agriculture is turning to the IoT for help and the role of satellite comms

The UN Food and Agriculture Organisation has predicted that global food production in 2050 will need to be 70% higher than in 2009, as the world population and calorie per capita intake continues to grow rapidly.

To generate increases in yield without a major increase in land resource is going to require major changes in the face of climate change; forcing agricultural producers to battle against water shortages, increasing temperatures and more freak weather incidents. Meeting these targets will require a quantum leap in technology and tech take up in farming. However, this transformation is underway and at its heart is a growing, super-efficient agritech ecosystem with a dynamic, wirelessly connected IoT.

Demand for data

Fundamental to this agricultural innovation revolution is the need for more data points to give agronomists, engineers, designers and farmers a highly granular data picture of the food production cycle's aspects. BI Intelligence predicts that by 2035 there will be over four million data points per day on the average farm - an eight-fold increase on 2020.

Key data sources include soil moisture sensing, weather stations, crop and storage monitoring, livestock and asset tracking, following the complete field to fork journey.

For example, the moisture level of soil at different locations and depths across a farm helps to calculate the best times for sowing and harvesting, while detecting temperature changes in a greenhouse makes it possible to adjust ventilation and irrigation accordingly.

So much of agricultural success depends on being able to accurately measure and translate environmental conditions into intelligent insights and acting upon them, presenting truly enormous possibilities for agricultural IoT. Sensors measuring the location of livestock, weather or soil conditions are relatively cheap and straightforward to deploy, yet deliver unparalleled visibility and benefits across the biggest farms and ranches.

Farmers can monitor field conditions from anywhere, with data flowing seamlessly from sensors to the cloud and on to a laptop or cell phone app. This increases operational efficiency, lowers costs, reduces waste and improves the quantity and quality of yield. For example, it is estimated IoT could save up to 50 billion gallons of water annually, as sensors help farmers to optimise water usage.

Connectivity problems

Designing, producing and deploying sensors and devices needs to go hand in hand with connectivity improvements. The current pace of broadband change and mobile connectivity in rural Britain, according to the 2019 NFU survey, is unacceptably slow. Sixty-four percent of farmers believe their broadband speed is insufficient for their business needs and 59% think the cellular signal they receive is insufficient. The UK's Stuart Roberts, NFU Vice President, said: "Many members feel they still don't have adequate access to the broadband services needed to run a modern-day farming business."

However, connectivity for the IoT does not rely solely on cellular and Wi-Fi. Other wireless radio technologies are available.

LoRa and LoRaWAN

LoRa is a modulation method for transmitting long range radio signals with low-power. For example, a remote soil moisture sensor may send small data packets several times a day over a distance of say 10 kilometers for over 3-5 years, on two AA batteries. LoRaWAN is the standard protocol for wide area network communications using LoRa, creating an IoT network with bi-directional communications.

Sensor-to-satellite

An emerging technology in agritech is sensor-to-satellite connectivity. Using LoRa, it is possible to send data from the farm directly to a Low Earth Orbit satellite without the need to maintain a terrestrial LoRa network. Effectively, the terrestrial gateway is replaced by a gateway in space, freeing up sensors to be placed literally anywhere on the globe, however remote.

This means unserviced connectivity areas will come into range, while access to remote data opens up new applications. For example, a crop requiring a certain soil type, water input and fertiliser may become possible in a given environment if the true information of the ecosystem is understood, both on a macro level and in a highly-localised way. Specific, granular conditions can alter inputs to improve yield and reduce environmental impacts. The opportunity to blend this data with highly local satellite imagery is a potential game changer.

Future harvests

There is a massive potential for IoT innovation in global agriculture, connecting wireless sensors, from the corn and wheat heartlands of the USA, to sub-Saharan cassava production in Nigeria, to livestock farms of Argentina and to vertical farming in any urban global area.

Agricultural colleges and universities, agronomists, agrometrics software providers and farmers all stand to benefit from these new rich, granular data sources. Along with machine learning and AI breakthroughs, improvements in data flow are predicted to radically gain pace to deliver against the demanding environmental and agricultural targets lying ahead. ■

Four steps to protect your data against disaster in the cloud

Florian Malecki, senior international marketing director of Arcserve

The recent fire at OVHcloud's data centre in France has placed huge emphasis on businesses to evaluate the best ways to keep their data safe, Florian Malecki, senior international marketing director, Arcserve, provides guidance on ways to keep data safe for when the worst happens.

Is data truly safe when an organisation moves to the cloud? The recent fire at the OVHcloud's data centre in France proves that it is not. The fire impacted millions of websites—including government agencies, e-commerce companies, and banks and resulted in a lot of data loss. Some of that data was backed up and saved, but some is now lost forever.

And yet, many businesses still think that if their data is in the cloud, it's backed up and protected by their cloud provider. Indeed, a recent survey by Arcserve found that 44% of respondents believe protection and recovery of data stored in public clouds is the cloud provider's responsibility. It's not.

So why the misconception? For starters, many cloud customers think that because cloud services are now so prevalent and easy to use, they're also safe and disaster-free. Well, rideshare services are also prevalent and easy to use, but riding with one doesn't protect you against a car crash. Yes, you don't have to worry about maintaining the vehicle. But once you're in the car, it's still your responsibility to act responsibly and make sure you're wearing a seatbelt. That's the part many cloud customers forget.

Here are four ways to keep data safe, even when disaster strikes your cloud provider.

1. Don't rely solely on your cloud provider to protect your data

When moving to the cloud, companies need to realise that cloud security is a shared responsibility between them and their cloud provider and that the sharing is not entirely equal. It is you, the customer, who is primarily responsible for protecting your data in the cloud, not the service provider.

Leading providers like AWS, Microsoft Azure, and Google Cloud Platform typically secure the core infrastructure and services as part of their responsibility. But when it comes to securing operating systems, platforms, and data, that responsibility lies squarely in the hands of customers. Organisations that overlook this simple fact face a much higher likelihood of suffering data loss.

If a business signs up for a service like Office 365, for example, Microsoft clearly states in its terms and conditions that it does not take responsibility for your data. It's their responsibility to manage and protect their data. Typically, Microsoft will back up data for 30 days. After that, it cedes responsibility. This is why it recommends that businesses use third-party software to protect data in the long term.

Business owners need to be aware of their responsibility and ensure that they have protection solutions in place. They regularly test how they can recover from data loss if it happens.

2. Follow the 3-2-1-1 data-protection strategy

The 3-2-1-1 strategy directs that you have 3 backup copies of your data on 2 different media, such as disk and tape, with 1 of those copies located offsite for disaster recovery. The final 1 in this equation is immutable object storage.

Companies should look for a cloud storage solution that safeguards information continuously by taking snapshots every 90 seconds. This means that even if disaster strikes, data can be quickly recovered. With immutable cloud storage, there will always be a series of recovery points, ensuring that your data remains protected.

3. Ask the right questions

There is a list of essential questions you should be asking your cloud provider. You should ask it what procedures it follows for its own business continuity and disaster recovery. You should also understand its service-level standards. Is its service designed to stay up 99% of the time or 99.999%? The difference between just one or two 9's can be the difference between three full days of downtime per year for businesses versus 27 minutes of downtime per year. And that difference can have a significant impact on an organisation's bottom line.

Businesses should also find out if their cloud provider offers the additional data backup that lets them back up data to various geographic locations. And if so, is that service built-in, or do they need to subscribe to a third-party data-protection partner to ensure that they have the proper data backup and disaster recovery plan in place?

Finally, ask how easy or difficult it is to move to a different cloud provider. Moving from one provider to another is often easier said than done.

4. Have a recovery plan in place

Having the proper backup and recovery plan enables you to protect your data if and when disaster strikes. A recovery plan should include a simulation of business disruption to assess a disaster recovery plan. It should also include the regular testing of backup images so that issues can be resolved before they occur. In the OVHcloud fire case, customers who had a recovery plan in place were more likely to escape maximum damage and permanent data loss.

When it comes to data protection, businesses should hope for the best and prepare for the worst. Having a solid plan in place will ensure that they always land on their feet, no matter how far they may fall. ■

Register for Networking+

Selecting data centre ITE cabinets

Michael Akinla, UK and Ireland area manager, Panduit FlexFusion Cabinets

The continuing increase in compute density within data centres coupled with higher awareness of environmental sustainability requirements has driven the evolution of ITE cabinet designs.

How do you go about selecting a cabinet system that meets your compute and supply chain requirements and still offers customisation capabilities for future changes? A key initial decision is, does it meet your platform requirement? Whether you are a hyperscale, colocation, enterprise or edge site you need cabinets that are highly configurable with the modularity for future expansion or change.

Sustainability

Maximising energy use within the ITE environment through more efficient air flow across the hot equipment will positively influence the sites PUE and increase the energy available for compute purposes. Cabinet front and rear doors effect the rate of air flow across ITE, so choose a design that optimises the air flow into the cabinet. Today, you can select a cabinet system offering doors with 80% perforations providing increased high airflow.

Configuring cabinets in hot air containment layout offers increased energy efficiency by eliminating cold and hot air mixing. Creating a highly efficient hot air exhaust flow requires cabinets that seal gaps and openings in order that all exhaust heat is directed up and away from the ITE and cool environments. Ensure the cabinet you choose is optimised with the correct level of cable seal options, such as brush seals and CoolBoot grommets, which offer up to 95% air management efficiency.

Security and ease of management

For installation of systems and ease of maintenance and upgrades ensure that the cabinet door offers industry leading 170o opening to maximise access and allow more data centre aisle space.

Physical security is a key obligation to your customers and cabinets now offer a range of capabilities to ensure only authorised personnel access your ITE systems. Most cabinets offer a range of locks, so ensure that your chosen systems meet your requirements for access and monitoring. Handles now have capabilities to offer mechanical keylocks with replaceable tumblers, pin code and digital combination locks and smart handles that combine keys, card readers (low and high frequency) and onboard remote access to the cabinet's intelligent PDU interface and environmental monitoring. This offers the critical dual factor authentication secure access control often sought after by customers. This level of monitoring provides high levels of systems management whether on site or at a remote location.

Inside out

The speed of change in data centres heightens the need for a flexible cabinet system. Choose a system that provides a wide range of options in sizes from 600mm to 800mm widths and 1070mm and 1200mm depths and a range of heights from 42RU to 51RU, that way, whatever the requirement you are guaranteed uniform capabilities and high quality.

Fully adjustable front and rear E-rails help to maximise equipment utilisation, and rail position markers; top, middle and bottom ensure correct positioning, saving time and aggravation. Increased density means more ports and connections, so confirm the cable management capability of the cabinet for the density you need. Vertical cable panels are now essential and when employed with cable management fingers provide highly effective cable routing to the critical connectivity and increase the overall efficiency of the airflow cooling through the cabinet.

Additionally, the flexibility to easily remove the side walls of the cabinet, for installation or MACs, is highly useful so ensure your cabinet system has two-piece horizontal panels with conveniently placed handles and a locking mechanism.

Increased performance, heavy load

Higher performance has increased the loading on individual cabinets and is shifting the scales up towards 1,587 kg static load capability. Even semi-configured cabinets are a challenge to position within the data centre or move around if needed. Ensure you are also familiar with the rolling load rating, which is always lower than the static rating, however it can be as high as 1,133 kg.

Any colour, as long as it is…

Finally, remember that Panduit undertook research that demonstrated that white cabinets positively affect the light level reflected into the cabinet interior and therefore assists maintenance. We have ensured that all components of our white cabinets are indeed white and this has a very positive effect on the reflectance of light in the white space allowing for increased light efficiency and the ability to reduce LUX levels and better energy efficiency with fewer lights being deployed. Although, our cabinets are available in both white and black.

PRODUCTS

Excel's Environ range of free-standing racks and open frames along with a comprehensive portfolio of wall-mounted racks offers flexibility that makes them suitable for a wide range of applications in the enterprise, data centre and security markets, as well as for every day cabling systems. The range of Environ Racks is versatile, where each type of rack is suitable for a variety of applications. Each rack family has been designed with specific applications in mind, helping customers to select the most suitable option for any installation. For example, Environ Equipment and Communication series are suitable for everyday applications across the full spectrum of vertical markets, whilst the Environ Co-Location series is ideal for shared facilities where security is paramount. To complement the Environ range, Excel claims its Environ Locking Solution provides an ergonomic solution for environments where security is paramount. Bringing intelligence and monitoring right down to the lock level of a rack, "the Environ Locking Solution provides ultimate access control". The full range, which is available for free next day UK delivery and with a comprehensive 25-year warranty when installed by an accredited Excel Cabling Partner, can be viewed in the dedicated Environ digital catalogue. Excel's Specialist Support Services include pre-configured cabinets and on-site rack assembly to offer customers a flexible service which is proven to reduce installation cost and time whilst providing a fully tested, fully traceable, 100% inspected product. *Excel-networking.com*

The Cannon Smart Space cabinet has been designed to allow the side panels to be removed in situ and exchanged with various options e.g. half depth and side panels with brush glands to allow for simple cross patching between network and switch cabinets. The company says the cabinet allows co-locate users to have a suite of cabinets with cross connections completed within their own domain.

Traditional cabinet side panels are often trapped when cabinets are bayed together, but Cannon reckons the Smart Space cabinet can even be reconfigured to suit cold/hot row cooling - a unique solution for the dynamic IT environment. The cabinet offers two versions of sliding removable partition panels for racks bayed in rows. Used in pairs these narrow partition panels can slide fore and aft to either open cross cabling apertures between adjacent racks, or they close off inter-rack side access, protecting equipment in the process. Importantly, cooling air flow is managed to maximum efficiency in both positions.

Full depth panels, used singly (or in pairs) achieve a permanent sideways barrier between adjacent racks. They are also used as end-of-row side panels and "preserve cooling air flow efficiently".

RiMatrix Next Generation (NG) is described as a "ground-breaking new modular system for installing data centres flexibly, reliably and fast".

Based on an open-platform architecture, RiMatrix NG means customised solutions, delivering future-proofed IT scenarios, can be implemented anywhere in the world. These include single rack or container solutions, centralised data centres, distributed edge data centres or highly scaled co-location, as well as cloud and hyperscale data centres.

RiMatrix NGm, Rittal reckons, is the first platform that supports OCP direct current technology in standard environments.

Change is a constant across today's IT infrastructure, but digital transformation is creating innovation at a pace that has never been seen before and the pace will almost certainly continue to accelerate. This requires both rapid responses and long-term investment in data centres which are flexible enough to meet a myriad of new challenges.

Rittal says it has responded with its new RiMatrix Next Generation (NG) IT infrastructure platform.

"Right from the initial design phase, we thought ahead in terms of adapting to diverse and constantly evolving requirements when we were developing the open platform," says Uwe Scharf, managing director business units and marketing at Rittal. "Our customers have to adapt their IT infrastructures to developments faster than ever before to ensure business-relevant products and services can be continually created at the highest possible speed and without faults. "Our aim is to support them as their partner for the future."

Prism Data Centre Solutions Data Cabinet offering is the perfect solution for housing high density IT systems safely and efficiently, the company says.

Data cabinets are suited to a wide range of IT, telecommunication, AV and security purposes, with the most common use being to house smaller rack server systems in a stable yet easily portable housing. "That's why Prism let you design a cabinet tailored to your projects requirements, with a wide variety of customisable options from doors, side profiles and accessory options," the company adds. Key features include a bolted aluminium frame construction and lockable front door with 83% airflow mesh and three point locking. Additional options are split sliding slide panels and reptile plinths. *Prismdcs.co.uk*

The Qube Acoustic Wall Boxes and floor cabinets have been "designed to offer the best sound proof enclosures possible". Using what the company describes as "state of the art 34mm thick cladding", it is comprised of absorbent Class 0 fireproof acoustic foam laminates applied to both sides of a heavy layer sound barrier membrane. "Using this level of cladding, allows us to reduce noise by up to 25dB," Qube says. Furthermore, combining a high surface mass with flexible physical characteristics, the product offers optimum acoustic performance.

A Class 0 fire rating means that the Qube Acoustic range is suitable for demanding applications such as, marine and automotive industries.

The Qube Acoustic Wall Box is a good fit for small to medium sized data installations. *qube-enclosures.co.uk*

Described as a feature-rich rack enclosure, the NetShelter SX is one of the most popular on the market today. With generally positive reviews, the SX range is optimised for easy installation, managing cables, integrating power distribution and maximising airflow.

What's more, this apparently "multi-functional rack enclosure influenced by customer feedback (10 years of it) from around the world", is designed to meet current IT market trends and applications ranging from high density computing and networking to broadcast and audio-video. Designed with a strong focus on cooling, power distribution, cable management and environmental monitoring, the NetShelter SX rack enclosure provides a reliable rack-mounting environment for mission-critical equipment. *apc.com*

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Next generation mission critical services are being defined now – it's time to take part

Chris Hogg, GCF head of 5G certification

An analysis by the Global Certification Forum (GCF) has revealed that the rate of adoption of 5G technology in mobile devices is significantly outpacing the rate at which 4G LTE was adopted in its early years. GCF is a non-profit, global, membership driven organisation. With more than 300 members from major operators, MVNOs, all major device and IoT manufacturers and the test industry, working together with key industry partners on certification programmes demanded by the market.

One of 5G's cornerstones will be ultra-reliable low-latency communications, significant for mission critical use cases including semi-autonomous driving, and many more benefits are promised. Much of this improvement, the increases in performance and efficiency, and greater flexibility and variety of offerings, will be built upon the virtualisation of services. Here, hardware and software will be separated and commercial off-the-shelf computer systems will replace dedicated equipment proprietary to specific vendors within the telecom infrastructure.

What effect will this have on the provision of and demand for, mission critical services (MCX)?

These new 5G services will take time to roll out but the established 4G networks already provide many functions that blue light services and other critical users value, such as broadband internet access and high-definition video. Currently, in order to access these functions, operatives must carry additional devices, which are connected to non-mission critical networks. This is clearly not ideal and consequently there is a demand for a mission critical broadband solution. Such a solution would require a hardened radio network (LTE or 5G – both standardised by 3GPP) that, as defined by The Critical Communications Association (TCCA), "is capable of a very high degree of availability, priority, pre-emption, trusted security and extensive coverage".

So, where are we on the path to MCX over LTE?

Working together, GCF and TCCA are on track to launch a certification programme for mission critical devices based on 3GPP wireless protocols during 2022. Ensuring mission critical devices and networks are interoperable is a key part of GCF's vision to enable the high quality, reliable and secure wireless communications demanded by users and industries across the globe, and of TCCA's mission to promote standardized critical communications solutions and the benefits of open and competitive markets in efficiently developing and delivering these solutions. GCF certification, developed in close cooperation with TCCA, is the way to ensure that broadband LTE devices are interoperable with mission critical networks and services. With lives sometimes depending on it, complete trust in this interoperability is crucial.

What are the next steps?

Having completed an extensive gap analysis, GCF's Mission Critical Services workgroup has defined the scope of a first phase of certification. GCF and TCCA are tracking the progress of deployments of mission critical LTE, currently ongoing in the USA, UK and South Korea, and gathering inputs from stakeholders to make sure that when mass scale deployments begin there is a fully proven certification process in place. A number of field trial test cases are being developed with the intention of submitting these to the GSM Association (GSMA)'s Field Trial Devices Group so that they may be included in a test specification. In the US, three National Institute of Standards and Technology (NIST) funded conformance test tool projects are underway, including one with TCCA as a participant, and GCF is monitoring the status of these and the expected availability of commercial MCX test tools.

The next generation of mission critical services, delivered over 3GPP based networks and devices, will be revolutionary and their shape and scope are being defined now. GCF and TCCA are keen to ensure that all parties interested in ensuring the seamless interoperability of devices and networks in this new MCX world have the opportunity to contribute to the discussion and, in doing so, help to fashion a certification programme that benefits all stakeholders.

To learn more or participate in the GCF Critical Communications certification programme, contact gcf@globalcertificationforum.org

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- Combining a high surface mass with flexible physical characteristics, the product offers optimum acoustic performance.
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Please meet...

Ruth Schofield, UK and Ireland country manager for Heimdal Security

What was your big career break?

In 2009, having spent almost 20 years working in InfoSec sales in channel, I was invited to interview for a role at Sophos. I couldn't believe my luck.

I had learned so much in channel, working in both sales and vendor management, but I was desperate to get into the vendor selling community. I was also a single parent supporting a family and couldn't manage financially. Sophos allowed me to secure their future whilst achieving my own goals and dreams. It was the springboard to where I am today.

It also opened my eyes to the art of the possible – what can happen when someone believes in you enough to give you an opportunity to succeed.

Who was your hero when you were growing up?

As a child of the 70s I'd have to say Starsky and Hutch! I loved the way they handled the baddies – firm but fair! - and the way their characters bounced off each other, with Hutch being more 'by the book' and Starsky flying by the seat of his pants. It was hugely relatable, even for pre-junior school children. What I really took away from that was how successful you can be when you have a good partnership and I made it my business to build strong bonds and alliances with people from all walks of life.

What's the strangest thing someone has asked you to do?

At school in my German class one of my friends asked me to get in the stationery cupboard at the back of the room, to surprise another friend who was always late. Our German teacher was very strict and did not tolerate insubordination of any type. Unfortunately for me our late friend was so late that the German teacher arrived before her and I had to try and crawl out of the cupboard unnoticed, which was pretty tricky given the squeaky hinges on the door. After 10 minutes of wriggling around and managing to push the door open sufficiently to release one of my feet, the teacher noticed the creaking, walked to the back of the room, then shut the door and left me in there for the entire lesson!

What would you do with £1m?

I would find 10 people who had a great attitude and deserved an opportunity, give them £100,000 each and help them turn it into £1m. They would then pay back the £100,000 to me and I would find another 10 people and repeat the process. Every cycle I take back what I lend and re-invest in 10 more people.

The reality is – this could solve poverty, homelessness, gang crime, prostitution and social deprivation much more quickly and with more dignity than any amount of benefits, food banks, social workers, hostels and handouts. I firmly believe that given the option, most people would happily work hard to earn a living. It's all about giving them an opportunity.

What's the best piece of advice you've been given?

Follow your dreams, write them down and never give up.

If you had to work in a different industry, what would it be?

My real passion is animals, mainly of the canine and equine variety. But I adore nature in general so I'd definitely be doing something outdoors with animals and nature.

The Beatles or the Rolling Stones?

The Rolling Stones every time. Mick Jagger came from a working class background; father was a teacher, mother was a hairdresser and he'll always be known as one of the most influential front-men in the history of Rock & Roll. Respect.

If money was no object, where would you live?

In a Scottish bothy in the middle of nowhere.

What's the one thing you'll miss about Donald Trump?

He did what he said and said what he did, something rarely seen in politics.

Where would you like to visit before it's too late?

It's never too late … though the world is definitely changing and given the fragility of our climate, I would love to visit Countries that are really struggling ecologically to do what I can to help before I leave this planet.

Which law would you like to change?

I don't think there are any laws I would seek to change because I believe they are all there to serve a purpose, regardless of whether we consider them good or bad, relevant or irrelevant as individuals.

What is the best decision you ever made?

Go big or go home.

And the worst?

Not making the one above sooner!