Breakthrough for high bit rate long distance quantum comms

By Rahiel Nasir

Researchers from Scotland and South Africa say they have demonstrated quantum teleportation of patterns of light, paving the way for high bit rate secure long distance quantum communication.

According to the researchers – from South Africa's University of the Witwatersrand (Wits) and Heriot-Watt University in Scotland – current communication systems are very fast but not fundamentally secure. To make them secure, researchers have used the laws of nature for encoding by exploiting the properties of the quantum world.

One such property is 'entanglement'. When two particles are entangled, a measurement on one immediately changes the state of the other, no matter how far apart they are. Entanglement is one of the core resources needed to realise a quantum network.

According to the researchers, quantum communication over long distances is integral to information security. They say it has been demonstrated in free space and fibre with two-dimensional states, recently over distances exceeding 1,200km between satellites. But using only two states is said to reduce the photons' information capacity, so while the link is secure it remains slow.

Overcoming this requires a higher-dimensional 'alphabet', for example, using patterns of light, of which there are an infinite number. One such pattern set is the orbital angular momentum (OAM) of light. The researchers have found that increased bit rates can be achieved by

An experiment being conducted in the Structured Light Laboratory at the University of the Witwatersrand, South Africa.
PHOTO WITS UNIVERSITY
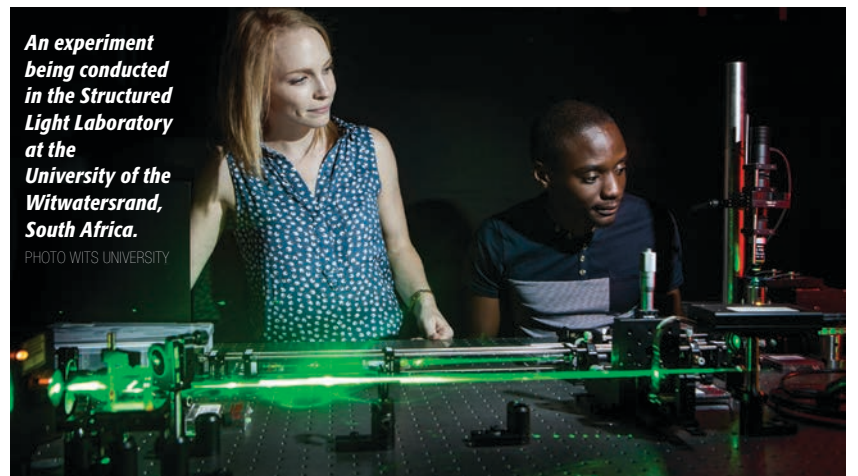
using OAM as the carrier of information.

However, such photon states decay when transmitted over long distances, for example, due to mode coupling in fibre or turbulence in free space, thus requiring a way to amplify the signal.

While such amplification is not possible in the quantum world, it is possible to create a 'quantum repeater' which is analogous to fibre repeaters in classical optical networks.

New forum aims to tell government how to end the digital divide

A new lobbying group has been set up to campaign for affordable, high-speed and full-fibre connectivity across the nation.

It's claimed the UK Fibre Optic Connectivity Forum (UKFOCF) has garnered interest from all corners of the country's fibre optic marketplace. Members include providers, manufacturers, operators and consultants.

The forum aims to be a grassroots lobbying group, influencing and educating policymakers as to the most fair and efficient way to put an end to the digital divide. At its inaugural meeting held in mid-September, members discussed business rates and fibre tax, dark fibre access, the current digital landscape, and the universal service obligation funds for broadband.

UKFOCF is chaired by Ian Lucas MP, a key member of the DCMS Select Committee and a long-standing campaigner for ultra-fast fibre optic connectivity.

The forum was founded by Askar Sheibani, CEO of Sorrento Networks (Comtek Group). He says: "The UK's fibre optic infrastructure is drastically and embarrassingly well behind that of many European nations such as Romania, Bulgaria and Sweden. In order for us to catch up, we as the stakeholders need to work together to support and advise the government to deliver policies that can create a fertile and encouraging environment for the rapid growth of the country's digital economy."

UKFOCF will hold quarterly meetings in addition as well as a parliamentary reception on 21 March 2018. Its remit will be to support the government in introducing "sound and innovative" digital policies relevant to present global economic conditions. ∎

Hughes and BT launch SD-WAN services

Hughes Europe and BT have entered the SD-WAN arena with two new platforms that are both aimed at supporting distributed enterprises with their digital transformations.

Hughes Europe is part of US-based satellite and managed network services provider, Hughes Network Systems. Its managed SD-WAN service leverages a range of in-house technologies that are designed to transform ordinary broadband connections into enterprise-grade high-performance WANs.

According to Dan Thornton, head of solution development at Hughes Europe, the granularity of the platform's *ActiveQoS* system and support for real-time and mission critical apps, such as VoIP, are key differentiators. "Most SD-WAN solutions require you to describe the applications which need high priority. Ours does this based on

the network needs of the application and it works even if the application is encrypted."

Thornton goes on to explain that most networks will look at the speed of a line, such as an ADSL connection, and that organisations will then build their templates around that speed. "But if the speed of the line comes down or goes up, the templates don't adjust when using other SD-WAN platforms. We automatically adjust throughput based on the capabilities of the line at any given time so that you get consistent delivery of services across the network. That's fairly unique to Hughes."

Another platform feature is *ActivePath*. This uses algorithms and techniques that exploit the use of multiple network paths. "The algorithms that we have developed are really our USP in terms of the way we dynamically organise things," says Thornton. "A lot of the algorithms

Dan Thornton, Hughes' head of solution development, says many of the algorithms the firm has used have come from its expertise in satellite networking.

have come from our history of satellite networking. In satellite, you have lower speed capability lines that have to carry delay-sensitive traffic across them, and there's a lot of jitter and latency in some aspects. We have taken all our knowledge in optimising those types of links, and built it into a terrestrial-based platform."

BT says its new service also features dynamic routing. According to the telco, *Agile Connect* uses SDN on a national or global scale to dynamically determine

the most effective path for traffic to take across a customer's WAN. It says this enables users to meet bandwidth demand by making better use of what were previously backup connections.

Announced in late September, *Agile Connect* was built using technologies from BT and Nuage Networks, the SDN specialist that is now part of Nokia. It includes BT's controller infrastructure hosted on the internet and on its MPLS network, as well as the company's MPLS internet gateways to offer cloud-based inter-connectivity.

Agile Connect is delivered as a single box located on the edge of a customer's network, with further services bolted-on as additional devices. In the future, BT says the service will support VNF (virtual network functions), with new services deployed virtually to the box, thereby negating the need to install multiple devices. ∎

NASA sends HPE supercomputer into space

On 14 August, SpaceX successfully launched its *Dragon* spacecraft to deliver critical cargo to and from the International Space Station (ISS) for NASA. Part of the *Dragon*'s payload was a supercomputer from Hewlett Packard Enterprise (HPE).

The *Spaceborne Computer* will be used to support a year-long experiment conducted by HPE and NASA to run a high-performance commercial off-the-shelf computer system in space. This has never been done before, and the aim is for the system to operate seamlessly in the harsh conditions of space

for one year – roughly the amount of time it will take to travel to Mars.

HPE says many of the calculations needed for space research projects are still done on Earth due to the limited computing systems available on board orbiting vessels.

As well as creating a challenge when transceiving data, this approach only works when astronauts are in near real-time communication with Earth. Therefore, once they travel farther out and closer to Mars, they will experience longer latencies. This could mean it would take up to 20 minutes

for communications to reach Earth and then another 20 minutes for responses to reach astronauts. This would make any on-the-ground exploration challenging and potentially dangerous if astronauts are met with any mission critical scenarios that they're not able to solve themselves.

The *Spaceborne Computer* includes HPE's *Apollo 40* class systems with a high-speed HPC interconnect running an open-source Linux OS. Although there are no hardware modifications to these components, HPE says it created a "unique" water-cooled enclosure for the hardware and developed purpose-built software to address the reliability requirements of supercomputing in space.

Generally, in order for NASA to approve computers for space, the equipment needs to be 'ruggedised' or hardened to withstand the harsh conditions of space. But because this physical hardening takes time, money

SpaceX's Dragon spacecraft is used to deliver cargo to the International Space Station for NASA.

and adds weight, HPE says it took a different approach and ruggedised the system using software. This will manage real-time throttling of the computer systems based on current conditions and can mitigate environmentally induced errors, says HPE.

Once the researchers learn more about how the *Spaceborne Computer* reacts in space, future phases of the experiment will eventually involve sending other new technologies and advanced systems, such as memory-driven computing, to the ISS. ∎

Quantum communication

An integral part of a quantum repeater is the ability to entangle two photons that have never interacted. This so-called 'entanglement swapping' is accomplished by interfering two photons from independent entangled pairs, resulting in the remaining two photons becoming entangled.

The scientists say this allows the establishment of entanglement between two distant points without requiring one photon to travel the entire distance, thus reducing the effects of decay and loss. It also means that you don't have to have line of sight between the two places.

As a result, the information of one photon can be transferred or "teleported" to the other. "If two photons are entangled and you change a value on one of them, then the other one automatically changes too," says the researchers. "This happens even though the two photons are never connected and are in fact in two completely different places."

The team from Wits and Heriot Watt say they have now performed the first demonstration of entanglement swapping and teleportation for OAM states of light. They claim their experiments showed that quantum correlations could be established between previously independent photons, and that this could be used to send information across a virtual link.
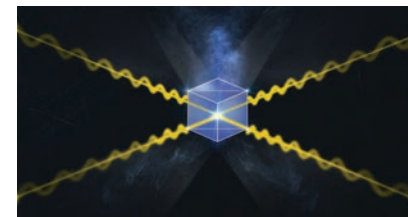
The core element of the quantum repeater is a cube of glass. Researchers put two independent photons in, and as long as they could detect two photons coming out the other sides, they knew entanglement swapping was possible. PHOTO WITS UNIVERSITY

The researchers add that, importantly, the scheme is scalable to higher dimensions, paving the way for long distance quantum communication with high information capacity.

Professor Andrew Forbes of the Structured Light Laboratory at Wit's School of Physics says: "We are continuing with this work and looking at quantum key distribution across a virtual link, as well as introducing noise to the link and attempting to show robust communication over long distance even in the presence of noise. With these advances we will have a practical quantum repeater for communication." ∎
IBM builds its most powerful universal quantum processors – News, May 2017 issue.

THE WORLD ACCORDING TO...

Jamie Wilson, marketing manager public safety, EMEA, NICE Systems

Navigating the complexities of the new ESN

Early next year, the UK government plans to transition emergency service communications from the Airwave radio system to existing commercial 4G networks.

The new Emergency Service Network (ESN) will allow police, fire and ambulance services to stream high resolution video, send images and access real-time information. [*Editor's note: also see News, Jan 2016 issue.*] A smooth transition which navigates the complexities of capturing additional data sources is vital for all blue-light services up and down the country. It's important to start preparing for the switch over now, rather than being swamped with multimedia once the network goes live.

With a deluge of data currently overwhelming emergency services, data silos are inevitable and it's easy to see why data management can be a complex task. With broadband data as standard, ESN is set to increase the volume of information captured by emergency services. IT professionals will need to ensure that processes are streamlined and data can be accessed from a centralised location.

Solutions such as digital evidence management systems can help emergency services manage and store incoming data. By facilitating the recording and organisation of voice, video and messaging communications and associated metadata. Giving the ability to search, find and share information easily as well as understanding the wider picture.

Discarding inflexible legacy IT systems and processes is no easy task, but the imminent launch of ESN provides a good opportunity to identify solutions which are inefficient and hinder collaboration.

Centralising operations and adopting common systems will help emergency services to collaborate with other agencies and tackle the growing storage problem in an affordable and scalable way. Cloud-based systems not only help the digitisation of reporting but also enable control rooms to be more efficient, cut response times and harness data sets – helping responders spot patterns.

As with every unknown situation, ESN causes some concern. However, it also brings about an opportunity for change and the chance for the UK to raise the bar on emergency service communications for those willing to fully embrace it.

Artwork showing LONDON5 and LONDON6 which will be built on an eight-acre site in West London.

Virtus plans London's largest data centre campus

Virtus Data Centres has announced plans for two new adjacent facilities near Stockley Park, West London. It's claimed the new site will create the capital's largest data centre campus.

The two buildings will be built on an eight-acre site covering 34,475m². Known as *LONDON5* and *LONDON6*, Virtus says they will provide an additional 17,000 net technical metres of IT space. The facilities are designed to deliver 40MW of IT load, and the company has secured capacity to increase to 110MVA of incoming power from diverse grid connection points, future proofing expansion for customers.

The two data centres will increase Virtus' London portfolio to around 100MW across its six facilities in Slough, Hayes and Enfield. The firm adds that power can be expanded to around 150MW on the various campuses.

It goes on to claim that Stockley Park offers an ideal location. The site is seven miles from its Slough – home for Virtus' *LONDON3* and *LONDON4* data centres – and on the main fibre routes that connect the town to London which is 16 miles away. As a result, Virtus reckons the new campus will provide a "limitless, metro fibre connected, flexible and massively scalable data centre space within the M25".

Work has started to fit out space in *LONDON5* for customers who have already committed and general availability is expected in early 2018. ■

O2 scales new heights to expand connectivity across Scotland

O2 claims it has overcome all the challenges of Scotland's varied terrain and extreme weather to bring mobile connectivity to both urban and rural communities across the country.

By the end of 2017, the operator says more than 800 new locations in Scotland will be covered by its network. To meet the growing demand for data in every corner of the country, O2 says it has deployed fleets of helicopters and off-road vehicles to install the new technology and digital infrastructure needed to bring 4G to more customers.

For instance in Aberdeen, the company has worked with the Wireless Infrastructure Group to install what's claimed to be the UK's first fibre-connected small cell network. Discreetly positioned on lampposts, O2 says the technology will improve network capacity and 4G connection speeds for shoppers and city workers, as well as help pave the way for future 5G.

Earlier in October, the operator built a new 4G mast in Fort William, the gateway to Ben Nevis. Before the end of the year, O2 plans to send engineers in helicopters to install a second mast higher up the mountain so that climbers can stay connected.

Meanwhile in Inverness, a new 50 metre mast will be constructed just outside the city

An engineer installs a small cell radio for O2 on a lamppost in Aberdeen.

to significantly improve the range and performance of 4G connectivity for local users.

As well as connectivity infrastructure, O2 says it has also installed 85 new generators in some of Scotland's most isolated and hard to reach locations. It says this will ensure that mobile connectivity isn't affected by the power cuts that are often caused by adverse weather conditions.

Fergus Ewing, MSP for Inverness and Nairn, and cabinet secretary for the rural economy and connectivity, says: "High-quality mobile communications for people across Scotland is a priority for the Scottish Government. *Our Mobile Action Plan* sets out a clear commitment to working with the mobile industry to deliver improved mobile coverage in Scotland." ■
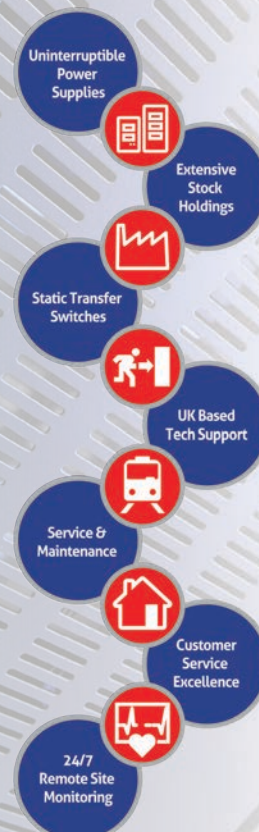
Updata to connect air traffic control

Updata has been awarded a contract by NATS to provide network connectivity to UK air traffic control services. The contract, worth £15m over seven years with a three year option to extend, will provide the critical national infrastructure through WAN connectivity to support NATS' new IP-based voice services being delivered across UK airways. It is due to go live in 2020. The new IT infrastructure is an integral part of NATS' commitment towards the Single European Sky ATM Research programme. This aims to develop technologies to increase European airspace capacity, improve safety, cut delays and airline costs, and reduce environmental impacts. ■

Indigo acquires Belcom247

Indigo Telecom Group (ITG) has acquired Belcom247 (Bellcom UK Ltd) for an undisclosed sum. While ITG specialises in designing, deploying and supporting global telecoms networks, Belcom247 provides field engineering and data centre connectivity solutions worldwide."Indigo and Belcom247 have been closely working together over a number of years," says ITG CEO Stephen Thompson. "This deal addresses our need to offer both existing and new customers a broader portfolio of services and greater geographical reach." Thompson adds that Belcom247's experience, specifically within APAC, will enable ITG to provide a "One Stop Global" service approach. ■

Excel gains certification to new standards

Excel says its Cat 6 and Cat 6A systems have become one of just a handful of cabling products in the industry with both channel and component verification. The infrastructure solutions provider has gained updated certifications for its six port screened and unscreened modules for Cat 6 and 6A copper cable, as well as the Cat 6 screened toolless butterfly style jacks. Excel says these certifications are "especially rewarding" as they include testing to the new standards and regulations which cover the proposed higher power and 4 pair PoE, which means 2 Amps per connector. It adds that further certifications will be granted for Cat 6A toolless connectors, once the renewal date arrives. ■

AI helps in hunt for cyber threats

Switzerland-based Vetropack makes glass packaging for the food and beverage industry and runs eight production sites across Europe.

Vetropack is using artificial intelligence to hunt for cyber attackers and improve its network security.

The European glass manufacturer has deployed Vectra's cyber security platform. This is said to provide complete network visibility, as well as non-stop automated threat hunting and real-time attacker detection based on AI and always-learning behavioural models.

Vectra says its system automatically prioritises the highest-risk threats detected across the Vetropack network, which extends to offices, manufacturing facilities and distribution centres in several European countries.

Markus Müller-Fehrenbach, head of IT infrastructure and operations at Vetropack Holding, says: "Vectra solved this problem by automating the hunt for cyber attackers and instantly prioritising the highest-risk threats."

Immediately after its installation, it's claimed Vectra's platform learned Vetropack's local and global environment, and promptly started to detect active threats inside the company's network.

"Our security team always knows what is going on, where an attack is happening, and the necessary steps to remediate the threat," says Müller-Fehrenbach. "Our security team is now able to focus proactively on other critical areas, such as threat containment, remediation and forensics." ■

Volta and root6 partner to power media industry

Volta and root6 have teamed-up to offer support to the film, post-production and new media communities in central London.

Soho-based root6 is a specialist supplier of AV technology solutions and managed services to clients such as the BBC, ITV, FOX International Channels, amongst many others.

As part of its ambition to become a role model to show customers how they can improve their business infrastructures, root6 needed a resilient data centre close to Soho where most of the capital's media industry resides. Volta reckons it was an obvious choice.

Built to Tier III standards, the company claims its 91,000ft^2 data centre has a history of zero outages and offers a unique central London location with two separate diverse 33kV power rings coming into its building. Volta adds that the facility also benefits from ultra-fast connectivity linking customers to a variety of "world-class" carriers, cloud providers, networks and major internet exchanges.

root6 has now transferred its processing and IT equipment into the centre, with its technicians maintaining constant access when required.

"It was key for us to choose a data centre partner that could keep pace with the development of innovative technologies as it is vital to our business in the media industry," says root6 director Rupert Watson. "In the fast-moving media community, easy access to information, as well as availability at any time of day and night is vital because deadlines can't be missed."

Moving its equipment to a hosted provider has also provided the experience and knowledge for the company to showcase the approach to its customers.

root6 needed a super resilient data centre close to Soho – Volta says its facility in Great Sutton Street has a history of zero outages.

Watson says: "Our high-end TV and [digital] cinema customers look to us to be ahead of the game when it comes to providing uncompressed quality and low latency HD and 4K video. Through our partnership, we can offer complex wave division multiplex and KVM solutions that fit perfectly with the metro fibre network that terminates at Volta." ■

Full-fibre connectivity to boost education in Stirling

Primary and secondary schools will become the first public buildings to benefit from an ongoing deployment of an ultrafast network in Stirling.

Around 7,000 pupils, teachers and school staff will have access to full-fibre internet connectivity. This will give classrooms the speeds and bandwidth needed to adopt digital tools such as smart boards, and enhance education with innovative e-learning initiatives such as coding and app-building.

One of the first schools to be connected is Allan's Primary. Some of the initiatives it plans to implement include *Google Classroom*, a suite of tools that facilitates learning, development, collaboration and

School pupils in the city will soon be able to access the most innovative learning programmes to help ensure they stay ahead of the digital curve.

achievement tracking; and an app design project that aims to showcase historical sites in Stirling's old town.

Other schools across the city will be leading the charge for digital skills by working towards the Digital Schools awards and participating in challenges set by a new partnership between technology startup incubator Codebase and the University of Stirling.

Full-fibre connectivity will support Stirling Council's ambition to ensure that all young people leave school with the ability to use a wide range of digital technologies in the workplace. Furthermore, it will help to reverse the existing trend that sees one-in-five adults in Scotland lacking basic digital skills.

The network is being deployed through a partnership between the local council, CityFibre and MLL Telecoms. ■

VIEW FROM THE TOP
Craig Walker, VP cloud services, Alcatel-Lucent Enterprise

Can we give enterprises a voice?

With personal assistants such as *Siri*, *Cortana* and *Google Assistant* moving us toward a new voice-controlled relationship with technology, it is almost a given that voice-activation will eventually make it into the enterprise.

But in order to move from simple consumer-based use cases to voice-first enterprise environments, a few things need to happen.

Firstly, security will be critical for enterprise systems relying on voice commands. For voice system security to be viable in the enterprise, only authorised users with the right privileges should be able to perform specific actions or interact with specific assets.

Recognition and contextualisation also need to be refined. In 2016, Google's voice recognition system could recognise more than five million words with around 90 per cent accuracy – but that's still not extensive or accurate enough for interactions with life support systems in hospitals, or power and utility networks. We still have some way to go.

It's not just about recognising words – it's also about what to do with them. This is where cognitive engines and AI can be leveraged to understand word context. Interactions such as *'How do I get to Green Park?'* may sound simple enough, but they need to be put into

context, including location awareness and assumptions about available transportation.

We would then need to further leverage those cognitive engines behind the voice recognition systems to act as check and validation systems to prevent human error, and bring in broader intelligence capable of understanding the actions related to voice-controlled requests.

Innovations in the traditional voice communication world tie-in strategically with the development of voice-controlled enterprise environments.

Communication Platforms as-a-Service (CPaaS) are leveraging APIs to transform applications into voice-integrated solutions – think applications that allow you to move straight from app to voice chat. I believe these developments will play a big part in 'voice-first' environments by harnessing the rich API infrastructure of CPaaS to communicate with applications and devices.

Behind all this communications infrastructure, how platforms communicate with devices really needs to be standardised before we see rapid deployment of voice technology. Only in this way will enterprises be able to ensure that investments in new technologies won't be obsolete before they realise a return.

Huawei and Riverbed offer "superior" WAN

Huawei and Riverbed Technology have teamed-up to help make it easier for enterprises to manage their networks and optimise performance in the cloud.

The joint solution will combine Riverbed's *SteelHead* with Huawei's *CloudEPN* platform. The partners say this will enable them to bring new services to market more quickly and address some of the "most critical" needs their customers are facing as they move to the cloud and embark on digital transformation.

Riverbed says *SteelHead* speeds the performance of cloud applications by overcoming the combined challenges of bandwidth limitations and latency on the WAN.

Meanwhile, Huawei's recently introduced *CloudEPN*, which includes SD-WAN and cloud-based VPN solutions, has been designed to provide on-demand interconnection between branches, data centres and cloud. The vendor says it delivers application-level network-wide intelligent

path selection, smart acceleration and cloud-based visualised operations and maintenance, and open universal computing gateways.

CloudEPN features the company's *AR1600* and *AR650* series open universal computing gateways. Huawei says these support the on-demand deployment of its value-added services as well as those from third-parties, and enable flexible orchestration and automated delivery so that they can be provisioned in minutes.

It's claimed the joint Huawei-Riverbed solution will result in a "superior" WAN experience for enterprises as they continue to move applications and infrastructure into the cloud, giving them greater agility, flexibility and the ability to innovate more quickly.

Li Xianyin, GM of Huawei Enterprise Gateway Domain, adds: "Together, we can offer what the customers are looking for – simplified network management and accelerated delivery of applications." ∎

Orange and Microsoft join forces for fourth industrial revolution

Microsoft and Orange Business Services (OBS) are partnering to deliver large-scale, end-to-end IoT solutions that boost the digital processes of companies in the manufacturing sector.

Through their collaboration, it's claimed enterprise users will be able to take advantage of OBS' and Microsoft's combined expertise regarding data protection, as well as device and data management.

By using OBS' modular IoT *Datavenue* service strengthened by the *Microsoft Azure* IoT Suite, the partners says companies can transition to 'Industry 4.0' and optimise the entire manufacturing value chain.

Datavenue is said to offer a comprehensive set of solutions and services to securely manage IoT projects and their integration with information systems. OBS says it is backed by more than 700 experts working on data and IoT projects, and

features 14 million connected devices that are managed by Orange and the capacity to handle more than 160 million items of technical data per minute.

The company adds that the software environment provided by Microsoft will allow for the use of advanced solutions such as the *Cortana Intelligence Suite* for advanced analytics and AI, *Power BI* for data visualisation, and the *Xamarin* app to ensure a "flawless" mobile user experience.

According to market watchers, digital transformation is giving rise to the fourth industrial revolution or 'Industry 4.0'. While the first three revolutions brought mechanical innovations, mass production, and then computers and the internet, they say Industry 4.0 will lead to system-wide innovations that are being driven by the continued digitalisation of networked societies. ∎

Reading builds 'Research Cloud' using Dell EMC and Nutanix

The University of Reading is migrating academic support workloads from a mixed collection of legacy platforms to an all-new *Reading Research Cloud* built on a single cluster of appliances.

The university has consolidated five different compute and ten storage platforms previously located across multiple sites into one data centre. It is now running the *Nutanix Enterprise Cloud Platform* on Dell EMC's *XC Series* appliances located in a single rack.

Ryan Kennedy, Reading's academic computing team manager, says the setup offered a more cost-effective alternative to moving everything into the cloud, and has enabled the university to deliver the equivalent of a public cloud service in its own data centre.

He adds that the ability to automate management processes and make compute, storage and network resources available directly to users was also key to the decision.

"We simply allocate resources on the *Nutanix Enterprise Cloud Platform*, leaving users free to configure and manage their virtual machines, storage and network

Existing workloads, typically, running meteorological modelling, brain analysis and other demanding academic applications, have already been migrated to the new infrastructure.

connections as they wish using the *Nutanix Self Service Portal*. This frees up staff to support academic users with the design, running and support of those workloads, rather than spending all their time keeping the infrastructure lights on."

As part of the migration, Kennedy and his team have switched from using VMware to Nutanix's hypervisor. The platform also features the capability to take snapshots to *Microsoft Azure* for backup and disaster recovery. ∎

Energy Efficiency

As the need for data centre services continues to increase, aren't the challenges about energy efficiency only set to get worse?

Mr Nicola Domenighini, UK Sales Manager, Stulz UK

The continued growth of the Internet of Things is set to cause a three-fold increase in IP traffic across the world over the next four years, according to research conducted by Cisco. It predicts that a surge in connected personal devices around the world will mean that, by 2020, there will be 26 billion connected devices across the world, up from 16 billion connections in 2015. The demands on data centres are set to increase significantly and energy efficiency will obviously come into sharp focus. However, it is important to note that the energy efficiency challenges are driving the R&D development of new technologies. These challenges are pushing innovation forward at a rapid pace in the sector and we are seeing the emergence of more efficient, more cost-effective and more environmentally-friendly solutions to meet these challenges.

Data centres are focused on reducing their operating expenditure (opex) and this is where the latest cooling technology can make a valuable contribution. Compared to compressor technology that is 15 years old, a reduction of at least 35% in energy consumption can be achieved, today. If you replace mechanical cooling with solutions such as free cooling options, the savings can be much greater (up to 65%).

Using the energy efficiency ratio (EER) – which is the ratio of cooling capacity to power consumption – e.g. 15 years ago the value for typical aircooled chiller was around 2.5-2.7 which is nowadays 3.2-3.7 due to new technologies and/or design concepts. Ideally, the value should be as high as possible (i.e. not much energy is required to produce the desired cooling capacity). Modern cooling technologies are using significantly less energy compared to 15 years ago, therefore, and manufacturers, such as Stulz, will continue to drive this trend forward through R&D of new, energy efficient technologies.

What are the solutions data centre operators need in order to stay on top of such challenges?
A good solution that is not used properly will lose efficiency. It is just as important to learn how to use equipment, and how to control and monitor the performance, to get the best possible result. As well as specifying 'energy efficient' equipment, staying on top the energy efficiency challenge requires careful consideration of how systems are maintained and serviced. In addition, it is important that solutions are also designed to be environmentally friendly, not just energy efficient, and this needs to be a key aspect of the technology's design.

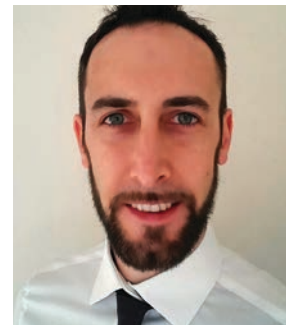**What are the pitfalls to avoid when it comes to choosing solutions?**
Any project will inevitably involve different parties – including contractors, manufacturers, installers and users – each with different targets. The success of a project will depend on bringing these together and focusing on the overall picture, to get the best benefit from the technology. It is important not to simply focus on one's own vision of the project. Networking and connecting with these different interested parties, and sharing information and perspectives, is invaluable.
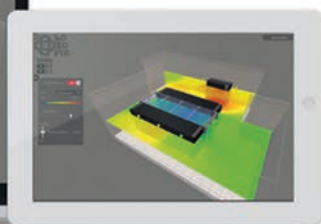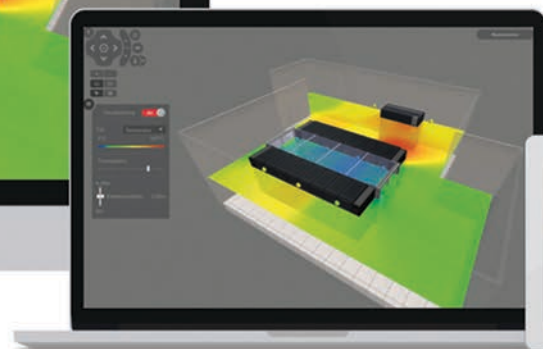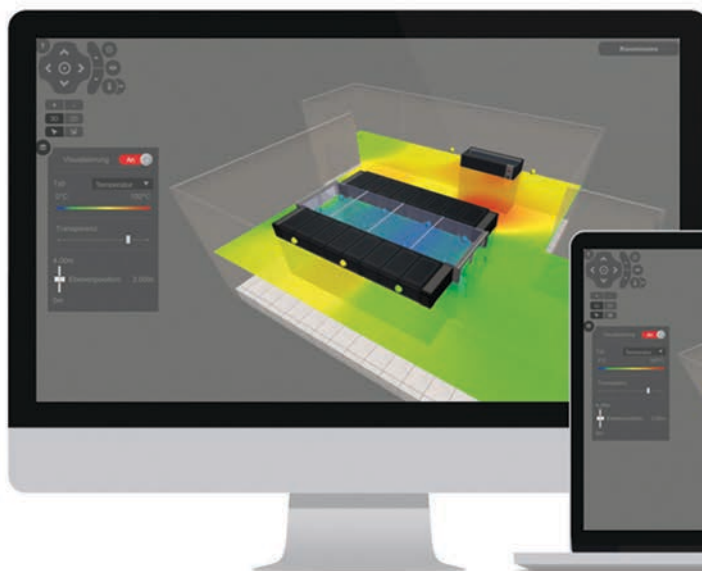
What metrics should be used to measure and monitor power and energy efficiencies – is PUE enough?
In the data centre world, PUE is the most commonly used and established metric. However, I have come from a parallel industry and believe that we should look at more indices. It is important to understand what is the best possible efficiency, or price equivalent efficiency (PEE), achievable in a specific geographical location or region. PUE, as it stands, does not offer a true picture of the efficiency of a data centre on its own. Energy efficiency needs to be understood within the context of the best possible performance that can be achieved in any given location. A data centre in the North is going to encounter very different weather conditions to a data centre in the South, so the possibilities in terms of energy efficiency will be greater. This must be taken into account, to fully understand and measure performance.
It is very difficult to find a "one size fits all" figure for energy efficiency, especially from the cooling point of view. The problem is, that the commonly used ESEER figure is related to HVAC for commercial buildings can not be transferred to datacenter applications. Other reference figures like PUE are just simply overdriving very important factors when it comes to energy efficient design for IT-cooling, such as:
- Location of the datacentre
- Building structure
- CHW system design (glycol or glycolfree)
- Load profiles
- CHW temperature levels
- etc.

As the value of cooling is usually very important for PUE calculations, a lot of explanations are necessary to be made to really combine PUE figures to each other. The easiest, most transparent and valueable way to compare energy efficiency of cooling systems is a project based energy consumption evaluation. This approach is virtually displaying the thermodynamical situation on site reflecting all external and internal influences.

Any other points?
Another significant challenge in the short-term will be cyber security. While the energy efficiency of the technology is a key consideration, it will also need to be viewed in terms of being a potential gateway for cyber threats. A lot of information and control is cloud-based, so we will need to focus more and more on addressing cyber security. If a cyber attack targets a specific node point, via the building management system, for example, it is feasible that this could result in failure. The cooling system is an important part of the facility management. Therefore, a solution must be provided to guarantee security on site – this will need to be considered as part of the cooling plans. In the future, there will need to be greater awareness of the potential threat, in the industry, to protect the integrity and security of cooling operations and other critical infrastructure. This is set to become a big challenge for data centres.

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Colocation services need to be flexible and robust to meet the changing compute and compliance needs of modern businesses.

IT challenges for legal firm as three become one

Law firm Howard Kennedy has undergone huge change over the last few years, including merging with two other law firms.

The mergers brought with them more staff and a growing number of clients with significant amounts of data which needed to be accessible and protected. In addition, the firm moved into new offices in Southwark by London Bridge.

Clive Knott, appointed IT director, had the task of consolidating operations onto integrated platforms. Knott says he viewed the firm's changes as a unique opportunity to invest in new IT infrastructure and to move the IT systems and services to a data centre run by a managed services provider.

He worked with independent consultancy Bell Integration to identify the firm's options, then to specify their exact requirements and finally to identify potential providers.

CenturyLink now provides Howard Kennedy with colocation services in two separate data centres. They are linked by a 10Gb fibre optic network so they can operate as a single resource as well as provide business continuity in the event of disruption.

The colocation provider says the data centres run all of Howard Kennedy's operations including mission-critical applications such as the Document Management System (DMS), billing systems that ensure effective and accurate charging of their time, and other functions such as email.

CenturyLink says that because of the legal sector's cautious approach to colocation services, it was essential for Knott to provide the reassurance that the firm's data protection approach was compliant with the Solicitors Regulation Authority (SRA) and the Financial Services Authority (FSA), as well as specific requirements dictated by some of its larger clients.

Because CenturyLink works with other firms that are regulated by the same authorities, he was able to visit the facilities himself and check off the security and compliance issues. The colocation arrangement also settled client and compliance questions over where client data would be stored.

Knott says: "In IT nothing is perfect, I wouldn't expect it to always go smoothly; in fact, I worry when it does. However, where there were challenges our resolution was always met very early on."

He says that in the past business downtime owing to IT issues had been a frequent occurrence. Now IT resiliency was built into the services provided, downtime was a distant memory for the firm.

CenturyLink says that as Howard Kennedy grows, it anticipates expanding its colocation agreement and might also manage some of the applications on those systems.

In the City, trust is vital for IT company

Founded nearly 30 years ago, MMRIT provides IT services to professional services organisations in London, including hedge funds, alternative investment managers, barristers' chambers and law firms.

The company is based in Clerkenwell, near Old Street tube station and the British Museum. It reports that an increasing number of its clients were keen to move their IT off-premise to the cloud. The advantage would be the ability to centralise their infrastructure, free up office space and share costs around hardware, power and cooling with other MMRIT customers.

However, customers were reluctant to move fully to the public cloud so MMRIT and Iomart began work to design and build a secure, private cloud environment which would meet the security and regulatory requirements of its clients. MMRIT was already using Iomart's colocation services in London.

Paul Line, head of commercial for MMRIT, says: "Our clients are comfortable with MMRIT because of their experience with us, our expertise and our security accreditations. However, they needed reassurance when taking the step from on-premise to private cloud. Working with Iomart, which has similar expertise and security accreditations, as well as a public listing on the stock market, we were able to assure our clients that they could trust us with their data and they were happy to give us control to create the best cloud solution."

Iomart says it worked with the MMRIT team to build a highly available, private cloud platform that meets all the financial and security requirements of their customers. Instances are securely and logically separated to protect each client's data. There is no single point of failure.

It is housed in Iomart's London data centre which, says Iomart, allows the MMRIT team controlled access to the infrastructure so they can make their own changes on behalf of customers when necessary. It says MMRIT's clients benefit from more robust power and connectivity than when their infrastructure was hosted on their own premises.

Iomart says that while the primary production servers are in London, disaster recovery is provided from another of its data centres in Maidenhead. Fast connectivity between the two sites, it says, gives clients the security of having a DR location that is outside the M25. Regular business continuity and DR testing is carried out.

Iomart says the private cloud environment meets the requirement of the Financial Conduct Authority and the Solicitors Regulatory Authority which means MMRIT can be confident when targeting new clients in these highly regulated sectors.

Previously MMRIT had used a number of different managed service providers but Iomart is now its sole provider.

The data centre 'just down the road'

Based on a farm in a Surrey village, IT Protocol specialises in security services to protect its clients' networks, including vulnerability tests, intrusion prevention, remote authentication and data leakage protection. Its customers include a global staffing company, big retailers, investment firms, housing associations, university departments, a stately home and a luxury yacht.

When the site of its data centre provider was sold, IT Protocol had to look for a provider to host and manage its server and storage. It had to be easily accessible to IT Protocol staff and the company's clients, some of whom are based in London.

After some research, says the company, it found Aegis Data based just two-and-a-half miles away – eight minutes by road – in Godalming, which has a direct rail link to London.

Thiew Tan, director of IT Protocol, says the location means that they can easily visit the site at any time: "It also makes a more cost-effective relationship as we are not being forced to pay London rental prices, which is a saving we can pass onto our customers."

Following a meeting, Aegis says its team was able to offer a flexible solution that did not require IT Protocol to take up a minimum amount of space within the data centre – often a standard practice within large colocation providers.

Without having enough original infrastructure to take on a full rack, Aegis says it provided IT Protocol with the space necessary, as well as additional space within the rack to expand as required.

Aegis was formed in 2009 by the owner and chief operating officer, Adrian Deslongrais. The site on which the data centre was built was originally a metal finishing works so it had the benefit, says Aegis, of a large power supply.

Killed by cloud?

If cloud-based infrastructure is delivering on all its promises, RAHIEL NASIR wonders what the future of on-premise IT is.

With nothing but praise heaped upon cloud and all that it offers, you'd be forgiven for thinking that this now represents the only way forward for enterprise IT, and that the death knell for on-premise hardware has well and truly rung.

Indeed, if the humble server epitomises the type of on-premise infrastructure that is most at risk from a cloud migration, the forecasts are not looking good.

For instance in June, International Data Corporation's (IDC) server tracker showed that in the first quarter of this year, the EMEA server market saw a year-on-year decrease of 1.4 per cent in units shipped to just over 530,000, and a decline in vendor revenues of 12.7 per cent to $2.7bn. HPE remained at the top of the Western European server market, though earnings for the firm in this sector fell 21.4 per cent year-on-year. According to IDC, Dell was the only major manufacturer to see growth in Western Europe during the quarter.

Michael Ceroici, the company's research analyst for European Infrastructure, says: "Server revenues in Western Europe continued to decline in 1Q17. In particular, IBM server revenues decreased 50.3 per cent due to declining non-x86 shipments and a continuing trend for extended refresh cycles."

IDC adds that while sales of non-86 servers fell 30 per cent year-over-year, x86 servers saw only a moderate decline of 3.2 per cent during the same period, benefiting from hardware demand by cloud service providers.

Gartner's research is in line with IDC's findings, although it also includes Fujitsu in its list of top five server vendors in EMEA, estimating that the company's 1Q17 market share was 7.1 per cent and ahead of Lenovo at 6.6 per cent (*see table 1 right*).

In September, Gartner issue data for 2Q17 and said global shipments of RISC/Itanium Unix servers fell globally, down 21.4 per cent compared to 2Q16. It also said shipments for x86 servers grew 2.5 per cent during the period. The researcher attributes the increase to strong performance in Asia/Pacific because of data centre infrastructure build-outs (mostly in China), and the ongoing hyperscale data centre growth that is represented by the self-build/original design manufacturer segment.

So what do the analysts say about cloud?

Spend, spend, spend

IDC reckons total global spending on IT infrastructure products (server, enterprise storage and Ethernet switches) for deployment in cloud environments will increase 12.4 per cent year-over-year in 2017 to reach $40.1bn.

The firm states that increased spending on cloud IT infrastructure and decreasing investments in non-cloud IT infrastructure will be a common theme for all regions. It says global spending on traditional, non-cloud, IT infrastructure will fall 4.6 per cent in 2017, accounting for 58.7 per cent of the overall end-user spending on servers, enterprise storage and Ethernet switches. That's down from 62.6 per cent in 2016.

In all three technology segments, IDC says spending on IT infrastructure deployed off-premises will grow in 2017 while spending on on-premises environments will decline. Natalya Yezhkova, the company's research director for enterprise storage, says: "Enterprise adoption of hybrid and multi-cloud IT strategies and the proliferation of cloud-native applications and areas such as the IoT will fuel further increases in end-user spending on services-based IT. In turn, this move will be reflected in a shift of the overall spending on IT infrastructure from on-premises to off-premises deployments and from traditional IT to cloud IT."

According to the forecasts, Ethernet switches will be the fastest-growing technology segment in cloud IT environments, while spending on servers and enterprise storage will grow 9.1 and 12 per cent, respectively.

In some of its latest forecasts published in October, Gartner predicts that the global public cloud services market will be worth $260.2bn in 2017, up from $219.6bn last year. According to research director Sid Nag, one of the reasons for this is that the SaaS market is expanding faster in 2017 than previously expected, leading to a "significant uplift" in the entire public cloud revenue forecast. SaaS revenue is expected to reach $58.6bn in 2017, up from $48.2bn in 2016.

Gartner says the acceleration in SaaS adoption can be explained by providers delivering nearly all application functional extensions and add-ons as a service. It believes that this appeals to users because SaaS solutions are engineered to be more "purpose-built" and are delivering better "business outcomes" than traditional software.

The analyst expect the highest revenue growth to come from IaaS which is projected to reach $34.7bn in 2017. Nag adds that strategic adoption of PaaS offerings is also outperforming previous expectations. He says: "Enterprise-scale organisations are increasingly confident that PaaS will be their primary form of application development platform in the future."

Although public cloud revenue is growing more strongly than initially forecast, the firm still expects growth even beyond 2018. It says this reflects the increasingly mainstream status and maturity that public cloud services will gain within a wider IT spending mix.

"As of 2016, approximately 17 per cent of the total market revenue for infrastructure, middleware, application and business process services had shifted to cloud," says Nag. "Through 2021, this will increase to approximately 28 per cent."

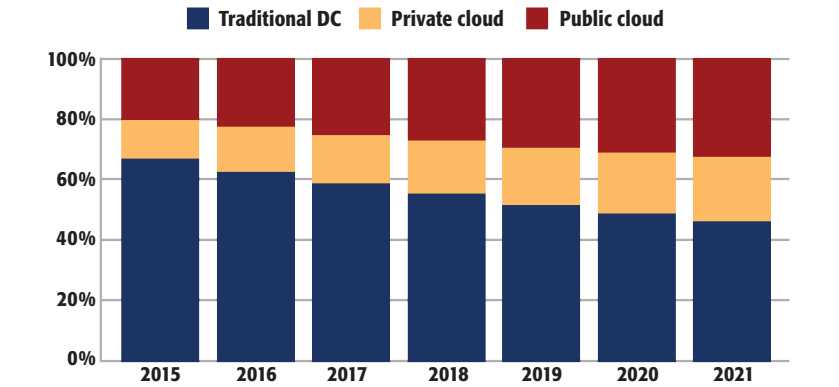## Every silver lining has a cloud

So it would seem that the cloud can do no wrong. Or can it?

For example, the platform is often hailed as the future of data storage but live chat specialist Parker Software warns that there are still risks involved and believes there remains a strong demand for on-premises systems instead.

"Headlines suggest that cloud storage provides the most cost-effective hosting model, but that's not necessarily true," says the company's CEO Stephen Parker. "Research [from Computerworld's *Tech Forecast 2017* survey] suggests that 31 per cent of IT departments have hit roadblocks for cloud delivering business value. What's more, six per cent reported no or very little value from a cloud-based model."

The firm also highlights performance issues with cloud-based services. Quoting data from Dynatrace's *Global Digital Performance and Transformation Audit*, it says 50 per cent of UK companies experience digital performance issues on at least a weekly basis (if not more often), and that on average, businesses experience 27 hours of downtime per month, according to IHS Markit's *Cost of Server, Application and Network Downtime Survey and Calculator – 2016*.

Parker goes on to claim that the cost of such cloud problems is "sky-high". Citing

Company	1Q17 revenue	1Q17 market share (%)	1Q16 revenue	1Q16 market share (%)	1Q17-1Q16 growth (%)
HPE	915,079,134	33.0	1,118,767,775	35.5	-18.2
Dell EMC	561,854,433	20.3	533,414,867	16.90%	5.3
Cisco	199,260,000	7.2	211,640,000	6.70%	-5.8
Fujitsu	197,885,111	7.1	217,138,861	6.90%	-8.9
Lenovo	183,544,197	6.6	196,801,000	6.20%	-6.7
Others	712,376,198	25.7	875,367,033	27.80%	-18.6
Total	2,769,999,072	100.0	3,153,129,537	100.00%	-12.2

Table 1: Top five server vendors in EMEA and their revenues for the first quarter of this year.

Company	1Q17 shipments	1Q17 market share (%)	1Q16 shipments	1Q16 market share (%)	1Q17-1Q16 growth (%)
HPE	167,818	33.4	199,819	36.5	-16.0
Dell EMC	112,872	22.4	116,305	21.3	-3.0
Lenovo	25,070	5.0	25,439	4.7	-1.5
Fujitsu	24,186	4.8	30,385	5.6	-20.4
Cisco	20,659	4.1	20,106	3.7	2.8
Others	152,567	30.3	154,765	28.3	-1.4
Total	503,173	100.0	546,819	100.0	-8.0

Table 2: EMEA server shipment estimates per unit for the first quarter of this year.

IDC predicts that total global spending on IT infrastructure products for cloud environments will reach $40.1bn in 2017, with public cloud exhibiting growth over the next few years.

the Ponemon Institute's *Cost of Data Center Outages* report published last year, the firm says data centre outages cost companies nearly $9,000 per minute, and that 57 per cent of businesses have reported that high charges and provider fees are a "major issue" with cloud providers.

"There's no denying the innovation of the cloud and the storage model certainly does have its benefits," says Parker. "[But] the notion that the cloud is the answer to every business hosting problem is exaggerated. Admittedly, with the right provider and under the right circumstances, cloud storage can be effective – but it is not necessarily right for everyone."

As a result, Parker says only 10 per cent of UK businesses have moved completely to the cloud (*Information Age, 19 Jul 2017*), while 21 per cent of technology pros responding to the *Tech Forecast 2017* survey cited

above said they have no plans to switch.

And in contrast to the predictions made by IDC and Gartner above, the company says that even by 2020, more than 50 per cent of spending on IT infrastructure will remain on traditional data centres (*GCN, 17 May 2017*).

And then of course, there's that old chestnut of security. Referencing a 2014 cloud security global study from BT, the company says 76 per cent of IT decision-makers say this is their main concern about using services, while 35 per cent think cloud is less secure than on-premises software (from *The Cloud Balancing Act for IT: Between Promise and Peril* report published in 2016 by the Cloud Security Alliance and Skyhigh Networks).

Compliance with regulatory issues is also flagged as a concern, particularly with the EU's General Data Protection Regulation

coming up (*see feature "If you can't stand the heat…", May 2016 issue*), and the UK's latest Data Protection Bill which gives the Information Commissioner's Office more power to issue higher fines of up to £17m or four per cent of global turnover in cases of the most serious breaches.

The security issue: red herring or beached whale?

When it comes to compliance, Alex Hilton, CEO of the Cloud Industry Forum (CIF), agrees that regulation is obviously a key consideration for the financial services industry and public sector. But he adds that frameworks are rapidly evolving and are not the absolute barrier to the adoption of cloud services they once were. "For example just last year, the Financial Conduct Authority softened its stance on public cloud in the

financial services industry, which I think says a lot about how far we've come.

"The key here is conducting your due diligence – understanding where your data is going to be hosted, to ensure that you're covered from a data sovereignty point of view, what safeguards there are in place to protect it, and how you can migrate your data back if or when the relationship ends."

In terms of the General Data Protection Regulation (GDPR), Hilton reckons this will prove to be one of the main drivers towards cloud and away from legacy technology going forward.

"Some legacy technology makes it difficult to comply with the data handling obligations of the GDPR – such as the 'right-to-be-forgotten' – as you find that data is trapped in silos and in unreadable formats, and legacy wasn't necessarily written with security top of mind. The new breed of cloud services are much more streamlined and have security written in to them, and so they will make GDPR compliance less of a challenge."

And as far as security goes, Hilton says that while this comes out as the number one concern for end users in the CIF's research, it is a "red herring" which he thinks many businesses are now starting to realise.

"You need to consider the security of every technology, whether it's in the cloud or on-premise – it's good business sense. In most cases, cloud is as secure as on-premise IT, if not more so. Cloud service providers invest considerable amounts of time and money in keeping their services safe, and their brand and reputation depends upon this."

Lawrence Jones, CEO of hosting specialists UKFast, supports this view. "The myths about the insecurity of cloud have largely been dispelled over recent years, but it's still important to carry out the due diligence and make sure that you pick the right provider to meet the regulatory requirements that you have and that you're satisfied with their security processes.

"Cloud is as secure or insecure as you make it. If you use a reputable supplier, everything on their side will be secure and they'll have the standards in place to ensure your data is held securely. The vast majority of cloud platforms are not breached through the infrastructure. They are breached because of an application vulnerability or a misconfiguration. So long as your application stack is secure and the infrastructure is secure, there's no difference between physical or virtual infrastructures."

Not for all

Jones goes on to acknowledge that cloud isn't going to be for all businesses all of the time. "We've been through the age of pushing everything into one cloud and we're seeing quite a few users pulling back from that. Cloud is suited to many different workloads and as the technology has matured, people have learned what works best for them.

"What we're seeing now is a move towards multi-cloud strategies – different clouds for different processing needs – as well as a move towards edge computing."

According to Jones, many users are maintaining some on-premise functions for certain tasks. For example, he says businesses often don't need their whole payroll and HR information to be stored in the cloud, so they keep these data on-premise while using a hybrid cloud model to connect their on-premise infrastructure to other processes which need to be more dynamic and flexible.

"With the maturity of cloud we've seen more applications being created to be run in a virtual environment. Many more capabilities are being pushed into

certain areas of cloud, meaning that some workloads which previously would have been run on-premise are now run more effectively in the cloud.

"The cloud offers guaranteed connectivity, high bandwidth, and a skilled team of engineers looking after everything. But it does mean you're trusting that data to someone else. There's always going to be a case for keeping some of your data on-premise, alongside picking the cloud specialist that can best support them in managing whatever workload they have."

Hilton supports this view while pointing out that the CIF doesn't argue for cloud for the sake of it. He adds that although more organisations than ever before are now committing to a 100 per cent cloud environment, the vast majority are a long way from moving their entire IT estates.

"Just 17 per cent consider their primary IT model to now be cloud and 44 per cent expect to keep certain applications in-house for the foreseeable future.

"There are any number of reasons why organisations continue to maintain their own servers. Some are practical and perfectly reasonable – with existing investments in legacy slowing the pace of adoption (but likewise, depreciated or ageing hardware assets represent a good springboard to cloud adoption).

"Other factors include a lack of cloud migration skills or budget implications preventing businesses from moving as quickly as they might like to."

Hilton also points out that there are also factors that are "more irrational". He says some IT staff worry about the internal cultural impact so they throw up barriers to change, while others cite the security issue as a reason to avoid change.

With the analysts above forecasting big numbers for SaaS in public cloud deployments, can the same be said for keeping software in house?

Here, Hilton says there are perfectly legitimate reasons why businesses stick to on-premise. "Some legacy applications on which businesses rely simply can't be migrated to the cloud, and there might also be latency considerations for keeping software on-premise. A business's attitude to risk, their industry (such as heavily regulated verticals) and a fully tested cloud environment may also slow adoption.

"That said, SaaS brings with it huge benefits, not least where security is concerned. A cloud supplier should always be running the latest version of software, removing the necessity to patch and update which, from a data security point of view, is incredibly valuable."

Jones believes that you can traditionally think of cloud as removing the infrastructure costs of your organisation, because in principal the same software can be run either in the cloud or on-premise. "As applications are developed to be cloud native, they are built to take advantage of the flexibility of cloud and of the fact it can scale elastically. This is why we're seeing more software being run from cloud architecture."

It's all in the mix

Ultimately, though, and while it will take time, Hilton seems in no doubt that the direction of travel is clearly towards cloud. "Cloud is really the agent of digital transformation, so those businesses not using the delivery model will find it increasingly difficult to compete in the digital age."

Hilton goes on to state that cloud computing has come a long way in just a few short years. "When we commissioned our first major research project into the UK Cloud market in 2010, just 48 per cent of organisations had consciously adopted a Cloud service; a figure that stands at 88 per cent today. But what is clear is that cloud isn't yet all things to all people and that it will continue to sit alongside on-premise solutions for quite some time to come."

Parker clearly agrees with this: "Cloud providers have a vested interest in ramping up hype around their services.

Much of that hype will be deserved, but not everyone is a cloud convert just yet – and many never will be.

"On-premises will be around for the foreseeable future. Cloud may continue to rise, but it will do so as part of a mix of on-premises, private cloud and public cloud deployments; not as a towering storm cloud that swallows all else."

Jones sees a strong push for hybrid cloud right now, but also says that while cloud native applications are on the rise, legacy software and hardware will remain for another decade, at least.

"Vendors are working towards a hybrid cloud model with seamless integration and load migration between cloud and physical infrastructure. Our enterprise customers don't put everything in the cloud; they select the workloads that suit the technology. It's horses for courses." ∎

"Cloud is really the agent of digital transformation, so those businesses not using the delivery model will find it increasingly difficult to compete in the digital age."

Alex Hilton,
CEO,
Cloud Industry Forum

off-the-shelf: monitoring & optimisation

Watching your assets

Smart software to help you optimise and keep an eye on all your network infrastructure.

Blue Medora has unveiled the *True Visibility Suite (TVS)* for VMware's *Wavefront*. The suite is designed to extend real-time analytical capabilities across the enterprise IT stack, offering insight into applications, data tier, infrastructure and hardware.

TVS is targeted at teams in large enterprises tasked with supporting DevOps initiatives with hybrid cloud infrastructure. Blue Medora says it instantly expands the *Wavefront* analytics engine to on- and off-premises resources.

It adds that the platform currently supports more than 25 IT stack integrations, including *Pivotal Cloud Foundry*, *Amazon RDS*, *Cisco UCS* and F5's *BIG-IP*, and will "rapidly" grow to support more than 200.

Among the key features, the suite is claimed to offer end-to-end, real-time visibility across the IT stack, with "deep" metrics and "easy-to-understand" insights

into the behaviour of the major data centre, cloud and database technologies. It offers visibility into relationships at all levels through object tagging to see how layers of the IT stack impact each other.

Users are promised more accurate analytics as well as the flexibility to fine tune metrics with custom definitions for what Blue Medora claims are "high performing and right-sized analytics".

Ipswitch has added new features to its *WhatsUp Gold* (*WUG*).

According to the company, its popular network monitoring software "is all about ease-of-use and quickly resolving network issues". It has now extended that to include *Amazon Web Services* and *Microsoft Azure* servers, enabling users to

now monitor hybrid cloud environments.

The platform also now includes real-time performance monitoring reports. Similar to the 'split-second' graphs of legacy versions, Ipswitch claims the reports provide "extremely granular" data for troubleshooting. It says they can be added to any dashboard and configured

to display real-time statistics for CPU, memory, interface, disk and ping. Users can view data on multiple interfaces per device, pause monitors, or export the data to Excel for further analysis.

Another new feature is automatic and manual failover to ensure high-availability operation for a *WUG* server. Automatic failover can be setup based on specific event occurrences or conditions, while a manual failover option is provided for scheduled maintenance or planned outages/downtime.

Visibility to distributed networks has also been extended. Ipswitch says a range
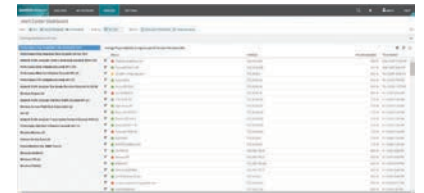
of distributed features are included in most editions making it easy to support larger and more geographically diverse networks. It says WUG provides users with "out-of-the-box" capabilities to view centralised reports from the remote sites and provide proactive network monitoring across a distributed environment.

Paessler has introduced an SaaS version of its *PRTG* network monitor where the visualisation, configuration and management of the environment is taken care of by the vendor on behalf of the customer via the cloud.

Established for many years now, *PRTG* has been designed to monitor all systems, devices, traffic and applications in an organisation's IT infrastructure. It uses SNMP, WMI, SSH, flows and packet sniffing, HTTP, REST API returning XML or JSON, ping, SQL, and more. Paessler adds that it is a comprehensive solution and that there are no additional modules to bolt-on or pay extra for.

The cloud-based version uses a remote probe installed on a *Windows* machine in the network to collect monitoring data. It executes the monitoring processes on the computer, and sends the collected
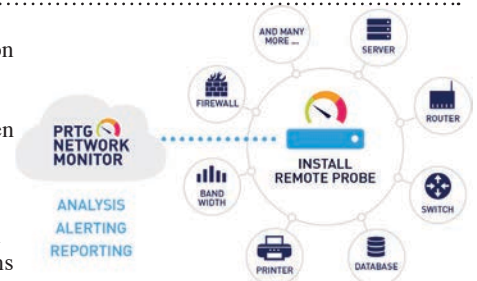
data back to the *PRTG* cloud server for processing and visualisation.

Paessler says end users configure their devices and sensors via a web interface. From there, they can also create reports, manage users and build custom dashboards, all online. Should problems or failures occur within the monitored IT infrastructure, the *PRTG* server notifies the end-user via alerts that can be sent via email, push notifications, etc.

Riverbed Technology says the latest version of *SteelCentral* empowers customers to measure and troubleshoot all parts of the "digital experience", from the user device to the backend network, infrastructure, cloud and application.

The new release features integration between Riverbed's *SteelCentral Portal*, *SteelCentral Aternity* and *SteelCentral AppInternals*. This means users can now incorporate the device-based view of the end user experience, thereby providing a single pane view of IT performance and its impact.

In addition, the company says the integrated workflow between *Aternity* and *AppInternals* provides a single monitoring system for the entire end user service and allows IT to "rapidly" troubleshoot business-critical applications across devices.

The latest version of *SteelCentral* also introduces application migration planning and prediction. This is designed to enable network planning teams to simulate and predict traffic behaviour and impact on the
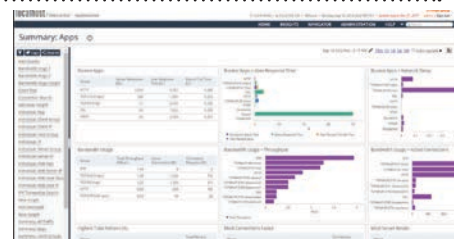
network prior to application migrations.

Furthermore, *AppInternals* now enables IT operations and development teams to consume performance insights and diagnostics across the application lifecycle. Leveraging new REST APIs, they can add performance testing to their build tool chain and ensure that releases are optimised for production. Riverbed says operations teams can consume alerts on popular collaboration tools such as *Slack* and *HipChat*, while support teams can automatically open tickets on incident management tools to log issues, their root causes and diagnoses. In addition, teams can use the API to extract metrics and enrich existing reports and tools.

Schneider Electric reckons it has come up with the first architecture for 'Data Centre Management as a Service'. It claims *EcoStruxure IT* "revolutionises" DCIM by delivering a cloud-based platform purpose-built for hybrid IT and data centre environments.

The system features *IT Expert*. Schneider says this delivers visibility across the hybrid environment from anywhere with one tap access direct from any computer or smartphone with the *Mobile Insights* app. Data centre and IT managers can benchmark performance against their own system or those across the industry for trend analysis, maintenance or failure prediction, efficiency comparisons and other measures.

EcoStruxure also features *IT Advisor*. This is designed to address the need for greater system optimisation and inventory management for enterprise and colo users. Schneider says it enables "superior" control, planning and prediction across all site locations, on- and off-premises. The
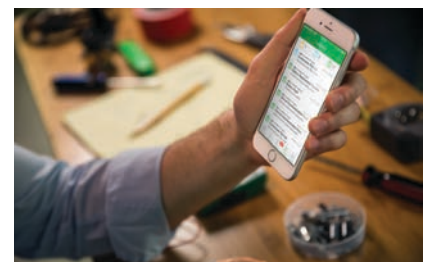
firm says failing equipment can be located and addressed easily, thus reducing time to repair, and can be supported by its round-the-clock remote monitoring service bureau. In the event of an incident, it's claimed the bureau helps troubleshoot and ultimately reduces MTTR.

Other key benefits include device information, smart alarms and monitoring through open system collecting data from all devices, regardless of vendor. Schneider says it also offers foresight into potential risks by leveraging global benchmarks and analytics in the *EcoStruxure* data lake.

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Firms globalising IT to access tech talent outside UK

The cost of professionals with expertise in digital transformation is higher than for other IT initiatives, according to Interoute. In a recent survey of 120 UK IT leaders, the global cloud and network provider found that nearly half regard the skills shortage as the problem.

As organisations pursue digital transformation projects to remain competitive and adapt to change, there is a need to connect with a wider talent pool, says Interoute. In its *Transforming for Success in a Changing World* report, the firm found that 87 per cent of organisations rely on contractors that can support projects on an interim basis. It revealed that on average, 42 per cent of employees working on digital transformation projects don't have a UK passport.

The company warns: "As flexible and multi-cultural IT teams become the enabler of digital transformation, the skills gap could be inflated if the capacity to hire digital talent is restricted by post-Brexit policies or changes governing how contractors are employed."

More than three quarters of respondents indicated that any restrictions on hiring contractors would impact timescales for their digital transformation projects, while 28 per cent stated an inability to hire contractors would halt digital transformation plans completely.

Interoute believes that one of the solutions here is to enable workers to collaborate more through using network infrastructure that can bring together dispersed and mobile working groups. It adds that 38 per cent of the organisations in its survey are looking to globalise their infrastructure so they can use skills from outside their geographic location as part of digital transformation plans.

Mark Lewis, EVP Products and Development at Interoute, says: "The key here is to enable your organisation to shift from worrying about piecing together network and clouds to instead choosing and developing your best software. Do this by leveraging pre-integrated global infrastructure, so your most valuable skills can be put towards making a difference for your business."

First university connects to IoT learning network

Siemens and the University of Sheffield are teaming up as part of the first collaboration for a new UK-wide digitalisation network to link universities with the IoT.

The partnership is based on the MindSphere Innovation Network (MINe) developed by Siemens to connect a university's estate and research assets into its cloud-based IoT platform.

The two organisations have also invested in a multimillion pound bespoke space on campus for collaboration and learning between students, local businesses and other partners. The *MindSphere Lounge* is located in the Diamond building which is said to be the university's largest ever investment in learning and teaching (the precise figure has been withheld). Students, academics and industry partners can use the lounge to access data produced by the university and the various projects connected to the *MindSphere* platform.

Siemens says its teams will be based on campus to help projects and engage communities by enabling Sheffield and

The MindSphere Lounge can be used to access data produced by the various projects connected to the cloud-based IoT platform.

other universities to become hubs for collaborating with local businesses.

IN BRIEF…

■ For the past two years, BeecherMadden says its annual research into women in cyber security has shown that women were being paid up to 30 per cent more than their male counterparts. But this year, the specialist recruiter could find no evidence that women were being paid any more than men with similar experience and backgrounds. BeecherMadden says there seems to be no obvious reason for the adjustment in pay. However, the one area where women are still outperforming men is in the speed in which they progress through the interview process.

■ Organisations with the most servers pay their IT employees the highest salaries, according to the *2017 DevOps Salary Report* from Puppet, the standard for automating the delivery and operation of the software. The report, which is based on 3,200 responses to a global survey, reveals that IT pros are more likely to earn $100,000 or more if they work for an organisation with more than 500 servers. Among the other key findings, Puppet says IT practitioners in the US continue to earn higher salaries than their counterparts around the world, with the most common annual salary being in the $100,000-$125,000 range.

■ Arrow Electronics will deliver Microsoft's training portfolio across EMEA. The deal renews Arrow's relationship as a long-term Microsoft Learning Partner and extends its geographical reach. Courses available range from cloud solutions to certification-related programmes, and involve Microsoft's online training platforms, *Open edX Learning* and *On Demand*. Jacques Assant, business development services director at Arrow ECS EMEA says: "Cloud solutions are at the heart of our strategy, and education is a key element of the value-added services at Arrow, enabling the market and the channel to support technology providers with product and solution readiness."

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