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FEBRUARY 2013

networking

FIXED & WIRELESS NETWORKS FOR ENTERPRISE USERS

More symmetrical network speeds needed for the cloud

by Ian Grant

User behaviour is forcing Ofcom to accept that there is a need for greater symmetry in the UK's broadband networks. However, the communications regulator is unlikely to change its policies soon.

"The trend is towards greater symmetry," said Ofcom CTO Steven Unger during a question and answer session following his presentation of the annual Appleton Lecture at the Institution of Engineering and Technology earlier this month.

An Ofcom spokesman subsequently told *Networking+* that the regulator is unlikely to ask BT to provide faster upload speeds in its £2.5bn next-generation broadband rollout. However, he added that Ofcom wanted to ensure that the UK "keeps pace" with developments.

During his presentation, titled "Fibre broadband – what will it take to make it happen?" Unger stated that the assumption that high definition TV is the 'killer app' for high-speed broadband is probably wrong, and that in fact there may be no killer app.

He said satellite is still the "best way" to deliver broadcast TV, but networks are carrying much more video on demand, which is increasingly often viewed on mobile devices such as tablets and smartphones in "multiscreen homes".

Unger suggested that the growing number of simultaneously connected wireless devices is driving the extension of fibre closer, if not into, premises for backhaul rather than delivery. The trend is driven not only by user-generated content (for example, *YouTube* now uploads three days of video every minute) but also by the shift to cloud computing.

"If cloud-based services do take-off then clearly they need much greater symmetry because people need to upload content as well as download it. That would drive symmetry in the network, [but] I don't think we're there yet."

Ofcom CTO Steve Unger says cloud computing will need symmetric network speeds to succeed.

PHOTO ©POLICY EXCHANGE

Earlier, he said the use of LTE to deliver broadband over fixed wireless links had shown promising results in a BT pilot study in Devon which began last year. Unger believes that if LTE becomes the way rural consumers receive high-speed broadband it would require greater use of fibre for mobile backhaul.

He outlined BT's graduated rollout of fibre, firstly to street cabinets and perhaps later to kerbside distribution points. This uses asymmetric GPON technology where at present typically 32 users share a 2.5Gbps stream, giving each a nominal 80Mbps download service over a copper final drop. Extending fibre to pole-mounted distribution boxes might enable homes and premises to receive a 1Gbps download service, said Unger.

He added that Ofcom and BT are discussing SLAs with respect to broadband services for small and medium enterprises. Unger says that Ofcom's brief is to protect consumers while big businesses could take care of themselves. ■

Resellers 'remain reluctant' when it comes to offering bespoke cloud services – p6

UK enterprises hampered by poor indoor mobile connections

Businesses are suffering from poor in-building mobile coverage and/or capacity. According to a survey carried out by international market research firm YouGov, 39 per cent of IT managers from large UK enterprises say they have experienced problems, and 35 per cent say they're prepared to move to a wireless carrier that could guarantee a better indoor solution.

YouGov also found that a quarter of businesses who have experienced an issue turned to their carrier for assistance but found that they were unable to help. As a result, 28 per cent of IT managers stated that they had taken connectivity matters into their own hands by installing a wireless system to improve coverage and/or capacity issues. A further 19 per cent said they had looked into installing a system but had yet to do so.

In addition, almost half reported interest in mobile device management as an operator-hosted service to support mobile devices in the enterprise, and 40 per cent showed an interest in Wi-Fi as a service from their operator.

Commenting on the results, small cells specialist SpiderCloud Wireless says there's a real opportunity for operators who can solve the in-building headache and offer services over the top of the enterprise radio access network. ■

Intrinsic delivers flexible infrastructure for state-of-the-art college

Furness College in Cumbria has deployed a new network which includes virtualised desktops, a unified communications platform, a 'bring your own device' scheme, and much more.

As part of its new £42m campus, Furness College in Barrow-in-Furness, Cumbria, contracted Intrinsic Technology to completely overhaul its IT infrastructure.

In a wide-ranging project, the cloud computing specialist has updated the college's networks, implemented virtual desktop infrastructure, and unified its communications. Intrinsic says it utilised its "high-level accreditations" with a variety of vendors, including Cisco, Citrix and Microsoft, to carry out the installation.

"The solution we've implemented is centred on flexibility," says Dave Griffiths, Intrinsic's head of corporate sales. "Furness College offers such a wide range of education and training that the IT infrastructure needed to cater for this with an easily accessible, shared network."

All systems are based on a modular design to ensure future scalability and supported by *Fusion*, the firm's managed service offering. Intrinsic says its platform proactively monitors and maintains the infrastructure, and has consequentially allowed the college to extend its hours of IT support into the evening.

The new network also accommodates a 'bring your own device' scheme, anytime remote learning, and improved collaboration and communications strategies for both students and staff.

Jo Anson, HE director at Furness College, adds: "Our new development is about providing an absolutely state-of-the-art environment for students and staff, and we always knew IT would be fundamental to that. Intrinsic not only delivered a creative, cost-effective infrastructure but its managed services proposition has completely overhauled the way we support users." ■

The challenges of building networks for the education sector – feature pp14-17.

Combined disk-tape system saves time and money for Serco

Serco Global Technology Delivery is expected to save $2m (£1.28m) in storage costs over the next five years, thanks to the deployment of an integrated tape- and disk-based system from Quantum. According to the vendor, the company has already reduced its disk capacity needs by up to 96 per cent and decreased restore times by "a factor of five".

Hampshire-based Serco delivers a range of managed and outsourced business solutions. Since 2010, its IT environment has grown from 50TB to 800TB, and it expects to reach 5PB within five years. As a result, the firm needed a flexible solution to protect its increasing data volumes while reducing excessive management costs. It now has eight Quantum *DXi8500* disk-based backup systems and two *Scalar i500* tape libraries. This is said to provide flexible deduplication, scalable architecture, as well as enterprise-wide backup and disaster recovery for clients. Serco runs *CommVault* for backups and relies on *Quantum Vision* software to manage its disk and tape environment from a single console. The software also enables the IT team to track data via mobile devices.

"The deduplication, encrypted replication and scalability features of the *DXi* technology ensure that we can adhere to contracted SLAs," says Mark Owen, Serco's senior infrastructure consultant. "We now have the flexibility to respond to customer requirements quickly and easily, and the disaster recovery is greatly enhanced through replication." ■

By using eight DXi8500 disk-based backup systems (right) and two Scalar i500 tape libraries (left), Quantum claims Serco has decreased restore times by a factor of five.

Mobile working: private firms can learn from the public sector

Teliqo's Russell Lux believes the public sector is leading the way in adopting new technological approaches to improving productivity.

The public sector is leading the way in cutting costs and increasing productivity with mobile working, according to cloud-based telephony provider Teliqo. It says local and national government organisations are "embracing technology" to help solve the growing problem of getting improved results with diminishing resources.

Earlier this month, Brent Council and HMRC announced new plans to enable employees to work remotely using smartphones, tablets, and mobile applications. Vodafone will support Brent Council by providing employees with constant availability. Staff will be contactable on any internet-enabled device via a single phone number using a single tariff for minutes, texts, and data. Meanwhile, HMRC aims to reduce its annual operational costs by more than £900 million. As part of a pilot scheme, it is equipping mobile field workers such as VAT inspectors with *iPads*, and a rapid wider rollout is expected once the scheme's feasibility has been assessed.

"Economic pressures have seen the public sector emerge as an innovator that is leading the way in adopting new technological approaches to improving productivity," says Russell Lux, Teliqo's commercial director. "Organisations in the private sector facing the same challenges should take note."

Lux says that while security has often been cited as one of the reasons against the widespread implementation of mobile working, this is now less of an issue.

"CESG, the information security branch of GCHQ, conducted a review last year that found Apple's *iOS6* operating system to be secure enough to handle restricted government data; the government is currently adjusting its rules to widen the range of devices cleared for mobile working schemes." ■

Avaya deploys comms network for 2014 Winter Olympics

Avaya Communications has been revealing its plans for connecting next year's Winter Olympic Games to be held in Sochi, Russia.

The vendor says it has now completed its network. It has deployed equipment to ensure secure, seamless and ubiquitous connectivity with any device for all test events leading to and during the games.

The Avaya network is currently being put through its paces. As part of its first test in December, the system was used to manage the world figure skating finals held onsite at the Ice Palace "Iceberg" venue where the games will be staged in 2014.

The firm's communications kit will unify all the sporting venues, media centre and Olympic villages. Its *Virtual Enterprise Network Architecture* will also be used for communications, logistics, registration and accreditation, as well as public safety.

In addition, Avaya is providing systems and communications training for local employees. It says this is designed to provide ongoing skills development on the latest communications technologies, and will ensure Russia has better skilled telecoms workers following the games.

US-based Avaya has a long-standing partnership with the Olympic movement and was also responsible for the communications systems behind the Vancouver Winter Games in 2010. ■

Avaya will connect all the Olympic venues including the "Iceberg" Ice Palace where the main events will be staged.

Kroll Ontrack develops new recovery capabilities for Dell EqualLogic, NetApp and VMware

Kroll Ontrack has developed new data recovery capabilities for storage environments that use the latest Dell EqualLogic, NetApp and VMware systems.

The firm says that through "custom real-time development", it made six updates to its Dell EqualLogic toolset in 2012 and claims a 100 per cent success rate with recoveries. As an example, it cites a recent case which involved two Dell EqualLogic volumes that were accidentally deleted from the user interface.

"One of the volumes was an NFS share from a *Windows* server and contained 600GB of data, including *Lotus Notes* data," says Kroll. "The other contained a VMware VMFS partition with MS SQL virtual servers. The R&D team solved the data structure related corruptions and implemented a full solution, resulting in a 100 per cent recovery of the deleted volumes from the NFS share and VMware VMFS volume."

Kroll says its latest NetApp capability was developed as a result of a three-drive failure in a *RAID-DP*. It says that its data recovery engineers are now able to emulate the NetApp RAID controller and retrieve the data from the array – even in the areas where there are more than two non-working HDDs. Leveraging this capability, the firm says it recovered over 30 million files and 7TB for one customer that lost more than 14 NetApp storage volumes.

Kroll Ontrack adds that it is also continuously enhancing its VMware recovery capabilities. It says that recent improvements include faster and more accurate support for VMFS-5, deleted virtual disks, and snapshots. ■

THE WORLD ACCORDING TO...

Bryn Jones, sales director, data centres, CommScope

Evolution or extinction for the data centre? You make the decision

Unfortunately, there is no way to completely 'future proof' a data centre. But it is possible to build one that is capable of evolving over time to meet changing demands and take advantage of new innovations.

A silo approach should be avoided, since a lack of communication and coordination between all the disciplines can lead to later problems. During the operational phase, tools such as DCIM will provide a holistic view of the centre, allowing for the management of all parts and how they connect with one another.

In addition, an IIM system will provide a complete view of the Layer 1 infrastructure and associated IP devices, ensuring security, workflow efficiency and SLA compliance, whilst maximising asset utilisation.

Rather than building a centre you can 'grow into', it's best to build one that will grow as your needs increase. An organisation's ability to make upgrades quickly has become critical. Following a modular expansion plan can greatly simplify the growth process while minimising the risk to existing services.

Finally, rather than looking at what is cheapest, businesses should invest in quality technologies that will provide greater long-term value. Take Cat 6 and 6a cables, for example. Server makers now provide LAN on motherboard 10GBase-T interfaces which means that those IT managers who invested in Cat 6a can now reap the benefit – while those that took the cheaper option with Cat 6 infrastructure can never get the full benefit of their new server investments.

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Tel: +44 (0) 1932 886 537
Fax: +44 (0) 1932 886 539

Annual subscription: £80 (UK); £95 (Europe), £100 (USA and the rest of the world) airmail. Cost per single copy is £8.25.

Printed in England by Williams Press.

KADIUM

ABC audited circulation:
19,679
1 Jul 2011 – 30 Jun 2012

IN BRIEF

Digital Realty launches POD 3.0

Digital Realty Trust has unveiled the next-generation of its *POD Architecture*. It says that *POD 3.0* advances the modular approach to data centre design by increasing the critical IT load delivered from the current 1,125kW to 1,200kW while reducing the number of components necessary for the additional capacity. Digital Realty claims *POD 3.0* will produce data centres that feature higher energy efficiency, such as PUE ratings below 1.2. The firm adds that the centrepiece of its *POD Architecture* is the pre-fabrication and inventorying of major electrical and mechanical systems that "traditionally stand in the time-sensitive path" of data centre construction projects. ■

Next Connex moves to the dark side

Zayo Group will provide dark fibre connectivity to Next Connex, a wholesale data centre and internet infrastructure provider. The bespoke connection allows Next Connex to support data centre operators by providing connectivity to other centres and internet hubs throughout London. The dense fibre deployment will also support the company's backbone network, allowing customers to extend to other Next Connex locations. ■

Boston to link Shetland Gas Plant

Boston Networks has designed a solution to support voice and data throughout the first critical buildings within the Shetland Gas Plant. The company has not revealed further details but says the plant needs infrastructure that is "robust, scalable and able to deliver optimum performance, even in highly challenging environments". Working to tight deadlines to ensure the plant is fully prepared to receive gas in spring 2014, the Boston team will begin the project in early 2013, working closely alongside construction partners GA Barnie, Morrison Construction and Petrofac. The facility will occupy an area of around 540,000m^2 and will be the main processing plant for gas from the Laggan and Tormore fields which are approximately 125km north-west of the Shetland Islands. ■

Smiths Group deploys telepresence and UC across 400 global sites

Smiths Group is using telepresence to unify its video, voice, and data communications across 400 locations worldwide.

The London-based firm has five divisions creating products, technologies, and services for the threat and contraband detection, medical devices, communications, and energy markets worldwide. It employs more than 23,000 staff in over 50 countries. As a result, Smiths faced several challenges when it came to communication and project collaboration and the speed of decision making, as well as mounting travel costs.

It has now implemented Polycom's *RealPresence HDX 8000* room video system and desktop *HDX 4500* in fixed locations. All the systems are powered by the vendor's *RealPresence* UC platform which is also connected to Smiths' *Microsoft Lync* desktop clients. *Lync* is being rolled out across the entire company with a target completion date of mid-2013.

The combination of Microsoft Lync and Polycom RealPresence, enables staff to collaborate face-to-face via video on their desktops, in a conference room, or on a mobile device.

Polycom says video conferencing has significantly changed the group's way of working. It has enabled it to break down some of the barriers to communicating across a distributed workforce whilst reducing travelling costs, improving employee collaboration, and increasing efficiencies across business units

Simon Quintin, Smiths Group's director of workplace services, adds: "The ability to actually see someone directly makes the whole communication mechanism more personal as you build rapport quicker to get things done faster."

The company is currently running a pilot using Polycom's *RealPresence Mobile 2.0* for about 250 mobile staff using tablets and smartphones. This is extending video collaboration beyond the office. Smiths plans to introduce this to more of its mobile workforce in the coming months. ■

RNIB upgrades WAN to deliver better services

The Royal National Institute of Blind people (RNIB) has upgraded its WAN, bringing all of its thirty nationwide sites into a high-performance resilient network.

The charity says the new WAN will help it to provide blind and partially sighted people with better online access to its full range of services and content. This includes access to the RNIB's National Library as well its flagship *Talking Books* service.

"Each day, a large number of people rely on RNIB's services including our helpline, library service, online support and access to information about sight loss," says Jon Curry, head of IT. "Although our existing network had served us well in the past, it could no longer meet increasing demands for real-time communication, collaboration and access to data and applications."

Claranet MD Michel Robert reckons the RNIB now has an "ultra-reliable network infrastructure".

Curry adds that the new WAN means the RNIB can run its internal systems to a level of performance that will enable it to continue to provide the "highest level" of support to those with sight loss.

The network was supplied by managed services provider Claranet. Its MD, Michel Robert, says: "RNIB will be provided with an ultra-reliable network infrastructure that will support current and future internal and external communications, application and service delivery needs." ■

Openreach's Ethernet delivery system is 'broken'

Openreach's service delivery process for Ethernet lines isn't working, says the Office of the Telcommunications Adjudicator (OTA2), an independent telecoms watch-dog set up by Ofcom to oversee co-operation between communications providers and enable a competitive environment.

In its January review, the adjudicator said: "The process of [Ethernet] service delivery is broken." It believes efforts to improve matters by moving Ethernet onto BT's EMP platform* have failed. "If anything, some communication providers [CPs] believe it has worsened the situation," said the OTA2.

It also reported that Openreach had agreed to pay fines if it misses service level guarantees (SLGs) for local loop unbundling. The agreement covers 'appointed provides', where an Openreach engineer needs to visit premises (about a quarter of all provides).

The average lead time for provisioning is now just under 16 days. Openreach will pay £2 per day for every line that misses the 13-day SLA, and £4 per day if it takes longer than 16 days.

Also, forecasting service providers such as BT Retail, Sky and TalkTalk, will have to hone their estimated line requirements from +/-15 per cent to +/-10 per cent by November. Non-forecasting CPs will receive full SLG payments automatically.

The deals follow an "intense review" between the forecasting CPs, Openreach, OTA2 and Ofcom. The OTA2 says that this showed "there were many failures where appointments should not have been required in the first place." It proposed a number of improvement work streams with the aim of significantly reducing the requirement to have an Openreach engineer attend. ■

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[1] Based on IBM testing and documented in IBM System x® Virtualization Server Consolidation sizing methodology. IBM Flex System x240 supports 27X more Peak Utilization Virtual Machines (VMs) than previous generation BladeCenter® HS22V.

[2] Based on IDC white paper "The Economics of Virtualization: Moving Toward an Application-Based Cost Model," Michelle Bailey, November 2009, http://www.vmware.com/files/pdf/Virtualization-application-based-cost-model-WP-EN.pdf

Optional IBM Flex System storage node available fourth quarter 2012.

Enterprise cloud services revenue will grow to $31.9bn by 2017

The global market for enterprise cloud-based services will grow from $18.3bn (£11.7bn) in 2012 to $31.9bn (£20.5bn) in 2017. In its latest *Enterprise cloud services: worldwide forecast 2012-2017* report, Analysys Mason says that the year-on-year growth rate will be 17 per cent in 2013, but will decrease during the next five years as the overall size of the market expands.

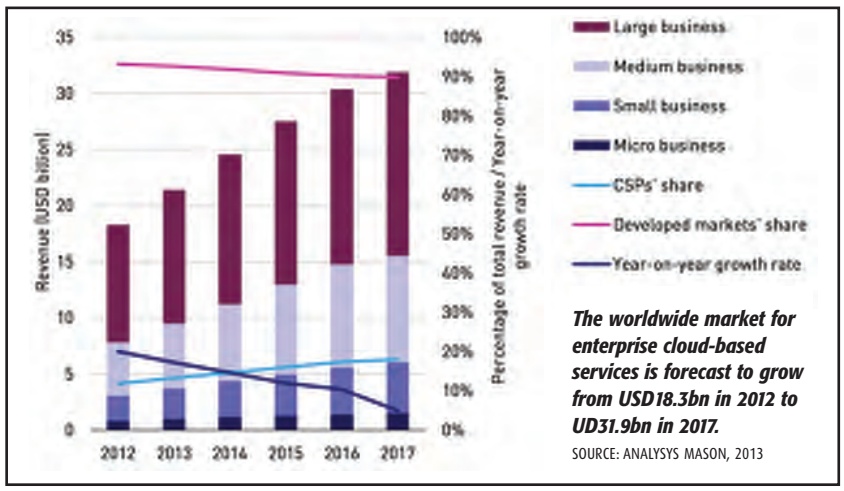
While the public cloud services market continues to grow, this is at a slower overall rate compared to previous forecasts, according to principal analyst Steve Hilton. "This slowing of growth is the result of difficult economic conditions worldwide and slower-than-anticipated adoption of new IT technology by both large and small enterprises."

In developed countries, revenue from enterprise cloud services is expected to increase from $17bn (£10.9bn) in 2012 to $28.7bn (£18.4bn) in 2017, at a CAGR of 11 per cent. Analysys Mason believes that communications service providers (CSPs) will account for an increasing share of enterprise cloud services sales.

"CSPs will become more adept at offering a high-quality cloud solution with network- and application-level SLAs, which will drive more enterprises to adopt cloud services," says Hilton. "CSPs will be responsible for 18 per cent of total worldwide enterprise cloud services revenue by 2017." He adds that CSPs will continue to position themselves as ICT, rather than communications, providers to large enterprises and SMEs."

SMEs accounted for 43 per cent of total public cloud services revenue by the end of 2012. Analysys Mason says that SMEs often have fewer security-related concerns than large enterprises when adopting cloud services, but are slower overall to adopt new technology solutions.

"We expect the proportion of revenue from SMEs to increase to 49 per cent by 2017, because their awareness of public cloud solutions will continue to increase. The usability of SME cloud services will continue to increase as vendors and CSPs create affordable, easy-to-use solutions that are targeted towards SMEs," says Hilton. ■



The worldwide market for enterprise cloud-based services is forecast to grow from USD18.3bn in 2012 to UD31.9bn in 2017.

SOURCE: ANALYSYS MASON, 2013

Resellers "refrain" from offering cloud services

It's been revealed that over a third of resellers in the UK and Ireland do not currently offer cloud services. Research carried out by the Cloud Industry Forum (CIF) with IBM says that channel organisations are preferring to sell applications or SaaS solutions rather than bespoke/IaaS solutions.

In *The critical role of the channel in driving cloud adoption* research report, the CIF says that 37 per cent of resellers do not currently offer cloud services, representing little change when compared to a similar study carried out in 2010.

Results from the latest report suggest a consistent number of firms are offering cloud based services – 61 per cent in 2010 versus 63 per cent in 2013. There is also no material movement in the split in the number that just resell services as opposed to those that deliver their own solutions or offer a combination of both (64 per cent).

But the CIF notes that one marked change from the original research is that whilst the number of businesses offering SaaS style solutions moved ahead slightly from 79 to 81 per cent, those claiming to offer IaaS decreased from 51 to 29 per cent.

The forum says these results suggest that channel organisations prefer to sell specific solutions rather than bespoke solutions or components. It adds that these solutions are likely to be in specific application areas rather than the wholesale movement of activity from on-premise to hosted or cloud.

When asked to comment on the barriers they face in selling cloud services as part of their portfolio, the primary issues cited related to data security and privacy, poor internet connectivity at end user sites, contractual expectations of customers, and data portability concerns.

CIF chair Andy Burton says cloud vendors should do more to educate resellers.

"In reality, cloud impacts supply chains, responsibilities and accountabilities of parties, contracts, financial operations, reward systems and service expectations," says CIF chair Andy Burton.

"The fact that over a third of resellers still refrain from offering cloud services is significant, and leading cloud platform vendors can do a lot to educate and assist channels in managing their own business transformation." ■

VIEW FROM THE TOP

Jonathan Hunt, business development director, Point to Point

The barriers to moving enterprise desktops into the cloud

In recent times, I have seen a growing number of organisations trying to move desktops into the cloud. However, while there has been a lot of talk around this whole area, the reality is that most have not been ready to make the move.

Part of the reason is that Microsoft won't allow a *Windows 7* environment to be used in the cloud – and that's presenting serious challenges. It has said cloud service providers can't offer a licence for the operating system, and the Microsoft Services Provider Licence Agreement does not include provision for it. This means that cloud providers are not able to licence desktops in the cloud. Customers who have their own dedicated infrastructure and licensing can do so, but for many this defeats the whole concept of the cloud.

The attraction of a cloud platform is that you don't need these components, you merely pay for what you use. Microsoft's lack of support for a full cloud infrastructure is causing issues for our customers who need advice and support to find ways around this barrier. Increasingly, this advice is focusing on the use of server platforms to act as the desktop, either in its literal form as the server operating system itself, or in the more traditional way as *Citrix XenApp* or *Microsoft Remote Desktop* services. This is changing the nature of desktop debate for many as it involves a different platform and the transition of applications to it.

Point-to-Point has been considering completely different delivery methods for the Desktop as a Service (DaaS) approach. We are actively talking to our customers about the option of an operational budget funded desktop in line with DaaS, but with a local customer hosted infrastructure. This removes many of the barriers and concerns that our customers have about moving desktops to the cloud, but still provides them with the cost and management benefits that were initially of interest. The added bonus being that this now resides in a physical environment they know and trust.

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Connecting the community

PSNs, unified communications, cloud services, storage and servers – councils need the full array of IT products and services in their quest to transform local government.

Finding more space in Derbyshire

Derbyshire County Council (DCC) has more than 30,000 staff who help deliver a huge variety of services to a population of 750,000 people. It generates vast amounts of data, but this had led to problems as data centre manager Rob Skermer explains: "We first implemented our SAN in 2003 and it was scaled for 2TB. Today, for each environment, we're looking at 250TB. So growth is more than a hundred-fold. Keeping pace is difficult."

By 2012, DCC's existing storage solution was running out of capacity. It didn't provide file services directly and required many *Windows Servers* to be connected to deliver the bandwidth and performance for 8,000 users. Data replication and file server failover was complex and unreliable. When backing up the servers, an entire weekend was required due to the many millions of files, many never being touched or changed.

Skermer says the council was about to exceed capacity and wanted to avoid both penalties within its existing contract and having to spend on an interim solution. "We had to implement fast, over four weeks," he says.

DCC then turned to Phoenix. Following consultations, it found that the council's storage array excelled in some functions but failed in others. Its approach was to "right-size" the solution and implement functional storage tiering. A dual-site NetApp storage system was deployed, and this consolidated multiple servers onto a single unified platform using high-capacity SATA drives and with storage efficiency features including thin provisioning, data de-duplication and compression.

NetApp *Snapshot* technology meant millions of tiny files could be backed up in seconds and retained for four weeks, with tape used for long-term retention to meet governance requirements.

NetApp is also used to replicate data offsite to a secondary site. "Using NetApp we have failover in 10-15 minutes from one site to another and it's invisible to users," says Skermer. He adds that the solution is modular and offers scalability. "With the NetApp controllers, we can swap-out without any service interruption, attaching more storage. So it's sustainable – one of our original requirements."

All this has ultimately enabled the council to free-up 20TB of tier 1 storage. The new efficiencies have reduced its storage outlay by up to 50 per cent, while the backup window has shrunk from 48 hours to seconds. Reduced tape handling has also improved service levels and cut the cost of IT operations.

Cambridge dons PSN

With the Cambridgeshire Public Services Network (CPSN) project, Cambridgeshire County Council set itself a tall challenge – reducing IT spend while providing better technology services to staff and citizens.

That also meant developing a network which was easy for its partners to use too, so that the barriers to getting the technol-ogy were removed and strong partnerships could drive more use of the network around the county.

With the help of Virgin Media Business (VMB), Cambridgeshire now has a net-work that's capable of increasing internet speeds and data access in more than 200 schools, 32 libraries, and via more than 50 community access points. Twenty-eight fire stations across the county are also now able to enjoy the benefits of using it.

VMB says that what's "truly inspiring" about the project is the difference it's making to local people. Cambridgeshire County Council has opened 50 access points in community centres, village halls and other public buildings so that people who may not have the internet, or just prefer to socialise with neighbours while they browse, can get online near to home.

The CPSN uses a 10Gbps fibre-optic core network and services can be provided both on-premise or via the cloud, depend-ing on how partners want to share them. VMB says it's not just about connection speeds – the new shared network also makes it cheaper and simpler for partners to get services like web-filtering security software compared to buying them themselves. And being able to buy the framework's network services from the cloud means that full security protection comes 'built-in' so even the smallest authorities can afford the best security.

As well as improving services in the community, VMB says that the CPSN is also reducing county council network bills by a £1m each year. That has a knock-on effect on all the partners using the network – the more money that is saved, the more funds are made available to invest in frontline council services.

"CPSN allows us to focus on the 'business' in question, not the plumbing that lies beneath it," says Henry Cressey, ICT head at Cambridgeshire Fire and Rescue. "The potential buying power that comes from joining forces give every partner a very real reason to participate. We're all doing things with the network that improves what we do and means we spend less money doing so."

VMB adds that the next chapter in the CPSN story is to increase its reach. The team aims to open up the network to other public sector organisations, even beyond Cambridgeshire's borders.

Warwickshire keeps IT cool

Warwickshire County Council has recently completed its fourth data centre using EcoCooling's computer room evaporative cooler (CREC) system.

Its Centenary House facility in Nuneaton features four roof-mounted CRECs which are said to deliver 90kW of cooling and provide N+1 redundancy.

EcoCooling says hot and cold aisle containment is used with a raised access floor to enable 9m^3 of air per second to be fed into the cold aisle. Low energy electrically commutate fans are also used to provide extraction. There is no refrigeration backup to the system.

The vendor adds that its control system provides a variety of operations dependent upon the outside temperature. A PLC (Programmable Logical Controller) is used to control all parameters including group control of CRECs, fan speed, damper positions and links to fire systems. The system also monitors performance, while an Ethernet protocol TCP modbus facility integrates with a Trend BMS system for data and fault reporting.

According to EcoCooling, evaporative cooling is a low energy, low carbon alternative to air conditioning, and uses a simple method of cooling air without refrigerants. The patented system features wetted filter pads and air is cooled when the water evaporates.

The firm says its CRECs are suitable for sever rooms from 10kW to 5MW and for both retrofit and new builds. It also claims that a return on investment in under a year is achievable in many cases.

According to EcoCooling, by deploying CRECs, customers can benefit from energy savings of more that 95 per cent compared to traditional refrigeration systems, and their facilities can also achieve PUEs of less than 1.1.

The company says its ultimate aim is to slash the UK's total energy demand by one per cent – the equivalent of shutting down an entire power station.

Sealing the cracks in network management

To date, network management has been like papering over the Grand Canyon. But now, mobile broadband, BYOD, cloud computing, machine-to-machine, etc, are creating cracks as wide as the Great African Rift Valley. IAN GRANT looks at the ecosystem that is trying to manage exponential demand for bandwidth.

NATIONAL PARKS SERVICE GRAND CANYON PHOTO BY MICHAEL QUINN

You could call them the four horsemen of the network apocalypse: mobile broadband, BYOD, machine-to-machine and cloud computing. Together, they are changing the way we live and work, and in the process they have driven an 80-fold increase in network traffic in less than a decade. The problem? The old networks can't cope and the new ones are fundamentally flawed.

The old circuit switched, time division multiplexed networks were designed to handle voice – not data. Presently, the world's packet switched and statistically multiplexed data networks (including the internet) mostly run as an overlay on old systems. With most information formats now digital, it reduces complexity and saves money to use a native data network and to run voice as an application.

As far as enterprises are concerned, it is no longer necessary to lease a private line network and build your own IP network with dedicated servers – it can all be leased from the carrier, including managing the IP address assignments.

"Although circuit networks can be used to build an IP-based service network, the rigid hierarchy inherent in the former is too expensive and unnecessary for packet-based services," says carrier networking consultant Mark McDonald. "The invention of 'wide area Ethernet' or Carrier Ethernet has given the telcos confidence to deploy native Ethernet connections directly to customers. The economy of these connections has allowed greater bandwidth to be provided which in turn is an enabler for greater use of IP services in general, and cloud-based services in particular."

The flaw in the flow

Unfortunately, the Internet Protocol was flawed at its inception (see *How they broke the internet*, p16). Fortunately, Ethernet, a technology developed for local area networking, has proved remarkably extendible. January saw the certification of the first 20 kit vendors to support Carrier Ethernet 2.0, the latest incarnation of Ethernet for WANs, and the recent CES debuted a slew of 802.11ac routers that offer gigabit wireless connections.

Bigger challenges remain as each of the 'horsemen' raises its own problems in terms of network management, and these are in addition to latency and congestion that affect everything. Despite the simplicity promised by having a single Ethernet/IP environment, it is easy to see why enterprises may opt to offload the problems to 'the experts'. Giuliano Di Antonio, Cisco's VP for data centre products, expects half of IT workloads to be processed in the cloud within 10 years, using public, private and hybrid services. That may be contentious. But some firms such as Infoblox believe it offers the hope that one day the network manager's only job will be managing data flows against application SLAs and even that might be automated.

In the meantime, networks contain a growing variety of proprietary hardware appliances. A new network service often needs yet more hardware and finding the space and power to accommodate this kit is getting tougher. There is also the added complexity of integrating, deploying and managing such appliances in a network. Moreover, hardware lifecycles are shorter, which reduces the investment return from new services and hamstrings innovation.

An indication of how hard this makes life in the data centre comes from Infoblox EVP for marketing David Gee. One customer, a large US financial services firm, told him it makes more than 1,000 manual changes a day to its firewall and access controllers. As each new box is added to the network you rapidly run out of capacity to manage things manually, says Gee. And he adds that BYOD and M2M are making things worse: "The number of [processor] cores on your person and in your house coming online continues to grow. As a service provider, the requirement to have a single authoritative version of your network assets, and the interactions those assets are having with each other, becomes increasingly mission-critical.

"If you use your smartphone to look up something on the net, send email, or make a call, that's north of 100 DNS queries. So every device is driving demand for core network fidelity. And the only way you deliver that is to have an authoritative version of the truth. Nothing else matters."

Industry response

The industry is responding to cost pressures and vendor lock-in with new technologies such as software defined networking (SDN) and network function virtualisation (NFV). To overcome the shortage of IP addresses it is starting to implement IPv6. With its 128-bit address space, IPv6 should provide enough addresses for the foreseeable future, assuming processors become fast enough to resolve the more complicated routing.

In January, AT&T, BT, Orange, Deutsche Telekom, Telecom Italia, Telefónica and Verizon were among 52 operators, telecoms and IT equipment vendors, and technology providers to create the ETSI Industry Specification group for NFV. The group aims to apply IT compute and storage virtualisation principles to networks. It will consolidate many network equipment types onto industry standard, high volume servers, switches and storage.This involves implementing network functions in software that can run on a range of standard servers, and that can be moved to, or instantiated in, various locations in the network as required, without the need to install new boxes.

With SDN, network operators and their customers should benefit from lower capex and opex through reduced equipment costs and reduced power consumption. It will mean less delay in deploying new services which deliver better returns on investment, and have greater flexibility to scale up and down or evolve. Plus, it will lead to greater openness to the virtual appliance market and pure software entrants, as well as more opportunities to trial and deploy innovative services at lower risk.

War looms

SDN started as a way to virtualise data centre networking, but quickly attracted attention from WAN operators. Unusually, it's the end users rather than the vendors who are writing the SDN standards, in particular, the OpenFlow protocol. So does this herald another battle over standards between telcos, equipment vendors and users? The short answer is yes.

NFV coincides with the SDN initiative from the user-driven Open Networking Foundation (ONF). Its executive director, Dan Pitt, is trying to head-off the war and says that the ONF is staying in "very close touch" with NFV. He adds that he was "pleased" to see the level of participation by telcos at an SDN meeting held in Darmstadt last year. Telcos made up half the attendees, and among the speakers were AT&T, Colt, Deutsche Telekom, Interoute and Telefónica. The latter, together with Swisscom, are now ONF members and Pitt is also talking to BT, Colt, and Vodafone about joining.

He also claims to maintain personal contact with individuals, many of whom sit on boards and guide their organisations' technology developments. Pitt adds that he is in touch with the ITU to keep it abreast. "We move very quickly, they move very slowly," he says.

In Pitt's view, the way to get virtualisation right is to separate the 'control plane' from the 'data plane' – in effect liberating the management function from the data flow through the stack. "SDN goes a great way to virtualising Layer 4 to 7 functions in a server because of what you can do to the network to make that possible."

Cloud Distribution's director of product development Adam Davison agrees and says the separation of the switching and control planes under OpenFlow means a radical rethink for traditional network management solutions: "The lack of a northbound interface on the current generation of SDN controllers means that any management solution needs to be custom-written for each vendor's SDN controller if it is to leverage the underlying infrastructure. The alternative is to integrate a controller into a vendor's own network management solution."

"SDN goes a great way to virtualising Layer 4 to 7 functions because of what you can do to the network to make that possible."

Dan Pitt,
Executive director,
Open Networking Foundation

What the vendors say

The equipment vendors among the ONF's 89 members were quick to translate OpenFlow protocol into products and services. But Pitt is concerned that some firms are trying to impose their own vision and proprietary technology on SDN. He believes that the companies that have implemented their architectures in silicon are typically those with most to lose.

The leading suspect is Cisco. EMEA CTO Ian Foddering reckons Cisco's *ONE* (*One Network Environment*) "absolutely" addresses SDN issues, but offers a broader answer: "SDN for us is just one of a three-pronged strategy. We've got the separation of the control plane and the data plane running in pilot. We've got SDN 1.1 running and we're looking to develop our own capability in that space as well."

"SDN for us is just one of a three-pronged strategy. We've got the separation of the control plane and the data plane running in pilot ... and we're looking to develop our own capability in that space as well."

Ian Foddering, EMEA CTO, Cisco

Brian Shorland, Alcatel-Lucent's enterprise product manager for EMEA, adds that IP address management will be hugely important with the advent of SDN in terms of controlling and managing the devices which are on the network at any given point. "But the real issue will be how we control applications between the user's device and the core part of the network – and that's where SDN comes in."

Shorland says IPv6 will simplify virtualisation across the entire infrastructure, as well as provide resources and functions to make SDN scale more easily. "SDN and IPv6 look as if they bring with them management pains for IT staff. But automation is one of the benefits of SDN."

Infoblox claims it has already responded to this issue with the release of a new DNS firewall, security device controller, and network edge services appliance, all integrated with its latest network control portfolio.

SolarWinds' VP Sanjay Castelino says uptake of SDN beyond unique use-cases of large enterprises and service providers, will have a "profound impact" on both network infrastructure vendors and management vendors. "Today, SDNs focus on a problem that really exists within data centres, that of rapidly changing network requirements and configurations. While the separation and abstraction of the control plane solves many problems related to the dynamism of the network, it doesn't remove the need for management. On the contrary, the change makes management more complex because with abstraction comes new challenges."

Castelino goes on to say that SDNs will co-exist with today's networks for many years yet. "Management solutions will have to deal with both types of architectures, providing a cohesive view for IT operations to deliver services to business."

How they broke the internet (on purpose)

Just as the world converts its networks to Ethernet and IP, comes the revelation that the internet was broken by design from day one back in 1976.

This is because DARPA (the US Defense Advanced Research Projects Agency, responsible for the development of new technologies for military use) picked a less complete protocol than its European counterparts – one that left out how networks might interconnect with each other. But because DARPA had more money, it ruled. As a result, how today's networks interconnect is almost on a hand-stitched, case-by-case basis.

John Day, one of the original developers of Arpanet and the Open Systems Interconnect model, says the decision to use an inferior protocol was the result of a three-way battle for market dominance.

According to Day, the phone operators didn't like the new protocol (INWG 96) because an end-to-end transport relegated them to a commodity business, thus denying them exclusive claim to value-added services or services in the network.

IBM, which had 80 per cent of the computer market, didn't like the new model either because it had its own hierarchical network architecture, SNA. But the other computer companies – especially the minicomputer makers like Digital Equipment, Data General and HP – loved the new model because it played to their strengths and because it "nailed down the other two".

Consequently, a vast ecosystem has grown up to address, if not fix, the latent deficiencies of the internet. In Day's words, these include the inability to provide: security; multi-homing (an IP address with more than one simultaneous connection to the internet); and quality of service. The network was also unable to address space exhaustion, deal with the complexity in providing mobility and

Napatech president Erik Norup is also cautious. He reckons SDN, OpenFlow and other initiatives will lead nowhere unless they improve the cost base for communications services and allow users to monitor, manage and optimise services end-to-end. He argues that the basic information already exists in data from network and application monitoring appliances. Firms can use these to build profiles of normal network behaviour that will quickly show anomalies in real time.

According to Norup, network, application and security monitoring appliances based on standard servers and Napatech adapters can scale with the number of CPUs supported at speeds up to 40Gbps; while intelligent deep packet inspection software from vendors such as Qosmos or Vineyard Networks can provide high-speed application awareness. "This ensures actionable, real-time information in the event of an attack on network security."

What service providers say

Communications services provider Vtesse Networks says that in terms of WAN management, it is seeing more vendor support for application monitoring. "On top of classes of service available with MPLS-based IP VPNs and Carrier Ethernet networks, we see vendors implementing systems that allow customers to see which of their applications create most traffic, letting them know, for example, if their staff are spending all day on *Facebook*," says senior product manager John McDonald.

He also notes a recent increase in dynamic assignment of bandwidth for specific applications and automated WAN setup and configuration. Cisco's *Virtual Office* and US-based Glue Networks services are cited as examples. This rise is due to more on-demand consumption-based IT, one of the prime drivers of SDN.

Market analyst Dell'Oro Group predicts the total data centre appliance market will approach $4bn in 2017, a CAGR of just under 10 per cent. This will largely be due to the accelerated adoption of virtual appliances in production networks and cloud environments. "Virtual appliances are a nascent and fast-changing market," says senior analyst Casey Quillin.

"We foresee higher-end, higher-priced products that make networks smarter becoming more prevalent. Cloud applications are a perfect example of this. For example, F5, Riverbed, Citrix, and Al0 have all recently announced virtual appliances for the public cloud which are compatible with *Amazon Web Services*."

Meanwhile, apart from playing a leading role in NFV, BT claims to be addressing the congestion and latency problems that are crucial to the success of cloud, mobile and machine-to-machine communications. It told ISPs last October that it is installing more than 500 "multiservice edge" routers to upgrade its 21st century network in order to meet heavier demand for bandwidth and services at the edge.

The customer response to SDN, outside of the mega data centre operators, carriers, universities and research labs, has been muted. But it is early days. Christine Gerbauer, UK manager at network monitor supplier Paessler, says customer feedback is central to how it develops its *PRTG* network monitoring software. "Currently, we are not seeing any immediate demand from our customers for monitoring of SDNs. However, it is a young market that is gathering momentum, and we will certainly be keeping a close eye on it."

The ONF's Pitt agrees that the SDN market is still developing but adds that it is rapidly growing. For instance, he points out that financial services firm Goldman Sachs joined the ONF board recently, and Google, an ONF founder, went public last April about how it is using SDN technology to connect its data centres. So quite a lot has already happened in just two years. The next 24 months will see a lot more. Watch this space. ■

the increasing size of the router tables, and suffered from poor usage of resources.

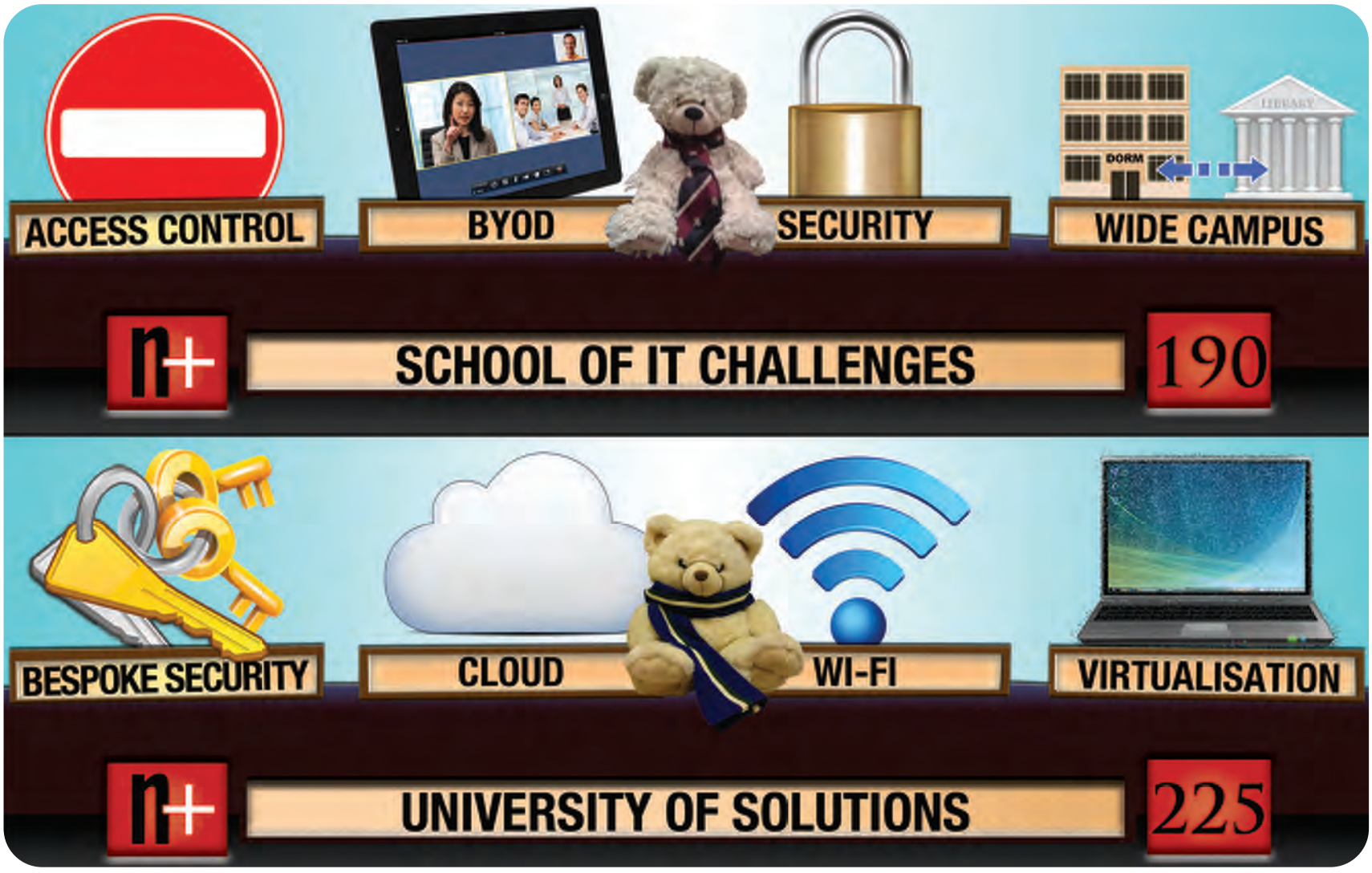
Martin Geddes, telecom consultant and former strategy head of BT's research laboratory, reckons none of these problems can be solved with TCP/IP. It is only Moore's Law and the advent of optical fibre networks that has kept things staggering along. But that's about to end.

In his 2010 paper, *Is the internet – an unfinished demo?*, Day wrote: "An IPv6 prefix consumes four times more memory in a router than an IPv4 prefix and requires more computing power for convergence of routes. This fact, compounded with the multi-homing issue (which avoids single points of failure) and the advent of the Internet of Things [with] billions of sensors, smart meters and devices directly connected to the internet, may lead to routers not being able to converge on the calculations of the BGP routing tables, causing routing instabilities and ultimately an internet far less reliable than today."

Day says Recursive InternetWork Architecture (RINA) can replace TCP/IP. But Geddes believes that "one to two years" of additional lab development is needed to shake down this technology, and then some early commercial trials on "edge" cases after that. "My guess is that RINA is five to 10 years from first use in 'mainstream' networks. It would be a natural technology for military use, but they apparently have gone to commercial off the shelf products even if it can't solve the problem."

Geddes thinks IP and RINA networks will co-exist and interoperate: "You can wrapper any existing network using 'shims'. There are a number of issues in doing so, as the systems work very differently. There is [also] an open debate about 'new core' versus 'old core' networks."

In terms of network management, RINA makes software defined networking and OpenFlow redundant. Geddes concludes the IP paradigm is broken and more fixes and overlays will just keep adding to the complexity and brittleness of networks.



University challenge

Building networks for schools, colleges and universities can prove to be quite a test for IT vendors, service providers and integrators. RAHIEL NASIR gets swotting.

Over the last few years, the shape of IT services in educational institutions has changed beyond measure. While technology developments are helping to drive the transformation, they're also putting greater pressures on education sector IT departments which are often confronted by many unique challenges.

One issue is size. Many colleges and universities have campuses and buildings spread throughout entire cities and some even have sites across more than one city.

"For the higher education sector in particular, networks are essential for linking disparate sites such as campuses and halls of residence," says Marcus Jewell, head of Brocade's Western Europe division. "Infrastructure must therefore be strong and reliable to ensure consistent uptime, delivery and performance when transmitting data from site to site."

However, all that's just the beginning. As you would expect, when supporting educational apps and comms services for students, there are some serious security issues that must be addressed. "Just as students are relying more on the internet for their studies, they're also increasingly bringing their own devices, such as laptops and tablets, into their school, college or university," says Jewell.

He warns of two risks. The first is to the institution: processes must be put in place to ensure devices coming on to the network do not pose any threat to the infrastructure. The second risk is to the student: the networks they're accessing web services on must be secure enough to ensure they're only able to see appropriate content.

This latter point strikes a chord with Andrew Lawrence, education lead for security specialist Sophos UK. He points out that schools must take into account the different access requirements of fundamentally different user groups: as well as staff, these also include pupils who range between the ages of five to 18.

"Schools also handle sensitive data such as PII, student records, and in some cases this can include sensitive financial data. To add to the complexity, some students like to explore the boundaries of the environment they operate in – certainly to a greater degree than the usual user encountered in the corporate market."

Lawrence goes on to say that Sophos helps schools to deploy security that is not only simple but also allows them to manage the bandwidth they have available.

"A wireless network is ideal for a BYOD solution, especially when the wireless network is managed by the same solution that delivers a transparent proxy, so that users can have web traffic filtered in the way that the administrator feels is most appropriate. The *Sophos AV* client helps to manage the movement of sensitive data, and full disk encryption can be deployed from the same console that is used to manage the endpoint protection."

Encryption is a vital part of securing a network, as Kevin Percy, UK business development manager for data encryption specialist DESlock, explains: "All schools in the UK hold sensitive information about staff, pupils and associates – they also have to comply with many regulatory standards with regards to protecting this information. Data is transmitted between departments on a regular basis, so it's crucial that it is adequately protected."

Staffordshire Learning Technologies (SLT) is using *DESlock+* data encryption software to secure communications across public networks via its cloud service. SLT is part of Staffordshire County Council and provides ICT and consultancy services to more than 400 local schools. It is also managing the use of DESlock's software, meaning that the schools do not need to carry out any management tasks.

"Apart from the functionality, one of the key reasons for using *DESlock+* is that the local server is synchronised to DESlock's cloud service," says Andy Arnold, SLT's CS team leader of system solutions. "This means that in the event of any outage or unforeseen disaster, the cloud service will continue to manage clients and enable swift recovery of the local server. Another driving feature was that *DESlock+* deals with secure client communications across the public network without the need for firewall configuration at our data centre."

Arnold adds that *DESlock+* offers further benefits as it has also enabled SLT to offer an encryption service for mobile devices within the schools at no extra cost.

Technology is the solution – not the problem

While technology developments have arguably driven the transformations in education sector IT, which has in turn led to increased challenges, they are also providing the solutions.

Exponential-e, a specialist cloud and IT network services provider, says the key is to work closely with schools and build services specifically aligned to their needs. "For example, we've made it our mission to understand today's security challenges that campuses face and have deployed a best-of-breed web filtering solution as a result," claims David Lozdan, the company's public sector head.

Managed network services provider MLL Telecom agrees that schools, colleges and universities need customised IT solutions. CCO Karl Edwards says: "When working with the education sector, you need to recognise that one size does not fit all, and a solution needs to have benefits for different groups, with different priorities."

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1. Based on a 2011 commissioned study conducted by Forrester Consulting on behalf of IBM. 2. Based upon testing of the IBM PureApplication System W1500-96 with time measured from powering on the system to when it is ready to support application deployments and based upon testing of the IBM PureFlex System Express & Standard models containing one chassis and one compute node with the time measured from powering on the system to when it is ready to support a virtual image deployment. 3. Up to 2X application density based upon simulations of virtualized applications on an IBM Flex System x240 Compute Node as compared to a previous generation IBM system. The IBM Flex System x240 Compute Node is available in IBM PureFlex System and IBM PureApplication System. Up to 2X performance of business applications based upon testing of IBM Storwize v7000 "Easy Tier" on previous generation IBM system. IBM Storwize v7000 is included in IBM PureFlex System and IBM PureApplication System.

What's that in the school playground? It's a "data centre in a box"

Last year, Cannon Technologies launched its *Mini Data Centre* (*MDC*) range which it described as a "complete data centre in a box" for schools and colleges.

With BYOD and increasing demands for connectivity, institutions now need to have the "full functionality of a small data centre", according to Mark Hirst, product manager of Cannon's T4 data centre solutions division. "But a serious problem in many schools is the lack of space for the data centre and of the skills and resources to manage and maintain one."

The company says it developed the *Mini Data Centre* using its experience of miniaturisation kit for the military. It comprises a complete self-contained data centre in a single enclosed rack or cabinet which can be sited in a corridor, cupboard or externally in the car park or playground. The *MDC* contains "sophisticated" self-management systems alongside cooling equipment, a UPS, WAN connectivity, a router, firewalls, content filtering and control, Ethernet switches, storage, servers and Wi-Fi controllers.

Cannon adds that all of this is integrated in its factory with e-learning management software such as *Moodle* and *Blackboard*, together with all of the back-office systems, and security functions like campus-wide access control and CCTV recording for the institutions.

"Although it is possible to run Ethernet cabling throughout the school, with the preponderance of handheld devices, whiteboards and large-screen displays, the moves, adds and changes for a school are a potential nightmare," says Hirst. "We tend to recommend the use of encrypted Wi-Fi which does away with most of the MACs."

He adds that if PoE is used with the *MDC*, the total cabling job for an entire school is reduced to one main supply to the cabinet and only 10 Ethernet cables to 10 Wi-Fi access points for a 300 user system, or just 40 cables for an entire 1,200 user campus.

MLL Telecom put that approach to the test when it built a new network for Suffolk County Council (SCC) in 2011. With more than 300 schools in the county demanding more internet access in their classrooms, the council's existing core network had become congested and reached a point where it was no longer viable to upgrade. SCC wanted to provide better services for the schools as well as all other local government organisations in Suffolk.

MLL Telecom worked in partnership with Customer Service Direct (a joint venture between SCC, Mid-Suffolk District Council and BT) to design, build and manage a new MPLS network to replace the legacy infrastructure. The project team worked closely with the end users, such as head teachers and IT managers, to plan the deployments around exam periods and holidays to ensure there was minimal disruption.

MLL Telecom claims the flexibility of the team was highlighted when last-minute changes to the installation plan needed to be executed. Initially, SCC wanted to start with the corporate offices. but a change in priorities meant it needed to swap this around and start with the schools instead. MLL Telecom says these changes were implemented using temporary radio links, where necessary, and where the lead time for fibre and copper was too long.

The project was completed on time in January 2012. SCC's new network now connects 80,000 pupils in 300 schools, as well as 300 libraries and other council buildings. It is said to run across super high-speed fibre connections to around 50 hub locations across Suffolk. These provide 10Mbps to 100Mbps links using fibre, copper and wireless technologies

200km of Cat 6a connects Bournville College

In September 2011, Bournville College opened its new £66m state-of-the-art campus in Longbridge. For students and staff at the 114-year-old college, having a high performance IT network infrastructure was a necessity, and in order to help achieve this, it chose a Brand-Rex cabling solution.

The new campus has capacity for 15,000 students and spans 4.2 acres of land at the former MG Rover works in Longbridge. The college site features a six-storey building plus four additional buildings which are connected to it. Its Learning Resource Centre has over 300 PCs and offers wireless internet access.

The college's system would need to support a variety of applications including voice, data and video-conferencing, as well as as digital signage, wireless networking, a digital media suite, and building management. ICT design consultancy LANBuilder was called in to help specify the cabling infrastructure that could operate these diverse systems. "We needed a cabling system that could last the building for anything up to 50 years, and which could be guaranteed to meet the stated levels of performance for at least 25," says consultant Darren Hill.

It was decided that a Cat 6A unshielded solution from Brand-Rex's *10GPlus* range would fit the bill. The vendor says that this features a unique Reuleaux shaped cable that reduces interference from adjacent cables and incorporates very highly balanced pairs. It also claims that the cable's performance has been independently verified in 100m length testing for both

With great power comes great responsibility?

Networks are certainly growing in complexity, functionality and technologically. So does all that require education sector IT network managers to be more skilled? "Potentially, yes," says Brocade's Jewel. "IT network managers in schools and colleges are increasingly dealing with WANs, remote and mobile connectivity and management. As a result they need to broaden their skills portfolio."

But Lozdan doesn't necessarily agree and says that the challenge is to provide support to those IT managers who need it, whilst having a flexible enough network and service to allow the more skilled managers to do as much or as little as they like with their networks. "If schools and colleges deploy a private sector network solution over that originally provided by a council, it is hugely important for vendors to be available to provide IT managers with support and advice. The shift to a private network provider requires internal IT managers to focus on their own security policies and their firewalls, or consider some local web-filtering, for example."

Lozdan adds that managers also face growing complexity from within their networks. "Managing different devices and applications is one area where we often find ourselves helping IT managers a great deal. As a vendor working in the educational sector you have to recognise when support must be given to ensure your clients are comfortable with the technologies they are deploying."

Edwards goes further and predicts the eventual demise of the school IT department: "Although it may well be the case that more skilled IT network managers are required in schools, we predict that due to cost cutting, actual dedicated ICT staff will disappear (with the exception of only the largest institutions). As budgets get squeezed, schools are more likely to move to an opex only, outsource model, but with a focus on cost and the essentials."

When it comes to the future for education sector networks, if there's one thing the industry does agree upon it's the continuing rise of BYOD.

"The practice of bringing devices into institutions is going to become more mainstream," says Jewell. "As the cost of owning such devices tumbles, we're going to see younger children owning and bringing their devices into schools to support their learning experience. Networks must therefore be resilient, secure and bullet-proof to ensure that the infrastructure doesn't buckle under the pressure."

For Sophos, the future looks like it is moving away from the traditional desktop, and more towards a tablet-based environment. "The reason for this is that tablets offer connectivity to resources all through the school, and that there is a growth in some high-quality apps for educational use. It is not realistic to expect these apps to be used, deployed and managed on student devices at this moment – but the future may change this," says Lawrence.

Lozdan believes the education sector is currently in a state of flux – shifting away from being a traditionally closed environment, towards one that embraces everything technology can offer, such as remote learning and cloud-based solutions. And he adds that as more schools move towards a virtualised environment, initially as an in-house system, it is becoming more important to look at IT-as-a-Service.

"Connectivity is critical to unlocking the potential of cloud-based services. This is not just a question of fast internet access – it's about being able to use that access to run multiple services, both private and public, down the same circuit.

"IT departments can make huge savings by deploying virtualised environments, as well as being able to support additional network capabilities such as disaster recovery, remote access and network flexibility without the need for more infrastructure. A high performance, low latency network that is 'always on' is going to be vital in supporting the next evolution of education," he concludes. ■

the cable and the channel configurations. "The low levels of electromagnetic interference in the college campus also added to the suitability of unshielded cabling," says Brand-Rex.

As well as installing *10GPlus*, the specification called for a fibre optic cabling backbone. LANBuilder originally, looked at installing an OM3 multimode fibre backbone. But its plans had to be revised after it transpired that the distance it would have to run would be further than the 300m it could operate 10GbE over in accordance with 10GBASE-T. "With this in mind, we decided to opt for an armoured OS1 singlemode fibre from the Brand-Rex *FibrePlus* portfolio," says Hill.

The OS1 12 core fibre optic cables were terminated onto LC patch panels and these linked the main equipment room to satellite equipment rooms via diverse routing. Hill adds that sing OS1 was also another way to ensure the infrastructure's longevity as it offers expansion to 40GbE and beyond.

The completed installation at Bournville College comprises a total of 4,400 Cat 6A U/UTP outlets incorporating more than 200km of *10GPlus* cable. A further 768 Cat 6A links were installed within the equipment room which were terminated onto patch panels at both ends.

Brand-Rex that its patch cords were also used. It claims that these use independently verified Cat 6A/Class EA cable and are manufactured using standards compliant RJ-45 modular plugs. In order to make the best use of their time on-site, the installation engineers used the vendor's tool-free RJ-45 *Snap-In-Jack* for what was said to be "fast and efficient" termination. According to the vendor, this combination resulted in a much quicker installation time which contributed to reduced labour costs.

off-the-shelf: routers & access points

Routing for business

As more users require wireless connectivity in the workplace, here are some of the latest routers and access points that could help IT managers build the right network for their organisations.

The *Linksys Smart Wi-Fi EA5600* is **Cisco**'s first router to feature 802.11ac, the IEEE's latest Wi-Fi standard which is designed to deliver wireless speeds around three times faster than 802.11n.

The *EA5600* is backwards compatible with previous wireless networks and devices using 802.11a/b/g/n.

Cisco says that it is equipped with six internal "3D antennae" that are designed to ensure the same performance whether placed on a desktop or mounted against the wall.

As with all *Linksys Smart Wi-Fi* routers, it features the *Cisco Connect Cloud* platform. This can provide access to the network and its connected devices from anywhere via the web or a mobile device. To help simplify connectivity, the firm has integrated a 'SimpleTap' feature into its *Connect Cloud* mobile application which enables users to connect devices with one touch of a button. In the future, this could also be used to connect by swiping an NFC-enabled smartphone over an NFC tag.

The *EA5600* has been optimised to work with the *Linksys Universal Media Connector*. This allows the connection of wired devices such as smart TVs for streaming HD video content over a Wi-Fi network. Cisco says the connector has four gigabit ports and operates at 5GHz band for less interference and a clearer signal.

802.11ac is optimised to meet the increasing demand for video and the proliferation of wireless devices. It has been designed to improve speed, range and reliability, and also helps to improve power consumption for mobile devices.

The *Vigor 3200* series is a quad-WAN port firewall router. **DrayTek** says each of its four GbE ports can be hooked-up to their own WAN connection such as an ADSL or VDSL modem, cable modem, satellite feed, or any other Ethernet-based connection. Each can be configured for load balancing – splitting traffic across multiple internet connections – or for switching to alternative connectivity when the primary connection fails.

The *3200* supports multiple private subnets on the LAN. This is said to be ideal for increasing security, segmenting, or the inclusion of legacy LANs. DrayTek adds that each of the IP subnets can be distributed on separate tagged VLANs for further physical separation. 802.1q VLAN tagging can be used to mark packets so that they can be transmitted together and split further along in the network topology, as required, or merely ignored/dropped if they fall outside a device's VLAN settings. 802.1q VLAN is supported on both the WAN and LAN ports.

In addition, QoS enables administrators to give specific traffic types or clients different levels of priority when it comes to transmitting data so that appropriate bandwidth is reserved for the most important data. QoS supports both 802.1p and TOS/DCSP methods, and the VLAN groups can be combined with QoS rules for transmission onward to the internet.

DrayTek claims the latest version of its object-based firewall allows "vast flexibility", enabling the creation of combinations of users, rules and restrictions to suit multi-departmental organisations. The firewall protects against DoS attacks, IP-based attacks, and access by unauthorised remote systems.

Other features include the ability to connect to a compatible USB modem or mobile device for 3G access, a USB port which can be used with external devices to add storage memory to the unit, and a NAS facility which uses any FAT16/FAT32 formatted device and supports a transfer rate of 12Mbps.

Dovado plans to launch its *DOMA* and *TINY* routers for use with EE's LTE network during the coming months. It says that the routers can be used to share 4G mobile broadband via Ethernet and Wi-Fi with up to 32 devices connected simultaneously.

As a result, it's claimed that customers will be able to replace their fixed line with mobile broadband without any detriment to the speeds they receive.

Both routers include the firm's 'SmartUSB' functionality which is designed to ensure that the inserted USB modem is automatically re-powered in the event of failure. The *DOMA* and *TINY* (*pictured*) also include support for remote control along with event and internet consumption notifications via SMS, allowing users to not only receive an SMS alert of their monthly data consumption, but also to disconnect or reconnect the router remotely by sending it a text.

Dovado says that the routers can also operate in 'Bridged Mode', thus disabling NAT-routing in order for businesses to use 4G mobile broadband as a transparent connection for their hosted services.

The company adds that in the near future, when the UK's LTE frequency portfolio broadens out to include additional bands, the routers can be manually locked down to a specific frequency group in order to pair the USB modem with a fixed directional antenna. This will enhance the internet connection with a significant boost in both uptime and speed.

Dubai-based Dovado says its routers support more than 200 modems from a various vendors. For example, it says that with Ofcom reporting that the average UK fixed line broadband speed is around 9Mbps, EE's 4G customers using the *DOMA* or *TINY* with the Huawei *E392* will have access to comparable speeds.

Sophos has developed the *AP 5* wireless access point as an accessory for its *Remote Ethernet Device* (*RED*). It claims that using the two in combination creates a secured wireless branch office solution that is easy to set up "within minutes".

The vendor reckons that with the *AP 5*, small branch offices can now experience the same level of wireless security that larger branch offices and headquarters already experience. Supporting up to five users, the new AP connects to the *RED* via a USB port. Wireless security is controlled via the firm's unified threat management (UTM) platform located at the main office, ensuring the branch office's wireless security complies with company policies.

The *AP 5* can transmit a single SSID and delivers wireless data rates up to 150Mbps. It supports 2.4GHz and complies with 802.11 b/g/n WLAN standards.

Sophos adds that in the future, customers will be able to add WLAN capabilities by connecting the *AP 5* to the UTM to further extend the AP's versatility.

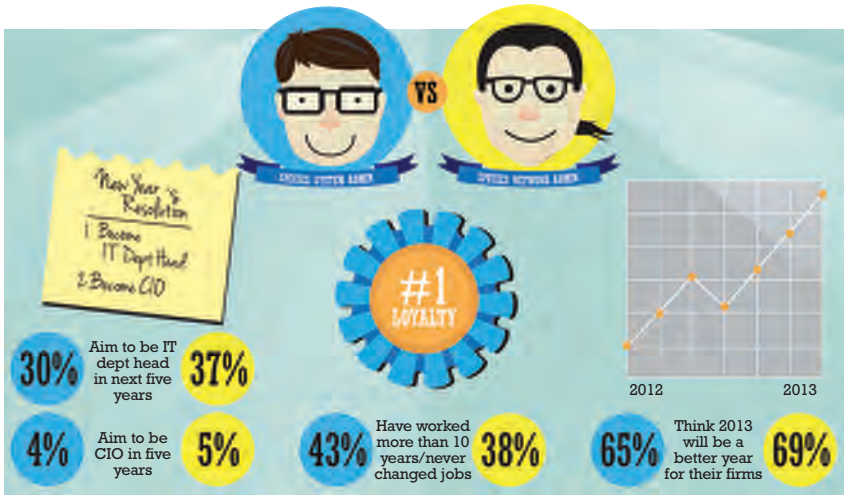
Patton has released the *BODi rS BD007*, a multi-channel, load-sharing VPN router. According to the firm, the new device uses a multi-WAN load-balancing algorithm designed to deliver peak-performance wireless internet access by combining 3G/4G/LTE, VSAT and Wi-Fi/WiMAX WAN services into an integrated, "highly-efficient fat-pipe" service.

The *BD007* features 'WAN Optimisation Control' (WOC) with automatic failover. Patton says that this prevents wasted worker productivity due to slow response time stemming from congested, poorly utilised network resources.

Link-prioritising and bandwidth-control mechanisms are used to ensure traffic cannot choke business-critical applications by hogging network-access capacity.

Patton claims that load-sharing across two DSL lines delivers T1-equivalent speed at a fraction of the cost. By adding lower-speed, nominal-cost 3G/4G wireless or WiMAX services for a load-balanced internet connection, it says users can realise peak-performance networking. If any link fails, the router automatically re-routes traffic over the best-available alternate.

The *BD007* offers four USB connections plus two GbE ports for WAN access, a dual Wi-Fi access point, and a four-port Ethernet switch. 256-bit AES encryption is used to ensure sensitive business information remains confidential and secure.



SolarWinds' survey looked at the attitudes and preferences of 400 system administrators and 400 network administrators.

IT staff are "model employees"

IT workers in the UK are "model employees" according to research carried out by SolarWinds. In a survey of 400 network administrators (netadmins) and 400 system administrators (sysadmins) last October, the IT management software specialist found that IT professionals have high levels of overall job enjoyment.

Seventy two per cent of netadmins and 67 per cent of sysadmins expressed enjoyment in their jobs, and more than 70 per cent agreed that problem solving was the most enjoyable thing about their job.

Generally, IT workers are loyal to their companies, with more than 40 per cent having worked at their jobs for 10 years or more or never having changed jobs. In five years time, just over a third see themselves as the IT department head, but only five per cent think they'd make it as CIO.

But 72 per cent of both groups felt their work is not well understood by co-workers. SolarWinds CEO Kevin Thompson says: "It's essential for companies to understand what drives netadmins and sysadmins to perform and give them the support that helps make their jobs easier in order to retain these valuable employees."

The survey also looked at the IT pro's personal interests. Respondents indicated a preference for *Android* over *Apple iOS*, *Call Of Duty* as their favourite video game, and *Star Trek* as the top TV show.

Big Data gets big funding

Big Data and greener computing are among the key technology areas which the government will fund to promote the UK's future growth and help it stay ahead. Universities and Science minister David Willetts has set out details of how the £600m announced for science in the Autumn Statement will support eight key technology areas that were listed by the chancellor in November.

Among the investments announced, £189m will be spent on Big Data and energy efficient computing. This will be used to build on the country's existing research base capacity for analysing big data sets in areas such as earth observation and medical science.

Some of the other areas that will receive funding include: £45m for new facilities and equipment for advanced materials research in areas such as low-energy electronics and telecoms; £30m to create dedicated R&D facilities to develop and test new grid scale storage technologies; and £25m for the development of products and services using space technology and data from space-based systems.

NEW COURSES

Windows Server 2012 Hyper-V Virtualisation – Learning Tree

This four-day course is aimed at IT pros responsible for implementing or managing virtualisation solutions based on *Hyper-V*.

The course leverages a *Windows Server 2012* Active Directory infrastructure with iSCSI SAN storage. As well as the *Hyper-V* manager and *Performance Monitor*, other tools used include the *System Centre Virtual Machine Manager* to build a private cloud.

Concepts include: monitoring and troubleshooting; implementing high availability with clustering and *Hyper-V* replicas; redistributing VMs through storage and live migrations; and more.

The course takes place from 30 April to 3 May, via the web or by attending the London centre. *www.learningtree.co.uk*

BYOD, PII and Outsourcing audit and assurance programmes – ISACA

ISACA has added three new topics to its IT audit and assurance programmes.

BYOD Audit/Assurance can help auditors provide management with an assessment of policies and procedures. It will help to identify internal control, regulatory deficiencies, and security concerns.

Personally Identifiable Information (*PII*) focuses on private data and storage, including the deployment of an organisation-wide data classification scheme, policies and procedures relating to action needed after a breach of PII confidentiality, and training employees in handling and processing PII.

Outsourced IT Environments is for those who need to provide an assessment of the outsourcing process, compliance, billing, and remediation of issues identified during business processes. *www.isaca.org*