Inside_Networks

THE NETWORK INFRASTRUCTURE E-M

Positive thinking

DRIVING EFFICIENCIES WITHIN POWER INFRASTRUCTURES

AGAZINE WWW.INSIDENETWORKS.CO.UK

MAY
20

Best of both worlds

THE FUTURE OF HUMAN AND MACHINE COLLABORATION

Law and order

IS IT THE END OF THE LINE FOR MOORE'S LAW?

SIEMON™

Ultra High Density Fibre Enclosure

Future-proof your Data Centre with Siemon's LightStack® 8 Fibre Solution.

LightStack® 8

Modernise your data centre to support high density applications for the ever growing data demand.

Siemon's LightStack® 8 Ultra High Density Plug and Play System enables 100% fibre utilisation, and supports high density data centres with 40 gigabit and 100 gigabit, as well as future 200 and 400 gigabit applications.

Connecting the world to a higher standard.

siemon.com

Discover more ›

CNet Training

Customer Focused ▶▶
Quality Driven ▶▶▶▶

The Global Leader in Technical Education for the Digital Infrastructure Industry

Professional Network Infrastructure and Data Centre Technical Education Across the World

Keeping Education Accessible

Reaching the world with different ways of learning:

- **Live and fully interactive classroom learning remotely**
- **Distance learning programs with online tutor support**

CNet Training has been designing and delivering technical education since 1996 and is the originator of the highly acclaimed **Global Digital Infrastructure Education Framework**, comprising technical education programs throughout the data centre and network infrastructure sectors. Today CNet delivers programs in many ways to support learners across the world and remains the only industry dedicated technical education provider in the world to award both **industry recognised qualifications and official certifications.**

info@cnet-training.com **+44 (0)1284 767100** **cnet-training.com**

Disruptive technology

EDITOR
Rob Shepherd
07708 972170

SUB-EDITOR
Chris Marsland

ADVERTISING MANAGER
Kate Paxton
01603 610265

CREATIVE DIRECTOR
Vishnu Joory

TECHNOLOGY CONSULTANT
James Abrahams

CIRCULATION MANAGER
Debbie King

ACCOUNTS
Billy Gallop

CHALK HILL MEDIA

All rights reserved.
No part of this publication may be used, transmitted or produced in any form without the written permission of the copyright owner. Applications for written permission should be addressed to info@chalkhillmedia.com
The views and comments expressed by contributors to this publication are not necessarily shared by the publisher. Every effort is made to ensure the accuracy of published information.
© 2020 Chalk Hill Media

The coronavirus pandemic is having an unwelcome effect on the way that we interact socially, as well as in our working lives. Fortunately, many of us are able to go some way towards business as usual thanks to remote working and online communications. 20-25 years ago the situation would have certainly been very different and while we all hope that things return to 'normal' as quickly as possible, this situation highlights the positive role connectivity plays in the modern world.

In an industry where constant change and unpredictability are two key factors which make it so interesting, it is truly amazing that some comments made in 1965 by Intel's Gordon Moore have had such longevity. Moore's Law, as it is known, states that the number of transistors that can be placed inexpensively on a chip doubles every two years. However, all good things must come to an end and it has been suggested that it is now longer relevant. In order to assess whether this is the case we've asked a panel of experts to offer their views, and you can read their responses by **CLICKING HERE.**

The reaction to the recent BBC documentary – Dirty Streaming: The Internet's Big Secret was very interesting. Whatever your views about the programme, it is clear that the role of data centres and IT in the climate change debate has now gone overground. In the interest of balance, perhaps it is time that the industry's trade bodies and associations stepped up to address some of the claims made – what do you think?

Power usage is certainly an area of continual innovation and this issue has two excellent articles on this subject. In the first Marc Garner of Schneider Electric explains how to drive efficiency within power infrastructure, while Keith Stewart of Networks Centre examines the adoption of lithium ion (Li-ion) batteries for uninterruptible power supplies (UPS), and how they are being used in edge computing applications. **CLICK HERE** to read Marc's article and for Keith's **CLICK HERE.**

I hope you enjoy this issue of Inside_ Networks. Don't forget that if you'd like to comment on any of these subjects, or anything else to do with enterprise and data centre network infrastructures, I'd be delighted to hear from you.

Rob Shepherd
Editor

Answers to your top fibre questions.

Get in-depth answers to eight of the most common fibre testing questions our Technical Assistance Team gets asked in this useful digital handbook.

Our team has over 150 years of combined experience and helps hundreds of customers every month with some of the toughest fibre questions.

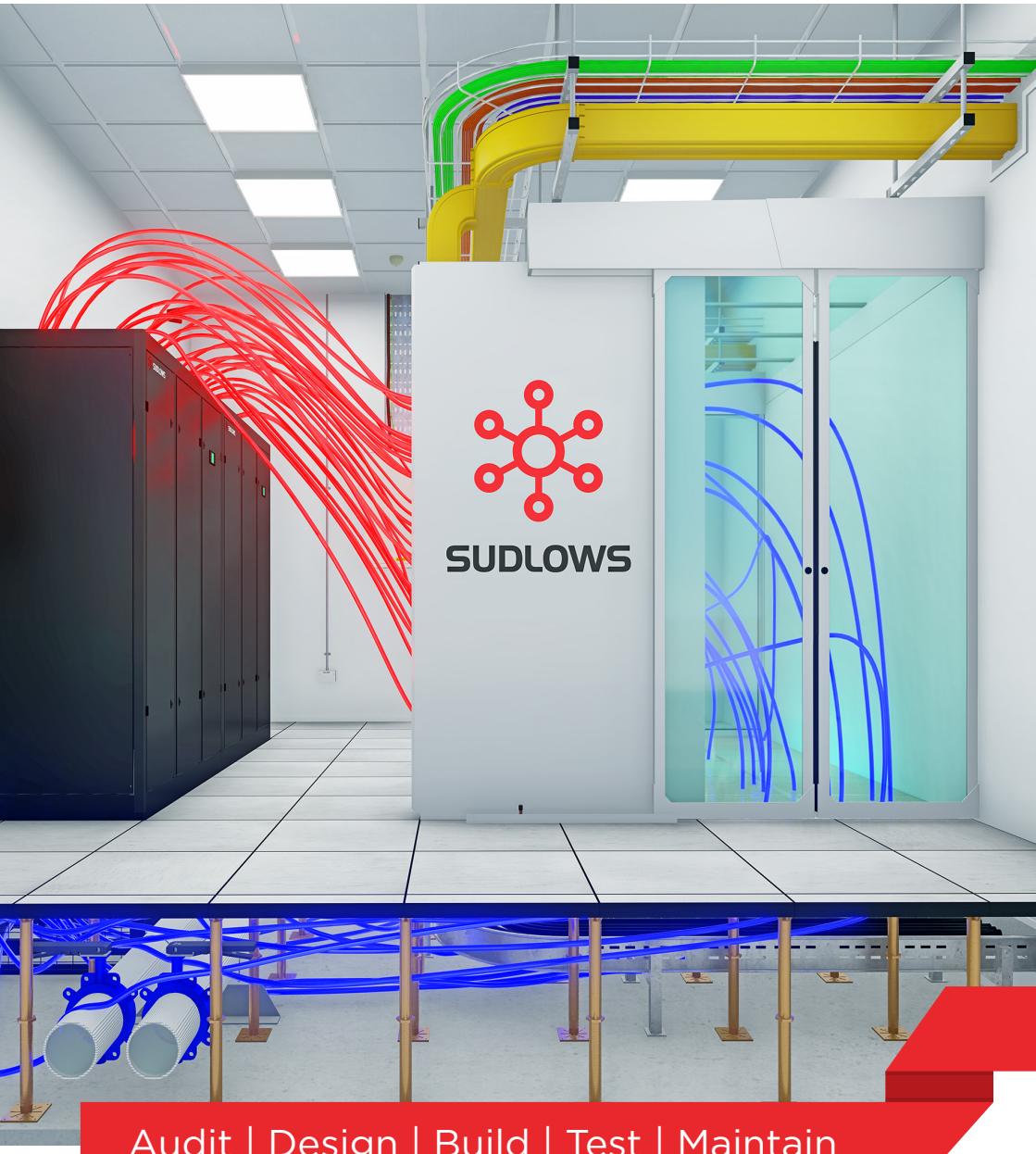
Download your FREE copy here:

www.flukenetworks.com/request/top-fiber-questions-digital-handbook

FLUKE networks

©2020 Fluke Corporation. 1/2020 19485

SUDLOWS
working at the core of your business



Audit | Design | Build | Test | Maintain

sudlows.com / 0800 783 5697

TIA elects leadership for new engineering committee developing technology lifecycle management standards

The Telecommunications Industry Association (TIA) has announced the 2020 leadership of its new TR-60 ICT Lifecycle Management Committee. The committee, launched in May 2019, develops standards for information communications technology (ICT) systems, infrastructure and services. TR-60 has Jerry Bowman of Square Mile Systems, Gregory Bramham of Global Com and Christy Miller of BCL IT Consulting as its new 2020 committee officers.


Dave Stehlin

'Industry standards are the foundation to building a trusted environment for global networks,' said TIA CEO, Dave Stehlin. 'TIA's committees lead the way in developing standards that will help our members and the industry achieve critical business objectives. The work being planned for TR-60 will be groundbreaking and we thank the new leadership team for their willingness to step forward.'

TR-60 chair, Jerry Bowman, added, 'TR-60 is a gamechanger for the ICT industry. We've spent decades developing world class manufacturing and installation standards and now it's time to focus on management. TR-60 is taking the next step that defines the management requirements for technology to complement the engineering standards that have been in place for years.'

UK's tech industry will hold strong in the coming months

The UK's tech industry will maintain resilience despite the coronavirus outbreak, according to new analysis from Robert Walters. In Q1 of this year, permanent job vacancies in the tech sector increased by 32.56 per cent and contract tech roles increased by 48.27 per cent when compared with the same period last year.


Ashan Iqual

Ahsan Iqbal, director of technology at Robert Walters, commented, 'At the moment the tech sector has experienced a spike in demand and so – unlike other industries such as aerospace – no immediate impact has been felt regarding hiring freezes. As digital infrastructure becomes the focal point for many internal business discussions, we do not anticipate a cancellation or slowdown in tech projects.'

Looking at the impact of coronavirus, Iqbal stated, 'As pressure mounts in the coming weeks and months on IT departments to help support remote working capabilities, as well as business continuity plans, firms will look to strengthen their teams with contract staff who have prior experience of in-house systems and a provide a strong sense of being able to hit the ground running.'

Infinera breaks industry record with 800Gb/s transmission over 950km in a live network trial

Infinera has successfully completed a live network trial of 800Gb/s single wavelength transmission at 96Gbaud over 950km across a long-haul link in a major American network operator's production network. This achievement signals a major industry milestone in driving down the cost per bit of telecommunications networks.

The trial showcased the ability of Infinera's 800Gb/s technology, which is designed to enable network operators to rapidly and cost effectively address the increasing capacity demands of new services such as 5G, enhanced broadband and cloud based business services.


Parthi Kandappan

'The success of this trial proves our ability to transmit 800Gb/s signals across significant distances, which will be instrumental in driving down network costs,' said Parthi Kandappan, chief technology officer at Infinera. 'This marks another major accomplishment for Infinera's Optical Innovation Center, adding to its long history of pioneering innovations in optical networking.'

IT bosses 'kept awake at night' by cybersecurity worries

Cybersecurity has moved into first place on the list of IT leaders' biggest concerns, an annual survey has found. Each year BCS, The Chartered Institute for IT asks its members to reveal details of their major professional priorities and the solutions needed.

18 per cent said cybersecurity was top of their to-do list, moving it to the number one spot this year, going past cloud computing (16 per cent) and remaining above artificial intelligence (AI) and automation technologies (14 per cent). The finding was confirmed by the question 'What keeps you awake at night?' to which over 35 per cent put the cybersecurity issue above any other, ahead of 'pace of change' with 15 per cent.


Paul Fletcher

Paul Fletcher, chief executive of BCS, said, 'Beyond direct financial losses, cyberattacks also pose long-term reputational and legal risks for organisations. IT leaders know true data security is as much about professionalism and people as it is about the tech, and investment in staff development is the single biggest thing that can be done to mitigate these risks.'

Inside_Networks 2020 Charity Golf Day is rescheduled

Following the UK government's advice to avoid mass gatherings, non-essential travel and contact with others in order to curb the spread of coronavirus, Inside_Networks has taken the decision to reschedule its annual Charity Golf Day. Originally due to happen on 20th May, it will now take place on 15th September at the Hanbury Manor PGA Championship Course in Ware, Hertfordshire.

Last year it raised over £13,000 for Macmillan Cancer Support and the event is firmly established as a highlight of the network infrastructure industry calendar. The money generated goes towards emotionally, physically, financially and practically supporting people living with cancer.

'Given the government's advice and in order to help protect everyone involved with this event, we had no option but to reschedule,' said Rob Shepherd, editor of Inside_Networks. 'We are, however, delighted that we have been able to secure an alternative date in September, where the industry will once again gather for a day of great golf at one of the UK's premier courses, raising money for a worthwhile and important cause.'

For more information **CLICK HERE** to email Mark Cumberworth of Slice Golf and Events or call him on 07769 696976.

Software defined storage market set to reach $86bn by 2023

The software defined storage (SDS) market is expected to register a 28 per cent compound annual growth rate (CAGR) from 2019 through 2023 to reach $86bn, as vendors expand SDS product offerings to meet rising demand, according to Omdia. As storage capacity grows due to the accumulation of data for video, big data, data analytics, AI and machine learning, an increasing portion of data centre storage spend is expected to shift towards SDS storage, which is suited for this new type of data retention and processing. The SDS market comprises hyperconverged infrastructure (HCI) and standalone SDS products.


Dennis Hahn

Dennis Hahn, principal analyst at Omdia, said, 'HCI represents an affordable way to add capacity, with small enterprises able to configure and manage the technology using generalists on their staff. Many enterprises like HCI as a pragmatic solution for meeting their immediate growth challenges. In contrast, a core data centre storage solution would likely entail the use of skilled administrators to conduct equipment integration into the data centre infrastructure.'

50 per cent of enterprise WAN managers are adopting or considering zero trust security

TeleGeography has released its annual WAN Manager Survey: Cloud Connectivity & Network Security Report. The report reveals an opportunity for enterprises to further integrate networking and security and adopt new models to prevent data breaches.


Greg Bryan

According to the survey, less than 20 per cent of enterprises have fully or mostly integrated network and security teams. More than 40 per cent have separate teams but work closely together on things like SD-WAN or hybrid network adoption. 15 per cent have largely siloed networking and security operations. Although only eight per cent have actually implemented zero trust, 31 per cent are considering it, 19 per cent are in the adoption phase, with a fifth of respondents unfamiliar with the concept.

'Enterprises are looking at greater integration between security and networking teams that will reduce risk while accelerating the adoption of networking technologies like SD-WAN. WAN managers recognise the need for stronger relationships between these teams and we anticipate fully or mostly integrated teams growing over time,' said Greg Bryan, senior manager enterprise research at TeleGeography.

NEWS IN BRIEF

According to data gathered and analysed by Atlas VPN, the number of Google searches for 'what is VPN' increased by 81 per cent globally during March.

The Independent Networks Co-operative Association (INCA) has expressed its support for the measures announced by the UK government in agreement with the telecommunications industry to protect consumers during the coronavirus crisis.

Stulz now owns the entire shareholding of Stulz Technology Integration (Stulz TI).

ABB has agreed to acquire Cylon Controls. The acquisition enhances ABB Electrification business' position in the commercial buildings segment.

Equinix has opened its third International Business Exchange (IBX) data centre in Warsaw, called WA3. Valued at approximately €31m, it will enable businesses in Poland to extend their access to Platform Equinix.

Cohaesus, having recently been awarded the UK government's Cyber Essentials certification, has now achieved the Cyber Essential Plus Certificate of Compliance, following a successful independent assessment against the Cyber Essentials Standard.

LET'S CONNECT!

EATON
Powering Business Worldwide

Integrated Power Management Solutions

Power Protection, Distribution & Software Management

Contact us for more information on the Eaton Power Management Solutions we offer

DUNASFERN Inc. AURIGA
LET'S CONNECT!

01908 282200 | enquiries@dunasfern.com | www.dunasfern.com

It's an ill wind...

Hi Rob

What single subject tends to get me jumping on my soapbox about uninterruptible power supplies (UPS)? It's how battery autonomies are calculated. Let me very briefly explain.

At tender stage, batteries are sized by calculation. The actual proof that they meet performance only comes when they are installed and a load bank test is performed. Of course, it's too late if they have been incorrectly sized at the beginning.

To calculate a battery configuration you firstly need the load size (kWs) and the required autonomy – nice and simple. Battery manufacturers very kindly publish the watts per cell power of each of their battery types, so you would think everyone would come up with the same battery solution. So why don't they? One proposal has three tonnes of batteries and the other has five tonnes, which is very strange!

The answer lies in the application of three variables during the calculation:

- UPS efficiency. Modern UPS units have efficiency claims of around 96-97 per cent. You could add an extra one per cent efficiency by negating the front-end rectifier conversion.

- Battery end of discharge voltage. Batteries will be irreparably damaged if allowed to discharge too deeply, so a UPS will cut off well before then. However, in the calculation, a 'cushion' should be allowed when it comes to the discharge variable. In other words use 1.75V, not a low 1.6V.

- Temperature. UPS systems are installed in environmentally controlled conditions, typically in an IT room at 20-22°C. So why

Rittal – The System.
Faster – better – everywhere.
RITTAL XPRESS
24
7 DAY
Express Delivery of the TS IT Rack is as simple
A Choose your rack. B Choose your accessories. C Choos
Visit us on line to fi
ENCLOSURES POWER DISTRIBUTION CLIMATE CONTROL
FRIEDHELM LOH GROUP

calculate battery autonomies at 25°C? The easy answer is that you get a bit more power out of the battery at the higher temperature, and you end up with that final load bank test being performed with heaters to raise the room temperature! That is, of course, if a final load bank test is actually carried out.

The above is just a very simple example of how, by using the variables to their limits in the calculations, you can get differing battery solutions for the same specification.

To be sure of the required battery autonomy a contingency should be included. Otherwise, it's like only being able to finish a race if the track is downhill and the wind is behind you! And don't forget all this is when the batteries are new – after 10 years, batteries typically provide 80 per cent of their original power. Therefore, if you need the required run time at the end of their design life, they should be oversized by some 20-25 per cent from day one.

So if you are looking at two 'identical' UPS quotes with significant price variance, look at the weight of the batteries and request evidence of the calculation methodology. It could be the difference between proper power protection, or batteries that might support the load for the first few years, but only if that wind is blowing in the right direction!

Mike Elms
Centiel

Editor's comment
Excellent advice from Mike, which highlights how end users can quickly come unstuck if they fail to scrutinise the claims made by manufacturers!

Remote control

Hi Rob

Countries around the world are taking extraordinary measures to prevent the spread of coronavirus. As it continues to spread, corporations have advised employees to work from home. However, is this feasible at a major scale and what challenges do companies encounter?

Advancements in technology have enabled telework, yet most companies, even technology giants, lack the digital infrastructure to enable this at a large scale. While most companies have policies, technology and procedures in place to allow employees to work remotely, corporations normally anticipate only about 15 per cent of employees connecting remotely at one time.

The shift to mass remote work therefore brings additional security risks. As devices are installed outside a company's network infrastructure and connected to new networks and WLAN, the attack surface for cybercriminals expands exponentially. Corporations large and small will require a quick solution for a limited duration. To many, virtual private networks (VPN) seem to be an appropriate solution, but VPN for workforces are often only dedicated to specific employees and are expensive and complex to implement globally.

For corporations lacking the infrastructure, time and capital to expand VPN access, it will be critical to externalise this service. A key component of this solution is enabled by secure access service edge (SASE) platforms. This is a set of services offered by internet service providers and telecommunications corporations to enable network as a service (NaaS) for remote employees to connect, coupled with network security as a service (NSaaS) offerings including VPN, firewall as a service (FWaaS), DNS and cloud secure web gateways (SWG) to minimise vulnerabilities.

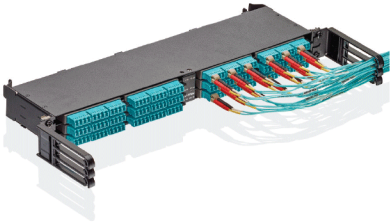
Fundamental to the SASE offer is a secure and high-performance DNS service which protects apps, users and data against DNS attacks, ensuring that business operations are not impacted – especially when employees are connecting to the network remotely. DNS should ideally be complemented by edge global server load balancing (GSLB), distributing the load of network traffic for servers.

Taken together, these measures ensure that company networks are running smoothly, despite increasing network complexity in the new remote work reality that will define 2020 and perhaps beyond.

Jean-Yves Bisiaux
EfficientIP

Editor's comment

These are unprecedented times and we are all having to configure new ways of living and working. Those with malicious intent will always try to exploit such situations, so this advice is well worth heeding.



Quick, easy network deployment is possible when your cable assemblies are made-to-order.

The Leviton Data Center Factory creates pre-terminated fiber optic and copper cabling, delivered to you fast from the UK, for minimized network downtime and easy jobsite clean-up.

- ✓ **Faster deployment**
- ✓ **Guaranteed high performance**
- ✓ **Peace of mind**

Learn more about the advantages of Leviton cable and connectivity: explore our many fiber optic and copper options at **Leviton.com/ns/emea/mto**

LEVITON®

LEADING FIBRE OPTIC CABLE TECHNOLOGY

Draka UC Fibre Cable integrates our entire technology stream from optical fibre core manufacture to finished cable designs that are perfected for any application.

This includes

- Easy to install high-performing cables for all CPR fire ratings in designs that are flexible, slim and robust whilst also protecting the fibre inside
- Leading edge fibre technology in any cable design your network requires, i.e. BendBright® bend-insensitive multimode and single mode fibre in every cable
- Sirocco®Blown Fibre technology now an integral part of UC-Connect warranted installations
- Our Flextube technology enables high-density cable installations and is ideal for pre-terminated cabling

Keeps What It Promises!

draka.mms@prysmiangroup.com

Draka

A brand of the Prysmian Group

Our Partners

CommsCentre. COMTEC DUNASFERN Inc. AURIGA PRECISION CABLES

Above the law

There has been a suggestion that Moore's Law is becoming less relevant and might even be dead. Inside_Networks has asked a panel of experts to examine if this really is the case

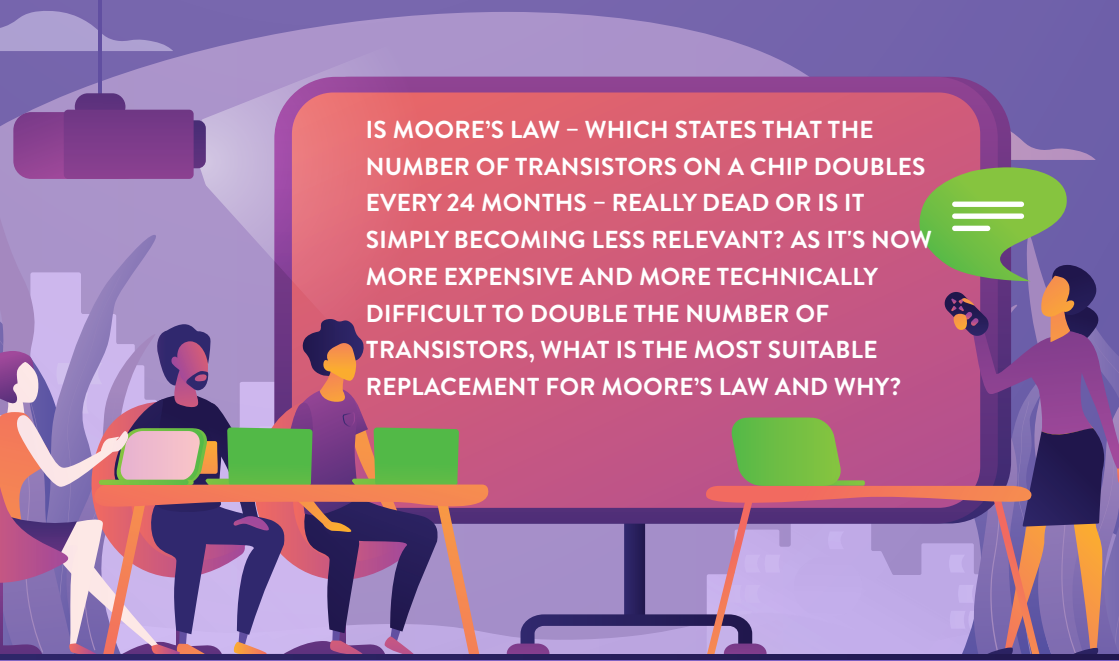
In 1965 Gordon Moore, the co-founder of Intel, had an article published in Electronics Magazine that helped to shape developments in computer hardware technology. He noted that the number of components in integrated circuits had doubled every year from their invention in 1958 to the time he produced his paper for publication.

This became known as Moore's Law and it is quite amazing that in such a fast moving industry any prediction can be accurate as his. Still, nothing lasts forever and there is a growing belief that Moore's Law may not be relevant for much longer, while some think it is dead.

Moore himself went on record in 2005 and said, 'In terms of size of transistor you can see that we're approaching the size of atoms which is a fundamental barrier. It'll be two or three generations before we get that far – but that's as far out as we've ever been able to see. We have another 10 to 20 years before we reach a fundamental limit. By then they'll be able to make bigger chips and have transistor budgets in the billions.'

Inside_Networks has assembled a panel of industry experts to provide their thoughts on the impact of Moore's Law and whether they believe it has had its day.

Don't forget, if you have a question that you would like answered **CLICK HERE** and we'll do our best to feature it.



MARK ACTON

CRITICAL SUPPORT DIRECTOR AT FUTURE-TECH SCI

Moore's Law is not a law of physics but rather an observation and prediction that has held true over recent decades for silicon chips. First suggested by Gordon Moore in 1965, he adjusted the timing in 1975 to a doubling every two years.

The current smallest production channel dimension on silicon chips is at the 7nm scale. 5nm technology has been demonstrated but the complexity and cost involved in development means 5nm will take longer to reach market than the two years predicted by Moore's Law. It is worth noting that 3nm is already being researched.

New materials and technologies offer the possibility of sustaining or even replacing Moore's Law. There is therefore huge interest in materials such as graphene/carbon nanotubes, gallium oxide, indium selenide, two dimensional antimony (antimonene), and other atom thick sheet structures, as well as photonic chips etc.

It is not only materials that have a role to play in this developing story though. Improvements in processor performance can be made without adherence to Moore's Law. Efforts are underway to improve the way chips operate, which includes focusing on specific tasks, such as chips tuned to artificial intelligence (AI) workloads, to make them more efficient and therefore more powerful. An example is the work by Microsoft and Intel in running code on reconfigurable chips called field programmable gate arrays (FGPAs).

The use of application specific integrated circuits (ASICs) and FPGAs by cryptocurrency miners, due to their greater energy efficiency and productivity for focused tasks, demonstrates this. Energy used per cryptocurrency hash is directly related to the cost of the currency unit created. Removing legacy design barriers would allow fundamental improvements in design and efficiency, although this does create issues due to a lack of compatibility with existing software and operating systems.

The demise of Moore's Law does not mean a halt on processor performance and efficiency – rather it is an opportunity for significant change. Improved methods and processors based on new materials offer the potential to reduce energy demand, despite our growing use of technology. It could be strongly argued that without a move beyond current silicon constraints, our use of technology is both limited and unsustainable due to increasing power demand.

'THE DEMISE OF MOORE'S LAW DOES NOT MEAN A HALT ON PROCESSOR PERFORMANCE AND EFFICIENCY – RATHER IT IS AN OPPORTUNITY FOR SIGNIFICANT CHANGE.'

Helping your business journey to

ECA
Excellence in Electrotechnical & Engineering Services

Growth & Prosperity

ECA offers valuable Trade Association membership to organisations in the electrotechnical & engineering services industry, which includes:

- Extensive expert technical support
- Free access to ECA's eRAMS (online Risk Assessment & Method Statement service)
- Significant discounted access to BSI standards
- Expert business support including commercial, employment and health & safety
- Helping to get you specified
- Free CHAS first year assessment & ongoing discounts
- Regional support & networking opportunities
- 50% off Part P notifications
- Other exclusive member discounts
- See even more member benefits at eca.co.uk/**journey**

info@eca.co.uk
0207 313 4800
@ECAlive

Join us online at www.eca.co.uk/journey

Shaping our industry.
Enabling business growth.
Getting you specified.

Terms & conditions apply and are subject to change.
* Membership eligibility and the stated 25% discount on initial 12 months membership of ECA is subject to continued registration of qualifying schemes through accepted certification bodies or organisations. All rights reserved. Registered in England: Company Number 143669. Covering England, Wales & NI.

MIKE HOLMES

CHANNEL MARKETING MANAGER AT NEXANS

Technology continues to evolve – there are more cores in processors, although clock rates are still limited, whilst virtualisation makes it possible to use the power of dozens of cores in server systems. Smaller features can result in more powerful chips, whilst R&D teams strive to reduce power consumption without compromising performance. It is clear that progress continues to advance at pace – but whether that pace is lagging behind, or ahead, of the Moore's Law curve is perhaps less critical.

It is important to realise that speed isn't the only relevant factor and the impact will have different consequences depending on the application. Hyperscale data centres have very different needs than office networks.

From a physical infrastructure standpoint, the relevance of Moore's Law has traditionally been to ensure that the installed base of cabling will be future proof in order to support the next generations of faster transmission protocols. That remains valid for the high end data centre market, where demand for ultra-high bandwidth continues to grow and more processing is handled in the cloud.

But when planning a network, other parameters also come into play, especially when dealing with converged networks and smart buildings. Consideration needs to be given to the specific requirements of the people and devices that will be relying on the network, the building conditions, and the flexibility required to manage both the network and the building. Yes, bandwidth is still important but changes in the way buildings are used mean that cabling must be provisioned to handle more and higher powered wireless access points, video conferencing, CCTV, signage, and various internet of things (IoT) devices. The ability to handle these converged applications at the same time – and deliver power over Ethernet (PoE) – becomes a key factor.

In summary, the 'concept' – if not the specific 'trajectory' – of Moore's Law remains true, along with the resulting acceleration in network speed and bandwidth. But as a practical tool for forecasting and planning future physical requirements, a much more holistic approach to the problem is needed in order to make the necessary smart choices.

'FROM A PHYSICAL INFRASTRUCTURE STANDPOINT, THE RELEVANCE OF MOORE'S LAW HAS TRADITIONALLY BEEN TO ENSURE THAT THE INSTALLED BASE OF CABLING WILL BE FUTURE PROOF IN ORDER TO SUPPORT THE NEXT GENERATIONS OF FASTER TRANSMISSION PROTOCOLS.'

IAN BITTERLIN
CONSULTING ENGINEER

Gordon Moore wrote about the photo-etching process on silicon wafers and its increasing miniaturisation, with transistors doubling every 24 months. His law held for 45 years but the last iteration of 7nm resolution is near the physical limit for using silicon. The number of transistors in a 1971 processor was 2,100 but by 2018 it was 3.5 billion. The miniaturisation of the processor has done more for the energy effectiveness of ICT than any other development – with the ASHRAE Thermal Guidelines a distant second.

The 24 months of Moore's Law was not a design goal, but a consequence of a process improvement. It was quickly decoupled from the pure 'number of transistors' idea by Intel itself by adding clock-speed into the development of capacity for computation and reducing the 24 months to 18 – a 40 per cent compound annual growth rate (CAGR).

However, Moore's Law has not been a smooth progression, but a series of steps. It takes continuous research and development (R&D) to develop the 'next' processor and, having spent billions of dollars tooling-up, you need to get your investment back before you make the 'last' product obsolete. But 7nm has proven to be at the limit of commercial practicality.

But does it matter if Moore's Law stops at 7nm? I don't think so. For example, consider enterprise and colocation facilities that deploy 42U cabinets. These are nearly always less than 50 per cent occupied and we spend money on blanking plates – we are not short on vertical space to fit more servers.

But that simplistic view disguises the opportunities for increasing energy effectiveness. Load is often 40-60 per cent of the utility capacity and the resultant partial load and average server utilisation is nearer to 15 per cent than the 60 per cent available from virtualised environments. In other words we have huge opportunities if we change our deployment behaviour.

Servers and most other ICT products have outperformed Moore's Law, for example, the RJ-45 plug was designed in the 1980s for transmitting data at 3kHz and has now reached 2GHz, a 600,000x increase. The 'concept' of Moore's 40 per cent CAGR will stay for years to come.

'THE NUMBER OF TRANSISTORS IN A 1971 PROCESSOR WAS 2,100 BUT BY 2018 IT WAS 3.5 BILLION. THE MINIATURISATION OF THE PROCESSOR HAS DONE MORE FOR THE ENERGY EFFECTIVENESS OF ICT THAN ANY OTHER DEVELOPMENT.'

OLI BARRINGTON

MANAGING DIRECTOR UNITED KINGDOM & IRELAND AT R&M

In 2007 Gordon Moore himself predicted the end of his law, stating that a fundamental physical limit would be reached in 10-15 years. It would appear that the number of transistors that can be squeezed on to an integrated circuit is definitely finite. However, that doesn't necessarily mean that the performance improvements will end.

Daniel Reed, vice president for research at the University of Iowa, compares future developments in chip production with changes in the aircraft industry. A Boeing 787 is a completely different plane to a 707 from the 1950s. The 787 comes with innovations such as fully electronic controls and carbon fibre fuselage. This is what will happen with computers – as Reed said, 'Innovation will absolutely continue – but it will be more nuanced and complicated.'

In the field of computers, entirely new approaches may allow constant technological progress. This could mean a continuation of Moore's Law, albeit in a different form. Instead of a doubling of the number chips on a transistor, we may see performance being boosted by alternative carrier materials for electronic circuits. These could include graphene or carbon nanotubes, or spintronic elements that employ the orientation of electrons' spin to process and memorise information, neuromorphic systems based on the neural structure of the brain, the integration of memory and processing functionality into a single unit, three dimensional stacked chip architecture, and quantum computing.

Moore's Law does indeed appear to be reaching its limits. In 2016, the semiconductor industry's predictions were no longer in sync with it. But in the future, chip manufacturers may be taking take more differentiated and specific paths. So Moore's Law may not actually be obsolete – just in need of a redefinition.

'MOORE'S LAW DOES INDEED APPEAR TO BE REACHING ITS LIMITS. IN 2016, THE SEMICONDUCTOR INDUSTRY'S PREDICTIONS WERE NO LONGER IN SYNC WITH IT. BUT IN THE FUTURE, CHIP MANUFACTURERS MAY BE TAKING TAKE MORE DIFFERENTIATED AND SPECIFIC PATHS. SO MOORE'S LAW MAY NOT ACTUALLY BE OBSOLETE – JUST IN NEED OF A REDEFINITION."

centiel

continuous power availability

UPS Service and Maintenance

bsi. ISO 9001 Quality Management | ISO 14001 Environmental Management | ISO 18001 Occupational Health and Safety Management

- 24/7/365 Technical Support
- Comprehensive Maintenance Packages
- Nationwide Emergency Cover
- Fan, Capacitor and Battery Replacements
- Impedance Testing

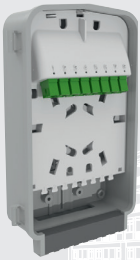
www.centiel.co.uk

HellermannTyton
www.htdata.co.uk

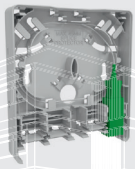
End to End FTTX Solutions

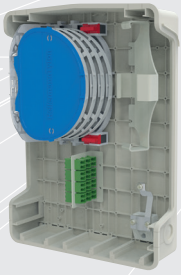

AFN

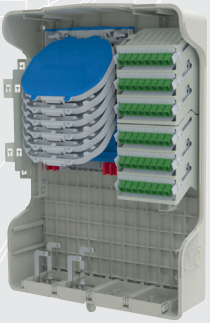

CCE

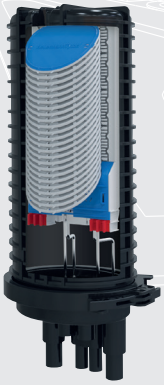

MDU - S1


CCP

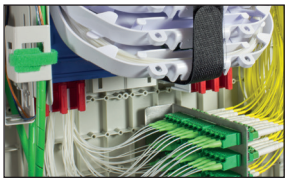

Fibre Faceplate


MDU - S3


MDU - S5


FDN-IR Fibre Closure


Street Cabinet



Made to Connect

Connecting businesses and residents in cities, towns and rural locations on a global scale.

HellermannTyton provides a complete end to end range of FTTX solutions, delivering flexible fibre connectivity across every stage of the last mile network.

RICHARD EDNAY

TECHNICAL DIRECTOR AT OPTICAL TECHNOLOGY TRAINING

This is a very timely question from Inside_Networks, as I've been researching the capabilities of electronic chips for one of our courses. Although it's an optical networking course many of the key developments are enabled, limited, or driven by the electronics at the end of the line.

For example, the switch application specific integrated circuits (ASICs) deployed by the hyperscale operators in their data centres are now capable of 12.8Tb/s throughput, meaning that they can drive 32x400Gb/s input/output channels. Handling this amount of data is driving interesting developments with the optical transceivers, and certainly the next generation of 800Gb/s interfaces is likely to include the move towards on-board and co-packaged optics, rather than the front panel pluggable optics transceivers that we are used to seeing today for 100Gb/s and 400Gb/s.

This switch ASIC capability is achieved with a 16nm complementary metal oxide semiconductor (CMOS) process. The feature size is a key indicator of the number of transistors that can be fitted on a chip. Perhaps even more impressive is the processing power and miniaturisation of the digital signal processing (DSP) chips that are now an essential part of the coherent transceiver modules for longer distance transmission at 100Gb/s, 400Gb/s and beyond.

The latest product announcements include 400Gb/s transceiver modules compliant with the OIF 400ZR implementation agreement in the fairly tiny QSFP-DD form factor. These include an integrated coherent transmit and receive optical sub-assembly (ICTROSA) that implements dual polarisation 16QAM transmission together with its tuneable laser, as well as all the required DSP inside the package. The latest DSP chips are manufactured with a 7nm CMOS process.

The International Technology Roadmap for Semiconductors maps out the next technology processes of 5nm, 3nm, 2.5nm and 1.5nm, so there is quite a way to go yet with Moore's Law. Given our insatiable appetite for more and more – or is that Moore and Moore – data then I think that there are a few years yet to run for Moore's Law to meet the demands in these specific application areas.

And then what? Well there's always quantum technology and optical computing on the horizon...

'THE INTERNATIONAL TECHNOLOGY ROADMAP FOR SEMICONDUCTORS MAPS OUT THE NEXT TECHNOLOGY PROCESSES OF 5NM, 3NM, 2.5NM AND 1.5NM, SO THERE IS QUITE A WAY TO GO YET WITH MOORE'S LAW.'

BARRY ELLIOTT
DIRECTOR AT CAPITOLINE

Everybody agrees that Moore's Law can't go on for ever, as it can't be physically possible to make the chip size smaller and smaller without running into the law of diminishing returns. Heat dissipation and electrical noise are the limiting factors and eventually it will cost more and more to produce a functioning and reliable chip.

Moore's Law, in terms of silicon fabrication, is coming to an end, certainly in this decade, but I doubt if the wider precept of computing power getting smaller and faster all the time will end at all – it will just move on to a different technology. In the short-term designers will extract more efficiency from existing designs, and hence an apparent speed increase, by paralleling up architecture to spread processing load plus far greater efficiencies in software design.

Much has been made of the advent of 5G and how it will demand far greater processing power inside a mobile phone. I'm not so sure – I for one would vote for a slightly dumber phone that didn't drain its battery within a few hours.

I think silicon transistor chip technology will be with us for many decades but it will be relegated to more and more mundane tasks such as controlling a room thermostat. The next real steps will be along the lines of more exotic materials such as compound semiconductors like gallium nitride. Compound semiconductors can run faster and cooler and it seems to be an area with a vast potential for R&D. After that we may see graphene and carbon nanotube technology. Ultimately, quantum computing will be the key to ultra-fast processing but the practical limitations involving size and running at room temperatures appear daunting.

So Moore's Law for silicon is coming to the end of the road but the technological march to greater computing power, in a smaller space for lower costs, will always continue.

'MUCH HAS BEEN MADE OF THE ADVENT OF 5G AND HOW IT WILL DEMAND FAR GREATER PROCESSING POWER INSIDE A MOBILE PHONE. I'M NOT SO SURE – I FOR ONE WOULD VOTE FOR A SLIGHTLY DUMBER PHONE THAT DIDN'T DRAIN ITS BATTERY WITHIN A FEW HOURS.'

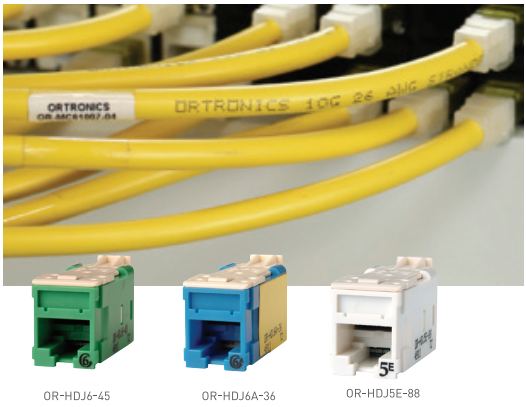
ORTRONICS®

CLARITY® HIGH DENSITY COPPER SOLUTION

THE NEW HIGH-DENSITY CLARITY® JACK AND PANEL PRODUCTS SOLVE DENSITY CHALLENGES WITHOUT SACRIFICING PERFORMANCE.

The smaller HDJ jack footprint allows up to 48 ports of premium Category 6a, 6 or 5e performance in 1 rack unit panel. This system is ideal for applications like data centres, distribution areas (TIA-942 Standard) or limited space, high density environments.

Ortronics® HDJ patented, recessed angled modular patch panels combine with Ortronics vertical cable managers to provide up to quadruple the density as standard panels with horizontal cable managers.



OR-HDJ6-45 OR-HDJ6A-36 OR-HDJ5E-88

THE NEW HIGH-DENSITY JACK AND PANEL SERIES PROVIDES:

- Less required rack and floor space to reduce real-estate costs
- A nearly transparent signal path, when used with Clarity patch cords, for enhanced network performance
- New cable termination process that is easier and faster for Category 6a and 6
- A new slide-lock mounting for a quicker installation time that reduces labour costs, while locking the jacks firmly in place
- Flexibility by combining copper and fibre in the same panel

legrand®

E: ortronics@legrand.co.uk | W: legrand.us/ortronics/high-density-copper

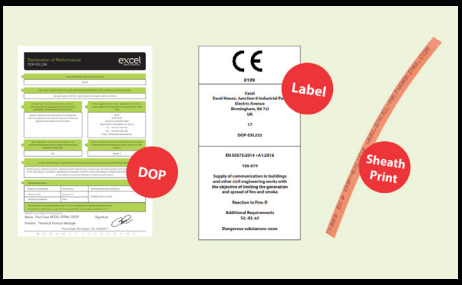
Improved reaction-to-fire pe with Cca+ cabling from Exce

The Construction Products Regulation (CPR) applies to all permanently installed cables within a building – communication, power and control cables in fixed installations. At Excel, we offer a comprehensive range of CPR-compliant cabling including Cca+ rated, which has an improved resistance-to-fire performance.

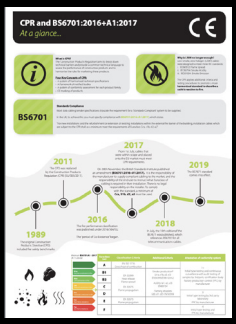
Our part numbers make it easy to identify which Euroclass of cable you are buying:

Dca	Cca	B2ca
100-XXX	170-XXX	190-XXX
Shop Online	**Shop Online**	**Shop Online**

At Excel, we have adopted a transparent approach when it comes to CPR. All of our CPR-compliant cabling supplied is accompanied by a Declaration of Performance certificate, labelling on the outer sheath of the cable and the product packaging as well as Certificates of Conformity.

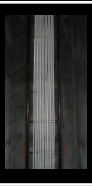


CLICK HERE to find out more about the CPR and BS 6701:A1 in our infographic.



Why choose Cca+ cabling?

These images show the difference between two differently classified cables before and after a standard 20 minute vertical fire test procedure, which gives a strong indication of the improved retardance to fire in higher Euroclass cables, and the damage that a fire could cause where a cable of a lower Euroclass is installed.

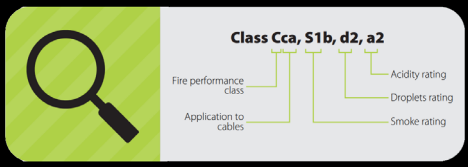
	BEFORE	AFTER
Dca cabling		
Cca+ cabling		

erformance
el

excel
without compromise.

What is a CPR Euroclass and what does it mean?

A CPR-compliant cable must belong to one of seven Euroclass categories, which pinpoint its specific reaction-to-fire. Each category relates precisely to the way the cable performs under appropriate fire test procedures.



Fca	Undetermined reaction
Eca	Basic reaction
Dca	Improved reaction
Cca	Reduced reaction
B2ca	Low reaction
B1ca	Very low reaction
Aca	No reaction

To learn more about the reaction to fire categories, watch our **Excel Explains... webinars.**

For advice about which Euroclass cable you should choose for your next installation project, contact our sales team who will be able to help on 0121 326 7557 or to send an email **CLICK HERE.**

You can help on every installation! Big or small, it all makes a difference

The increasing use of single-use plastic in packaging damaging our environment, and we are determined to lead the way in our industry to reduce this damage and remove as much single-use plastic from the supply chain as possible. Our natural brown packaging solutions are the latest example of our efforts to improve our sustainability, but it is by no means the end of the road.

It hasn't been an easy change but one that we've persevered with to develop alternative 'plastic free' packaging for much of our copper and fibre product lines, as well as reducing cardboard box sizes where we can. By choosing Excel products, you are choosing products that help to reduce the amount of plastic in our environment. #DoYourBit #BreakFreeFromPlastic #ChooseExcel

CLICK HERE to read more about Excel's Plastic Free initiative.

Knowledge is power

Marc Garner of Schneider Electric explains how to drive efficiency within power infrastructure

With global demand for data, energy and connectivity continuing to increase, businesses are creating new initiatives to reduce carbon emissions in response to growing concerns about climate change. Electric vehicles, for example, have emerged as an eco-friendly alternative to petrol and diesel engines, driving new manufacturing technologies and sustainability initiatives throughout the supply chain. Meanwhile, across other industries, digital transformation has caused a perceptible shift in the generation of data and the deployment of distributed IT systems.

CHAIN OF EVENTS

Greater awareness around the impact of technology has created a knock-on effect for both the generation and use of electricity, especially where data centre and edge computing environments are concerned. Moreover, businesses hoping to gain success from technological advancements must focus on both ends of the energy value chain, from how energy is generated to how efficiently it is consumed.

Various analysis suggests that the global installed base of IT consumes 1000-2000TWh of electrical power, which is equivalent to 5-10 per cent of all power generated. Additional research estimates that by 2030 IT will consume as much as 30,000TWh. Clearly, increasing the capacity of electrical generation in a sustainable way is an issue that is far beyond the scope of the data centre industry alone, but it is the responsibility of such a large electrical consumer to lead by example, to increase the efficiency of its operations and to reduce its impact on the environment.

GREEN THINKING

Today, many colocation data centre operators, for example, will influence how electricity is utilised

by specifying only green or renewable energy contracts. However, their contribution to a more sustainable world will also depend on how efficiently they use the power that is provided to them, regardless of how it is generated.

There is no doubt that digitisation will contribute greatly to the demand for power around the world. For economic as well as environmental reasons power efficiency must be a major concern for owners and operators across all areas of the sector – from the smallest, unmanned edge computing installations to the largest hyperscale facilities. Fortunately, the industry is responding with innovative software and hardware solutions, pre-integrated systems, references designs and deployment strategies that can assist in the development of more power efficient and sustainable data centres.

PRE-INTEGRATED DESIGNS

For most operators, the design of a facility is the first and most important aspect of how cost and energy efficient their future IT requirements and the accompanying operating expenditure (OpEx) will be. One design trend helping to improve data centre efficiencies is the evolution of prefabricated power, cooling and IT modules – pre-integrated systems based on existing reference designs that can be built for a specific Power Usage Effectiveness (PUE) rating and a predictable return on investment (ROI).

Based on real life reference designs, many of these facilities are built with energy consumption and reduced environmental impact as key priorities. Such modules take particular care to maximise the efficiency of the cooling architecture, whilst leveraging new power technologies such as lithium ion (Li-ion) uninterruptible power supplies (UPS) and built-in power distribution units (PDU) to drive efficiency throughout the system.

DECISION TIME

Another significant consideration is the choice of UPS. In the past, many UPS systems have utilised valve regulated lead acid (VRLA) batteries but, despite the cost premium, Li-ion cells are continuing to gain popularity through the advantages they offer end users in terms of lower total cost of ownership (TCO).

Typically, a VRLA battery will provide 1-2 minutes of runtime at full load, while discharging about 80 per cent of its

'The convergence of renewable power, energy efficient hardware, pre-integrated systems and cloud based software are essential for the data centre industry to meet the increased demand for digital services, with reduced impact on the environment.'

energy capacity. By contrast, an equivalent Li-ion cell could discharge 10-30 per cent of its capacity at full load over the same time period. Schneider Electric's Data Centre Science Centre found that, over a 10 year period, Li-ion delivered a TCO that is 10-40 per cent lower than equivalent UPS systems based on VRLA.

For operators this means UPS systems leveraging Li-ion technologies can provide a longer run time, therefore allowing more time to elapse before an alternative power source – typically an on-site diesel generator – is required, delivering a further reduction in OpEx and carbon emissions.

DRIVE TIME

Underpinning all of the efforts to improve energy efficiency is next generation data centre infrastructure management (DCIM) software, leveraging cloud based architectures, artificial intelligence (AI) and machine learning (ML) algorithms to enable greater levels of automation and visibility.

Today, many facilities incorporate internet of things (IoT) technologies to deliver data driven insights to users based on and off-site. Increasingly, hardware assets including racks, IT, UPS, PDU

and cooling equipment are fitted with sensors, allowing continuous monitoring, management and automation from a single console.

Using such software allows the ambient temperature to be raised where appropriate in order to reduce the total amount of cooling needed. This change can bring about a significant improvement in electrical efficiency and with it, a reduction in costs and emissions. Similarly, UPS systems and racks can be monitored to ensure optimal operation, spreading IT loads more efficiently and reducing overall power demands.

A SUSTAINABLE FUTURE

Electrical energy and digital technologies are key ingredients for a more sustainable future. Furthermore, the convergence of renewable power, energy efficient hardware, pre-integrated systems and cloud based software are essential for the data centre industry to meet the increased demand for digital services, with reduced impact on the environment. By combining energy efficient power infrastructure with a greater commitment to sustainability, data centre operators can yield greater efficiency, lower operating expenses and far lower carbon emissions, which will ultimately benefit us all. ■

MARC GARNER

Marc Garner is vice president of Schneider Electric's Secure Power Division in the UK and Ireland. He is a 13 year veteran of Schneider Electric, having joined the company after graduating from the University of Sunderland. Garner is tasked with continuing the successes of Schneider Electric's integrated power, cooling and software solutions for data centres, server rooms and edge computing installations throughout the UK.

Austin Hughes

InfraPower Intelligent Automatic Transfer Switches (ATS) from Austin Hughes are a perfect fit to provide power fallback for single corded devices.

Encompassing dual power inlets for connection to both a primary power source and a redundant secondary power source, an Intelligent ATS is a reliable solution for automatically sensing power loss and switching to the secondary power source. Power source transfer time is seamless to connected equipment, making sure that the switching occurs safely between the two input power sources. After switching to a back-up power source, it can also switch power back to the primary input after power has been restored.

Intelligent ATS with remote monitoring over IP functionality provides real time monitoring of amp, volt and kWh, assisting users with capacity planning and improving the overall power efficiency of a data centre. Supplied with free management software, users can also integrate with third-party data centre infrastructure management (DCIM) via SNMP.

CLICK HERE to find out more.
www.austin-hughes.com

EDP Europe

EDP Europe's custom built intelligent PDUs (iPDU) are designed, manufactured and supported in the UK, providing a comprehensive and cost effective solution for the monitoring and management of rack power – either locally or remotely.

Because they are custom built, EDP Europe's iPDUs can be configured to meet the requirement you desire with the features you need now, or want for the future. They can be either single or three phase and rated up to 63A, with the outlet configuration you need – be it C13, C19, UK plug or Schuko. Access is available via web browser, SNMP or RS485 Modbus, while monitoring of entire PDU, individual outlet or remote outlet switching are all available.

EDP Europe's iREM provides all the electrical measuring capabilities of an iPDU, but for little more than the cost of a passive meter. iREM will support collation of all readings into the PDU Agent DCIM and most other management platforms.

CLICK HERE to find out more, call our sales team on 01376 501337 or **CLICK HERE** to send an email.
www.edpeurope.com

Mayflex

There is never a good time for downtime – not when it's unplanned and within your network. Mayflex offers the APC Smart-UPS series of UPS, as every network and application needs reliable power protection.

The Smart-UPS series performs true double conversation for the power protection of servers, voice, data and security networks. The series can support loads of 1kVA up to 20kVA and devices are available in both tower and rack footprints. The included PowerChute management software provides unattended graceful shutdown of network operating systems, while all models of 5kVA and above include an integrated network management card for remote management.

The series can also be uploaded with extra power through additional matching battery packs to ensure power coverage for mission critical networks with larger power or run times of hours instead of minutes. The products also help infrastructures where power is unstable and input factor correction is needed.

For more information contact the Mayflex team on 0800 757565 or **CLICK HERE** to send an email.
www.mayflex.com

Excel Networking Solutions

The Excel Lite range of intelligent power distribution units (PDUs) is designed to suit any environment where the monitoring or managing of information is required. The PDUs can be configured in minutes and can communicate by HTML, HTTPs, SNMP and XML via an inbuilt web browser.

This product range has been developed so the PDUs can work as individual masters or run as a master and slave system. The PDUs operate with one master and up to 31 slaves all from one IP address – reducing the requirement for multiple IP addresses. Devices are fitted with a Neutrik connector to the front face of the power strip, thereby allowing for a choice of different lean lengths and power plugs.

They allow for the minimum and maximum thresholds to be set and measure RMS volts, internal temperature, RMS amps, frequency, kilowatts and power factor. In addition they measure peak volts, peak current, kVA, kWh, kg/CO2, KJ/H, BTU/H and consumption costs for billing purposes.

To find out more about the full range of products from Excel Networking Solutions **CLICK HERE.**
www.excel-networking.com

Take charge of the situation

Keith Stewart of Networks Centre examines the adoption of lithium ion (Li-ion) batteries for uninterruptible power supplies (UPS), and how they are being used in edge computing applications

Enterprise UPS deployments at the edge have gained favour recently and, as edge computing will remain a dominant factor for the foreseeable future, continuing deployments of mid-sized UPS (<160kVA) are assured. Our reliance on systems controlled from the edge with minimal latency will become all pervasive in our lives, so the reliability of these systems will be paramount.

GRAND DESIGNS

In spite of much advancement in the design of UPS over the past 20 years, the one thing that has remained constant, until fairly recently, was the use vented lead acid (VLA) and valve regulated lead acid (VRLA) battery solutions.

Lead acid batteries were first commercialised in 1881 and VRLAs are still the most commonly used battery for UPS. Although Li-ion batteries have been commercially available for around 20 years, they weren't previously the right size, energy density, safety or price per watt. That is no longer the case. With the help of battery technology developments and manufacturing scale for the electric vehicles industry, these problems have been overcome and the relative cost has come down. VRLAs are still widely sold and specified but Li-ion should be considered if total cost of ownership (TCO) and/or other factors outlined below are considerations.

LIFE ON THE EDGE

Edge computing is one of the scenarios where Li-ion starts to

make a lot more sense. Whilst the upfront capital cost might still be higher than VRLA, its price has reduced and is therefore increasing viability. Favourable lifetime costs and performance advantages can mean Li-ion is a much more compelling option.

For the purposes of this article VLA, also known as 'flooded cell', is not considered. Whilst this type has some lifespan advantages over VRLA, it requires more maintenance and a separate battery room, which effectively rules it out for smaller edge compute facilities.

SPACE SAVINGS

Edge computing implies physically smaller compute and storage facilities compared to a traditional data centre. Typically, these facilities are located in containerised modules, perhaps sharing land with a cellular mast or other utility, sometimes in remote locations.

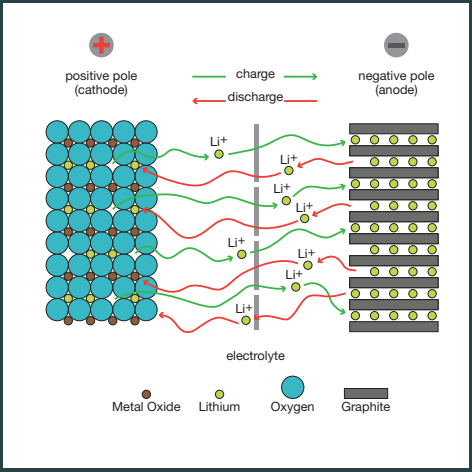
Regional edge compute facilities are still likely to be modest in size. Li-ion batteries save anything between 30-70 per cent of the footprint required by VRLA batteries, depending on the power and back-up time. For example, a 200kW/13m back-up time UPS can provide something like a 55 per cent floorspace saving if using Li-ion. Even disregarding the favourable capital and operational costs of reduced space requirements, there may be site or container space constraints that will dictate that space savings are designed in.

Weight may be a lesser consideration but compared to lead acid, Li-ion batteries provide significantly more power per unit weight (W/kg). This means that weight savings on batteries can be as much as 80 per cent. The rack or floor loading is also significantly decreased, as are transportation costs.

LONG LIFE

Battery life is usually expressed as either service life (time taken to reach 80 per cent of its capacity) or calendar life (life of battery were it to be trickle charged with no power draw over its entire life).

VRLA batteries have a typical service life of four years, whereas Li-ion is in excess of 10, and is typically 12-15 years. Calendar life is typically 17 years for Li-ion compared with just five for VRLA. If VRLA batteries are exchanged every four years, that is twice in the lifetime of the UPS. This is the biggest factor weighing in favour of Li-ion when taking TCO into account. The service life of Li-ion is similar to the UPS itself and as much as three times VRLA. More importantly, they are far more reliable. Unlike a large data centre, at the edge there is less likely to be maintenance staff on hand in the case of a battery failure and scheduled battery maintenance.



RECHARGE TIMES

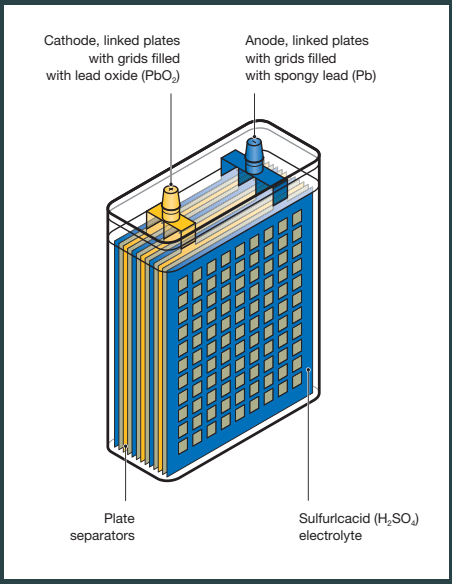
Power outages are often like buses – none for ages then several in a short space

'VRLA batteries have a typical service life of four years, whereas Li-ion is in excess of 10, and is typically 12-15 years. Calendar life is typically 17 years for Li-ion compared with just five for VRLA.'

of time. The recharge time for Li-ion batteries is far quicker than VRLA. Not only that but the number of cycles that can happen before the battery falls below 80 per cent capacity is 10 times that of VRLA batteries.

VRLA batteries are typically designed for over 100 charge/discharge cycles but can show significant decline in charging capacity after as few as 10 cycles. Conversely, Li-ion batteries are rated for up to 2,000 discharges over their service life. The only way to check the health of batteries is to take them offline, connect a load bank and run at the rated power for the required time (run-down test). After the specified time, if the battery is at less than 80 per cent of rated capacity, it should be replaced.

It follows that Li-ion batteries are more suitable where stored energy will be used on a regular basis. Whilst this article is focused on edge compute, Li-ion batteries are also seen as an energy storage system where there is a trend towards using Li-ion to charge at night, while energy rates are low, and discharge during the day. Using Li-ion batteries, grid sharing and peak shaving can reduce operating costs in addition to other benefits. Hybrid UPS energy storage solutions supplemented by solar or wind energy can be attractive for remote locations where three-phase power may be difficult to access.



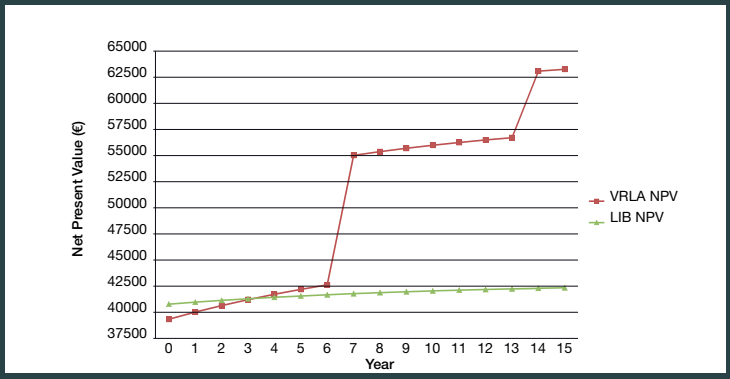
TEMPERATURE RANGE

The rated capacity of a battery is based on an ambient temperature of 25°C but the operating temperature will have an impact on the life of a battery, whatever type it is. If the temperature increases by around +8°C on average over a year, is will typically half the half the life of the battery,

However, Li-ion batteries have a better tolerance of temperature variations (0-40°C). This may or may not be an important factor, depending on the degree of control over ambient temperature, particularly under battery charge/discharge conditions when the cell temperatures will be at their highest.

SAFETY FIRST

It is a well-known hazard of VRLA batteries that they emit gas when under load, hence



the use of a valve. This is not normally a problem, as the gas is not volatile. There was a time when Li-ion batteries could be very unstable under certain conditions but battery technology has evolved significantly and there are many variants of what are collectively known as metal oxide batteries.

One type we are most familiar with and is used widely in customer electronics is lithium cobalt oxide (LCO). This provides a good energy density but can present safety risks, particularly if damaged. Other chemical compositions are used for UPS such as lithium iron phosphate (LFP), lithium manganese oxide (LMO) and lithium nickel manganese cobalt oxide (NMC). These don't provide such high energy density but are inherently safer. There is always a trade-off between performance and safety but combined with integrated battery monitoring that comes with Li-ion, this provides an extremely safe solution.

CHANGING PLACES

There is a good use case in some instances for replacing existing VRLA batteries with Li-ion – typically where a UPS is under 10 years old. The earlier in its lifecycle, the more cost effective it is likely to be but it will depend mainly on the expected life of the UPS. Li-ion is not a direct drop in replacement and will need to be assessed. The UPS may require upgraded firmware, the charging characteristics and runtime may all need to be reassessed, however, economically and reliability wise it may be the best choice. ■

KEITH STEWART

Keith Stewart is product marketing manager at Networks Centre. He has worked in network cabling and telecoms for over 20 years in various roles within manufacturing, distribution and project management. Stewart is also qualified to HNC in electronics and telecommunications.

Cisco appoints Elisabeth De Dobbeleer as new EMEAR partner lead

Cisco has appointed Elisabeth De Dobbeleer as its Europe, Middle East, Africa and Russia (EMEAR) partner lead. She moves into the role from her previous post as Cisco's vice president and deputy general counsel for EMEAR.


Elisabeth De Dobbeleer

In her new role, De Dobbeleer will be responsible for developing strategic growth initiatives and transformation programmes to positively impact Cisco's partner business, as Cisco evolves its portfolio and invests in customer lifecycle management. She will work closely with Cisco's channel partners, who represent the company's primary route to market.

De Dobbeleer said, 'I believe in building strong relationships with our partners based on trust, transparency, effective communications and sustainable profitable growth. This is increasingly important during these uncertain times. Technology is playing a pivotal role in helping our customers, critical services and communities around the world.'

Gigamon appoints first ever chief product officer

Andrew Harding has joined Gigamon as its first ever chief product officer (CPO). This is a critical new role for Gigamon, as the company focuses on the next generation of its digital transformation solutions. Harding will help Gigamon continue its strong growth trajectory, which ended with the strongest fourth quarter in company history.

Harding is based at the Gigamon headquarters in Santa Clara, and joins the leadership team as a key driver of the expansion of innovative solutions required to meet the demands that digital transformation, 5G and cloud initiatives put on the network. He will leverage his experience delivering world class products in network security, mobility and networking to lead product strategy and capitalise on the recent growth Gigamon has experienced.


Andrew Harding

'Andrew brings with him a history of redefining portfolios and invigorating markets by driving software based innovations in network security, infrastructure and cloud,' said Shane Buckley, president and chief operating officer at Gigamon. 'We are excited to welcome him to the Gigamon team.'

CityFibre completes its acquisition of FibreNation

CityFibre has completed its acquisition of FibreNation from TalkTalk Group, continuing CityFibre's long-term strategy of investing in critical national infrastructure. The acquisition enables CityFibre to increase its rollout ambition from five million to up to eight million premises, supporting an investment programme of up to £4bn. It will also help to accelerate the availability of full fibre across the UK – a platform critical to social and economic recovery in the wake of the coronavirus pandemic.


Greg Mesch

CityFibre's increased rollout plan to reach up to eight million premises is expected to span more than 100 towns and cities, and is estimated to create up to 7,000 construction jobs outside London. To date, CityFibre has identified 62 towns and cities to benefit from its rollout and it has connected thousands of public sector sites including hospitals, schools and community venues.

Greg Mesch, chief executive at CityFibre, said, 'In the face of the rapid spread of the coronavirus and its unprecedented impact on the UK's society and economy, we believe that the need for world class digital infrastructure has never been greater. Completing our acquisition of FibreNation marks an acceleration in our ability to deploy the critical future proof digital infrastructure our country needs.'

CHANNEL UPDATE IN BRIEF

WatchGuard Technologies has entered into a definitive agreement to acquire Panda Security.

CloudM has appointed a new commercial director to drive the business' UK and international growth. Nick Miles joins from Okta, where he was regional alliance director and responsible for the company's channel and partner business across EMEA.

Bentley Systems has announced its acquisition of GroupBC.

Fortinet is introducing Fortinet Engage, a programme designed to help Fortinet partners succeed in today's new security environment.

Anomali and One Distribution have entered into a strategic partnership giving One Distribution the ability to deploy and support Anomali threat intelligence solutions in the UK and Ireland.

Rob Taylor has joined Kohler Uninterruptible Power (KUP) as its hardware sales director.

Code breaker

John Booth of Carbon3IT explains the key points of the EU Code of Conduct for Data Centres (Energy Efficiency) (EUCOC) 2020 v11 update

The 2020 version EUCOC was published at the end of January 2020 and includes several updates. As a refresher, the EUCOC best practices have been incorporated into the EN 50600 series as a technical report since 2018. The full title is CLC/TR 50600-99-1:2019, which is the previous version of the EUCOC v10. A subsequent version will be published by the Standard Development Organisations (SDOs) in their relevant countries in due course.

WORD BY WORD

In the latest version of the EUCOC, which is v11, there have been several changes to the wording of some best practices, some have been made mandatory, and there are a number of new best practices. In addition, some of the notes in the reporting form have been updated. So, in best practice order:

3.2.2 Mechanical and electrical equipment environmental operating ranges

This was changed some time ago, but the note has now been updated on the reporting form.

3.2.4 Lifecycle assessment

Again, this was changed some time ago, but the note has now been updated on the reporting form.

3.2.5 Environmental management

Introduce a plan for environmental management in accordance with emerging EU guidelines and internationally standardised methodologies. An example of which would be ISO 14001. **Consider appointing a cross functional environmental sustainability manager to take responsibility for this initiative.**

3.2.6 Energy management

Introduce a plan for energy management in accordance with emerging EU guidelines and internationally standardised methodologies. An example of which would be ISO 50001.

Note: The Code of Conduct can be used effectively to underpin the expectations and reporting requirements specifically for data centres in relation to ISO 50001. **Consider appointing a cross functional energy manager to take responsibility for this initiative.**

3.2.8 Sustainable energy usage

Consider the proportion of energy used by the data centre that comes from renewable/sustainable sources. Recording and reporting on the proportion of sustainable/renewable energy used against the overall energy consumption is expected to become an expected monitoring and reporting requirement in time.

Note: Standardised metrics in this area are available as EN 50600-4-3 or ISO/IEC 30134-3.

EN 50600-4-3 Information technology – Data centre facilities and infrastructures – Part 4-3: Renewable Energy Factor

specifies the Renewable Energy Factor (REF) as the ratio of the renewable energy (in kWh) to the total energy consumption (in kWh).

Note: REF covers all renewable energy purchased from the utility (with guarantee of origin) and produced on-site. However, renewable energy produced on-site, that is not consumed on-site and partly or in total sold to the grid, shall be excluded from REF.

Note: CLC/TR 50600-99-1 and CLC/TR 50600-99-2 address best practices for data centre energy efficiency and environmental sustainability respectively. Both are a part of the European EN 50600 series.

Note: The EN 50600 series has now been adopted by ISO/IEC as ISO/IEC TS 22237.

Note: ETSI EN 305 200-3-1 KPIREN KPI excludes both energy from grid and energy not consumed on site, in conformance with net zero initiatives.

3.2.13 Consider technical areas of data centres as industrial space

This was changed some time ago, but the note has now been updated on the reporting form

3.2.14 Site documentation

Changed from optional to mandatory

3.2.15 Training and development

Changed from optional to mandatory

4.1.1 IT hardware – power

4.1.2 New IT hardware – restricted (legacy) operating temperature and humidity range

4.1.3 New IT hardware – expected operating temperature and humidity range

4.1.4 New IT hardware – extended operating temperature and humidity range

Changes to ETSI and ASHRAE references

4.1.6 IT equipment power usage against inlet temperature

Reporting form updated

4.1.10 Energy Star compliant hardware

Reporting form updated

4.1.11 Energy and temperature reporting hardware

Redfish added as reporting approach

4.1.14 Operating temperature range – direct liquid cooled IT equipment

ASHRAE reference changed

4.1.15 AC/DC converter efficiency

ISO and ETSI references added

4.2.6 Incentives to develop efficient software

Best practice wording changes

4.2.8 IT equipment utilisation

New best practice – set minimum or average targets for the utilisation of IT equipment (servers, networking, storage).

Note: This presents substantial uncertainty when considered without the load to power profiles of the equipment, with cloud and mobile services and the increasing ability to relocate the IT compute function dynamically to an alternate location and better serve customers and optimise costs, this becomes more complex and would require substantial work to usefully determine.

Note: This is a specialist area which is being examined in detailed by bodies specialising in this field.

'In the latest version of the EUCOC, which is v11, there have been several changes to the wording of some best practices, some have been made mandatory, and there are a number of new best practices.'

Reference ISO/IEC 30134-5:2017 Information technology – data centres – key performance indicators – Part 5: IT equipment utilisation for servers (ITEUsv). Also ISO/IEC 21836 Information technology – data centres – Server Energy Effectiveness Metric (SEEM).

4.3.2 Decommission and remove unused equipment

4.3.5 Decommission low business value services

4.3.6 Shut down and consider removal of idle equipment

4.4.4 Select lower power storage devices
Reporting form updated

5.1.3 Design – contained hot or cold air – retrofit
Changed from optional to mandatory

5.2.6 Dynamic control of building cooling
Reporting form updated

5.6.1 Direct liquid cooling of IT devices
Renumbered, previously 5.4.2.9

5.7.1 – 5.7.4
These practices have been renumbered 5.6.x is now 5.7.x

8.3.3 Metering of water consumption
ISO and The Green Grid references added

9.2.2 Automated daily readings
Practice has become mandatory for new build/retrofit and reporting form updated

THREE OF A KIND

Please also note that there are three new best practices scheduled for publication next year. These are:

5.7.5 Capture read infrastructure
Consider installing 'capture ready' infrastructure to take advantage of, and distribute, available waste heat during new build and retrofit projects. This is scheduled to become a mandatory best practice from 2021.

11.2 Network energy use
When purchasing new cloud services or assessing a cloud strategy, assess the impact on network equipment usage and the potential increase or decrease in energy consumption with the aim of being to inform purchasing decisions. The minimum scope should include inside the data centre only. The ambition is to include overall energy consumption and energy efficiency including that related to multiple site operation and the network energy use between those sites.

11.3 Smart Grid
Continue to evaluate the use of energy storage and usage to support a Smart Grid. A Smart Grid is a solution that employs a broad range of IT resources, allowing for a potential reduction in electricity waste and energy costs.

These changes and the ongoing commitment by volunteers to propose, discuss and agree vendor neutral best practices provide unbiased opinion on data centre energy efficiency best practices.

DATA BASE

All participants are expected annually to provide updated energy data and progress against any action plan items. All current endorsers are expected to provide updates on endorsement activities. All current participants are advised to send new 2020 reporting forms to the EU-JRC, as many of their applications will now be out of date and will not be included the updated best practices.

All new applicants should use the new reporting form and best practices and familiarise themselves with the requirements by downloading all the relevant documents from the website. If your organisation was previously a participant, but the organisation has been taken over or merged with another entity, please check your listing.

Finally, given the EU New Green Deal and its statement 'data centres, can, and should be climate neutral by 2030', and with a possible threat of enforcement contained in the briefing note, there are several data centre initiatives that can be considered by both enterprise and colocation operators. The first is obviously the EUCOC, while others include the Eco Management Assessment Scheme (EMAS) and Best Environmental Management Practices (BEMP) – both of which incorporate the EUCOC into their criteria.

OPINION PIECE

In my opinion, and I appreciate that others will have a different take on this, if the EC wants data centres to be climate neutral by 2030 then it needs to:

- Mandate the EUCOC and others in all new builds as a condition of planning
- Fund one of the EC directorates to police the scheme
- Compel legacy facilities to become more efficient either by policing or via tax breaks/penalties.

Operators can only go so far, government and regulators would do well to listen to the sector and legislate accordingly. ■

JOHN BOOTH

As well as managing director of Carbon3IT, John Booth is a reviewer for the EUCOC programme and also carries out work with the Certified Energy Efficiency Data Centre Award (CEEDA), which assesses data centres to a subset of the EUCOC best practices. Booth is chair of the Data Centre Alliance's (DCA) Energy Efficiency & Sustainability steering group and vice chair of the BCS Green IT and treasurer of the data centre specialist groups. He is also the executive director of Sustainability for London (SFL), a not for profit organisation that assists organisations in London to meet its ICT sustainability goals, and technical director of the National Data Centre Academy.

Quick clicks

Your one click guide to the very best industry events, webinars, electronic literature, white papers, blogs and videos

Moving Forward on 5G is a blog by Steven Carlini of **Schneider Electric.** **CLICK HERE** to read it.

Meeting Bandwidth and Functionality Trends With the Digital Ceiling is a blog from Jan Middeldorf of **Nexans.** **CLICK HERE** to read it.

FOR A FREE SUBSCRIPTION TO Inside_Networks CLICK HERE

R&M is extending its range of information with a new blog portal, which features specialist articles on key technology and market trends.
CLICK HERE to take a look.

Cable Certifiers – What Really Matters? is the question posed in a new white paper from Ideal Networks.
CLICK HERE to read it.

The Experience 2020 Report: Digital Employee Experience Today is a study by Nexthink.
CLICK HERE to access a copy.

COVID-19: Minimizing Critical Facility Risk is an advisory report produced by Uptime Institute.
CLICK HERE to obtain copy.

MPO Connector Basics and Best Practices is a white paper from Leviton.
CLICK HERE to read it.

Urban retreat

Luke Harley of Zyxel looks at how Wi-Fi helps create smart buildings, which are the first step towards smart cities

Smart cities use technology to help authorities run public services, which, in turn, can drive efficiencies, open up new and exciting options for businesses, and greatly improve the lives of residents and visitors. In fact, the growth of smart cities around the world is gathering pace, with the range of smart technologies that will underpin the cities of our future expected to grow by 18 per cent a year for the next decade. Driving the market's growth over the next few years is a combination of rising consumer awareness of the conveniences, costs savings and energy reductions that technology can provide.

STEP FORWARD

The small steps towards smart cities in specific areas promise to revolutionise day to day activities, and therefore create a more efficient version of our cities, where pretty much everything is connected and automated through technologies such as artificial intelligence (AI), big data and the internet of things (IoT). AI can be applied to networks within a city's buildings as a way of increasing the accuracy of information received, as well as reducing the time it takes to analyse and resolve issues. Big data and IoT, when used together, can carry out extremely thorough analyses to find inefficiencies, from which improvements can then be made.

The development of smart buildings is essentially the first stepping stone – paving the way to smart cities. A smart building is a structure that uses automated processes to control building services, without additional human input. These buildings use sensors and microchips in order to collect vast amounts of data and manage it according to inhabitants' requirements.

EXPLORING THE BENEFITS

For those who have already witnessed the increasing development of smart buildings, a huge number of benefits are now greatly apparent. With a network monitoring a building's operating systems, it frees up human time to work on the more important side of a business, thereby increasing productivity rates. Unobtrusive sensors built into the structure provide facilities managers with anonymous data on how a building is being used. In a smart commercial building, the occupants can then use the data received from these systems to generate insights that inform the planning for their businesses to review and use resources more efficiently.

The sensors and microchips within a building structure can, for example, help businesses save energy

and money, as the automated system will learn when it should bring building temperature up or down everywhere or only in a specific zone of the building. In addition, a building's systems can develop predictive maintenance, meaning they monitor building performance and activate maintenance procedures before an alert is triggered. This includes checking electrical loads – the amount of power passing through a network line or specific machine. When the load is rising and approaching the high limit setting, the non-essentials are automatically turned off, creating a safer and more pleasant environment.

UNDERSTANDING THE CHALLENGES

It remains to be said that whilst the benefits of smart buildings are extensive, with them come some significant challenges. Given varying building sizes, it can be a tricky task to achieve seamless network coverage and Wi-Fi across the entire infrastructure. The amount of time and skill required to set-up the multiple systems, sensors, and microchips required for a smart building is likely to setback the overall process. Until businesses and societies as a whole put in the time and money into implementing these changes, the progression towards smart cities will stagnate.

Another potentially catastrophic issue surrounding the progress in smart technology adoption is the equally advancing risk of cybersecurity breaches. With cybercriminals adapting as quickly as the tech around us, all it takes is for one person to hack into a smart device within

'Whilst the benefits of smart buildings are extensive, with them come some significant challenges. Given varying building sizes, it can be a tricky task to achieve seamless network coverage and Wi-Fi across the entire infrastructure.'

a building and they could then download confidential information – putting sensitive business data at risk.

A SMART SOLUTION

Whilst these challenges appear inevitable, there are ways to counter the risks associated with smart technology – with networks, come switches. A network switch connects devices on one computer network and can receive, process and forward data to the appropriate destination device.

One of the main benefits of switches is their ability to redirect data from each connected device into a separate channel, depending on preconfigured policies. This way a smart building network based on switches can not only handle each smart device and its data, but also interconnect all of them in a secure and consistent way. This further improves the effectiveness of the network and reduces the risk of network collapse.

If the vision of the smart city is to become an imminent reality, we must ensure buildings are smart enough to

cope. For example, to keep smart buildings safe from cybercriminals, barriers need to be placed within the network to prevent access to an entire system, like next generation security and switch solutions. With continuous power supply, new switches can be guaranteed to keep up all connected devices, even during firmware or configuration updates. The longer transmission distances of new switches allow for installation in remote locations when required.

As switches redirect data from different smart devices into separate channels, cybercriminals are prevented from accessing the entire building network, even if they manage to hack into one smart device – bringing peace of mind to occupants of the buildings.

MAKE THE SWITCH

For businesses wanting to benefit from the efficiencies of a smart building, the solution to protecting their networks and sensitive information lies in the initial investment in the right IT infrastructure. The decision to incorporate robust and appropriate switches in the network can be a crucial step in bringing us closer to the smart cities of the future. ■

LUKE HARLEY
Luke Harley is EMEA market development manager switch at Zyxel. He joined the IT industry in 1997 and has worked at companies including Flection Europe, Azlan and Infopact.

Mayflex

Available from Mayflex, the LevelOne WAP-8121 is a sophisticated, fast dual-band managed wireless access point. It provides a combined throughput of 750Mb/s using 802.11ac standards and also supports all legacy wireless devices on 802.11a/b/g/n.

The WAP-8121 performs automatic testing and assigns channels dynamically to detect conflicts and channel interference, constantly optimising performance in the background. The device runs on power over Ethernet (PoE), negating the need for electrical wiring.

Central management allows for adjustments to the radio frequency (RF) according to the environment, further optimising the performance of the network by adjusting and balancing workloads, as well as detecting areas of weak reception. The sophisticated and stylish access point mounts on a ceiling, providing a low profile, highly effective networking solution.

To find out more about the full range of wireless and networking solutions from LevelOne **CLICK HERE** to visit the Mayflex website or to send an email **CLICK HERE.**

www.mayflex.com

Ideal Networks

Ideal Networks' LanXPLORER Pro in-line network troubleshooter has a Wi-Fi testing accessory to support both 2.4GHz and 5GHz frequencies.

With so many channels now using the 2.4GHz Wi-Fi frequency, many business users are finding that the speed of their network suffers. This means that companies are increasingly moving to 5GHz Wi-Fi to beat congestion and prevent performance from depreciating. To meet this demand, Ideal Networks has a Dual Band USB Wi-Fi Adapter for its LanXPLORER Pro.

The new USB antenna offers enhanced functionality to support testing for both 2.4GHz and 5GHz Wi-Fi in accordance with the 802.11a/b/g/n/ac international test standard. The software updates for LanXPLORER Pro have also improved Wi-Fi testing capabilities and accuracy by enabling the tester to display RF parameters such as signal strength (dBm) and signal to noise ratio (SNR).

To find out more **CLICK HERE.**

www.idealnetworks.net

Wi-SUN Alliance

In 2011, a group of visionary leaders came together to form a global organisation that could drive the adoption of interoperable smart utility networks, as described by IEEE 802.15.4g. Wi-SUN Alliance is now a global member based association driving the proliferation of interoperable wireless solutions for use in smart cities, smart utilities and other internet of things (IoT) applications.

Wi-SUN members include global and national companies and utilities. Independent research from Rethink Technology estimates that companies in the Wi-SUN ecosystem are set to enjoy continued growth at 20 per cent CAGR, as mesh network technology begins to reach into new sectors and different business models are developed and implemented.

Membership of the Wi-SUN Alliance is open to all industry stakeholders and includes silicon and product vendors, services providers, utilities, universities, enterprises and local government.

To find out more **CLICK HERE.**
www.wi-sun.org

WatchGuard Technologies

WatchGuard Technologies' AP327X is a cloud managed outdoor Wi-Fi access point with ruggedised enclosure and external antenna connectors for use in extreme conditions, or locations that require flexible antenna pattern coverage. It is ideal for delivering secure outdoor Wi-Fi for university campuses, warehouses, manufacturing sites, shopping centres, public hotspots and municipal facilities.

With the introduction of the AP327X, WatchGuard enables its customers and partners to push beyond previous challenges to create secure Wi-Fi deployments in outdoor environments. The AP327X adds four N-Type connectors for flexible antenna pattern coverage capabilities and is IP67 rated for harsh conditions including rain, snow and dust. The AP327X is an 802.11ac 2x2 MU-MIMO access point with dual concurrent 5GHz and 2.4GHz band radios and data rates up to 867GHz and 400Mb/s respectively.

To find out more **CLICK HERE.**
www.watchguard.com

Private eye

The Long Term Evolution (LTE) networking standard was developed to provide increased speed and efficiency for mobile broadband. Stephen Patrick of CableFree looks at how building private LTE networks allows organisations to enjoy high-performance wireless infrastructures

Originally, LTE was designed for large scale carrier networks to cover entire countries. More recently, two factors have enabled the rise of private LTE networks – firstly, a range of compact, standalone and designed for purpose LTE systems and, secondly, the availability of the shared access spectrum and the unlicensed 5GHz band. These are now available to enable organisations to implement wireless

networks for mission critical automation and mobility applications.

WHAT IS PRIVATE LTE?

Private 4G and 5G solutions make it possible for organisations to deploy and operate high-performance, on-premises private wireless networks, without requiring access to the licensed spectrum, yet still benefitting from the performance and global ecosystem of LTE technology. This is attractive across a wide range of enterprise applications, particularly where in-house control, mission critical reliability, multi-service capability, mobility and security are needed.

Globally, most LTE networks are public – serving both public or enterprise subscribers from operator owned networks. An LTE network is considered to be private when its main purpose is to connect people/things belonging to an enterprise – normally across a campus or site – and where data needs to be kept totally secure by avoiding transmitting it through the core network of a mobile operator. Full private ownership of the whole LTE network – including base stations and core – has several advantages.

BENEFIT CHECK

The many benefits of a private LTE network include:

- Guaranteeing coverage and capacity in the target coverage area. Organisations can design, engineer and update a radio access network (RAN) to meet their specific performance demands. This includes coverage, configuring uplink and downlink, setting usage policy, determining which users connect and how traffic is prioritised.

- Optimising parameters in the LTE radio to operate in challenging physical environments. This can include fast recovery from failure, or optimisations for reliability and for latency. This is not possible when connecting to a public network, where such parameters are under control of the operator, not the user.

- Retaining control of critical data. In private networks, an organisation controls its own security and can ensure that sensitive information does not leave the network. This is an essential requirement for many types of businesses and security focused organisations. Also, keeping data and the core network on the private LTE network avoids the risk of service disruption due to a WAN link outage.

- Dedicated coverage and capacity of high speed 4G network with the ability to customise performance to enterprise needs.

- High speed, high capacity, reliable and secure mobile broadband communication layer for mission critical and business critical people, machines and applications.

- A fast route to digital transformation and internet of things (IoT), bringing intelligent insights for more efficient operation, agility, quality and innovation.

- It offers the use of advanced applications on mobile platforms and transparent handover to public LTE networks outside

of private LTE network coverage.

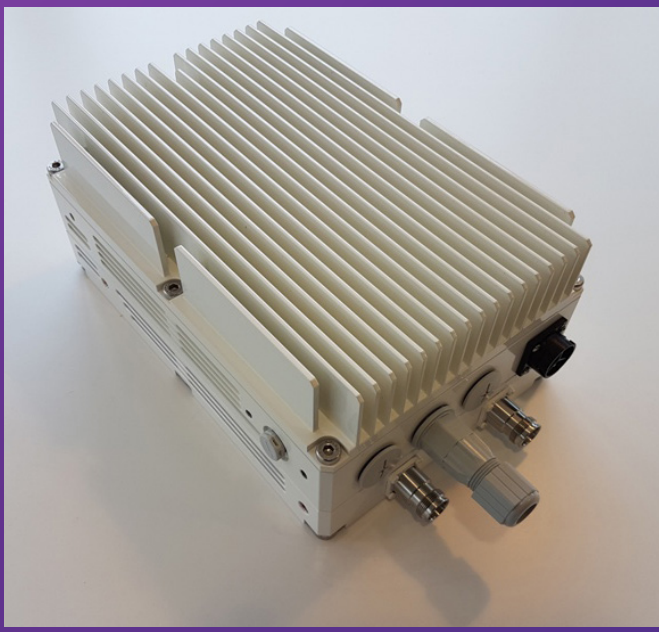
- It can be used to automate remote facilities and enhance security.

'Private 4G and 5G solutions make it possible for private organisations to deploy and operate high-performance, on-premises private wireless networks, without requiring access to the licensed spectrum, yet still benefitting from the performance and global ecosystem of LTE technology.'

THE CHOICE IS YOURS

In terms of spectrum, owners of private LTE deployments can choose from the shared access 3.5GHz band, spectrum sharing initiatives and the 5GHz unlicensed band.

Early examples of private LTE networks were typically deployed in the licensed spectrum, with permission from a regulator or partner mobile operator. The availability of open access spectrum, in combination with built for purpose interoperable equipment, now makes it easier for organisations to deploy and operate a private LTE network. Where there is choice, organisations can decide whether to deploy with unlicensed 5GHz or licensed band operation. Some organisations, especially



government, security, energy and utilities can get access to the spectrum to run private LTE Networks.

HARD AND SOFT

An organisation deploying private LTE can choose vendor equipment with a roadmap that suits them. Modern equipment such as software defined radio and software defined networking offer an easy roadmap to 5G and beyond. The upgrade cycle of software and/or hardware can be under the user's control, and meet demands for coverage, capacity, applications and network features. 5G-NSA (non-standalone) 5G-SA (standalone) versions are available. ■

STEPHEN PATRICK

Stephen Patrick is CEO and founder of CableFree: Wireless Excellence. He is a pioneer of high speed outdoor wireless communication technology, with several world first achievements within the wireless broadband industry. Patrick has co-authored several published academic papers in collaborative academic industrial projects.

MISSED AN ISSUE?

CLICK ON THE COVER TO READ MORE

FOR A FREE SUBSCRIPTION TO Inside_Networks CLICK HERE

Colt Data Centre Services breaks ground for 100MW hyperscale data centre in Mumbai

Colt Data Centre Services (DCS) has marked its new 100MW hyperscale data centre in Mumbai at a ground-breaking ceremony. Powered by renewable energy, the facility will be one of the largest hyperscale data centres in India.

Supporting international enterprises scale up their businesses globally is a key focus for Colt DCS. Its hyperscale offerings are specifically designed to ensure secure and robust data and network support as businesses expand internationally.

Through the new Mumbai data centre, Colt DCS will support various digital initiatives such as smart cities and Digital India, driven by the Indian government. India's speculated personal data protection bill is also expected to drive further demand for data storage capabilities, if passed through. Colt DCS is dedicated to providing a reliable data and network infrastructure to support the country and its growing data generation of consumers and digital businesses.

Microsoft rolls out digital twin of its new regional headquarters at Frasers Tower

In collaboration with Bentley Systems and Schneider Electric, Microsoft has rolled out a digital twin of its regional headquarters at Frasers Tower in Singapore, offering a living blueprint for the future of smart buildings. The companies worked together to implement sensors and telemetry to create a connected workplace that allows Microsoft to adjust the space based on usage, therefore improving energy efficiency.

Data is collected using a mix of 179 Bluetooth beacons in meeting rooms and 900 sensors for lighting, air quality and temperature by Schneider Electric. The platform generates nearly 2,100 data points that are connected to the cloud on Microsoft Azure, enabling the holistic management of the environment.

The sensors enable monitoring of facilities usage, energy and utilities. They optimise space utilisation, air conditioning and lighting adjustments. All these provide a comfortable and productive space for employees, while increasing overall energy efficiency. Open, interoperable technology also allows activity detection enabled lighting and room sensors to reflect room bookings on the Microsoft's Smart Building CampusLink app.

Natilik extends its relationship with Barratt Developments with a five-year WAN contract

Natilik is extending its relationship with Barratt Developments with a five-year wide area network (WAN) contract, built on Cisco's software defined WAN technology. Barratt's is the UK's largest housebuilder and this new investment will provide it with the agility to quickly respond to business demands, while maintaining an intelligent security position for its workforce.

The agreement covers 37 sites across the country, deployed on the UK's largest ethernet network, provided by Exponential-e. The solution allows Barratt to improve performance by reducing bottlenecks and mitigating the risks of downtime, whilst continuing to maintain a secure network as more services are consumed via the cloud. This is achieved while providing the Barratt network team with full visibility and control of the network through a single user interface.

Implementing SD-WAN technology is key to Barratt's IT transformation in order that its offices, developments and field based workers have fast and reliable access to cloud based applications. This agreement takes the partnership well in to 2025 and will enable the organisations to explore the benefits of a software defined approach.

PROJECTS & CONTRACTS IN BRIEF

The London Internet Exchange (LINX) has confirmed expansion plans for its regional internet exchange in Wales, as it builds out its network into Next Generation Data's (NGD) data centre near Newport. With this, the currently located LINX Cardiff regional internet exchange in BT's Stadium House facility is being rebranded LINX Wales.

IoT Scotland network connectivity is now available across the Scottish Borders with towns, villages and rural areas including Peebles, Melrose, Selkirk, Jedburgh and Hawick set to benefit.

PLDT and its wireless unit, Smart Communications, are now ready to deliver 5G services on the new converged SDN transport infrastructure provided by Cisco. This has completely transformed PLDT's network transport architecture, delivering on its promise to build one of the most modern transport networks in Asia.

Cumulus Networks, Dell Technologies and the Dutch National Police have entered into a partnership that will see the single largest government department in the Netherlands become one of the first data driven police departments in Europe.

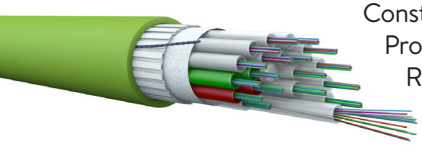
Cogent Communications has deployed its core backbone routers to the maincubes FRA01 data centre in the Frankfurt metropolitan area.

Nokia has secured a 5G contract with Chunghwa Telecom. Nokia's 5G radio portfolio and fast rollout capability will enable Chunghwa Telecom to further strengthen its role as the front runner in Taiwan's 5G market.

Draka/Prysmian

Prysmian Group has upgraded the design of the Draka N-Series of optical fibre cables, which forms part of the Draka UC Connect cabling system. The stranded loose tube cables are now available in fibre counts up to 432, with 18 units containing 24 BendBright-XS fibres each. BendBright-XS also gives a 100x improvement in macrobending over standard singlemode fibre.

Draka N-Series cables are the only non-metallic cables with gel-filled tubes that carry Cca and B2ca Construction Products Regulation (CPR) ratings.



With FireRes LSHF-FR sheathing, this cable is ideal for mixed indoor and outdoor installations. Having gel-filled tubes provides true internal and external water blocking, with increased robustness and immunity to mechanical and environmental effects.

The Draka N-Series portfolio includes internal and external non-metallic gel-filled stranded loose tube cables in units of 6, 8, 12, or 18 with each unit containing 12 or 24 fibres. All cables meet the requirements of ISO 11801-1, EN 50173-1, IEC 60794-1, TIA GR20, ICEA 640 and ICEA 696.

For more information on Draka's N-Series stranded loose tube cables **CLICK HERE.**
uk.prysmiangroup.com

Ideal Networks

Ideal Networks has introduced Ideal AnyWARE Cloud, a new test management system that makes managing, editing and sharing reports easier than ever for installers and technicians using LanTEK IV cable certifiers. The secure, cloud based tool can be accessed, viewed and updated on common web browsers, via PC or tablet. Registration for the free solution can be completed quickly and easily online, and users can select from a choice of nine languages.

Once logged in to Ideal AnyWARE Cloud, the intuitive interface provides easy access to data from the LanTEK IV. However, the platform also includes the WalkMe interactive digital help system, which provides proactive guidance every step of the way.

In terms of functionality, the test management system allows you to organise tests by building, floor, room, cabinet and panel, so that thousands of results can be easily and logically viewed and managed. It also makes it simpler for technicians to carry out the tests in the field by isolating only relevant test results for display on the LanTEK IV.

For more information about Ideal AnyWARE Cloud **CLICK HERE.**
www.idealnetworks.net

Leviton

Reduce installation labour and waste with Leviton's QuickPack bulk packaging options.

Time is money and the tedious opening of individual jack packaging can significantly slow your project. QuickPort Jacks come in QuickPack bags of 25, allowing for faster jack access and termination time. Not only do QuickPack bulk packs accelerate the completion of your install, they eliminate excess waste from single use packaging, which can pile up in large network installations.

Bonus! The Fluke Networks JackRapid Punchdown Tool comes complementary with every 150 pack order of eXtreme Category 6 and Category 5e UTP QuickPort Jacks.

CLICK HERE to learn more.

www.levitonemea.com

SHARE THE KNOWLEDGE!

TO SHARE Inside_Networks CLICK HERE

R&M

Applications relying on cabling, connectivity and network technology are becoming increasingly important to the economy and society. R&M has launched a dedicated blog offering background information and specialist articles on key technology and market trends.

The aim is to facilitate knowledge sharing and informed decision making. Focus reports examine topics of significance for the planning and implementation of infrastructures such as edge computing, all over IP, digitalisation, smart cities and 5G. Likewise, trend reports focus on technologies and applications such as 400 Gigabit Ethernet and Single Pair Ethernet.

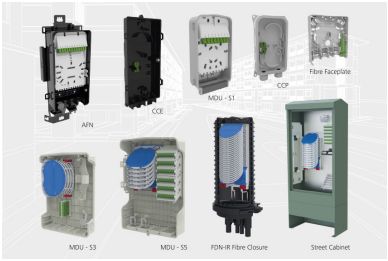
Authors from R&M, as well as guest contributors, share their latest findings, research and market insights with readers. A comment function makes it possible for readers to add their own findings, ask questions and engage in dialogue. Meanwhile, keyword based search and topic specific links make content easy to navigate.

The blog also provides information on corporate topics such as sustainability, training and corporate responsibility.

To access the R&M blog **CLICK HERE.**
rdm.com

HellermannTyton

HellermannTyton provides a complete range of end-to-end fibre to the X (FTTX) solutions, delivering fibre from the point of presence (PoP) to the building and through to the customer termination point.



From the street, HellermannTyton offers a wide selection of underground and aerial mounted fibre splice closures. In addition to the closures there is a street cabinet solution to help build a fibre network. Other pole and wall mounted products include the Aerial Fibre Node (AFN) and Fibre Facade Enclosure (FFE) wall boxes that are designed to deliver fibre from the street into the building.

Once inside the building, HellermannTyton's range of multi-dwelling unit (MDU) fibre enclosures offers excellent internal fibre distribution around different sized buildings – from a small unit with six apartments up to a huge residential complex with over 400 apartments. The fibre wall outlets provide a connection point inside the home or business. For any single dwelling units, the Customer Connection Point (CCP) and Customer Connection Enclosure (CCE) can route fibre into individual properties.

To find out more **CLICK HERE.**
www.htdata.co.uk

Leviton

Leviton has announced new 24AWG Category 6 U/UTP cables in Euroclass Dca, Cca and B2ca fire ratings, adding to the company's extensive selection of cabling systems. The cables, when combined with Leviton Atlas-X1 and eXtreme connectivity, provide a complete end-to-end system from a single provider.

IT network managers and installers are facing the need for faster deployment of new systems in tighter spaces, with less environmental impact, without sacrificing quality and reliability. The new 24AWG Category 6 U/UTP cables address these needs.

The cables have a small diameter, which allows for improved airflow in cable trays and conduits. They have been designed without a central cross filler, delivering environmental benefits through reduced plastic in the design and giving the cables greater flexibility that allows installers to achieve faster terminations. A better bend radius also reduces the stress the cable experiences as it engages with horizontal and vertical cable management.

The new cables meet all Category 6 requirements and are tested for use with power over Ethernet applications (PoE) up to 100W. All Leviton cables are third-party certified as meeting or exceeding component and channel performance standards. Leviton systems are also backed by 25-year system warranty.

To find out more **CLICK HERE.**
www.levitonemea.com

GET YOURSELF SEEN

BY THE TIME YOU READ THIS YOUR COMPETITORS' ADVERTISEMENTS WILL HAVE BEEN SEEN BY OVER 20,000 READERS OF INSIDE_NETWORKS.

IF YOU WOULD LIKE TO PROMOTE YOUR PRODUCTS AND SERVICES AND MAXIMISE THE POTENTIAL OF YOUR ONLINE ACTIVITIES, CLICK HERE.

FOR A FREE SUBSCRIPTION TO Inside_Networks CLICK HERE

All you need to know

CLICK ON THE COVER TO VIEW THE 2020 MEDIA KIT

Together in perfect harmony

Nikolas Kairinos of Fountech.ai examines whether man and machine can truly collaborate

The future of tech is one of mixed prophecy. On the one hand, there are predictions of work-free, luxurious lives, mindblowing convenience and seamless connectivity. On the other, are concerns that we'll head down a slippery slope toward robotic overlords and designer babies.

FACT AND FICTION

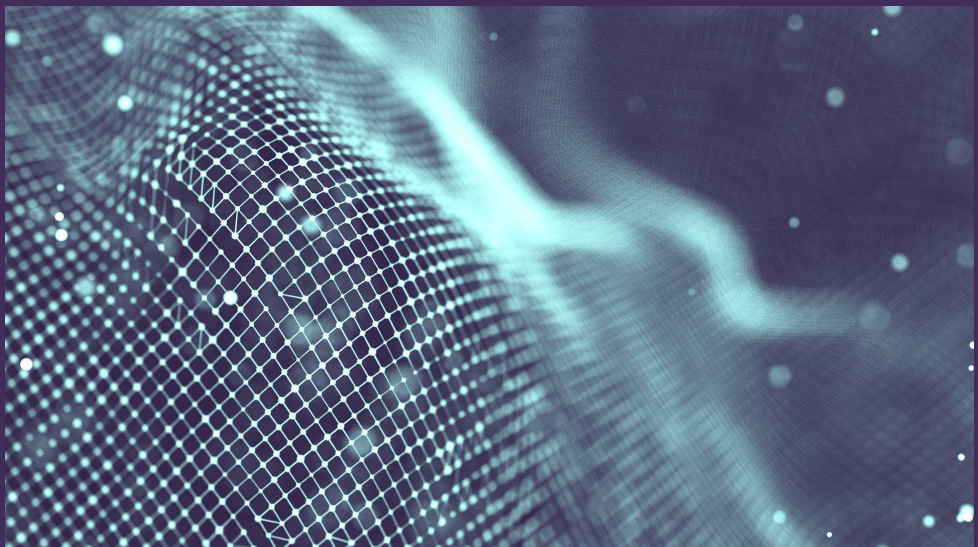
There's certainly some truth in the suggestion that machines will change the way the human race works. For example, according to PwC, 30 per cent of jobs will be at risk from automation by the mid-2030s. What's more, PwC suggested that 44 per cent of people with a low education level are at risk of being replaced by tech.

However, there is a degree of scaremongering that needs to be addressed. Indeed, as with any kind of technical subject, the reality is probably both more complex and interesting than either scenario. So, what does the future of work look like? And how will we work with machines in 2050?

LITTLE RISK OF REPLACEMENT

The first thing that needs considering is how humans are still the masters in charge, and we possess some innate skills and abilities that make us unlikely to be replaced – just yet.

First, consider what might be obvious – we train machines, not the other way around. During the development of Siri and Cortana, Apple and Microsoft designed tech personalities that fitted their respective brands. The team working on Cortana included a poet, a novelist and a playwright – highly creative types – that helped imbue confidence, helpfulness, but not bossiness. In this way, humans will likely remain in charge of new tech well into the future and are



'After reviewing 1,500 companies, analysis from Harvard Business Review found that firms gained the most significant performance improvements when humans and machines work together.'

needed to create subtlety and humanity in human facing tech. Considering how much tech is user oriented, this will be a vital role for years to come.

LOST IN TRANSLATION

Humans also have empathic understanding that is impossible for machines to completely emulate. This translates into many areas – take discrimination, for example. Researchers from Princeton have uncovered gender biases learnt by Google translate. The Turkish language uses the gender neutral pronoun 'o', but when they translated the sentences 'o bir doktor' and 'o bir hemşire' they came out as 'he is a doctor' and 'she is a nurse'. This kind of robotic clumsiness means emotional reasoning should remain a human domain for the foreseeable future.

Additionally, there are persuasive arguments suggesting that humans possess certain skills which computers will never be able to match. William J Littlefield II, a tech specialist and philosopher, suggests that humans have special ability to reason 'abductively'.

Whilst computers can reason inductively and deductively – think Sherlock Holmes – abductive reasoning requires creativity and allows humans to coin new ideas to unprecedented problems. For artificial intelligence (AI), this is a huge challenge, as it relies solely on working within pre-established parameters. Of course, who knows what the AI of 2050 or 2100 will be able to do, but there is a body of philosophical thought that suggests it may have inherent limitations.

REPETITIVE TASKS

Where the AI of tomorrow will certainly be able to help humans is in the field of repetitive, systematic tasks. For example, tech exists that is able to generate new leads for salespeople. Trawling through endless amounts of data is laborious and reduces the amount of time talented salespeople are able to spend doing what they love and are good at – interacting with prospective clients. Using this solution means they are able to quickly create a valuable list of contacts to approach, making the entire process more efficient and enjoyable.

There are countless examples of how AI will refocus humanity's jobs away from drudgery and toward creativity, especially in the office. Consider, for example, organising a meeting between colleagues – emails between several people can ping back and forth for days on end looking for an appropriate

time that suits everyone. However, AI tools can make this process much quicker by allowing workers to spend more time doing what matters. This tech performs administrative tasks including scheduling or cancelling meetings, and provides an excellent example of how man and machine will likely work together in the future, with little fuss and great productivity.

COLLABORATION AND AMPLIFICATION

But it's not just collaboration – machines are likely to also make humanity perform better when working with them. An excellent example comes from Google's Deepmind, which was able to defeat a Go grandmaster by analysing enormous datasets to simulate radical moves. 'It's not a human move. I've never seen a human play this move,' one Go champion explained. As AI starts to be able to simulate this kind of leftfield, disruptive behaviour, we will begin learning from it and using it to our advantage.

There are examples of this amplification in the workplace, too. In the design space a designer can now simply input parameters for a new design and the program generates a multitude of options for them to choose from. The designer can then make their tinkering and amendments, keeping the process distinctively human, but with many more avenues and options explored. Overall, this leads to a product more likely to be interesting, effective and marketable and, hopefully, with greater

margins. Amplification, therefore, can be highly cost effective.

RATE AND REVIEW

After reviewing 1,500 companies, analysis from Harvard Business Review gained that firms found the most significant performance improvements when humans and machines work together. There is little doubt anymore that this is the case, and companies must approach the AI space with confidence. Whilst the tales provided by the scaremongers are unlikely, many companies still require counsel and research before they are ready to fully realise the potential of working with AI and tech more broadly. When they do, they'll find their workers are more productive, creative and efficient, as they can avoid laboriousness and refocus on what really matters. ■

NIKOLAS KAIRINOS
Nikolas Kairinos is CEO and founder of Fountech.ai and specialises in the development and delivery of AI solutions for businesses and organisations.

WE HOPE YOU HAVE ENJOYED

Inside_Networks

COMING UP IN JUNE 20'S ISSUE:

SPECIAL FEATURES:
> AIM, IIM AND NETWORK MANAGEMENT
> CONTAINMENT

TO FIND OUT MORE ABOUT PROMOTION WITHIN THESE FEATURES CLICK HERE

> ALL THE LATEST NEWS, VIEWS, COMMENT AND ANALYSIS

> HOW THE IOT IS CHANGING THE WAY DATA CENTRES ARE DESIGNED AND OPERATED

> HOW AI IS KEEPING DATA CENTRES INNOVATIVE

> THE KEY DRIVERS FOR SMART NETWORK MONITORING

> WHY IT'S VITAL TO LOOK BEYOND THE NORM FOR TRUE INNOVATION IN COOLING

> MOVES, ADDS AND CHANGES IN THE CHANNEL

> NETWORK INFRASTRUCTURE CASE STUDIES FROM AROUND THE WORLD

> THE LATEST PRODUCT, SYSTEM AND SERVICE DEVELOPMENTS

FOR A FREE SUBSCRIPTION CLICK HERE