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The Network Infrastructure Education Roadmap

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From both logistical and capital expenditure points of view, getting a data centre's cabling infrastructure right first time is vital, as not only does it need to meet the requirements of today, it must also be able to accommodate the active equipment advancements of tomorrow. For many data centre owners and operators the cost and disruption of having to rip and replace cabling that is no longer fit for purpose is enough to bring them out in a cold sweat, so should be avoided at all costs.

Optical fibre cabling has become prevalent within this type of application and the specification process is now focused on whether singlemode or multimode is most suitable. Needless to say each has its own advantages and disadvantages, so deciding which one to use and where requires a great deal of consideration. To examine this issue in more depth, this month's Question Time asks a panel of experts to offer their views.

This issue also contains a feature on containment. Erwin Deeben of Leviton explains why it's important not to overlook cable management when it comes to network infrastructure planning, while Lars Lar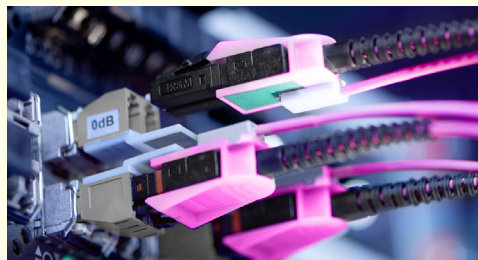sen of Legrand discusses the importance of rack and cable management design in protecting and maximising network performance. We also have a second feature dedicated to AIM, IIM and network management, where Carsten Ludwig of R&M explains why having the right infrastructure management system in place is essential when it comes to keeping data safe.

In addition to all of this we take a look at the importance of good connectivity in audiovisual (AV) systems with Simon Jacobs of Mayflex. AV systems are an increasingly important part of an intelligent building services infrastructure and the cabling and accessories that connect components together can be the weakest link in the chain if not chosen and installed correctly. Simon explains the dos and don'ts.

I hope you enjoy this issue of Inside_Networks. Don't forget, if you'd like to comment on any of these subjects, or anything else, I'd be delighted to hear from you.

Rob Shepherd
Editor

Inside_Networks
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CCCA endorses US legislation to protect consumers from counterfeit and stolen products sold online

The Communications Cable & Connectivity Association (CCCA) has joined with the Buy Safe America Coalition in publicly declaring support of the INFORM Consumers Act – legislation designed to increase transparency and accountability amid the rapidly growing problem of illicit goods sold online.

The INFORM Consumers Act aims to modernise consumer protection laws and require online marketplaces to collect and verify basic business information from sellers, in addition to requiring high volume sellers to provide contact information to consumers. It would also provide a hotline to enable customers to report suspicious activity.

David Kiddoo

'CCCA strongly endorses this vital e-commerce initiative to help create barriers and consequences for online perpetrators of dangerous and unsafe counterfeit and non-compliant goods,' said David Kiddoo, CCCA's executive director. 'This especially pertains to the safety and integrity of cabling and connectivity infrastructure components that are vital to meet today's communications and connected technologies, and which are increasingly essential to our healthcare, education, commerce and personal social networks.'

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Almost half of office workers scared to return to places of employment

40 per cent of UK office workers have said catching Covid-19 as a direct result of being back in contact with colleagues is what worries them the most about returning to offices. Over a third (37 per cent) of workers said they were most fearful of contracting Covid-19 through contamination of shared office devices and equipment such as computers and keyboards.

The Supporting Your Remote Workforce in 2021 and Beyond report, commissioned by Velocity Smart Technology, also found 65 per cent would advocate for social distancing measures of 2m between desks. Meanwhile, over half (52 per cent) would welcome mandatory mask wearing in office spaces.

Anthony Lamoureux

Anthony Lamoureux, CEO of Velocity Smart Technology, said, 'Business leaders and IT directors now need to understand exactly what the coronavirus pandemic taught us about remote working. In a nutshell, it is here to stay and for a company to thrive in this new paradigm it needs to evolve the support provided to remote employees and ensure they're equipped to give their all.'

IT and communications workers struggling to adjust to new ways of working

A fifth of IT workers are struggling to get to grips with new ways of working and are in need of wellbeing support as the economy starts to open up, according to a study by Westfield Health.

Its Coping After Covid report states that to bridge the gap IT companies must help the 20 per cent of their workers that are struggling to get to grips with new ways of working and the 34 per cent that are getting anxious about work. When asked what they would like to see from their employer in the next few months to improve their mental health,

Dave Capper

IT workers asked for extra wellbeing support (33 per cent), mental health support (30 per cent) and long-term changes to the way they work (40 per cent).

As a result, businesses are being encouraged to examine their wellbeing programmes and Dave Capper, CEO of Westfield Health, said, 'This past year has shown that the recovery of the economy will rely on the health and wellbeing of its people. The findings from our research highlight that when wellbeing is done right it can directly improve a business.'

Businesses focus on merging culture and technology to empower productivity

Smartsheet has revealed 71 per cent of technology decision makers are rethinking their longer-term strategic decisions around workforce technologies, according to its survey of enterprise professionals conducted by 451 Research.

Decision makers are considering how technology can alleviate workplace culture concerns related to collaboration, work-life balance and productivity, brought on by the shift to remote work. 41 per cent of UK respondents reported work-life balance difficulties and the risk of burnout as the most significant hurdle when supporting distributed workers, which was echoed by 50 per cent of US respondents.

Although UK leaders expressed less concern than US counterparts regarding

Chris Marsh

support for remote working, this changes when it comes to looking to the future. 62 per cent of US respondents feel their departments were prepared to dynamically adjust and respond to any disruptions. This was in sharp contrast to only 39 per cent of UK respondents.

'The coronavirus pandemic brought to light many longstanding workforce dysfunctions, resurfacing the need to bridge the gap between technology and culture to empower the workforce,' said Chris Marsh, research director at 451 Research. 'Now, these disruptions have switched the leadership mindset to prioritise workplace technologies, streamline their purchasing cycles and make culture driven decisions that empower employees to take ownership over their own projects and workflows.'

Organisations not confident in ability to access data for analytics

Research from Starburst Data has found that 42 per cent of organisations aren't confident in their ability to access timely, relevant data for critical analytics and decision making. To compound this issue 72 per cent of European organisations have up to 1Pb of data stored but 47 per cent are capturing a quarter of this amount or more each year.

Justin Borgman, CEO of Starburst Data, commented, 'With data volumes booming, now is the time to put systems in place that can turn this data into insight. Organisations today have more data in the cloud than on-premise (56 per cent versus 44 per cent), and this is estimated to increase in the next year.'

As data volumes rise, the coronavirus pandemic continues and IT professionals are often unable to be physically near to each other or their data repositories, the need for fast information access and simple analytics is rising. The study reported that more European IT professionals saw easy access to data as a priority than data location (51 per cent versus 49 per cent).

Justin Borgman

New EU AI regulations demand a 'fully professionalised tech industry'

European Union (EU) rules on using artificial intelligence (AI) in high risk situations will require organisations to meet unprecedented standards of ethics and transparency, according to BCS, the Chartered Institute for IT. The proposed regulations on AI that influences people's health, safety and rights include a ban on the use of this technology to track citizens' behaviour.

Bill Mitchell, director of policy at BCS, said, 'The EU has decided to regulate on standards for the design, development and adoption of AI systems to ensure we get the very best out of them. These ambitious plans to make AI work for the good of society will be impossible to deliver without a fully professionalised tech industry. Those with responsibility for adopting and managing AI will need to ensure their systems comply with these new regulations, as well as those designing and developing these systems.

'The IT profession will need to evidence they have behaved ethically, competently and transparently. In principle this is something we should all welcome, and it will help restore public trust in AI systems that are used to make decisions about people.'

Bill Mitchell

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Digital divide narrowed by coronavirus pandemic but around 1.5m UK homes remain offline

According to Ofcom the UK's digital divide has narrowed throughout the coronavirus pandemic as people went online during lockdown. The proportion of homes without internet access appears to have fallen from 11 per cent in March 2020, when the UK entered lockdown, to six per cent of homes in March this year.

However, for the six per cent of households that remain offline, digital exclusion is likely to be more disempowering than ever. The groups least likely to have home internet access are those aged 65+, lower income households and the most financially vulnerable.

Emmanuel Vella, vice president EMEA broadband networks at CommScope, commented, 'This is a reminder that the digital divide is still very much present. In many instances enhanced broadband can be delivered by either superfast fibre services or via ultra-high speed service over cable TV networks – the likes of DOCSIS 3.1 – and in some instances the next generation of 5G wireless can provide a solution. However, regardless of the delivery mechanism, it is essential that all strata of society can access the most appropriate local service including those that may need some financial assistance in doing so.'

NEWS IN BRIEF

As of Q1 2021, European Union (EU) countries were fined €33.61m in General Data Protection Regulation (GDPR) fines. Spain was the hardest-hit country, with regulators imposing €15.7m in fines from a total of 34 cases, while Germany ranked second with fines amounting to €10.7m.

Bureau Veritas has joined the European Data Centre Association (EUDCA), bringing with it significant knowledge and expertise in classification, inspection, testing and certification for mission critical industries.

Superior Essex Communications has announced its election as a corporate board member of the Continental Automated Buildings Association (CABA).

Target Corporation has joined the Open Compute Project Foundation (OCP) as a platinum member. Target is the first major US retailer to join the OCP.

Research conducted by Oxylabs has revealed that during Q1 of 2021 cybersecurity and public web data collection were the two primary sectors of growth among internet based businesses.

The HeiTech Village 2 data centre in Kuala Lumpur has achieved the TIA-942 Rated-3 data centre facilities certification.

Claranet has announced the acquisition of Mandic to boost its operation in Brazil.

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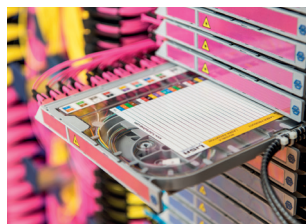
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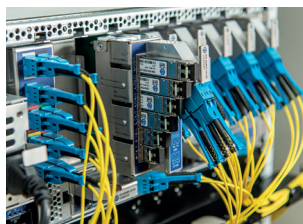
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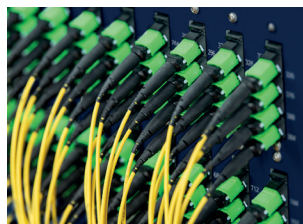
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Play your cards right

Hi Rob

On the 1st January 2021, the Network Infrastructure Electrotechnical Certification Scheme (ECS) Card structure was introduced. This means that all new (initial) applications must comply with the structure and, from 1st July 2021, all card renewals will also need to meet the new Occupational Qualification Structure requirements.

This new structure follows UK government policy, which sets a benchmark for new entrants to the industry to have a Level 3 qualification but also, more crucially, addresses the need to recognise professionals currently in the workforce that already benefit from hands-on experience, previous education and training, and industry recognised qualifications.

ECS wanted to update its offering and asked CNet Training, alongside a large group of other employers, to assist the Electrical Contractors' Association (ECA), Joint Industry Board (JIB), SELECT and industry stakeholders to form a group that could advise how best to move things forward. The aim was to create a structure that helped to professionalise the network infrastructure industry and ensure everyone on-site has, or is working towards, a qualification at the appropriate level.

The new Network Infrastructure ECS Card structure allows members of the industry to be recognised as qualified tradespeople. Organisations can also ensure they have the right people in the right jobs, with everyone having a card representing their qualifications and experience. It also encourages organisations to invest in their teams by creating long-term training plans that allow for growth throughout their workforce.

The new Occupational Qualification Structure leading to ECS Card recognition has two main focuses. On the one hand, it ensures that everyone on-site has the correct and valid qualification and, on the other, it allows individuals to demonstrate

their qualifications and professionalism.

The new structure is targeted and specialised to each individual. For example, there is a card for apprentices and a card for trainees – those new starters who are not on an apprenticeship program and don't have much experience working on-site. Once the trainees have completed their training and gained more experience, they are able to apply for the next level card. There are also assistant, installer, gold, supervisor, manager and designer cards, depending on an individual's level of experience and training.

This is a significant milestone for the network infrastructure industry and is a further step in our journey to ensuring our industry is professionally recognised – especially with many having critical worker status. These changes, alongside the introduction of the Network Cable Installer (NCI) Apprenticeship, mean that we have defined educational routes for both new starters and existing workforces

for the first time. It also will ensure that installations will be of high quality and safely delivered, resulting in improved outcomes for end users.

Andrew Stevens
CNet Training

Editor's comment
Having been kept regularly updated about the development of the new ECS Card structure, I know how much time, energy and effort has gone into it from Andrew and other colleagues from across the network infrastructure sector. It is an important achievement and will make the industry a more professional place in which to work and build a career. I sincerely hope that those from across the sector show their support for it and use it to help create a suitably skilled and qualified workforce.

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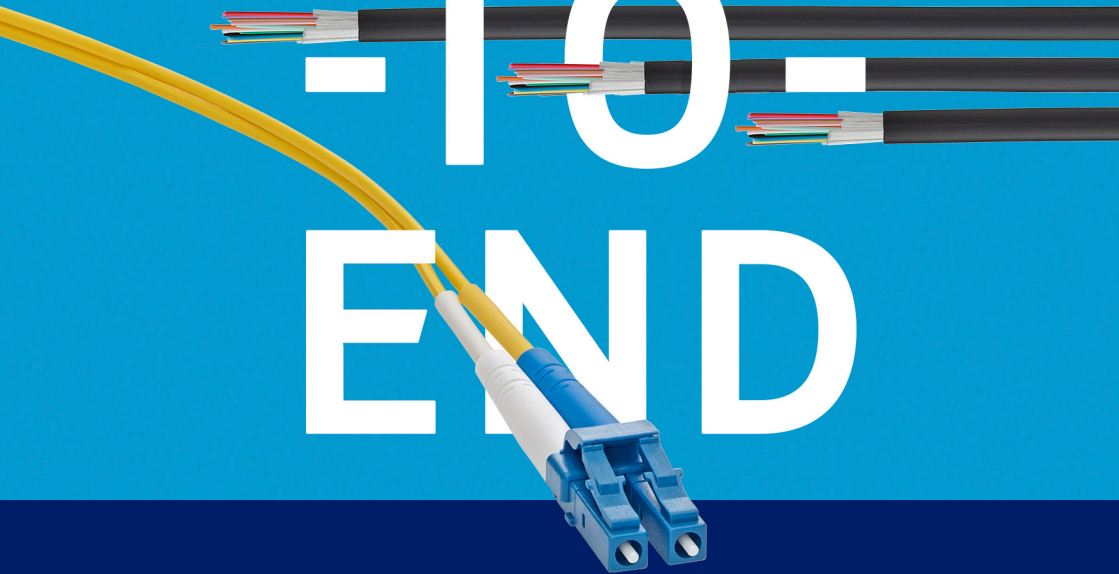
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END -TO- END

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On the bright side

Specifying an optical fibre cabling system for a data centre requires careful consideration. Inside_Networks has assembled a panel of industry experts to examine whether singlemode or multimode fibre is the most efficient, reliable and future proof option.

▶ Transmission speeds in data centres have evolved quickly, with new applications pushing the boundaries of what's possible. With even faster Ethernet speeds such as 800Gb/s or 1Tb/s now emerging, there are many factors to consider when selecting a fibre cabling system for a data centre environment. Understanding a facility's use and customer needs, as well as any future upgrade requirements, will help to define what is required and one of the most important issues to address is whether to use singlemode or multimode cabling.
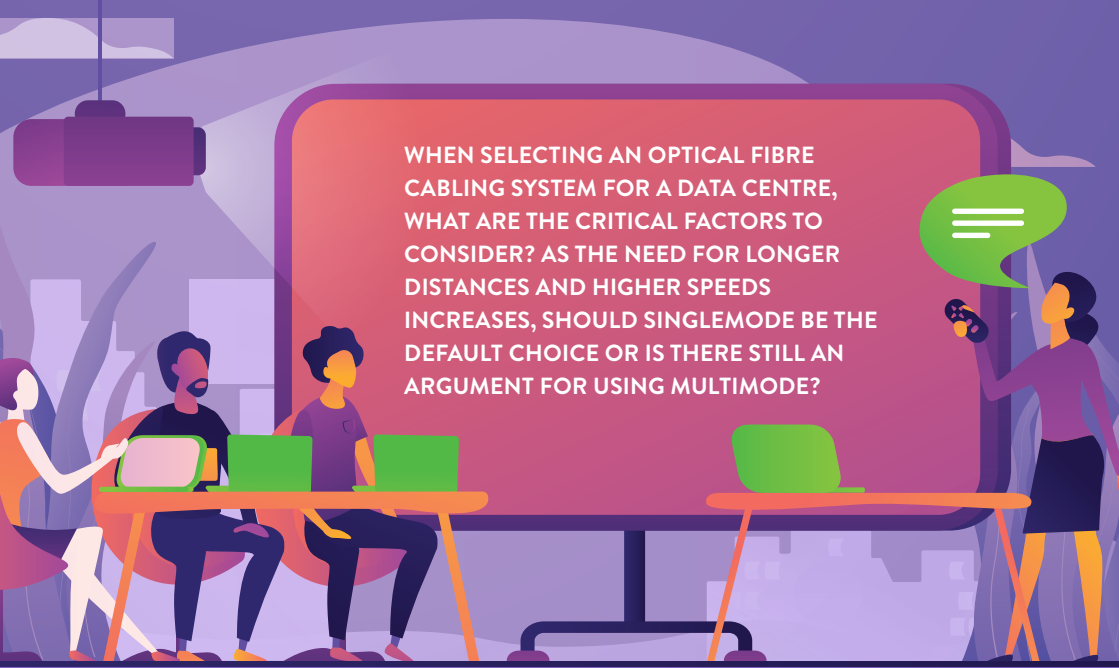
Singlemode fibres only permit one mode or ray of light to be transmitted and this requires precision alignment to inject light from the transceiver into the core, driving up transceiver costs. Meanwhile, multimode fibres have larger cores that guide many modes simultaneously, making it much easier to capture light from a transceiver, allowing costs to be kept down.

Singlemode's big advantage is distance, so in data centres with link lengths over 500m it is sometimes considered the most appropriate choice, whilst in smaller data centres multimode is thought to be more economical. But is it as simple as that?

Inside_Networks has assembled a panel of experts to offer their thoughts on what to be aware of when selecting a fibre optic cabling solution for a data centre.

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

WHEN SELECTING AN OPTICAL FIBRE CABLING SYSTEM FOR A DATA CENTRE, WHAT ARE THE CRITICAL FACTORS TO CONSIDER? AS THE NEED FOR LONGER DISTANCES AND HIGHER SPEEDS INCREASES, SHOULD SINGLEMODE BE THE DEFAULT CHOICE OR IS THERE STILL AN ARGUMENT FOR USING MULTIMODE?

CARRIE GOETZ
PRINCIPAL AND CHIEF TECHNOLOGY OFFICER AT STRATEGITCOM

We are beyond considering optical fibre only for backbone applications and copper for horizontal. We are also beyond just assuming that multimode is the standard for short links and singlemode is the standard for longer distances. While it is true that singlemode does go longer distances, there are other factors to consider. At the heart of every data centre decision, risk of downtime is at the forefront, so mitigating this risk is critical.

Following behind at a very close second is budget. When evaluating budget, the cost of the components is just as important as the cost of the fibre. Along with the initial costs, one should also look at lifecycle costs. On the multimode side, we have seen several iterations of electronics, multiple polarity schemes and numerous iterations of the actual fibre itself. On the singlemode side, we have seen one iteration – from OS1 to OS2.

OS1 is still viable for many speeds of both Ethernet and Fibre Channel over Ethernet. The cost of singlemode electronics used to be roughly 10 times their multimode counterparts, but that is no longer true. In fact, hyperscalers and their mass consumption of singlemode have driven that cost down to roughly twice the cost of multimode for many components.

An OS1 installation years back would still be viable today. An OM1, OM2 and, in many cases, OM3 and OM4 would have had to have been replaced at every iteration. To further complicate things, polarity needs for parallel processing would have created a need to replace two strand with multistrand fibre in the same category.

While there certainly are costs related to the fibre and connectivity, those costs are further increased by the labour to rip out and replace at each speed implementation. Risk is also introduced into those environments with complex polarity schemes, lack of interoperability amongst some vendors' products and the density of the solutions. Singlemode is two strands, plain and simple – even when moving to 400Gb/s.

Lower complexity, significantly longer lifespan, lower labour costs and lower risk due to polarity issues, support for multiple applications and speeds, and decreasing component costs make singlemode a strong contender to be the only fibre in a data centre.

> 'ON THE MULTIMODE SIDE, WE HAVE SEEN SEVERAL ITERATIONS OF ELECTRONICS, MULTIPLE POLARITY SCHEMES AND NUMEROUS ITERATIONS OF THE ACTUAL FIBRE ITSELF. ON THE SINGLEMODE SIDE, WE HAVE SEEN ONE ITERATION – FROM OS1 TO OS2.'

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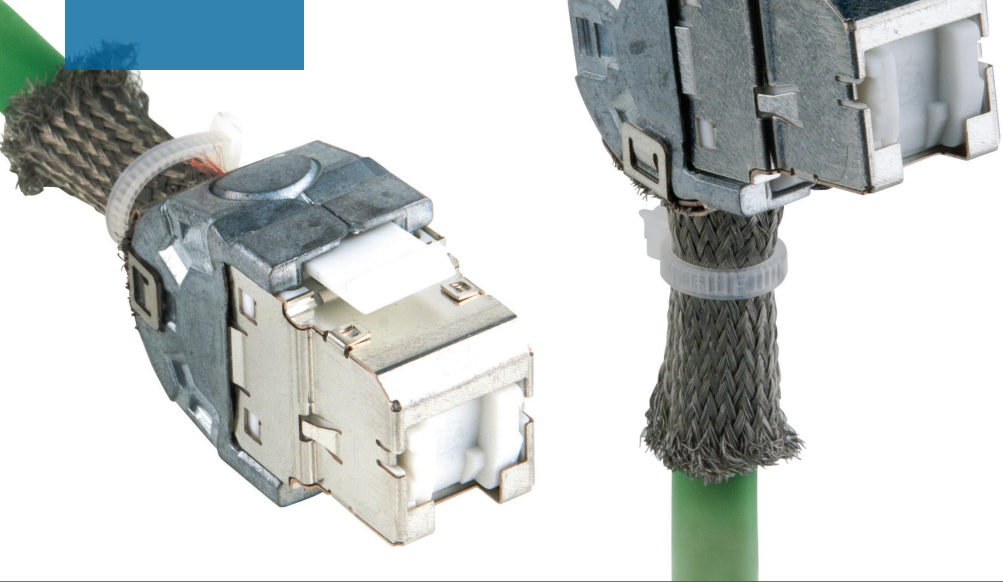
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DOMINIC ROSS
TECHNICAL MANAGER UK & IRELAND AT SIEMON

The four key areas that should be considered are future data demands, scalability, reliability and rapid deployment. Within these areas it is important to understand your projected need for bandwidth and application usage. This then allows you to better plan and design for future growth requirements and economically scale up to meet your demands over time – without impacting on performance or uptime.

We are seeing data centre architectures evolve to match these changing requirements, with a variety of hybrid designs emerging, as well as an increased use of virtualised networks utilising switched fabrics to generate lower latency with higher overall bandwidth. This creates less of a demand for traffic to pass through multiple layers, allowing users to simplify their architectures, lower the risk of increased latency and reduce the optical loss budget on the fibre channel, resulting in the reduction of link attenuation or distance.

When considering support for higher speeds and longer distances, one of the first questions to ask any data centre manager is 'what is your average link length?' For sure, OM4 multimode fibre can cater for applications of 40Gb/s up to 150m and applications of 100Gb/s up to 100m. OM4 can also absorb most of the dynamic traffic that is localised within the data centre and is a highly useful media to support greater bandwidths of 40Gb/s with duplex LC interfaces using BiDi technology, and 100Gb/s, 200Gb/s and 400Gb/s utilising parallel optics.

Multimode clearly has its place for distances over 150m inside the data centre and for longer-term applications. However, an OS2 singlemode optical fibre infrastructure would be my suggested first choice to guarantee application assurance and address the four key areas mentioned above, as it allows for high data availability and throughput.

An additional consideration when applying point to point links in a data centre is to incorporate high speed interconnections using embedded transceiver technology for a direct attached topology for server to server, server to switch and storage connectivity up to 100m. These will allow you to leverage speeds of up to 100Gb/s.

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'MULTIMODE CLEARLY HAS ITS PLACE FOR DISTANCES OVER 150M INSIDE THE DATA CENTRE AND FOR LONGER-TERM APPLICATIONS. HOWEVER, AN OS2 SINGLEMODE OPTICAL FIBRE INFRASTRUCTURE WOULD BE MY SUGGESTED FIRST CHOICE TO GUARANTEE APPLICATION ASSURANCE.'

ANDREW WHITTAKER
SENIOR DESIGN MANAGER AT SUDLOWS

An optical fibre cabling system for a data centre installation should not only be compatible with the technology implemented from day one but an upgrade path to accommodate active equipment advancements should also be considered.

There are several ways to aid decision making when selecting the correct solution. If the day one technologies that are to be deployed have already been determined by the end user, a quick internet search of the said products should provide the relevant datasheets for the corresponding transceivers. These should describe the parameters required to determine the most suitable fibre cabling and connector types.

Additionally, to ensure this information is used correctly, use the tools available via a chosen fibre manufacturer's website. These tools calculate the maximum link lengths and loss budgets allowed for the fibre cables and connectors, in conjunction with the parameters of the selected transceiver.

In scenarios where an end user has not determined the solutions to be deployed, and is seeking technical input and advice, there are multiple factors to be considered. Data rate, reach (link lengths) and cost are usually the main selection criteria. It is also useful to observe trends within the transceiver market to further assist the selection process – these are often driven by hyperscale data centres. However, it is important to understand that it may not always be beneficial to follow these trends, and that the infrastructure ultimately depends on the capacity and function of each specific data centre.

If asked this same question 5-10 years ago, my answer may well have been slightly different and would have most likely leaned towards selecting MPO/MTP connector solutions on singlemode fibre to withstand the Ethernet migration roadmap. However, we still see multimode and LC deployments specified within data centre environments, as these transceivers remain the preferred choice. By utilising bi-directional optical transceiver technology, 100Gb/s links can be achieved over OM4 up to 100m.

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> 'AN OPTICAL FIBRE CABLING SYSTEM FOR A DATA CENTRE INSTALLATION SHOULD NOT ONLY BE COMPATIBLE WITH THE TECHNOLOGY IMPLEMENTED FROM DAY ONE BUT AN UPGRADE PATH TO ACCOMMODATE ACTIVE EQUIPMENT ADVANCEMENTS SHOULD ALSO BE CONSIDERED.'
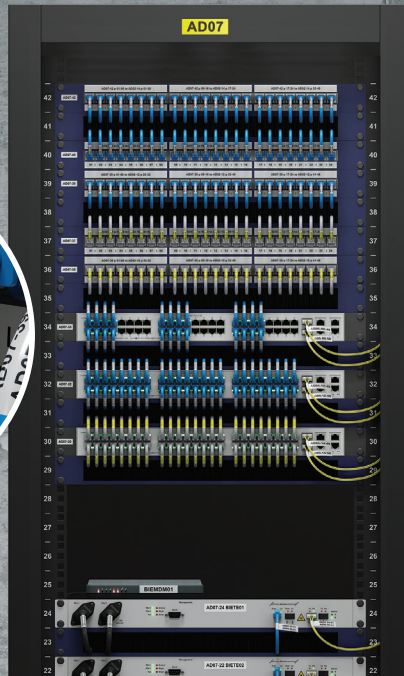
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CINDY MONTSTREAM
DIRECTOR OF TECHNOLOGY SUPPORT AND TRAINING AT LEGRAND

When selecting an optical fibre cabling system, begin by considering current versus future needs. What is the migration plan? Is the future two years away or five years away? What changes will be needed to support new generations of active optics?

For example, if changes are likely to occur in less than two years, harnesses may be the right solution to breakout multi-fibre push on (MPO) to LCs. Only the harness is replaced with an MPO cord. Cassettes simplify fibre administration and may be a good solution if the migration won't happen for several years. Density and platform are also key – is high density or ultra-high density needed? Selecting the correct platform and density today will facilitate successful scaling tomorrow.

Channel insertion loss is another significant consideration and is becoming the most common challenge that can influence product selection. For example, cassettes may be desired to simplify administration, however, each cassette contains two mated connections, which could cause the maximum acceptable channel insertion loss to be exceeded. Splicing is another way to reduce channel insertion loss. Selecting components that have low loss or ultra-low loss is very important – the lower the insertion loss, the more added benefits such as supporting longer distances and higher bandwidths can

be realised.

With increasingly small channel insertion losses, it is advisable to look for the next level of extreme low loss performance. I have seen many products now using the word 'quantum' to represent a high performing product, so maybe the next level of fibre performance, beyond ultra-low loss, will be quantum.

Singlemode and multimode fibre are both viable choices. Singlemode fibre cable costs less, has theoretically 'unlimited' bandwidth and supports much longer distances than multimode fibre. Multimode has the largest market share because it usually supports applications, for the distances needed, with less expensive electronics.

However, prices for singlemode electronics are decreasing. The lowest loss multimode products in the market can support longer distances (in excess 30 per cent over standard distances) and/or higher bandwidths. The lowest loss singlemode products in the market also support longer distances and higher bandwidths (1.6TB), however, you must balance the increase in cost.

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> 'I HAVE SEEN MANY PRODUCTS NOW USING THE WORD "QUANTUM" TO REPRESENT A HIGH PERFORMING PRODUCT, SO MAYBE THE NEXT LEVEL OF FIBRE PERFORMANCE, BEYOND ULTRA-LOW LOSS, WILL BE QUANTUM.'

EDDIE MCGINLEY
DIRECTOR OF PRODUCT MANAGEMENT AT LEVITON

There is no one size fits all optical fibre system for data centres and the factors for choosing cabling can include density, distance, performance and manageability. With so many transceiver options available and tech refreshes happening at a faster rate, it is more important than ever to plan early for a cabling design that can handle multiple generations of updates. They must provide the flexibility needed to meet future network demands like 100Gb/s and even 400Gb/s.

Today, the majority of 100Gb/s, 200Gb/s and 400Gb/s transceiver options are for singlemode networks, due to bandwidth and distance capabilities. This trend is also partially a result of decreasing cost, and recent standards committee activities are continuing to promote more singlemode options for higher speeds.

The other big draw of singlemode is its longevity, as there are simply less generations of fibre to deal with compared to multimode. If you installed OS1a or OS2 singlemode years ago, you would be able to support a current generation speed at the distance specified by standards.

For example, OS2 cable installed 10 years ago could support a new 100Gb/s network, such as 100GBASE-DR at 500m. The connectors may need replacing, but you would not need to pull new cable. With multimode, an OM1 or OM2 installation would not be able to support a new 100GBASE-SR4 network – OM3 could only support SR4 at 70m, and OM4/OM5 at 100m.

That said, there are definitely areas where existing multimode cabling will satisfy many short reach applications moving forward. Some technology advancements in transceivers and new transmission protocols, such as shortwave wavelength division multiplexing (SWDM), may help improve the reach of emerging multi-wavelength technologies while using an existing or new multimode fibre cable backbone.

Ultimately, either OM4 or singlemode will satisfy the majority of current and future network needs, but there are data centre managers with specific preferences and very select situations where an alternative could be considered. It is at this point the decision must be taken on the most appropriate technology from a performance perspective, along with long-term return on infrastructure investment considerations.

> 'TODAY, THE MAJORITY OF 100GB/S, 200GB/S AND 400GB/S TRANSCEIVER OPTIONS ARE FOR SINGLEMODE NETWORKS, DUE TO BANDWIDTH AND DISTANCE CAPABILITIES.'
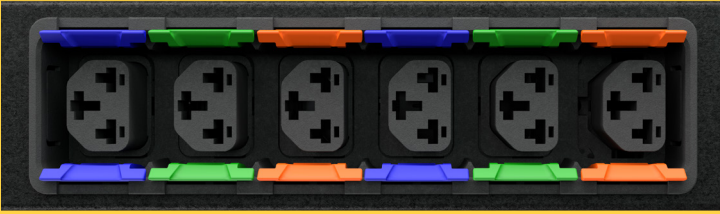
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KEVIN LENGLÉ
PRODUCT LINE MANAGER AT CAILABS

Both multimode and singlemode fibre have their advantages and disadvantages. Multimode has, of course, been the frontrunner in the modern data centre, with its main advantage being that it can carry high data rates over typical data centre short distances in a more affordable way than singlemode.

However, due to its intrinsic qualities and capabilities, singlemode seems to be the most sensible and realistic choice today for future data centre applications, especially in order to guarantee future bandwidth evolutions. There are many detailed comparative studies available on this subject, so I will not expand on this comparison. There is no reason to believe that traditional wavelength division multiplexing (WDM) based singlemode or multimode solutions will be able to meet long-term capacity requirements.

Tomorrow, scaling an optical infrastructure to such a large scale will be a significant challenge. To better support data centre traffic and density requirements, several recent efforts have begun to examine the suitability of building new approaches, including space division multiplexing (SDM), to which I would like to draw attention as a relevant technological approach.

SDM is a method by which transmission media is separated by space in order to maintain channel separation. Each mode acts like singlemode fibre. It is possible to realise SDM in classical multimode, or in new generations of fibres called few mode fibre, in which the number of modes is controlled by some geometrical properties of the fibre. In this sense, multi-core fibre is regarded as a feasible and efficient way to realise SDM networks, and its deployment seems very likely over data centre link spans. Bit rates of more than 10Pb/s have been transmitted on links up to few kilometres.

SDM itself is not new but the convergence of such technologies has accelerated over the last five years. The ability to make few mode fibre and multi-core fibre has allowed SDM in optical fibre to be a viable future path to overcome the data centre capacity crunch, while supporting density requirements and cost effective network capacity scaling.

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> 'TO BETTER SUPPORT DATA CENTRE TRAFFIC AND DENSITY REQUIREMENTS, SEVERAL RECENT EFFORTS HAVE BEGUN TO EXAMINE THE SUITABILITY OF BUILDING NEW APPROACHES, INCLUDING SPACE DIVISION MULTIPLEXING (SDM).'

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Allows you to 'focus and act' and pay attention to the things that matter, rather than being consumed with too much data/information. With built-in self-learning technology, AcuSense enables your system to distinguish people and vehicles from other moving objects.

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Providing cameras with Darkfighter and Lightfighter technology with up to 12MP resolution, this series gives you the ultimate in deployment possibilities.

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(SMEs). **CLICK HERE** to watch Mayflex's market manager, Neil Staley, give a five minute introduction to AX PRO.

• Hikvision Temperature Screening Solutions & MinMoe
Hikvision Temperature Screening Solutions provide a flexible product for a multitude of scenarios. Additionally, the Hikvision MinMoe offers a touch free, facial recognition access control system, making access easier than ever before.

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The Mayflex Academy regularly runs the Hikvision HCSA, which is free for Mayflex account customers to attend. For those installers completely new to security they also run the Introduction to IP CCTV course, which provides a great foundation for customers looking to get into security and is a good course to take before attending the HCSA.

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Built for *speed*

Lars Larsen of Legrand Data Communications discusses the importance of rack and cable management design in protecting and maximising network performance

The terms 'racks' and 'cabinets' are used interchangeably depending on where you reside but there is a fundamental difference between an open rack and a server or network cabinet.

DEFINING MOMENT

Cabinets provide protection where room security is not available. Server cabinets are designed to work well where utilisation inside the cabinet is 90 per cent servers and 10 per cent network. They provide an efficient way to provide airflow to servers and cold aisle/hot aisle separation. Network cabinets will have more cable management options but the internal space limitations often mean they do not provide the same level of access and ease of management as an open rack solution.

Open racks and cable management solutions are best suited for telecom rooms, intermediate distribution frames (IDFs) and main distribution frames (MDFs) where security is provided by the room or a caged enclosure. The huge benefit of an open rack is the ability to support a wide range of topologies. It protects and maximises the performance of copper, optical fibre and power cabling, while providing easy access to network equipment, copper panels, fibre enclosures and power distribution units (PDUs).

PLAY IT STRAIGHT

On 15th October 1997 Wing Commander Andrew Duncan Green OBE, driving the Thrust SSC in straight line, set the current world land speed record by reaching 1,227.986km/h (763.035mph) and became the first person to break the sound barrier on land. Meanwhile, car designer, driver and inventor, Bruce McLaren, co-drove the

Ford GT40 Mk with a top speed of 321km/h (200mph) to win the 1966 24 Hours of Le Mans. This was achieved with an average speed of 201.80km/h (125.39mph) on a course with numerous bends.

Managing a network can seem like competing at Le Mans 24 hours a day 365 days a year. Therefore, choosing the right rack solution can make a big difference in the ability to manage equipment and cable effectively.

It is advisable to choose an open rack solution designed by a company that is a leader in telecom cabling solutions. Working together, connectivity and physical support engineers will have worked out the straightest path and best practices for optimal connectivity and cabling performance. Open racks are the choice of many IT managers for commercial building telecom rooms, as well as data centre MDFs. In many cases a lot of care goes into the design and routing of the cabling plant early in the building process, with little or no input from the IT manager as to the telecom room or MDF requirements.

panels and fibre enclosures.

- Copper cables should be terminated at the panel, supported and fixed to a rear panel bar and then fixed again in large sweeps to the rear channels of the rack. If tied off at three points in the rear of the rack and tested, these 'permanent' cables will maintain that tested performance even if the bundles in the overhead pathway are adjusted or moved.
- Fibre trunks should be fixed in place on the rack and further strain relieved to the rear of the fibre enclosure.

SELECTION PROCEDURES

The proper selection of cable management racks and other necessary physical support products will assure the cabling of the active electronic equipment can still be optimised for efficient performance. Pick an open rack solution that provides the following features:

BACK OF RACK:

- A direct path from the cable pathway into the distribution area behind the patch

OUT FRONT:

- Moves, adds and changes (MACs) action is all out front in the patching field, so pick a vertical manager that is easily accessible. Dual hinged doors are great and if they latch when slammed shut, even better.
- Durable rack unit spaced fingers should have the capacity to accept a minimum of 48 copper patch cords. When that old switch you didn't think you would use again has a fan tray on the front left, you can route all the cords to the right.

- Snap-on bend limiting clips are a must for the fingers. Where possible, keep the fibre jumpers in a separate rack unit in the vertical and use the radiused bend limiter to protect the jumper as it enters the manager.

'Managing a network
Le Mans 24 hours a d
choosing the right ra
difference in the abili
cable effectively.'

CLIMATE CONTROL

Bruce McLaren once noticed that an unlatched fuel filler door was flapping up and down as he drove. Air pressure should have kept it closed as he increased speed. Realising that pressure under the body had to be holding it up he pulled into the pit and cut away the bodywork behind the radiator. Now able to run cooler and turn faster lap times with the added cut-outs, those 'nostrils' became a McLaren design feature.

Hot and cold aisle separation is a critical issue in large data centres, and if not addressed it can also create a performance problem in a telecommunications room

(TR). Orienting racks so the switch intakes face the side of the room with the cold air supply, and having the back of the rack face the air return, will help to keep equipment efficient. Here are some key pointers:

- The airflow of the equipment should not be restricted, whether that airflow is side to side or front to back.
- Blanking panels should be used to prevent the unintended flow of air through the rack. Even without a dedicated hot aisle/cold aisle, stopping local recirculation of the air above and below the switch will improve cooling and performance.
- Open racks with features for airflow, such as perforated sides, can significantly

can seem like competing at
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provide solutions to fit small TRs with a couple of patch panels and switches to larger IDFs and MDFs that require large campus switches and rackmount servers. Future expansions are much easier when racks, cable management accessories and connectivity are designed to work together. Also, make sure the products have UL 2416 certification for both weight capacities, and safety bonding to assure they meet capacity and safety requirements. Lastly, drive safely and keep it under 1,225km/h! ■

improve equipment performance.
• When using equipment that does not draw air from front to back, a secondary system, such as an angled baffle, can aid with ensuring that the intake air is drawn from the cold aisle and hot air is directed toward the hot aisle.
• Vertical managers with rear 'cages' that allow cold air to reach the side intakes of switches provide flexibility that sheet metal verticals don't offer. The cages can be blocked with rear vertical air dams to eliminate unwanted circulation.

WORKING TOGETHER

Rack and cable management requirements will vary even within the same facility. It's important to choose a physical support solution with a range of products that can

LARS LARSEN
Lars Larsen is product manager for physical support solutions at Legrand Data Communications. In his 25 years with Legrand he has focused on the important role physical support and cable management plays in maximising network performance. Larsen has launched numerous new product lines including the Mighty Mo 20 Rack System and been granted 27 patents for his design work.

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The full FTTH solution from HellermannTyton and gabocom

MADE TO CONNECT

Together, HellermannTyton and gabocom deliver a full end to end FTTX solution, combining strong industry knowledge and a wide choice of quality products ... a winning combination.

Huber+Suhner

Huber+Suhner has launched SYLFA HD to its comprehensive portfolio of scalable optical fibre management systems. A front access solution with a unique, versatile modular connectivity platform, SYLFA HD provides a space saving structured cabling alternative for WAN/access network, central office and data centre customers, which is easy to install and manage.

SYLFA HD maximises space with high port density and patch cord overlength support. It features a unique module design that improves the ability to access incoming cables from the front or the rear, boosting efficiency. The modules also provide a distinctive routing channel that respects minimal bending radius and enables front accessibility, without losing density.

It also eliminates the risk of cable movement and damage, removing the need to repair and replace parts of the system over the long-term. This also reduces the effort needed for moves, adds and changes (MACs), and enables quicker access to fibre optic cabling. Where front access is preferred, SYLFA HD can enhance performance and drive business growth by saving time and resources through easy installation and convenient access for ongoing maintenance.

For more information **CLICK HERE.**
www.hubersuhner.com

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Patch Solutions

Patch Solutions' new and exclusive Category 6A six way cassette looms are now available. These high quality pre-terminated RJ-45 cables are an ideal choice for 10 Gigabit Ethernet panel to panel links within any data centre – from just a few racks to a whole campus.

They are assembled using Construction Products Regulation (CPR) rated Category 6A shielded copper cable in a choice of colours, with short UK manufacturing lead times. All six cables are neatly loomed together in a smart single black braid, creating a durable, tidy and easy to handle loom to your required lengths, quantities and labelling sequence.

These cassette looms can be enhanced further with the Brady BMP-21 printer to secure VELCRO ties in multiple colours whilst installing 'under or over cabinets' for quick visual identification.

For more information contact a member of our team on 01442 890890, **CLICK HERE** to send an email or to visit the Patch Solutions website **CLICK HERE.**
patchsolutions.com

EDP Europe

EDP Europe stocks and distributes the latest high capacity fibre optic management system from Huber+Suhner – IANOS.

IANOS is a class leading and future proofed system that facilitates Base-2, Base-8, Base-12 and Base-24 pre-terminated cable systems for best in class density, speed of installation, handling and scalability – all major factors in future proofing cabling infrastructure. IANOS is also designed to accommodate a quick, simple and inevitable upgrade path from 10 Gigabit Ethernet serial to 40 and 100 Gigabit Ethernet parallel optics.

IANOS offers individual modules that easily slide out, reducing cord disruption and easing access, with each 1U chassis providing a maximum of 144 LC connections. Single or twin modules help improve flexibility, with twin modules offering improved routing space and splice handling. IANOS chassis are available in 1U or 4U rackmounts.

For more information call 01376 510337, **CLICK HERE** to send an email or to visit the website **CLICK HERE.**
www.edpeurope.com

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Centiel

Centiel's class leading modular uninterruptible power supply (UPS) – CumulusPower – offers a completely flexible solution for critical power installations. With a range of frame and module options, CumulusPower is available from 10kW-3.6MW.

For larger installations, CumulusPower also allows the inclusion of an input terminal to accept cables from either high or low level via steel wire armoured (SWA). This innovative design removes the requirement for a separate cable entry enclosure, enabling a more flexible layout within comms rooms and data centres, maximising the use of space.

CumulusPower is known for its 99.9999999 per cent (nine nines) system availability. This is achieved through fully independent and self-isolating intelligent UPS modules, unique Intelligent Module Technology (IMT) with a fault tolerant parallel Distributed Active Redundant Architecture (DARA) to remove single points of failure and reduce total cost of ownership through high double conversion efficiency of >97.1 per cent. This makes it currently the best and now the most flexible solution available for power protection.

For further information **CLICK HERE.**
centiel.co.uk

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Cable Management Warehouse (CMW)

CMW is a premium distributor of VELCRO Brand products.

VELCRO Brand One-Wrap tape and ties can be used for cable management by almost anybody – they do not require any special expertise to be used correctly and provide a simple mechanism that works on tightening and locking. You can segregate wires in your home and office workspace, data centre or comms room according to their utilisation and size.

VELCRO Brand One-Wrap tape and ties allow for optimum bend radius, which helps to maximise cable performance with a minimal risk of crushing or damaging a cable. They retain their shape, allow for some movement and are easy to use, store and remove.

VELCRO Brand One-Wrap tape and ties are an environmentally friendly alternative to nylon/plastic cable bindings and are reusable. There is no need to use cable tie replacement tools or snips when using them, which greatly reduces the risk of cable damage.

CLICK HERE to find out more or to send an email **CLICK HERE.**
cmwltd.co.uk

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HellermannTyton

Together, HellermannTyton Connectivity and gabocom deliver a full end to end FTTX solution, combining a wide choice of quality products and strong industry knowledge.

A winning partnership of quality optical fibre management closures and wallboxes, along with perfectly manufactured microduct, the demands of fibre deployment are met at every stage of the last mile network. From the street to the building and into your property, HellermannTyton and gabocom offer a full range of connectivity solutions, completing the fibre journey from the central office to the router.

With products for both internal and external fibre applications, the combination of HellermannTyton and gabocom allows end users and installers to source a full fibre solution from companies with a wealth of knowledge and experience in fibre connectivity in the UK, across Europe and the wider global market.

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

Siemon

The number of optical fibre links between switches, storage area network (SAN) and equipment areas continues to rise in data centre environments in order to support increasing data and bandwidth needs. Successfully routing and segregating larger amounts of fibre is challenging data centre managers to ensure routes maintain fibre protection and cost effectively adapt and scale.

Siemon's new LightWays fibre routing system is a fully enclosed, flexible ducting system that is ideal for protecting, segregating and managing cables in the most rigorous data centre conditions. Manufactured from halogen free, flame retardant UL94/V0 materials, LightWays provides a more secure and effective alternative to traditional fibre routing solutions such as wire ducting or basket tray.

LightWays includes a wide variety of components available in four different sizes. The system features innovative toolless joiners and waterfall outlets that can be easily placed anywhere along the sidewall of straight sections to create vertical drop-offs with full bend radius control.

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Comtec

Comtec, part of the ETC Group, offers a comprehensive range of containment and cable management solutions from some of the leading names in the business:

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• Data centre and industrial 'secure containment' such as cable tray and basket, and steel box trunking.
• Cabinet cable management including ring cable managers, cable management bars and cable dump panels – an abundance of options!

Need help or advice? Give the team a call on 01480 415000 or **CLICK HERE** to visit the Comtec website, where you can download technical spec sheets and order online. **www.comtecdirect.co.uk**

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L7 legrand

Attention to detail

Erwin Deeben of Leviton explains why it's important not to overlook cable management when it comes to network infrastructure planning

▶ Careful and clean cable routing is not always a primary concern during network design, and cable management can often end up as an afterthought. Yet a well devised cable management structure provides important benefits.

TAKING ADVANTAGE
Those benefits become critical in higher density pathways and patching areas. For example:

- It creates more efficient and safe maintenance during moves, adds and changes (MACs), reducing the possibility of downtime. With the right cable management, network technicians can identify changes and make adjustments more efficiently without sorting through a tangle of cords and cables. Furthermore, maintaining organisation is easier over the life of the network.

- It enhances the cable investment by providing bend radius protection. Proper cable management can ensure cables and cords are not overextended or damaged. They provide the tiedown points, cable separators and bend radius protection to ensure you get the performance and longevity you expect from Ethernet cabling.

- It provides support for heavier cables or bundles. The volume and weight of cabling routing into racks and cabinets can put a

lot of stress on individual cables. This can be especially true for heavier Category 6A, where a poorly supported cable exiting a patch panel that kinks or bends toward the floor can lead to decreased network performance.

- It helps with overall rack or cabinet organisation and planning. An organised rack or cabinet with well thought out cable management helps manage network growth and improves airflow for cooling and heating. However, due to the variety of active gear and patch panels available, you need to make sure you plan for the correct number and type of cable managers to fit the application.

ROOM FOR IMPROVEMENT
In higher density racks or cabinets, you may want to consider the following approaches to improve cable routing and organisation:

- Install angled patch panels. One popular way to manage patch cords and maximise rack space is through angled patch panels or flat panels with angled port openings. With these angled options, you can achieve proper cable bend radius and route directly into the vertical cable management without requiring the

central office facilities, large enterprises and cloud data centres, and act as a main cross-connect or interconnect patching frame for all fibre channels. Since they don't require the use of standard 19-inch cabinets, which often require additional width and depth, they can consolidate patching into an incredibly small footprint. At the same time, they are designed with integrated cable management for minimum bend radius, better slack storage, labelling and protection within the frame.

THE HEAT IS ON

Cable management is also important for larger cable bundles or closely grouped cables used for power over Ethernet (PoE). Cables near the centre of a bundle have greater difficulty dissipating their heat out into the environment. Therefore, the cables in the middle heat up more than those toward the outer surface of the bundle. The larger the bundle size, the more the cables will heat up. Industry standard cables carrying PoE at low power levels like 15W and 30W are unlikely to experience issues relating to overheating, unless extreme conditions exist such as huge bundle sizes or extreme ambient temperatures.

The following list of general cable management practices will help minimise heating in cables carrying any level of PoE:

• Plan for cable management and trays to use minimal fill rates to allow for expansion – less than 50 per cent is ideal.

• Use wire cable trays or similar cable management that allows for largely unrestricted airflow around cables or cable bundles.

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horizontal managers typically found above and below traditional flat panels in the rack.

• Use front cable rings or management trays for optical fibre installations. Solutions are available to help organise and route fibre that are integrated into the front of enclosures or panels, eliminating the need to use additional rack space for cable management.

• Use colour coded patch cords and labelling to easily identify different networks and data centre areas.

• Take advantage of the space above racks. Many network installations have unused space above racks and cabinets that could be used for additional cable management, as well as zero U patching in data centre environments.

• Consolidate fibre patching. Fibre distribution frames are often used in

• Minimise the number of cable ties used to secure the cables. Apply with minimal tension. Consider hook and loop fasteners, which are less likely to crush or damage cables.

'Use very minimal cable bundles – no more than 24 in a bundle – for long cable runs carrying high wattage PoE (70-100m). This minimises temperature rise and resulting increases in attenuation, enabling you to avoid having to reduce the allowable channel lengths cables, as dictated by ISO/IEC 11801 and EN 50174-2.'

improves the aesthetics of a network. A rack or cabinet with organised and well-dressed cabling is a source of pride for network integrators, and we must give credit to those virtuosos out there turning cabling installations into works of art! ■

• Loosely group cables when possible, rather than bundling. If bundling is required, loosely bundle cables in the smallest bundle size that suits the needs of the installation.

• Avoid surpassing the maximum fill ratios of the containment, particularly when passing through penetrations (wall and/ or floor). Where this can't be avoided then loosely arrange the cables on either side to help dissipate any possible heat build-up.

• Use very minimal cable bundles – no more than 24 in a bundle – for long cable runs carrying high wattage PoE (70-100m). This minimises temperature rise and resulting increases in attenuation, enabling you to avoid having to reduce the allowable channel lengths cables, as dictated by ISO/IEC 11801 and EN 50174-2.
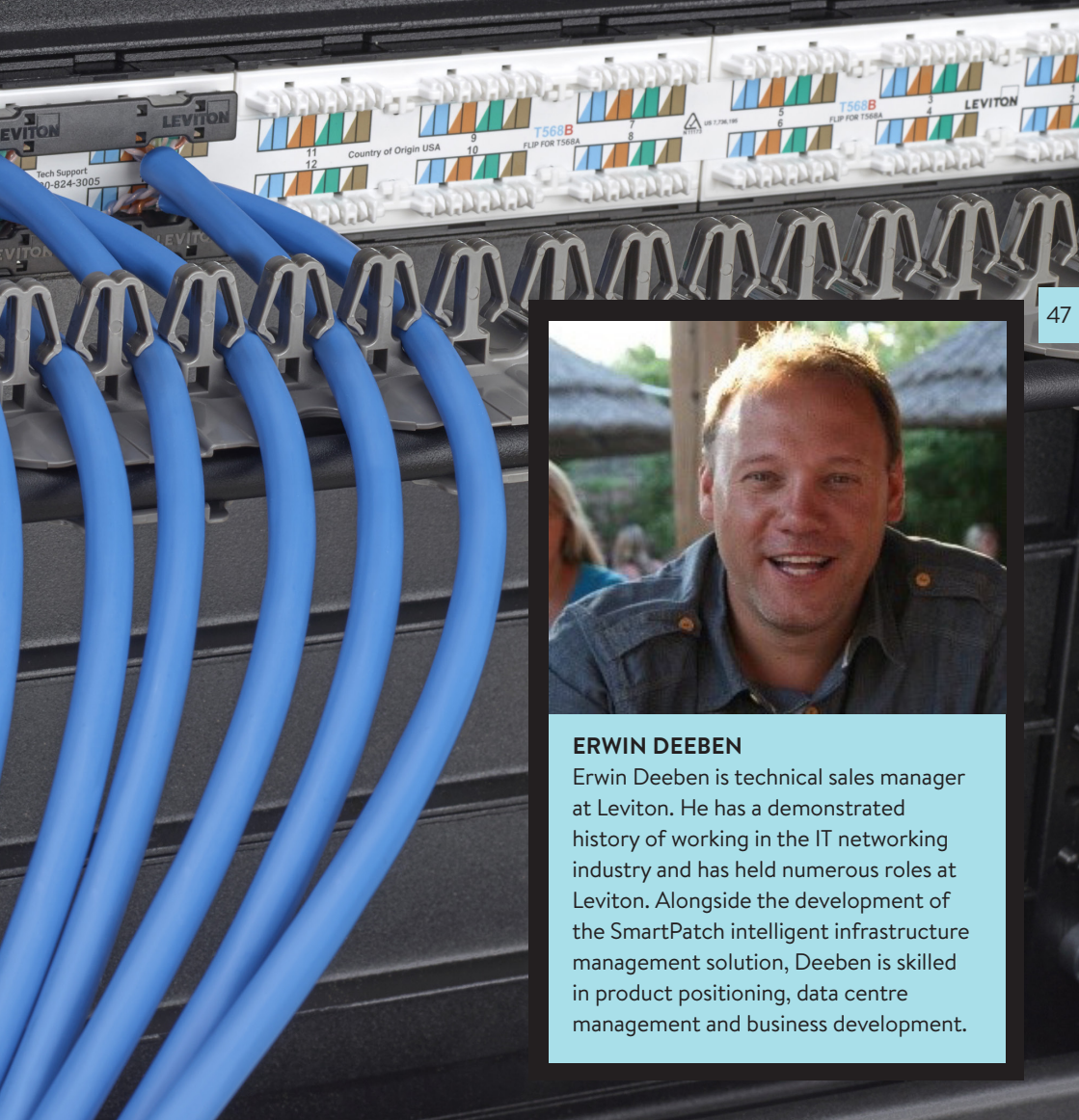
ONE STEP BEYOND
Beyond the stated benefits of better protection, maintenance, performance and longevity, cable management greatly
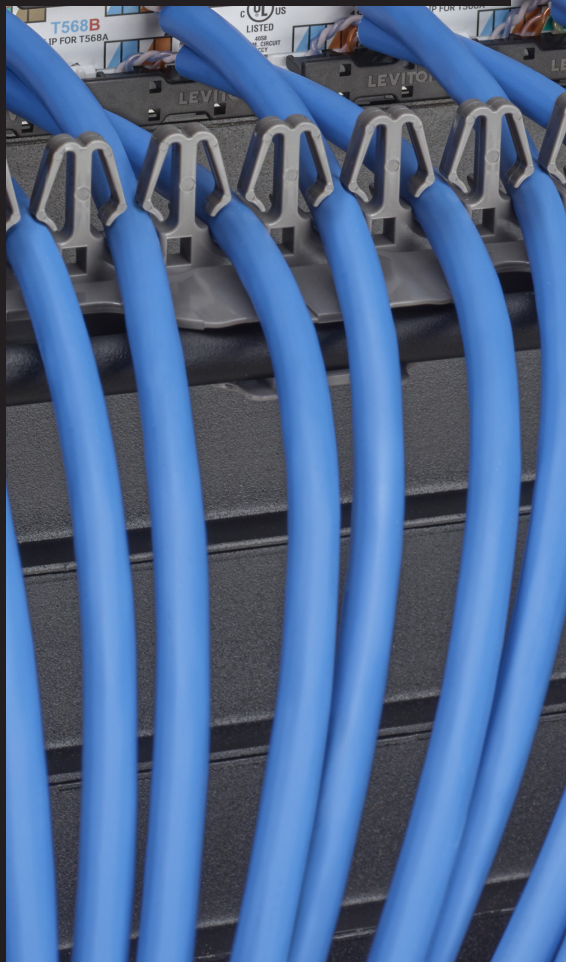
ERWIN DEEBEN
Erwin Deeben is technical sales manager at Leviton. He has a demonstrated history of working in the IT networking industry and has held numerous roles at Leviton. Alongside the development of the SmartPatch intelligent infrastructure management solution, Deeben is skilled in product positioning, data centre management and business development.

Quickclicks

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

The Changing Shape of Colocation is a blog from **Siemon.**
CLICK HERE to read it.

Juniper Research's white paper, Edge Computing: 5G's Secret Weapon, examines the short-term and long-term benefits to network operators of coupling their 5G service with edge computing technologies.
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The Four Types of PoE is the latest blog by Didier Willems of **Nexans** **CLICK HERE** to read it.

Infrastructure Sustainability Options and Revenue Opportunities for Data Centres is a white paper from **i3 Solutions Group** and **EYP Mission Critical Facilities.** **CLICK HERE** to download a copy.

Aryaka's 5th Annual Global State of the WAN report is now available. **CLICK HERE** to download a copy.

Guidelines For Providing Structured Cabling to Wireless Access Points is a white paper from **Excel Networking Solutions.** **CLICK HERE** to download a copy.

Lessons from Thriving Industrial Operations is a blog from Peter Herweck of **Schneider Electric.** **CLICK HERE** to read it.

Brave new world

Carsten Ludwig of R&M explains why having the right infrastructure management system in place to monitor flows is essential when it comes to keeping data safe

Back in medieval times, keeping items of great value safe was relatively easy. They would be kept in a treasure chest in a locked room within a castle, protected by a moat, gates and armed guards. Physical access was extremely limited and only the most familiar, thoroughly trusted people could get near these riches, or move them around.

UP TO DATE

Let's fast forward to today. For companies, data is often more valuable than any physical asset. That data can be intellectual property, research and development (R&D) documentation, or information on customers or business practices. Unlike the physical treasure from olden days, that data can be copied and stolen without anyone knowing who has touched it, or where, or when. In the old non-digital world, you would need to access a building to steal physical files and documents, but now information is liquid and can be anywhere.

As data security breaches and cybercrime become increasingly widespread, data centre operators everywhere worry about third-parties obtaining access to their clients' data. If sensitive information goes missing, operations and processes within companies may come to a standstill. In some cases, it won't even be possible to start them up again. New product ideas, customer data and intelligence about how a business is run may end-up in the wrong hands. Business and reputational damage can be huge and customer relations may suffer irreparable harm.

RISKY BUSINESS

Intellectual property, R&D material, and customer and business information is often stored on company premises. However, data often ends-up in the cloud or colocation storage facilities, where it can be exposed to risk. Even where there are strict access controls in place, a person who has legally entered a shared facility might be able to copy data once inside the building. All too often, control procedures are bypassed using simple psychological tricks, plausible excuses, or by creating confusion.

In a colocation site, several customers could be hosted in one location and multiple third-parties might visit during the course of a day. Colocation facilities highlight security in their marketing communications, as they are fully aware that any security breaches will scare away existing or new customers. Having multiple customer areas in a very large facility brings a much higher risk of security breaches and it's not unthinkable that a visitor, seeing

a competitor's 19-inch rack unattended, might decide to plug in a USB stick.

FOLLOWING DATA FLOW

Colocation facilities aim to limit access as much as possible, but this can never be completely achieved without adding a great deal of complexity. To realise acceptable levels of safety and the access management required, data and connectivity need to be split.

Smart connectivity routing can aid transparency of critical points in the infrastructure, such as where people working for different clients might have access to the same facilities. Knowing exactly which equipment is where, how it is connected, where any weak points are and how data flows

will reduce security risks. Understanding how data travels from where it enters the building, through each hop, to a router or server means you can create a map and determine exactly where the risky spots are, and where to expect incidents. Wherever infrastructure has several layers, you can find multiple usage or access points.

MADE TO MEASURE

Automated infrastructure management (AIM) and intelligent infrastructure management (IIM) systems usually measure status key performance indicators (KPIs) that data centres need for their operations. These include power consumption, security status (such as doors open/closed) and cooling

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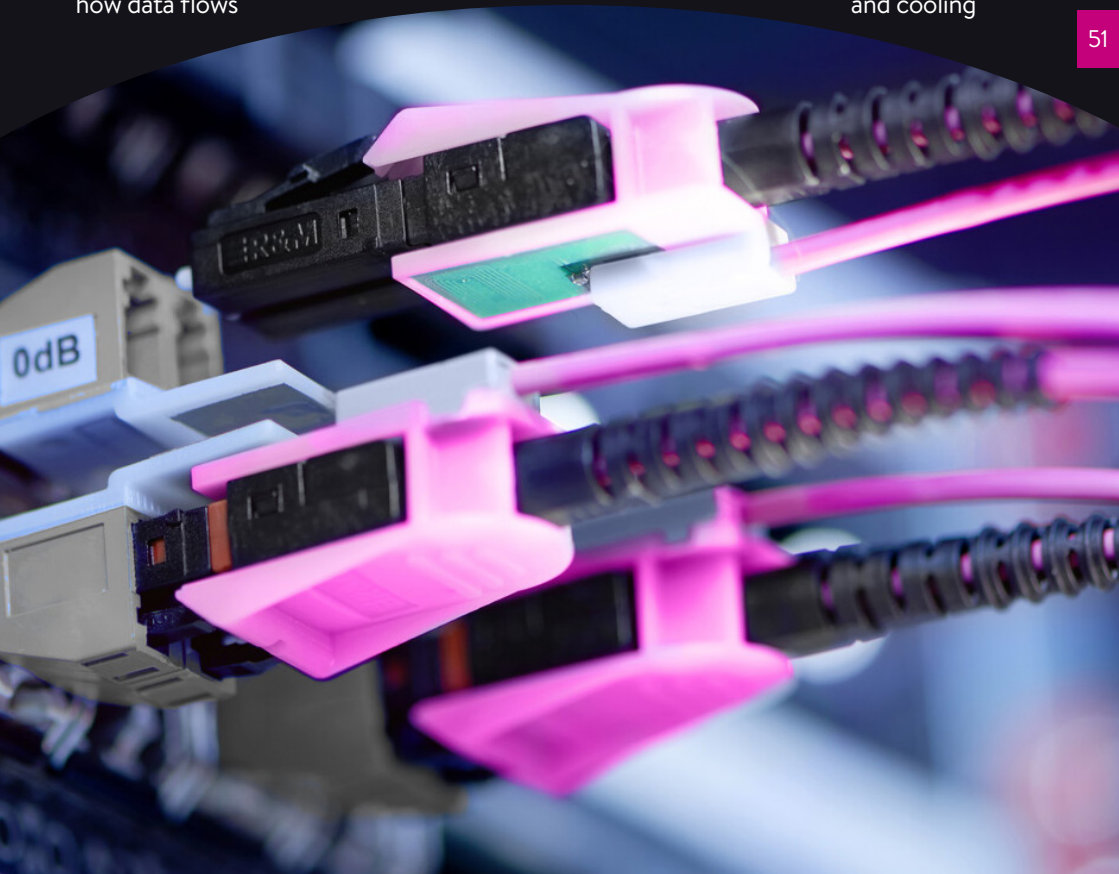
temperature. Measurements are taken in racks and, possibly, in any active components close to the racks. However, only very few products track connectivity and, if they do, it's usually only at a very basic level using, for example, model based software. Such systems can't detect whether a connector or other object is inserted.

This unconnected approach is fast becoming outdated. Just imagine a human being with their brain disconnected from the rest of their body? Networks also need a nervous system to connect the parts. Structured cabling is often seen as a building utility just like water or power infrastructure – and usually that means budget constraints. The percentage of total budget reserved for data centre cabling and connectivity is generally quite limited. The focus tends to be on very costly building, power and active technology expenses. However, structured cabling fulfils a function that needs to be safeguarded in a very different way and currently used technologies are not always sufficient to meet safety requirements.

Disconnected or misconnected devices could lead to parts of a system failing, which means hassle for operations

'If you monitor properly you will always know where to look if issues or suspicious circumstances occur. You don't need to check the whole chain and can simply receive 24/7 status reports via an infrastructure management system.'

managers. A root cause analysis takes time when critical paths in passive infrastructure are unknown – and that means more downtime. Ultimately, time is money and the longer it takes to figure things out, the more performance is affected. In today's high density environments with numerous connections in a small area, it's easy make an error. And failure might only show up when you restart a system after repatching.

MONITOR AND MANAGE
If you monitor properly you will always know where to look if issues or suspicious circumstances occur. You don't need to check the whole chain and can simply receive 24/7 status reports via an infrastructure management system. At any given moment you will be able to identify each

single connection and path, and every move, add or change.

If something happens, you'll know what it is. If someone (accidentally) unplugs a device, you might not know until that device is switched back on. Having up to date insight into connectivity changes that is immediately available saves time and effort, and supports development of mitigation plans and approaches to remedying issues. If you know which paths are critical, you know where to make extra efforts to protect data and avoid downtime. This means saving money, boosting performance and customer satisfaction. That type of seamless performance is vital to colocation data centres.

GO WITH THE FLOW

An operations department cannot only monitor the performance of equipment, but can also follow capacity and data flows within and out of a data centre. At the same time, operations managers can start mitigation plans without losing time finding any missing connectivity. This means spending less time and money and protecting customer data.

Any solution used should also be able to cover third-party solutions and common lines – especially where one carrier is shared by several customers. Shared paths, such as ducting or wall breaks, also represent a potential safety risk. If all of these are adequately documented, it becomes easier to monitor and know whenever something unwanted happens, wherever it is.

A good solution should split customer access and connectivity from that of others, and define an architecture that identifies critical paths and alternative routes in emergencies. All connections should be documented and linked

to a monitoring system for seamless management. In short, when securing data, and safeguarding business performance and customer trust, making a relatively small investment shouldn't be a big consideration.

SECURITY GUARD

So what core features do you need to look for in your passive connectivity solution? Quality and robustness are essential, as is smart architecture revolving around the appropriate order of solutions and an integrated monitoring solution that has a focus on connectivity. The combination of these characteristics will help you ensure data security today and for the foreseeable future. ■

CARSTEN LUDWIG

Carsten Ludwig is market manager at R&M. An experienced sales director leading international business teams, he has ample experience in managing change driven by business, technologies and markets, as well as sales and business development. He has previously worked with Siemens, Nokia and Huber+Suhner.

IM&M

At IM&M we believe that for any intelligent solution to be effective we all have to work together. We need strong foundations and that means starting with the cabling, which is the physical roadmap of any building.

Irrespective of whether it is the network, lighting, power or security, we need to know where things are and what they do. Only then can we start to manage and display relevant data and trends on dashboards.

In todays' modern world projects are highly complex and IM&M partners with many different solution providers, as no one organisation has all the answers. Our people can walk you through the demands and complexities that intelligent buildings present and find the right solution.

We have built a suite of tools that specialise in cable and computer aided design (CAD) drawing management, device discovery, asset management, occupancy and environmental management, which can be displayed in our system or mobile via our engineering and user apps.

CLICK HERE to find out more about IM&M.
www.immsuite.com

R&M

Designed for simplicity, R&M's inteliPhy net is an easy to operate data centre infrastructure management (DCIM) solution for asset, capacity and change management. Users can organise and document an entire network infrastructure digitally, as it bundles and visualises information on capacities, cabling, patch panels, racks, power distribution units (PDUs) and IT equipment in a single database.

inteliPhy net reduces deployment time and ensures high quality documentation with great IT infrastructure visualisation. Component representations can be added and moved by dragging and dropping, while ports and patch cords can be monitored in real time. Network managers can therefore ensure they are utilising resources and satisfying quality, compliance and service requirements.

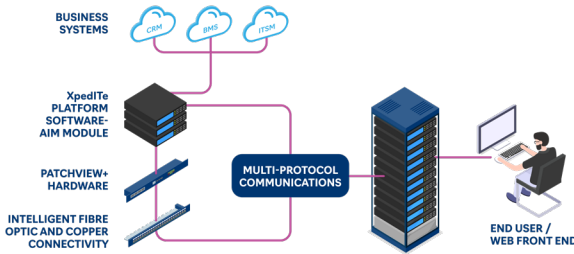For more information **CLICK HERE.**
rdm.com

RiT Tech

True AIM requires both advanced hardware and software that integrates with other key systems to go beyond the basic elements of physical connectivity management.

RiT's PatchView+ with the XpedITe platform fulfils both of these requirements and provides the management capabilities needed to support the increasing number of remote sites that lack on-site expertise. This combination allows for the most efficient and reliable use of physical infrastructure, as well as providing real time visibility, monitoring, management and control of all network physical layer components.

Maintaining and managing network infrastructure is becoming increasingly difficult as networks become more complex and more geographically dispersed. Effective AIM eliminates the risk of human error, ensures resilience and dramatically speeds up both deployment and fault analysis, while integrating seamlessly with legacy systems.

RiT's innovative approach to AIM is now incorporated as the basis for the ISO/IEC 18598 standard, which specifies the technical requirements for AIM systems globally and has recently been chosen by the Army of India for its 19 data centres.
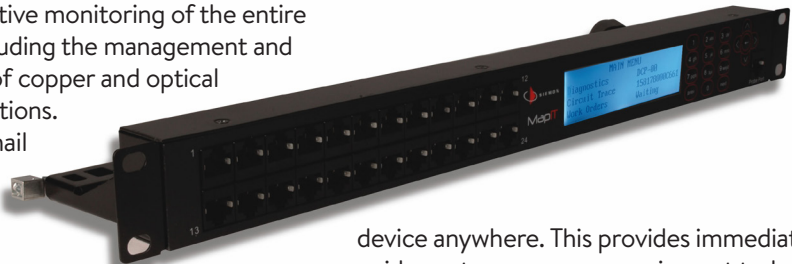
To find out more **CLICK HERE.**
www.rittech.com

TRUE AIM REQUIRES ADVANCED HARDWARE & INTEGRATION

BUSINESS SYSTEMS — CRM — BMS — ITSM

XpedITe PLATFORM SOFTWARE-AIM MODULE

PATCHVIEW+ HARDWARE

INTELLIGENT FIBRE OPTIC AND COPPER CONNECTIVITY

MULTI-PROTOCOL COMMUNICATIONS

END USER / WEB FRONT END

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Siemon

Siemon's MapIT G2 AIM solution allows for the effective monitoring of the entire network including the management and monitoring of copper and optical fibre connections. Real time email alerts notify IT or security staff when unauthorised access occurs, helping to prevent downtime.

MapIT G2 integrates innovative smart patch panels and fibre enclosures with user friendly master control panels and EagleEye Connect software, which is web-based to enable access from virtually any device anywhere. This provides immediate guidance to managers carrying out tasks remotely and, when necessary, to local maintenance teams to properly drive, control and execute daily work orders and/or emergency operations in a quick and secure manner.

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

SSE Enterprise Telecoms becomes Neos Networks

SSE Enterprise Telecoms will now be known as Neos Networks. The rebrand is part of the company's wider business transformation journey, which began in 2019 when Infracapital acquired 50 per cent of the business with SSE Group retaining 50 per cent.

Neos Networks, meaning 'new network', was the company's trading name prior to its acquisition by SSE Group in 2003. It is still recognised and holds a great deal of positive association within the telecoms industry. Alongside a new logo, representing the continuous connection

Colin Sempill

between Neos Networks and its customers, the rebrand embodies the company's vision to continue developing a new network, purpose built for the specific needs of UK businesses.

Colin Sempill, CEO at Neos Networks, said, 'As capacity requirements continually increase for businesses, there is a growing need for a new network solution to meet current and future demand, delivering much needed high bandwidth, high resilience services across the UK and Neos Networks will continue to deliver that network.'

Keysource achieves Investors in People accreditation

Keysource has achieved the Investors in People standard, demonstrating its commitment to ensuring that principles and practices around supporting people are paramount within the organisation. The company has committed to invest in its staff and understand the importance of a better, more productive workplace.

Keysource has been working closely with Investors in People to achieve this accreditation, ensuring that every employee has access to training and

Stephen Whatling

support throughout their career. Paul Devoy, CEO at Investors in People, said, 'We'd like to congratulate Keysource. Being accredited is a remarkable effort for any organisation and places Keysource in fine company with a host of organisations that understand the value of people.'

Keysource's managing director, Stephen Whatling, commented, 'Our people are amongst the best in the industry and we are extremely proud of every one of them. The Investors in People accreditation demonstrates our continued commitment to making Keysource a place where they can thrive and enjoy coming to work.'

Rahi signs distribution agreement with EkkoSense to offer data centre software optimisation in APAC

Rahi has announced a major distribution partnership with EkkoSense. Under the agreement, Rahi will offer EkkoSense's software driven data centre optimisation solutions to clients across the Asia Pacific (APAC) region.

Rahi provides data centre and IT services to support critical space, power, cooling and infrastructure optimisation. The partnership will see EkkoSense's EkkoSoft Critical M&E optimisation and capacity management platform added to Rahi's extensive global data centre modernisation portfolio.

Dean Boyle

Dean Boyle, CEO and EkkoSense co-founder, said, 'Our EkkoSoft Critical solution has already earned a strong reputation for saving data centre cooling energy, reducing thermal risk and releasing capacity. We know that these benefits will prove valuable for Rahi's customers. Rahi is a great distribution partner for EkkoSense and a key addition to our global EkkoSense ecosystem.'

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Draka announces new distribution agreement with Datatech

Draka, a brand of Prysmian Group, has formed a new partnership with Datatech, a division of Edmundson Electrical West Bromwich. Datatech can now hold stock and supply Draka's Universal Cabling System to its customer base. It can also offer installers membership to Draka's Installer Partnership Programme, enabling access to Prysmian Group's 25-year application assurance warranty.

Martin Ashton, UK sales manager at Draka, explained, 'As the largest

Martin Ashton

electrical distributor in the UK, Edmundson Electrical represents an opportunity for Draka to build on an incredibly strong position for our data cabling system in the electrical market. Draka and Prysmian Group are already sold through Edmundson but, up until now, this has not included the Draka structured cabling solution. We have invested in major updates to the cable and connectivity that forms the Universal Cabling System, resulting in an extremely strong, more rounded proposition for the market, which finds its perfect partner in Datatech.'

Bluepoint Technologies forms partnership with Cel-Fi by Nextivity

Bluepoint Technologies has expanded its affiliate portfolio by partnering with Cel-Fi by Nextivity. This new arrangement will see the Bluepoint Technologies team access specialist training to gain extensive product knowledge and technical support for Cel-Fi by Nextivity's mobile connectivity solutions.

Cel-Fi by Nextivity's products are designed to mitigate problems that can impact call quality and connection issues caused by a weak cellular signal. Fully compliant and authorised for use by 200 carriers around the world, its product

Kathryn Aves

range has solutions for every connectivity challenge – from home use to enterprise environments.

Bluepoint Technologies' managing director, Kathryn Aves, stated, 'The work we do is diverse but fast, capable and reliable mobile connectivity is always a critical theme. From basement buildings to remote rural locations, Cel-Fi by Nextivity has proven solutions to enable fast, clear and consistent communications and data streaming. This partnership will enable our team to lead in Cel-Fi by Nextivity capability, product knowledge and service to help our clients access solutions that they can be confident will keep them connected in any environment.'

Rittal celebrates its 60th anniversary

Rittal is celebrating 60 years in business. The company was formed in 1961, when Rudolf Loh bought an old weaving mill and founded Rittal. His idea was to manufacture standard enclosures that were immediately available from stock and better than the individually produced enclosures for control components of machines that were available at the time.

Rittal's solutions are now used in control and switchgear engineering, as well as in IT and the energy market. It is also the largest employer in the Central Hesse region

Friedhelm Loh

and every year employees of the Friedhelm Loh Group, including Rittal and its sister companies Eplan, Cideon, Stahlo, LKH, German Edge Cloud and Loh Services, donate huge sums of money to social projects, already totalling well over €5m.

'I am very proud of 60 years of success that we have written together with all of our employees,' said Friedhelm Loh, owner and CEO of the Friedhelm Loh Group. 'What makes us tick is curiosity, customer orientation, the courage to take risks and the joy of shared success.'

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CHANNEL UPDATE IN BRIEF

Kimberley Dilts has joined MicroCare as its global regulatory manager, while Dylan Griswold has become the company's senior sourcing analyst.

Ideal Industries has extended its wholesaler network thanks to a new deal with Associated Independent Electrical Wholesalers (AIEW).

Eurotech is working with Infineon, Microsoft and GlobalSign to simplify large scale, secure rollouts of connected devices. This collaboration delivers assurance by extending the secured device identity chain from the edge to the cloud.

Atkins has appointed John Batterbee to lead its new Applied Technology Practice, which has been formed in response to a growing demand for digital and technology capabilities across Atkins' markets.

NEC Enterprise Solutions has recruited over 50 resellers in the UK channel alone this year, along with numerous others from the rest of Europe, Middle East and Africa.

Paul Wakefield has been appointed by CityFibre to spearhead its full fibre rollout in Edinburgh, replacing Elaine Doherty who has moved to a new role as the company's head of data insight.

Sound and vision

Simon Jacobs of Mayflex examines the importance of good connectivity in audiovisual (AV) systems

The world of AV touches many of us in our daily lives – from going to the shops or, in non-pandemic times, attending a business conference or event. I've worked on many projects where these environments feature a sizeable chunk of AV infrastructure and it's crucial to get all the elements right to create a properly performing system.

HARD WORK

A key consideration when designing an AV installation is the hardware to be used. This typically includes amplifiers, speakers, microphones, screens and projectors. A lot of thought usually goes into these items, and rightly so, as they form the backbone of all major AV systems. What's less obvious is the cabling and accessories that connect them all together. These elements can be the weakest link in the chain and result in poorly performing hardware if not chosen and installed correctly.

Cable construction, connector resilience and the environment that the cables and connectors will be exposed to should all be thought about in advance. For this reason, it is important to understand the full system requirements. It is also important to understand how the connectivity will be run and plugged together. For example, connecting cables from a desktop fitting to a floorbox and then up to a wall could involve several HDMI connections within one total run, in which case it is best to use active cables for each length to ensure the best performance.

Similarly, if installing fixed microphones or remote audio inputs in a building, it's

important to be aware of existing cable runs and understand the best routing. If any routing involves cables being installed in ceilings, then it's likely that they will be subject to Euroclass standards for fire safety performance.

WHAT CAN GO WRONG?

One project I was involved with gave me the chance to see how not to do it. During the survey of the existing system, the client explained how there was a constant hum from the microphones.

On assessing this, I discovered some new lighting had been installed with power cables running alongside the existing microphone cables. This induced a voltage into the microphone cable, causing the hum in the microphone input. It was an easy fix and simply involved re-routing the cables to avoid a direct parallel. Shielded cables with good copper content in both the main conductor and outer shield will also mitigate such issues.

READING THE SIGNALS

Different considerations are required for different signal types. Here is a quick breakdown of what should be considered:

AUDIO CABLES

• Try to keep total cable lengths to less than 15m – otherwise use a different transmission format
• Connectivity is needed at each end – this can be RCA phono, TRS 3.5mm or XLR
• Make sure the installation is secure from tampering and clear of voltage cables

SPEAKER CABLES

• The type of speaker output being used could be 4-ohm, 8-ohm, 100V, 30W or 1000W – all of these will affect the cable conductor size required
• Total cable lengths are not usually an issue but longer lengths could require a larger cable conductor
• An indoor or outdoor routing environment will decide whether cables are subject to Euroclass considerations

COAXIAL CABLES

• Is the type of signal being transmitted satellite, TV, cable TV, CCTV, CCTV with power or BNC audio video?
• Will the cables be for indoor local connections or go across the building network?
• Termination requirements – BNC, F-Type or high-end video?
• An indoor or outdoor routing environment will decide whether cables are subject to Euroclass considerations

HDMI SIGNALS

• Specification of signal requirements – is it 1080p, 4K 30Hz or 4K 60Hz 4:4:4?
• System requirements will depend whether local equipment is connected in a room or through a full blown video distribution system
• Is equipment being routed by a direct A to B connection or through other terminations such as floorboxes or wallplates?

AVOIDING THE PITFALLS

Audio cables need to have strong connectivity both from the inner cable to the connector and from the connector on to the equipment. This should include a tight pin for the positive terminal and a tight outer ring for the negative terminal. Gold plating gives long life by preventing material corrosion, which can inhibit signal performance. Cable construction must be of oxygen free copper (OFC) in 26AWG or 28AWG for both the inner conductor and the shield, and with this construction cable lengths of up to 20m can be tolerated.

Speaker cables are usually driven by the system power, so where 18AWG cables might be suitable for small speakers up to 50W in a small room, 16AWG or 14AWG is a more common size for 8-ohm or 100V systems up to 150W or 200W. As these are usually contained cables then they are more likely to be subject to Euroclass requirements. Speaker cables are not usually restricted by lengths and runs up to 50m can be used.

Coaxial cables are usually chosen for applications such as CCTV, satellite or TV installations. Although some cables perform better at longer lengths than others, this

'If being used with picture sources that are delivering high resolution and fast moving scenes, poor performing connectivity can result in picture juddering or the loss of pixels.'

is not often a driving factor in cable choice, as it's usually down to the attenuation performance required for the application.

HDMI cables are fussy beasts and the HDMI signal itself is quite complex. For example, where you might terminate audio cables, speaker cables or coaxial cables with your own connector after routing, it is not something to ever consider for HDMI, as the signal is far too complex and sensitive. With 19 pins in use, it is also complicated by the very nature of how it works. When you plug a cable in, or turn on a piece of equipment, up to three signal handshakes need to take place before a full signal will even get down the cable.
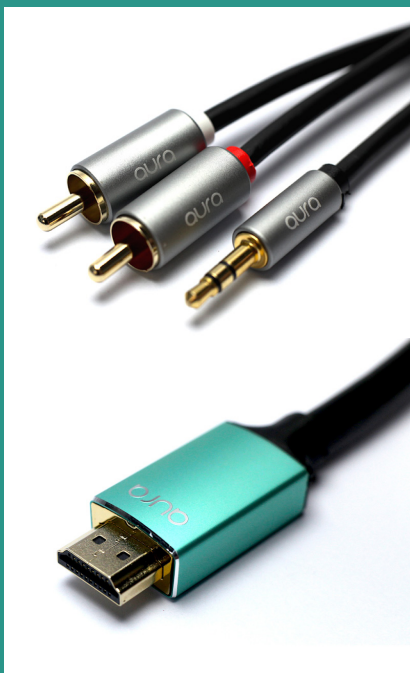
HOW IT'S MADE MATTERS

Cable construction makes a key difference when it comes to performance. How each pair is foil wrapped, and the sizing of each core, influences if a cable performs well – or doesn't. It is also about the speed of data and whilst many say 'it's digital, so will either work or won't', that's not quite true. If being used with picture

sources that are delivering high resolution and fast moving scenes, poor performing connectivity can result in picture juddering or the loss of pixels.

HDMI connectivity is also subject to different system requirements from individual pieces of equipment. In all instances good cables are essential, but then other hardware comes into play such as HDMI distribution over IP or HDMI extenders, and the performance of these also needs careful scrutiny to achieve success. Generally, dealing with HDMI distribution systems will also involve data cables for the core backbone of a network. Ideally these should be HDBaseT approved Category 6 cables but a reputable Category 6 UTP cable should provide a good basis for optimum performance.

BRAND VALUES

Work with a brand that knows how to define its products for best performance and ease of installation. Cables should always use OFC copper materials with enough copper strands and size to give good performance over reasonable distances. Well shielded cables should always be selected to avoid outside inference, along with flexible sheaths that allow for good routing.

The performance of accessories is also a key element – these can sometimes be used to achieve connectivity across large buildings and can also become a weak link if not specified correctly. Choosing accessories such as HDMI extenders that perform well against system requirements can prevent embarrassing end results and ensure confidence with the installation. Sometimes there are also other benefits in choosing good accessories such as support for infrared equipment, or saving the need for additional power requirements.

PICTURE PERFECT

To get the best AV results, choose products designed for performance and durability. Check those key factors when looking at different signal types, consider carefully the application, cable routing needs and customer expectations when it comes to performance. Work with a brand that is experienced in designing products for performance and you won't go far wrong. ■

SIMON JACOBS

Simon Jacobs is AV market manager at Mayflex. Although he started his career in aerospace design, he has over 20 years' experience in the AV industry specialising in AV accessories and connectivity. Jacobs joined Mayflex in 2020 to create Aura and he is now accountable for supporting sales teams with technical queries and developing the range further.

Vertiv and Green Mountain raise the bar for data centre sustainability

Green Mountain has deployed technologies from Vertiv to further increase efficiency and sustainability at what was already one of the greenest data centres in the world. The DC1-Stavanger data centre in Norway runs on 100 per cent renewable hydropower and is cooled with water from a fjord, which provides a continuous temperature of 8°C all year round. However, like all data centres it requires uninterruptible power supplies (UPS) and thermal management systems to maintain optimal uptime.

After extensive research, Green Mountain executives visited the Vertiv Customer Experience Centre in Italy to see Vertiv technologies in action and test performances in peak conditions. As a result, Green Mountain chose Vertiv Liebert PCW chilled water perimeter units for a total installed cooling capacity of 5MW.

Liebert PCW provides high efficiency standards thanks to a combination of latest technologies and an internal design that optimises the aerodynamics of all internal components. Vertiv was also chosen as supplier of UPS systems for another project deployed in parallel, providing several Liebert EXL S1 UPS systems, supported with lithium-ion battery back-up – a longer-life alternative to traditional valve regulated lead acid (VRLA) battery systems.

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Advantex sails to success on HMS Trincomalee

Advantex has completed a contract to provide new digital connectivity onboard Europe's oldest floating warship – HMS Trincomalee. The centrepiece of a popular maritime exhibition in Hartlepool, it is part of new investment by the National Museum of the Royal Navy in technology to support the ongoing conservation of its exhibits.

The technology is being used to connect specialist sensors around the ship to monitor equipment, enabling conservation officers to track and record potentially harmful rises in temperature and humidity levels. It also provides more reliable and secure connection to the internet for cash tills used during onboard weddings and corporate functions.

Built in 1816, shortly after the end the Napoleonic war, HMS Trincomalee also served as a training ship and now features as part of the National Historic Fleet.

Siemens invests in ongoing technical education with CNet Training

Siemens has implemented a schedule of professional development and education activities with CNet Training. This sees Siemens' sales and operations teams across the Middle East and South Asia and Pacific regions undertake CNet Training's Data Centre Fundamentals program.

Designed for individuals who are either new to the data centre sector or who sell products and services into it, the Data Centre Fundamentals program covers key areas including an introduction into the data centre industry, the types of data centre, key infrastructure requirements, an overview of compliance needs, the people within a data centre and common challenges. Key aspects relating to basic design and design philosophies are also examined, as well as the essential considerations of data centre management.

Samir Borkar, senior vice president head of data centre solutions and services at Siemens, said, 'Training, education and professional development are very important within the culture at Siemens. We have known CNet Training for many years, so we knew they could help us to achieve our objective of meeting a benchmark level of knowledge throughout our sales and operations teams. Fulfilling our objectives will provide additional confidence and motivation across the teams, whilst benefitting the company as a whole.'

Samir Borkar

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PROJECTS & CONTRACTS IN BRIEF

Secure IT Environments has extended its longstanding relationship with the University of Chichester. A new multi-year maintenance and support contract has been signed that will see Secure IT Environments work across two sites at Bishop Otter and Bognor.

Extech Cloud has implemented a high performing and secure cloud based IT solution for ILG.

SGN has renewed and extended its agreement with GTT Communications for cloud networking services.

China Mobile Cloud will leverage Nokia's Nuage Networks software defined networking solution for nationwide deployment of its public cloud service.

Openreach has chosen STL as a key partner to provide optical cable solutions for its new full fibre broadband network. STL will be responsible for delivering millions of kilometres of optical fibre cable to support the build over the next three years.

NetAlly

With the growth in bandwidth demands, increasing speeds of Wi-Fi access points, 1Gb/s to 10Gb/s upgrades and the deployment of new optical fibre links, network professionals must have confidence that their network media will transport data error free at the maximum speed possible. Downtime and/or intermittent losses are not options.

NetAlly has launched the LANBERT Media Qualification App for the EtherScope nXG Portable Network Expert analyser and LinkRunner 10G Advanced Ethernet Tester. This free software upgrade provides a flexible, easy way to test and assure the capability of premise cabling and media components including fibre SFPs, wall jacks, patch panels and cables for carrying multigigabit and 10 Gigabit Ethernet.

While there are warranty requirements for ANSI/TIA-568 certification at the time of cable installation, after 'day zero' installation media qualification using high volumes of real frames, rather than parametric substitutes, is far more effective. LANBERT sends actual Ethernet traffic between NetAlly testers or a physical loopback, monitoring for frame loss, bit errors, signal to noise ratio (SNR) and delay skew simultaneously to further understand the available SNR margin on the cable at the current link speed.

For more information **CLICK HERE.** **www.netally.com**

"Trillions of frames can't be wrong"
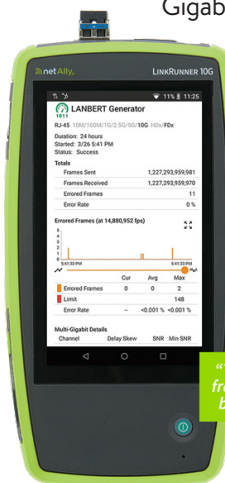
R&M

The latest edition of R&M's Connections magazine features an extensive report on how 5G ecosystems are emerging. In addition to an update on technology and rollouts across various areas, the feature looks at the importance of expert advice and development partnerships in helping market players make the right decisions at an early stage. These partnerships are an important contributor to the efficient construction and operation of urgently needed fibre optic and antenna infrastructure.

The issue also looks at the rapid expansion of broadband networks and the benefits of turnkey PoP solutions, splitting in aerial deployments, and high density fibre optic connectivity for 400 Gigabit Ethernet.

There's also news about Single Pair Ethernet (SPE) based on xBASE-T1. This uses a single twisted pair for data transmission, as well as miniaturised connectors, which can replace the traditional fieldbus, helping realise high density, fast connections and enabling ease of installation. A new SPE system is available that supports digital ceiling, IP building automation and the internet of things (IoT).

CLICK HERE to download the magazine. **rdm.com**

Secure Power

We don't realise how much we rely on our power until, ultimately, it fails. That's why you need an uninterruptible power supply (UPS) as back-up. A UPS system will keep your business running when your main power supply is disrupted, so the only thing disrupted is your power.

At Secure Power, we are partners with the largest UPS manufacturers such as Eaton, Vertiv, Socomec, APC and Riello. We also have years of experience in helping businesses like yours – so we bring the best resources and knowledge to create the perfect solution for your organisation.

Let's start the conversation for protecting your businesses power – **CLICK HERE** to contact our team. **securepower.com**

Leviton

Data centre managers need a network infrastructure that can support multiple generations of tech refreshes. The Opt-X Unity Fiber Migration System from Leviton offers an ideal path to 100Gb/s, 200Gb/s, 400Gb/s and beyond.

The system features pre-terminated trunks, harnesses and cassettes that use best in class MTP connectors. It includes ultra-low loss 8-fibre and 12-fibre cabling, and a 24-fibre MTP backbone that stays in place through multiple upgrades.

The Opt-X Unity Fiber Migration System is offered in OM3, OM4 and OS2, and includes colour coding to identify fibre count and mode.

CLICK HERE to learn more. **www.levitonemea.com**
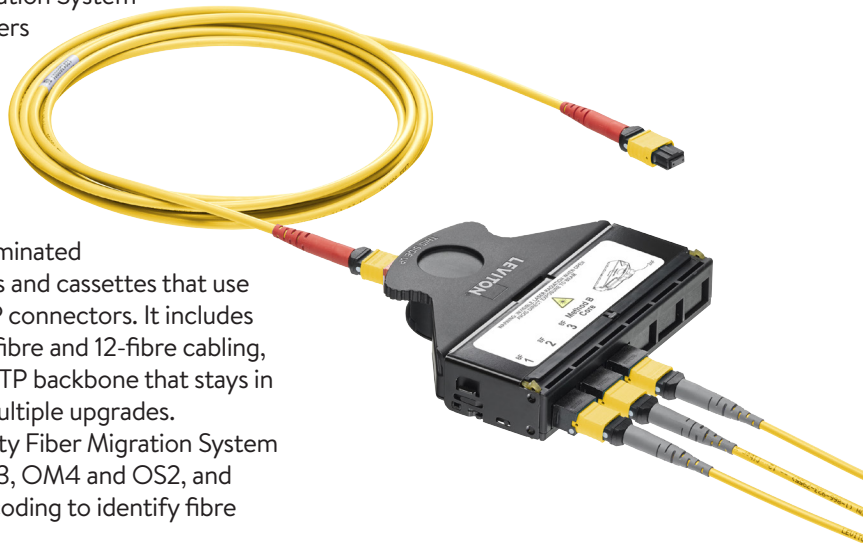
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Inside_Networks

Soft sell

Carrie Goetz of StrategITcom explains how the intelligence behind software defined power (SDP) adds the last pillar to the software defined data centre through the marriage of compute orchestrations and power awareness

▶ The task of a data centre is to make applications and data available for use. The facilities team and the IT team go about this in very different ways – often with little cooperation or planning between the two. Facilities works to assure redundancy in critical systems (power and cooling) and IT operates by orchestrating workloads to working active equipment. There are efficiencies to be had when the two teams work together.

PARTS OF THE PROCESS

As part of the orchestration of applications, we seem to read a lot about software defined storage, networking, WAN and the like, which reduces complexity and allows essential functions to move 'on the fly'. But we are missing the power component to implement a software defined data centre.

To address power outages, redundant power paths and redundant power sources have long been the means to assure uptime. 2N, 2N+1 and sometimes 2N+2 power configurations create power fail-safes in the event of power outages but, in general, these configurations lead to wasted and stranded capacity, and increase capital expenditure and maintenance costs. The idea of throwing more power at the problem of downtime doesn't always solve the likelihood of it. IT works around power downtime by making self-healing networks and systems through virtualisation. But the ability of IT compute to self-correct in the event of downtime through orchestration is rarely considered in power facilities design.

LOSS PREVENTION

The act of power distributing power creates a loss. While we can engineer for minimal loss, we cannot engineer out the loss completely. Battery back-ups sit unused the majority of the time, although we know that batteries will last longer when they are used. Generators don't always work despite our best efforts to test them. Switchgear is very difficult to replace and sometimes fails or arcs, which can create a fire.

Microgrids add alternative power sources and can actually generate to the power grid, and while generators, batteries and microgrids are certainly a part of an uptime strategy, they are not in and of themselves a solution. Tying together IT and facilities' power strategies can provide several benefits.

Data centre infrastructure management (DCIM) packages are a start to managing power and cooling across the data centre floor and assuring that hotspots are properly cooled. What they do not do, however, is provide actionable, automated controls for reacting to power fluctuations, costs and outages. They are not aware of compute fluctuations in real time. What does tie the two together to solve downtime problems and add cost savings functionality is SDP.

REACTION TIME

SDP allows systems and compute to react and move workloads during times of high costs and outages, and allows stranded or standby power to be used for compute. Data centres can take advantage of peak shaving, node capping and enhanced resilience.

By bringing artificial intelligence (AI) and machine learning to a data centre manager's toolkit, SDP enables both data centre operators and power equipment vendors to leverage intelligence and actionable data to increase capacity, ensure availability and enable automation. Understanding the how, when and where power is consumed in relation to compute ties the IT and facilities worlds together and the orchestration is a beautiful thing. We can now support data driven capacity in real time for far greater efficiency.

> 'SDP allows systems and compute to react and move workloads during times of high costs and outages, and allows stranded or standby power to be used for compute.'

WATT'S WHAT?

Let's assume that a data centre has allocated 10kW per cabinet. We know that is rare for the full 10kW to be consumed. Where secondary power is supplied to the same cabinet, 20kW is allocated to a single cabinet, although the assumption is that only 10kW is used. Exceptions will occur where load balancing is in force, but without a doubt there is very likely stranded power.

Colocation centres sell a fixed kW amount per customer, cage or data hall. Much of that capacity remains unusable, as it is earmarked regardless of use. Colocation data centres have not needed to worry about power numbers, largely because the cost is passed through to the end user. But these data centres also are handcuffed to those same modelled numbers, which can limit the number of paying customers on the site. Some have started to oversubscribe power to gain tenants, but that adds additional risk should that oversubscribed power be needed with the original tenant.

VALUE ADD

To facilitate using stranded power, node capping is one tool available. Node capping allows you to set maximum values to assure that no piece of hardware consumes more power than a pre-set value. Node capping uses technology already built into many hardware platforms that communicate through the intelligent platform management interface (IPMI) protocol. IPMI allows communication at the physical hardware level, providing monitoring and management. Utilising IPMI, one can tell compute loads to be shed as capped for better power management. It is analogous to capping volume on a speaker regardless of the volume control.

Capitalising on IPMI and adding intelligence via SDP provides an exponentially greater level of control for the entire compute ecosystem, while allowing the use of that stranded/standby power for compute needs. There is a tangible difference between boot-up power and running power.

Running power also varies based on compute processes and capacity planning uses the highest peak number with buffers. SDP can help data centre operators reduce such buffers and liberate stranded capacity for other workloads.

As examples, suppose there are 10 cabinets in a row, each with 10kW allocated on each of two power feeds. With node capping, we can set servers to use up to that 10kW threshold on each leg. We can also set it to round-robin energise servers in the event of a power failure – keeping that instantaneous all boot at once burst at start-up from happening. We can use all available power in the row and balance each cabinet across the row.
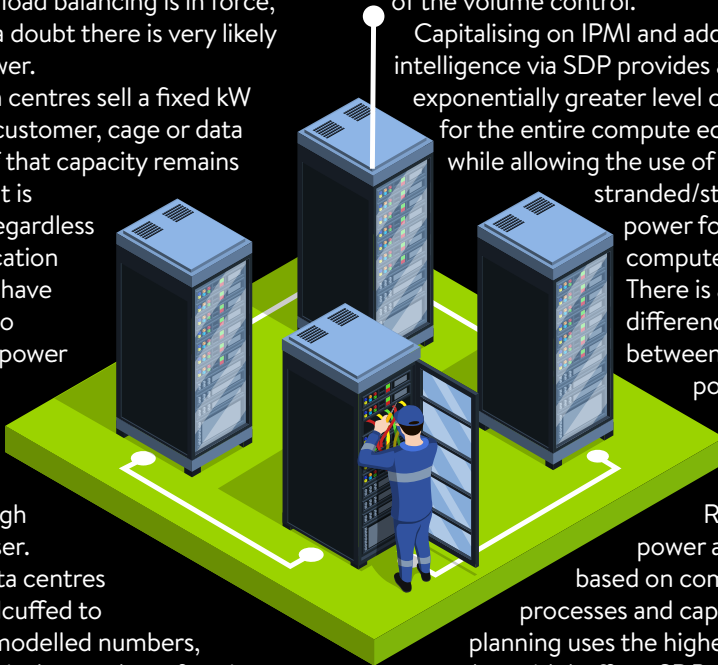
In a failure, some machines can be set not to spin-up at all, if desired. We can provide short-term power while the loads orchestrate to other devices or other sites, for that matter. We can set machines that occasionally process to power off or go idle – and all of this can be done in real time.

SAVING UP

SDP allows operators to turn off power at the breaker level to entire rows of the data centre that only do occasional processing – saving massive amounts in power costs. Redundant systems can be in warm or cold standby and energise when needed. The combined orchestration moves instances in real time. Adding power management hardware with SDP allows peaceful shifts and also creates an additional abstraction layer for power that interfaces entirely with server software in real time.

Peak shaving is another cost saving benefit of SDP. It facilitates the movement of compute to battery, generator, fuel cell, or even another data centre infrastructure based on hours of less expensive operation. This is particularly attractive for microgrids. As data centres work to be better environmental stewards, SDP is a forward thinking facilitator to adoption, regardless of location. The decisions and actions are based on a combination of hardware and software via AI and actioned based on a wide variety of policies set in advance or as a reaction to prescribed conditions, like outside temperature and humidity saving on the cooling (heat removal) processes.

ENDLESS POSSIBILITIES

SDP is the missing link to the software defined data centre ecosystem. The time for facilities hardware to 'speak'

to compute hardware is long overdue. The time to have better control of every fractional kW, regardless of where it originates, is a welcome development. SDP creates an AI action-based solution that can operate without human inspection and intervention. ■

CARRIE GOETZ
Carrie Goetz is principal and chief technology officer at StrategITcom. With nearly 40 years of global experience designing, running and auditing data centres, IT departments and intelligent buildings, she is an international keynote speaker and holds an honorary doctorate in mission critical operations.

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