

THE NETWORK INFRASTRUCTURE E-M

Age again the mach

NAVIGATING THE MULTIGEN
WORKFORCE

Inside Networks



Inst nine ERATIONAL

Power struggle

IT'S TIME FOR SOME SERIOUS
THINKING ABOUT DATA CENTRE
ENERGY MANAGEMENT

Long distance relationship

THE GROWING POPULARITY OF
EXTENDED REACH COPPER CABLING





Get 800G Network Speeds with High-Speed Cable Assemblies

Discover Siemon's comprehensive portfolio of flexible Direct Attach Copper (DAC) and Active Copper Cable (ACC/AEC) assemblies for high-speed switch-to-switch and switch-to-server/storage applications.

- ✓ Supporting Ethernet and InfiniBand™ at speeds up to 800G
- ✓ Compatible with OSFP, QSFP-DD, QSFP, SFP-DD, and SFP112 connectors.
- ✓ Enables low-power, low-latency deployments at next-generation 800G network speeds

Stay ahead of the curve. Advance your network with Siemon's High-Speed Cable Assemblies.

[FIND OUT MORE](#)



SIEMON™

6

ROB'S BLOG

In it for the long haul

9

NEWS

All that's happening in the world of enterprise and data centre network infrastructures



14

MAILBOX

The pick of the recent emails to Inside_Networks



17

QUESTION TIME

Industry experts discuss the reasons for the growing popularity of extended reach copper cabling and the key considerations when it comes to specifying, installing and testing it

28

COPPER CABLING STANDARDS

Alberto Zucchinali of Siemon looks at the evolving role of copper cabling in high speed networks



32

COPPER CABLING PRODUCTS AND SYSTEMS

State-of-the-art copper cabling products and systems profiled

34

COPPER CABLING STANDARDS

Harshang Pandya of AEM Precision Cable Test unravels the interconnected web of standards bodies and organisations

3

FOR A FREE
SUBSCRIPTION
TO

Inside_Networks

[CLICK HERE](#)



38

CHANNEL UPDATE

Moves, adds and changes in the channel

40

WORKFORCE MANAGEMENT

Adelle Desouza of HireHigher offers some advice on navigating the multigenerational workforce



44

QUICK CLICKS

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

46

DATA CENTRE ENERGY MANAGEMENT

Stu Redshaw of EkkoSense argues that when it comes to data centre energy management it's time for some serious engineering thinking

50

DATA CENTRE ENERGY MANAGEMENT SOLUTIONS

A selection of the very best data centre energy management solutions currently available

52

DATA CENTRE ENERGY MANAGEMENT

Ben Pritchard of AVK explains why effective data centre energy strategies are essential to minimise environmental impact and ensure resilience, grid stability and long-term operational viability



56

PROJECTS AND CONTRACTS

Case studies and contract wins from around the globe

61

FINAL WORD

Pierre Sillard of Prysmian Digital Solutions explains how to unlock the potential of light speed transmission for AI chipsets

Manage your critical IT infrastructure with

EFFICIENCY

with EcoStruxure™ IT Advisor



Optimise, model and plan your data centre of the future with the next generation Data Centre Infrastructure Management solution.

- Proactively manage and optimise your IT Environments and keep costs under control by managing your IT sites more efficiently.
- Gain visibility and actionable insights into the health of your IT sites to assure continuity of your operations.
- Get the high-level overview of your data centre – including lights out sites on the go!
- Manage and gain the flexibility you need to optimise uptime of your critical IT infrastructure on-premise, in the cloud and at the edge.

Watch how Wellcome Sanger Institute ensured more funding for Genomic research by reducing operating costs, and maximising energy efficiency by using EcoStruxure™ IT.

ecostruxureit.com

Life Is On

Schneider
Electric

Pushing the boundaries

EDITOR

Rob Shepherd
07708 972170



SUB-EDITOR

Chris Marsland

ADVERTISING

MANAGER

Kate Paxton
01603 610265



CREATIVE

DIRECTOR

Vishnu Joory

TECHNOLOGY

CONSULTANT

James Abrahams

CIRCULATION

MANAGER

Debbie King

ACCOUNTS

Billy Gallop



All rights reserved.

No part of this publication
JUL be used, transmitted or
produced in any form without
the written permission of the
copyright owner. Applications
for written permission should
be addressed to

info@chalkhillmedia.com

The views and comments
expressed by contributors
to this publication are not
necessarily shared by the
publisher. Every effort is made
to ensure the accuracy of
published information.

© 2025 Chalk Hill Media



The longstanding 100m channel limit for copper cabling might appear to be some kind of arbitrary rule but there's a good reason for it. As the length of a cable increases, so does the signal loss, which is usually referred to as insertion loss. Put simply, the longer the cable, the weaker the signal. While the 100m standard has been regarded as the sweet spot for reliable performance, ever more intelligent buildings, sprawling campuses and a growing number of edge devices mean times have clearly changed.

Everyone wants faster speeds over longer distances without blowing their budget, so adding more telecoms tooms, running more optical fibre and installing power over Ethernet (PoE) extenders is a big turn off. These are some of the reasons why there is growing interest in extended reach cabling and in this issue's Question Time we've asked a specially selected panel of industry experts to assess the key considerations when it comes to specifying, installing and testing it – and the pitfalls to avoid.

Staying on the subject of copper cabling, it's fair to say that its history is fascinating for many reasons – not least because every time it's suggested that its potential has been reached, it evolves in new and interesting ways. To drill down into the latest goings-on, we have a feature dedicated to this subject. Alberto Zucchinali of Siemon looks at the evolving role of copper cabling in high speed networks, examining how advances in standards, design and application are enabling copper to remain a relevant choice. Alberto is joined by Harshang Pandya of AEM Precision Cable Test, who unravels the interconnected web of standards bodies and organisations.

This issue also contains a special feature on data centre energy management, with two excellent articles on the subject. First up, Stu Redshaw of EkkoSense argues that when it comes to energy use it's time for some serious engineering thinking. He's followed by Ben Pritchard of AVK, who explains why effective data centre energy strategies are essential to minimise environmental impact and ensure resilience, grid stability and long-term operational viability.

Last but certainly not least, I'd like to say a massive thank you to all those who participated, sponsored and provided raffle prizes for the Inside_Networks 2025 Charity Golf Day. On what was the 20th anniversary of this event, the amazing sum of £10,000 was raised for Macmillan Cancer Support and a great time was had by all. You can see a round-up of the event in next month's issue.

Rob Shepherd

Editor



The R&M logo is displayed in white on a dark background. It consists of three horizontal bars to the left of the letters 'R&M'.The BladeShelter logo is displayed in white on a dark background. It features the word 'BladeShelter' in a stylized font, with 'Blade' in a larger, bolder font and 'Shelter' in a smaller font, all enclosed within a thin white border.

Integrated Modular Data Centres: Strategic solutions for pressing issues

DCs are facing growing challenges like rising power demands, labour shortages, rapid growth of AI workloads... Traditional approaches are often too slow, costly, and unsustainable where speed, efficiency, and scalability are required.

R&M addresses this with modular, ready-to-use solutions. These support key areas including servers and storage, computing rooms, meet-me rooms, and interconnects.

Scan to contact us.



Reichle & De-Massari GmbH
Hindenburgstraße 21-25, 51643 Gummersbach
Deutschland

The R&M logo is located in the bottom right corner of the page. It features three horizontal bars to the left of the letters 'R&M'.

BUSINESS ISN'T GETTING ANY EASIER.

BUT WITH ECA ON YOUR SIDE, THE FUTURE LOOKS REFRESHINGLY SIMPLE.

As the UK's leading membership body for electrical contractors, we help businesses like yours prepare for whatever's next.

Become an ECA Member and unlock the tools you need to win contracts, grow stronger and get your voice heard.

Enjoy tailored support
across your business for...

- Technical issues
- Safety, health and environment
- Employee relations
- Legal and business
- Education and skills



**SECURE
YOUR
SUCCESS**

Three out of five businesses are now exploring quantum AI

A global survey of 500 business leaders by SAS found that interest in quantum computing is very high, with more than 60 per cent of respondents indicating they are actively investing or exploring opportunities in quantum artificial intelligence (AI). The survey found that more than 70 per cent of respondents were very or somewhat familiar with the concept of quantum AI.

Respondents saw the most potential for quantum AI in business functions related to data analytics and machine learning (48 per cent), research and development (41 per cent), cybersecurity (35 per cent), supply chain and logistics (31 per cent), finance



and risk management (26 per cent) and marketing (20 per cent). Yet these business leaders also cited some crucial barriers to adoption of quantum AI. Among their top concerns were high cost (38 per cent), lack of understanding or knowledge (35 per cent) and uncertainty around practical, real world uses (31 per cent).

‘With quantum technologies, companies can analyse more data than ever and achieve amazingly fast answers to very complex questions involving myriad variables,’ said Bill Wisotsky, principal quantum architect at SAS. ‘Our goal is to make quantum research simple and intuitive.’

Global businesses face escalating risk as 87 per cent hit by AI cyberattacks

87 per cent of security professionals report that their organisations have encountered an artificial intelligence (AI) driven cyberattack in the last year, according to a study by SoSafe. It surveyed 500 global security professionals as well as 100 SoSafe customers across 10 countries.

The survey also highlighted a growing global tension between the widespread adoption of AI and the inherent security risks that it can pose. Notably, 91 per cent of all security experts anticipate a significant

surge in AI-driven threats over the next three years. However, only 26 per

cent express high confidence in their ability to detect these attacks.

Andrew Rose, chief security officer at SoSafe, said, ‘AI is dramatically scaling the sophistication and personalisation of cyberattacks. While organisations seem to be aware of the



threat, our data shows businesses are not confident in their ability to detect and react to these attacks.’

Siemon achieves 52.5 per cent absolute reduction in Scope 1 and 2 greenhouse gas emissions

Siemon has achieved a significant milestone in its sustainability journey by achieving a 52.5 per cent absolute reduction in combined Scope 1 and Scope 2 greenhouse gas emissions between 2021 and 2024. This commitment to environmental responsibility also strengthens Siemon's long-term operational stability, ensuring reliable and consistent product delivery for its customers.

The achievement is supported by notable improvements in operational metrics, with Scope 1 emissions declining from 271 to 195 tonnes of carbon dioxide equivalent (tCO₂e) and Scope 2 emissions from 1,163

to 486 tCO₂e. This strategic initiative not only demonstrates Siemon's commitment

to sustainable business practices but also aligns with its broader objectives of setting science based targets and reducing overall carbon footprints.

'Our commitment to innovative energy solutions and continuous improvement in operational efficiency is a testament to our

proactive approach in addressing climate change,' said John Siemon, chief technology officer and chief operations officer at Siemon. 'We are setting new benchmarks for sustainability in our industry and building a more resilient and efficient supply chain.'



John Siemon

Ruth Devine becomes the 112th president of the ECA

Ruth Devine is the latest president of the Electrical Contractors' Association (ECA) – the second female president in ECA's 124-year history, after Diane Johnson, who served in 2010-2011. For the past 18 years Devine has been a director of SJD Associates, based in Milton Keynes. A prominent figure in the electrotechnical and engineering services industry, she brings extensive industry experience, a deep commitment to apprenticeships, and a passion for building a more inclusive and sustainable sector.

Outside of her professional role, she chairs ECA's Skills Committee, which

advises the ECA Council on relevant skills matters and supports member

engagement with the skills system. In 2023 Devine was awarded an MBE in the King's New Year Honours list for her services to further education and apprenticeships.

She commented, 'It's an honour to take on the role of ECA president at such a critical time for our industry. As we face the triple challenges of increasing demand for electrification, improving and demonstrating competence for better building safety and closing the skills gap, there has never been a more important moment to unite behind a vision of excellence, opportunity and innovation.'



Ruth Devine

EfficiencyIT awarded prestigious Royal Warrant of Appointment by His Majesty King Charles III

EfficiencyIT has been awarded a Royal Warrant of Appointment as a supplier of IT infrastructure and services by His Majesty King Charles III. It recognises the company's exceptional service and commitment to delivering sustainable IT infrastructure solutions to the royal household. EfficiencyIT joins a prestigious group of companies noted for their excellence in service and craftsmanship, and their continued



Nick Ewing

dedication to infrastructure security, resiliency and sustainability.

Nick Ewing, managing director of EfficiencyIT, expressed his pride in receiving the honour and said, 'We are incredibly proud to be recognised with a Royal Warrant of Appointment. This award is a testament to our team's dedication to providing highly secure, resilient and sustainable IT solutions that support mission critical operations. We remain committed to delivering high standards

of excellence, environmental responsibility and sustainable growth.'

Inside_Networks 2025 Charity Golf Day raises £10,000 for Macmillan Cancer Support

The Inside_Networks 2025 Charity Golf Day raised £10,000 for Macmillan Cancer Support. This impressive sum was the result of fantastic industry-wide support and a great day's golfing at the Hanbury Manor PGA Championship Course in Ware, Hertfordshire, which was followed by a three-course dinner, prize giving, auction and charity raffle.

With main sponsorship provided by LMG, Excel Networking Solutions, RS Advisory Services, Onnec and Molex, 32 teams took part. On what was the 20th anniversary of this event,

it provided a welcome opportunity for all areas of the industry to take part in some good natured competition.

Rob Shepherd, editor of Inside_Networks, said, 'Once again the industry put rivalries aside to raise a considerable sum of money for Macmillan Cancer Support. Raising £10,000 for such a worthwhile cause highlights the generosity of those who attended.

The event wouldn't have happened without such

great support and I would like to extend my thanks to all the players and sponsors.'

A full review of the event will appear in the Aug 25 issue of Inside_Networks.



Colt research finds one in five global firms spends \$750,000 or more on AI annually

Colt Technology Services has carried out research that questioned 1,236 IT leaders in 13 countries across the US, Europe and Asia. It found that among businesses currently investing in artificial intelligence (AI), one in five is spending \$750,000 or more annually, while almost half are currently investing \$250,000 every year.

Businesses in Singapore (27 per cent), the UK (18 per cent) and the US (14 per cent) are investing over \$1m annually while more than one in four (27 per cent) businesses in Hong Kong is investing \$750,000-\$999,999. Businesses in Japan (90 per cent), the US (84 per cent), Germany (69 per cent) and the UK (68 per cent) are the most likely of all markets in the survey to



say they are currently investing in AI.

Looking ahead, the research found those organisations not currently investing in AI but planning to in the near future are shifting their AI investment towards automation (37 per cent). They are also staying consistent

with current investors' priorities of cybersecurity (35 per cent) and enhancing customer experience (33 per cent).

Buddy Bayer, chief operating officer at Colt Technology Services, said, 'This research shows just how many IT priorities companies are balancing. Despite the market differences, we're all part of a connected global economy and secure, software driven digital infrastructure is crucial to keep it moving.'

NEWS IN BRIEF

Naoris Protocol has revealed that IT directors at major global corporations are significantly increasing quantum computing budgets in anticipation of transformative industry impacts. Its research found that 84 per cent of IT directors expect quantum computing to have either a 'huge' (29 per cent) or 'big' (55 per cent) impact on their industries within five years, with only 16 per cent predicting minimal effects.

Since the beginning of 2025, there have been 90,471 announced layoffs across the global tech industry, as companies continue to double down on downsizing and cost-cutting efforts, according to research from RationalFX. American companies lead the trend, accounting for 65,545 layoffs, about 72.5 per cent of the total. Companies that have slashed the most jobs so far in 2025 are Intel (21,780), Panasonic (10,000) and Microsoft (8,840).

ScaleUp Technologies recently hosted the grand opening of its state-of-the-art NUE1 data centre in Nuremberg-Fürth, Germany. The newest Open Compute Project (OCP) Experience Center location, it is designed to showcase open hardware solutions and demonstrate the power of scalable, sustainable digital infrastructure.

CONNECT TO GROW

Invest in cable infrastructure today
to realise the efficient, reliable, and
sustainable data centres of tomorrow



Telecoms

Cables and
connectivity



Energy

LV and MV cables
and monitoring
systems

Why choose Prysmian cable solutions?

Maximise fibre density

Optimise duct space utilisation

Reduce installation and repair time

Significantly reduce cable footprint



EXPLORE PRODUCTS IN
OUR VIRTUAL DATA CENTRE

Is a solid data foundation

Hi Rob

When people talk about artificial intelligence (AI) it is easy to get caught up in the excitement. But the reality is that AI is only as good as the data behind it. While data itself has not changed much, the way we access and use it and the opportunities it creates have evolved significantly. Take Netflix, for example, and its impact on Blockbuster. The product is the same, it offers films and TV shows, but the delivery model transformed the industry and led to Blockbuster's decline.

Today's economic landscape is challenging. Businesses face inflation, supply chain issues and pressure to achieve more with fewer resources. In this climate, data is a lifeline. Companies that use their data effectively are better placed to make informed decisions, remain agile and stay ahead of the competition. Those that overlook their data or rush into AI without a clear strategy risk falling behind. So, what does it take to build a solid data foundation?

In my view, data should be treated as seriously as any physical or financial asset on the balance sheet. It is not just about collecting information. The real value of data comes when it is connected, easily accessible and used to drive action. Unfortunately, many organisations still struggle with siloed systems, meaning valuable insights are often locked away and underused.

The first step to solving this is to implement a modern data platform that brings everything together. Once that foundation is in place, you can begin to explore AI properly. It is important to be clear about what kind of AI you are aiming



to introduce. A good starting point is enterprise AI. It uses focused, purpose driven datasets to solve specific business problems and is usually easier to manage and scale in the early stages.

There is a lot of excitement around generative AI (GenAI), which can create content or improve customer interactions. However, these tools need large volumes of quality data to perform well. Without the right data infrastructure, businesses risk errors, unreliable results and a loss of trust that can undermine confidence in AI investment.

That is why I believe enterprise AI should

n the bedrock of AI?



come first. Zoom is a strong example, having built a solid data platform before introducing enterprise-grade AI tools. This gave employees instant access to the right information, supporting smarter decisions and better ways of working. It also made data easier to use across the business through plain language interaction. Enterprise AI is typically more energy efficient too, focusing on impact over scale.

Of course, enterprise AI and GenAI are not mutually exclusive. In time, most businesses will benefit from a combination of both. But the foundations must come first, and that means getting the data

strategy right from the outset.

It is also worth remembering that AI is about more than just technology. People and culture are fundamental. Understandably, there are concerns about automation and job losses. However, research from PwC shows that AI is expected to create more roles than it replaces, particularly in industries that are growing. What is changing is the nature of the skills required.

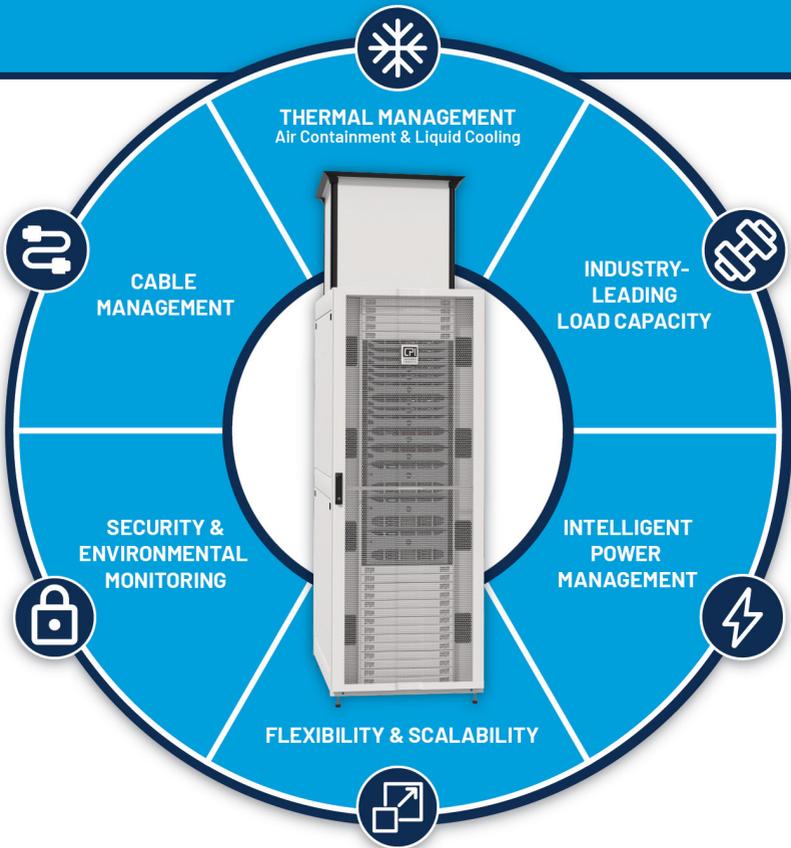
As leaders, we need to be proactive. That means investing in our own understanding of AI and ensuring our teams have the skills and confidence to use it. Open conversations between leadership and staff go a long way in building trust and engagement.

In the end, AI is not the final destination. It is one step in a longer journey of innovation. To take that step successfully, we need a strong data foundation. That is what allows AI to work and what will help our organisations succeed now and in the future.

James Petter
Snowflake

Editor's comment

'Data is the new oil,' mathematician Clive Humby declared in 2006. It's certainly true that companies that effectively leverage their data can transform it into actionable insights, enhance their strategic planning, optimise operations and anticipate market trends, ensuring they stay ahead of the game. Those that do so stand to get the most out of any AI investment.



Advanced Thermal Management

Single source for cooling solutions to meet diverse data centre needs

Air Containment:

Enhance cooling efficiency and reduce energy costs with CPI's adjustable air containment systems.

Liquid Cooling:

ZutaCore® HyperCool® Direct-to-Chip Liquid Cooling Solution

High-Performance Cooling:

Direct-to-chip cooling for processors of 2800W+ with zero throttling and up to 50% energy savings.

Optimised Integration:

Maximises density, fits with CPI's ZetaFrame® Cabinet, and simplifies deployment with preinstalled systems.



CHATSWORTH PRODUCTS

Discover
More...



Going the distance

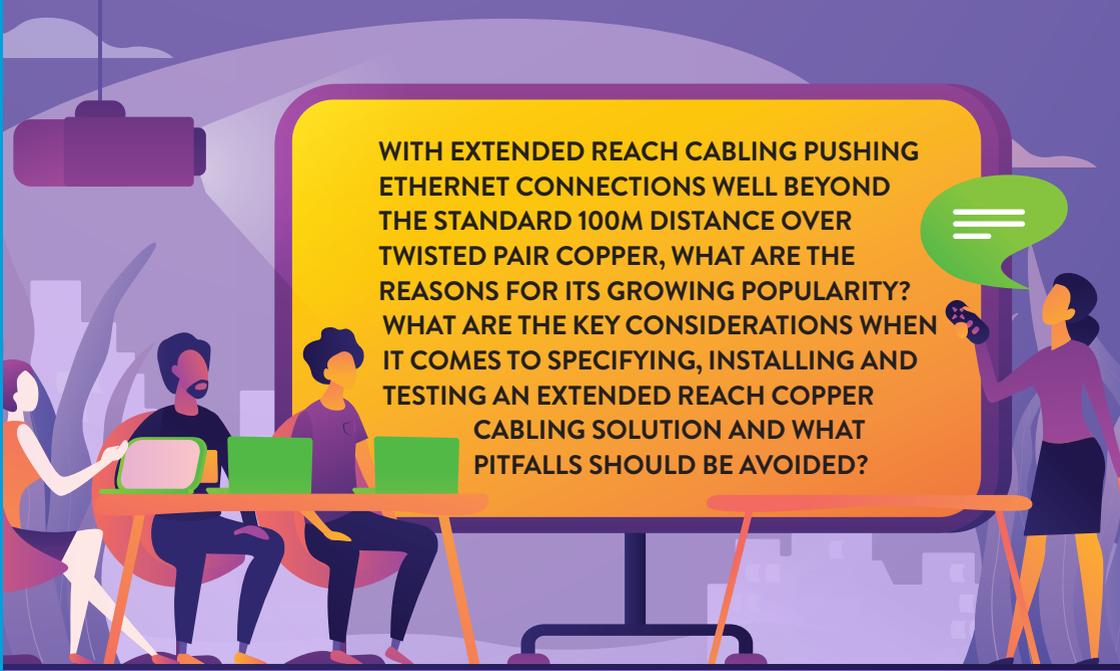
The idea of extended reach copper cabling going beyond the 100m mark might not be new but demand is growing for it. To examine the reasons behind it and identify the key considerations when implementing such a solution, [Inside_Networks](#) has brought together a panel of industry experts to offer their views

▶ The 100m limit for Ethernet over twisted pair copper cabling has been a fundamental element of network infrastructure design since the late 1990s. Why 100m? Put simply, as cable length increases so does insertion loss. Based on these performance factors, the industry standardised a 100m maximum distance.

However, as technology evolves and demands for higher speeds and extended reach increase, there is growing interest in surpassing this boundary. The demand for cost effective, high performance network connectivity in large scale deployments

and at the edge means that enterprises, data centres and industrial environments require longer cable runs to support expansive campuses, smart buildings and automation systems. Often they don't want to do this by investing in additional telecoms room, optical fibre and power over Ethernet (PoE) extenders.

To explore the drivers for extended reach cabling's increasing popularity and examine the issues around its implementation, [Inside_Networks](#) has assembled a panel of experts to offer their views on the subject.



WITH EXTENDED REACH CABLING PUSHING ETHERNET CONNECTIONS WELL BEYOND THE STANDARD 100M DISTANCE OVER TWISTED PAIR COPPER, WHAT ARE THE REASONS FOR ITS GROWING POPULARITY? WHAT ARE THE KEY CONSIDERATIONS WHEN IT COMES TO SPECIFYING, INSTALLING AND TESTING AN EXTENDED REACH COPPER CABLING SOLUTION AND WHAT PITFALLS SHOULD BE AVOIDED?

DOMINIC ROSS

TECHNICAL ACCOUNT MANAGER GLOBAL STRATEGIC PROJECTS AT SIEMON

The need for extended reach is driven when the requirement for a flexible and future proof infrastructure cannot typically be achieved by installing another telecommunications room close to the device, or when using optical fibre cabling in conjunction with media converters is not a viable option.

So, if there is only a limited number of devices and no future upgrades are anticipated, a third option, which is gaining popularity, is to specify an extended reach cabling solution that supports the specific communication, speed and powering protocols required by the device. With careful consideration this can be managed through engineered channels.

Application specific cabling is derived using a mathematical approach. Using this method, the worst case transmission performance of a cabling system is compared against the minimum data and remote powering application requirements to determine an engineered channel capable of operating beyond 100m. Engineered channels are assessed for performance across the entire frequency range. Conditions, such as environmental temperature are factored into the calculations, along with equipment reliant approaches, which utilise field testers, bit error rate (BER) testing or switch link status to make go/no-go determinations in a specific environment.

Engineered channels can be considered, used judiciously and by exception to resolve the specific problem of supporting

a limited number of low speed devices beyond 100m. Since these implementations are application specific, support of higher speed applications and equipment upgrades cannot be guaranteed.

Avoiding pitfalls involves understanding the limitations of extended reach copper, performing thorough testing and ensuring the system meets the application's bandwidth and power demands.

High performing shielded cable selection (22-23AWG), signal quality, application standards testing and power over Ethernet

(PoE) are key considerations for installation. It is important to always choose the correct test limits whilst testing extended reach cabling.

Extended reach cabling is technically non-compliant by standards. Therefore, it is highly recommended to always check with the manufacturer of the cabling system where you stand on the full warranty of the system when designing your infrastructure.



'APPLICATION SPECIFIC CABLING IS DERIVED USING A MATHEMATICAL APPROACH. USING THIS METHOD, THE WORST CASE TRANSMISSION PERFORMANCE OF A CABLING SYSTEM IS COMPARED AGAINST THE MINIMUM DATA AND REMOTE POWERING APPLICATION REQUIREMENTS TO DETERMINE AN ENGINEERED CHANNEL CAPABLE OF OPERATING BEYOND 100M.'

MICHAEL AKINLA

BUSINESS MANAGER NORTHERN EUROPE AT PANDUIT

Panduit recently published a white paper looking at 150m power over Ethernet (PoE) copper with 1Gb/s capacity and found it offers a cost effective alternative to installing additional intermediate distribution frames, consolidation points or transitioning to optical fibre. Extending copper reach simplifies infrastructure and reduces costs, while maintaining reliability and simplicity. However, there are considerations:

- **Cable selection.** Use higher category cables, like Category 6 or 6A, with larger conductors such as 22AWG. These cables exhibit lower insertion loss and enhanced signal integrity over extended distances.
- **Performance standards.** Choose cabling that meets or exceeds industry standards for parameters like insertion loss, near-end crosstalk (NEXT) and return loss, which are critical for data transmission quality over longer runs.
- **PoE compatibility.** Ensure cabling supports the required PoE standards, especially for devices needing power delivery over the same cable. It should accommodate the power levels necessary for devices like IP cameras and access points.

Furthermore, consider installation best practice and deploy appropriately for the installation environment. Ensure the cabling and connectors can withstand conditions such as temperature variations, moisture



and electromagnetic interference (EMI). Moreover, proper grounding and bonding are essential to protect the network from electrical surges and to minimise noise interference, thereby ensuring reliable performance.

Conduct thorough testing of the extended cabling channels to confirm they meet performance specifications. This includes assessing parameters like insertion loss, propagation delay and resistance unbalance. Use industry standard testing devices to ensure accurate measurements and reliable validation of the cabling infrastructure.

While extending cabling beyond 100m is feasible, surpassing the tested 150m channel length can lead to signal degradation and unreliable network performance. Our stringent testing found that 140m PL of 22AWG Category 6 or Category 6A, coupled with 10m 24AWG Category 6 or Category 6A patch cords provided consistent performance.

By carefully selecting appropriate cabling, adhering to installation best practices and conducting rigorous testing, organisations can effectively implement extended reach copper cabling solutions to meet current and future demands.

‘WHILE EXTENDING CABLING BEYOND 100M IS FEASIBLE, SURPASSING THE TESTED 150M CHANNEL LENGTH CAN LEAD TO SIGNAL DEGRADATION AND UNRELIABLE NETWORK PERFORMANCE.’

IAN MCKIERNAN

TECHNICAL PRE-SALES MANAGER AT EXCEL NETWORKING SOLUTIONS

Extended reach cabling is becoming increasingly popular due to several key factors. A primary driver of this trend is the growing demand for network connectivity in expansive environments such as industrial sites, campuses and building refurbishments, where devices and equipment are often located at considerable distances from the comms room.

This cabling approach eliminates the need for network extenders, or additional intermediate switches and all the additional facilities required. It also reduces both the complexity and overall cost of network infrastructure.

Modern cable categories, such as Category 6A and Category 7, offer improved signal integrity by minimising insertion loss, near-end crosstalk (NEXT) and return loss when compared to more traditional cable types. Additionally, the use of larger gauge conductors, such as 22AWG, contributes to reduced signal attenuation and lower DC resistance, enhancing performance over longer distances.

When specifying an extended reach copper cabling solution, several critical factors must be considered. Selecting the appropriate cable type and quality is essential, with higher category cables and those featuring larger gauge conductors being preferred for these applications. Maintaining signal integrity by accounting for insertion loss, NEXT and return loss is vital for ensuring reliable network

performance.

Environmental conditions such as temperature, humidity and electromagnetic interference (EMI) should also be evaluated, as they can significantly impact cable performance. Compatibility with existing network equipment must be confirmed to prevent bit error rate (BER) issues, while thorough custom testing and manufacturer validation using industry standard methods are necessary to verify the cabling meets performance specifications over the extended distance.

It is important to avoid several common pitfalls. These include deviating from established cabling standards, while best practice is

even more relevant when extending the cable length. Neglecting comprehensive testing, overlooking environmental factors and failing to ensure full compatibility between the cabling and network components should also be avoided. By carefully addressing these considerations, extended reach copper cabling can offer a dependable and cost effective solution for extending Ethernet networks beyond traditional distance limitations.



‘SELECTING THE APPROPRIATE CABLE TYPE AND QUALITY IS ESSENTIAL, WITH HIGHER CATEGORY CABLES AND THOSE FEATURING LARGER GAUGE CONDUCTORS BEING PREFERRED FOR THESE APPLICATIONS.’

StratusPower™

Power that scales.

Delivery that keeps up.



The AI revolution is driving unprecedented data centre **expansion**, demanding **bigger, faster, and more scalable** power protection.

Centiel's **StratusPower UPS** is built for the challenge:

Unmatched scalability: expand seamlessly as your data centre grows.

High-power density: compact footprint, maximum output.

Rapid deployment: designed for the highest availability to keep pace with AI-driven expansion.

Peak efficiency: cutting-edge technology for optimal energy savings.

Be ready for tomorrow, today. Future-proof your AI infrastructure with StratusPower.

RACHID AIT BEN ALI

PRODUCT & SOLUTIONS MANAGER AT AGINODE

Extended reach copper cabling is gaining traction due to several factors. Compared to optical fibre, copper cabling is generally less expensive and easier to install and maintain, especially over shorter distances. What's more, while fibre remains essential for high speed, long distance transmission, it isn't always the most efficient or cost effective choice for every application.

Let's take smart surveillance as an example. High resolution IP cameras typically require 100Mb/s to 1Gb/s but connecting them via fibre over short distances can be unnecessarily expensive and energy intensive. Fibre optics often require media converters or switches with higher power consumption but copper can support power over Ethernet (PoE), reducing the need for separate power infrastructure, allowing both data and power to be transmitted over a single cable. This eliminates the need for separate power infrastructure, even further simplifying installations and reducing energy consumption.

Extended copper solutions also often maintain compatibility with existing Category 6A or Category 8 cabling standards, making upgrades less disruptive and more incremental. Recent innovations

in copper cabling now enable transmission distances of up to 150m at 1Gb/s – a significant leap beyond the traditional 100m Class EA limit. These extended reach

copper solutions offer a practical and economical alternative for connecting endpoints across smart campuses and cities.

From digital ceilings to smart campuses, the cabling landscape is evolving rapidly. The next generation of networks will need to balance performance, flexibility and sustainability. As internet of things (IoT) devices multiply and demand for high bandwidth, low latency connections rises,

hybrid infrastructures that combine fibre, extended reach copper and intelligent cabling systems will become essential. Embracing these innovations will not only future proof infrastructure but also drive the creation of smarter, greener and more resilient digital environments.



'AS IOT DEVICES MULTIPLY AND DEMAND FOR HIGH BANDWIDTH, LOW LATENCY CONNECTIONS RISES, HYBRID INFRASTRUCTURES THAT COMBINE FIBRE, EXTENDED REACH COPPER AND INTELLIGENT CABLING SYSTEMS WILL BECOME ESSENTIAL.'

BARRY ELLIOTT

DIRECTOR AT CAPITOLINE

Although this subject has been discussed since the early 1990s, the main problem remains – it's not a standard until it's a standard. Until it becomes a new standard, equipment manufacturers are unlikely to offer any guarantees that their equipment will work beyond what is stated in the current standard, and this leads to the opinion that if it works, fine, but if it doesn't work, who is going take responsibility?

The current standard is TIA Telecommunications Systems Bulletin, TSB 6000 Application Channel Attenuation and Supportable Distances, published in January 2025.

This is really a summary of all the other standards that quote transmission distances over copper and optical fibre cabling, such as TIA 568, and it's quite clear that the maximum transmission distance for any Ethernet or power over Ethernet (PoE) copper cabling is 100m.

Also, the more demanding and faster the application then the higher specification is needed for the cable, for example, 10GBASE-T is limited to 100m but only over Category 6A or Category 8. Meanwhile, the technical problems come from the attenuation or insertion loss of the cable, hence the need for a bigger 22AWG conductor, but also from signal delay and delay skew between the different pairs.

There is a demand for longer distances and that comes from larger sites such

as warehouses and airports etc. In these applications lower speeds and PoE applications are usually of more interest than very high speed applications such as

10GBASE-T. 100Mb/s is usually more than enough for most point to point applications.

The TIA is working on the latest requirements and market expectations for extended reach Ethernet but it's very early days. The latest draft standard was only published on 1st April 2025 and it doesn't even have a number yet but is known as TR42.7-2025-04-001 Draft

TSB-XXXX Guidelines for Supporting Extended Distance Copper Channels 30/3/25.

Ultimately, both cable manufacturers and transmission equipment manufacturers must be on the same page about what is guaranteed to work over what media. Standardisation of that still seems quite a long way off.

'ULTIMATELY, BOTH CABLE MANUFACTURERS AND TRANSMISSION EQUIPMENT MANUFACTURERS MUST BE ON THE SAME PAGE ABOUT WHAT IS GUARANTEED TO WORK OVER WHAT MEDIA. STANDARDISATION OF THAT STILL SEEMS QUITE A LONG WAY OFF.'



LEWIS WHITE

VICE PRESIDENT ENTERPRISE INFRASTRUCTURE EUROPE AT COMMSCOPE

Building networks have evolved over the past decade and so has the role of horizontal copper cabling. Now more than ever, twisted pair forms part of the building power plan, with the need to support higher powered power over Ethernet (PoE) becoming as much a criterion for cabling media as data transmission has traditionally been.

Operational devices such as security cameras, access control panels and wireless access points require connectivity and power. Such devices are commonly positioned well away from telecom rooms, placing them beyond the 100m limit established by commercial building standards such as ANSI/TIA-568 and ISO 11801. More than just desiring support for Ethernet beyond 100m, the demand for power and data out at these edge devices is really driving the development and emergence of extended distance copper cabling technology.

Effectively delivering extended distance support for PoE and data requires purposely engineered solutions, involving much more than simply extending the tested distances of existing offerings. Appropriate copper conductor size, pair twist and jacketing are critical to ensuring performance in the elevated temperature situations that are often associated with the bundling and routing of cables connecting edge devices.

Such design aspects are also key to ensuring the improved DC resistance

necessary to provide reliable support of PoE applications at all levels. They also ensure the improved insertion loss required to maximise the distance over which 10/100/1000BASE-T applications can operate. Credible solutions must

be interoperable with existing connector types, as well as the ceiling mount and field terminable type solutions commonly associated with the installation of devices at high levels.

Well documented installation guidelines, especially regarding bundling, are crucial to ensuring that published distances and

performance are delivered. Extended distance cabling solutions also demand specific testing procedures incorporated into handheld testing hardware that reflect the channel limits, with adjustments for DC resistance and insertion loss.



'WELL DOCUMENTED INSTALLATION GUIDELINES, ESPECIALLY REGARDING BUNDLING, ARE CRUCIAL TO ENSURING THAT PUBLISHED DISTANCES AND PERFORMANCE ARE DELIVERED. EXTENDED DISTANCE CABLING SOLUTIONS ALSO DEMAND SPECIFIC TESTING PROCEDURES INCORPORATED INTO HANDHELD TESTING HARDWARE THAT REFLECT THE CHANNEL LIMITS, WITH ADJUSTMENTS FOR DC RESISTANCE AND INSERTION LOSS.'



Complete Cat6A and Cat6 Copper LAN Solutions with HTC Series.

With a tool-less jack, range of patch panels and outlets, plus accessories including LC and Euro modules, faceplates and back boxes.

MADE TO CONNECT



STEVE COWLES

PRODUCT LINE AND CUSTOMER CARE MANAGER AT AEM PRECISION CABLE TEST

Extended reach cabling solutions offer practical options for covering longer distances without switches or repeaters, especially in large buildings, industrial sites and campuses. Single Pair Ethernet (SPE) supports 1000m and delivers power up to 7W at that range, making it ideal for industrial automation and building systems. While SPE cabling, connectors and switches are available, endpoint devices are still in development.



margin observed in most cases. Vendor specific limits are tighter than IEEE standards.

- **DC loop resistance.** Affects power delivery over long distances. Measurement ensures sufficient power is available at the endpoint.

Proper installation practices are crucial to avoid performance issues. This includes using appropriate connectors and adhering to vendor guidelines. Compatibility between switches,

cameras and cabling must be ensured to achieve reliable network performance.

The future of long distance cabling is promising, with ongoing advancements reducing the need for intermediate equipment and improving network flexibility. As technology evolves, extended distance cabling will play a key role in modern networks. By prioritising rigorous testing and validation, businesses can ensure the reliability and efficiency of their extended distance cabling solutions, paving the way for a more connected and streamlined future.

Enhanced Ethernet standards like 10BASE-T and 100BASE-TX now support longer distances. For example, 10BASE-T reaches 275.5m, 100BASE-TX extends to 216m and Gigabit Ethernet (1000BASE-T) can span 150m with upgraded cabling specifically designed for these greater distances.

As demand for long distance cabling grows, rigorous testing and validation are essential for ensuring reliable performance for cabling that exceeds the standard 100m limit. Key parameters include:

- **Insertion loss.** Often the limiting factor for extended distance cabling. Vendor specific limits ensure performance over extended distances.
- **Return loss.** Typically, this is not an issue if installation is done correctly. Vendor specific limits are generally more relaxed compared to IEEE standards.
- **Near-end crosstalk (NEXT).** Sufficient

‘AS DEMAND FOR LONG DISTANCE CABLING GROWS, RIGOROUS TESTING AND VALIDATION ARE ESSENTIAL FOR ENSURING RELIABLE PERFORMANCE FOR CABLING THAT EXCEEDS THE STANDARD 100M LIMIT.’

ZORAN BORCIC

PRODUCT MANAGER DATACOM CABLE AT PRYSMIAN

One of the biggest challenges for businesses implementing a converged cabling infrastructure is the need to connect remote devices to the network.

IP is being used for an increasing number of applications. Data, voice, security and building automation and management systems can now all run over a common twisted pair cabling infrastructure.

With the new generation wireless LAN IEEE 802.11ac, we have the first volume application for 10GBASE-T in offices. This requires a dense 10Gb/s network of Class EA – preferably with power over

Ethernet (PoE) compatibility. The advantage of running all these different applications over the same cabling infrastructure eliminates the need to design and install separate networks.

The disadvantage of converged cabling, however, is that downtime no longer means employees just lose access to emails. Instead, security, building management systems and video conferencing, as well as power to remote devices, will all be affected. That's why it is important to install only the best performing cables and connectivity components including jacks and patch panels.

One of the challenges is the need to connect remote IP devices such as remote security cameras, external temperature

sensors or wireless access points to the network. With conventional twisted pair cabling the horizontal distance is limited to 100m. Long reach copper cabling

would appear to be the optimal solution because it is convenient and cost effective. And, by avoiding the need for sub-distributors and media converters, this solution also has the advantage of reducing the amount of technical space needed for converged cabling.

Long reach copper cables meet all requirements of the Ethernet standards IEEE 802.3 and ISO/IEC 11801 for 10GBASE-T and

PoE. The recommendation is to use an installation cable providing performance for a longer permanent link, for example, 105m verified by a field tester. This unique cable allows the installed cable length to be longer while using the same installation practices as standard cabling solutions, bringing peace of mind to installers and specifiers.



‘WITH CONVENTIONAL TWISTED PAIR CABLING THE HORIZONTAL DISTANCE IS LIMITED TO 100M. LONG REACH COPPER CABLING WOULD APPEAR TO BE THE OPTIMAL SOLUTION BECAUSE IT IS CONVENIENT AND COST EFFECTIVE.’

Quick on the draw

Alberto Zucchinali of Siemon takes a look at the evolving role of copper cabling in high speed networks, examining how advances in standards, design and application are enabling copper to remain a resilient and relevant choice in modern network infrastructure

▶ For decades, copper cabling has formed the backbone of Ethernet connectivity, serving as the foundational medium for local area networks (LANs) across enterprise, industrial and data centre environments. Despite the rapid evolution of optical fibre technologies and increasing demand for higher bandwidth, copper remains a crucial part of today's network infrastructure. Its role has not diminished – it has evolved. With technological advancements and new standards, copper cabling continues to offer viable, cost effective and energy efficient solutions, especially in short reach applications such as data centre interconnections.

TYPE CAST

Data centres remain one of the key environments where copper continues to be essential. As network speeds increase and infrastructures grow more compact, the demand for fast, reliable and low latency connections becomes increasingly vital.

For short distance links, copper cabling offers a cost efficient alternative to fibre, delivering similar performance without the added expense of optical transceivers and fibre terminations. This makes copper a smart choice for short range connections where both performance and efficiency are critical.

There are two primary types of copper cabling used in contemporary network

environments – balanced twisted pair cables and twinaxial (twinax) cables. Each has unique characteristics and use cases, and are optimised for different parts of the network infrastructure.

BALANCING ACT

Balanced twisted pair cabling is perhaps the most recognisable form of copper cabling, widely used in both enterprise and residential settings. The word balanced refers to the symmetry of the electrical signals carried by the cable pairs, which helps minimise electromagnetic interference (EMI) and crosstalk. These cables are classified into categories, ranging from Category 5e to the more advanced Category 8, each supporting varying levels of data rates and performance standards. They can provide more flexibility in structured cabling configurations and support channel lengths in the range of 100m for Ethernet networks.

This type of cabling also supports the remote powering of end point devices of up to 100W via power over Ethernet (PoE) technology. With the development of IEEE 802.3at Type 2 (30W), higher level IEEE 802.3bt Type 3 (60W) and Type 4 (90W) and POH (100W), remote powering technology serves a myriad of applications including wireless access points, security cameras, access control devices, LED lighting and audiovisual applications, as well



as desktop computers and laptops. Power cables and power outlets have become obsolete, which has led to great savings on material and installation work.

PoE can lead to heat building up within cable bundles and connector contacts can be damaged due to electrical arcing. This can cause power and efficiency losses, performance degradation and the potential for damaged connecting hardware. Shielded Category 6A or Category 7A copper cabling will maintain cabling performance, as these solutions are qualified for mechanical operation up to 75°C and provide greater thermal stability. Deploying connecting hardware in accordance with IEC 60512-99-001 (PoE Types 1 and 2) and IEC 60512-99-002 (PoE Types 3 and 4) will prevent possible damage to contact seating surfaces when the cabling is disconnected from a live device under PoE load.

TWICE AS NICE

Twinaxial cables, commonly referred to as direct attach cables (DACs), are another key component of copper-based networking. These cables consist of two insulated conductors enclosed in a single shielded cable, which provides excellent protection against EMI and ensures high signal integrity. DACs are predominantly used in point to point applications within data centres, connecting switches to servers or switches to other switches within the same rack or across adjacent racks.

DACs deliver exceptionally high performance, supporting speeds up to 800Gb/s. This makes them ideal for high performance computing (HPC), artificial intelligence (AI) clusters and cloud data centres, where ultra-fast interconnects are required. They can be grouped into passive DAC, active copper cable (ACC) and active electrical cable (AEC).

‘For short distance links, copper cabling offers a cost efficient alternative to fibre, delivering similar performance without the added expense of optical transceivers and fibre terminations.’

- **Passive DAC**

No electronics are present, as they rely on the switch or network interface card (NIC) for signal conditioning. Their typical use is for short reach connections (0.5-5m), with low cost, low power and low latency. However, they have limited reach and are heavier and less flexible than fibre.

- **ACC**

This is a sub-type of DAC that includes active signal conditioning to extend the reach and improve signal quality. They can reach up to 7m (depending on vendor and protocol), so they provide better performance over longer copper distances. They’re still more cost effective than fibre but consume slightly more power than passive DACs.

- **AEC**

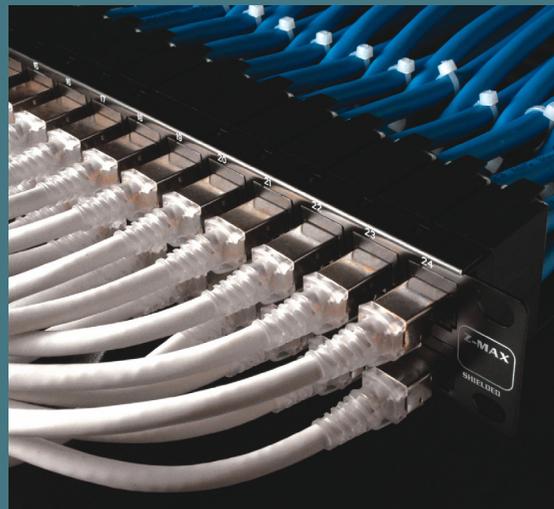
AEC is similar to ACC but usually supports retiming or equalisation, with more advanced signal processing than ACC. AEC’s typical range is longer than ACC (reaching up to 15m or more). AEC is ideal for mid-range connections where passive DACs are too short and fibre is too expensive, however, AECs are more expensive and power hungry than ACC or passive DAC.

Because DACs offer a direct electrical connection between devices, they eliminate the need for optical to electrical conversion, which not only simplifies the data path but also reduces latency and overall energy usage. However, it’s worth noting that DACs typically do not

support remote powering, unlike twisted pair cabling. Despite this limitation, the benefits of DACs, such as higher signal integrity, better shielding and tighter impedance control, make them superior to unshielded twisted pair cables in high speed, interference sensitive environments.

EVOLVING STANDARDS

As network demands continue to escalate, the standards governing copper cabling are also evolving to meet new performance benchmarks. One notable example is the October 2024 release of Revision E of the ANSI/TIA-568.2 standard. This updated standard outlines the performance and installation requirements for balanced twisted pair cabling systems, especially considering modern applications like High Speed Ethernet and industrial automation. The key updates in this revision include:



- **Recommended performance level.** Category 6A or higher, to support high speed applications.
- **Connecting hardware specifications.** Referencing IEC 60512-99-002 for unmating load testing to ensure long-term mechanical reliability.
- **Environmental conditions.** Defining maximum ambient operating temperatures of 45°C (113°F) and minimum cable temperature ratings of 60°C (140°F), which are essential for ensuring performance in thermally demanding environments.
- **Design and installation guidelines.** Emphasising best practices to maintain performance integrity, such as bend radius, cable routing and grounding requirements.

These updates ensure that copper cabling continues to meet the demands of future ready networks, while aligning with global standards for interoperability and reliability.

A HYBRID INFRASTRUCTURE

Looking ahead, the future of network infrastructure lies not in choosing between copper and fibre, but in combining both to create hybrid solutions that optimise the strengths of each medium. Fibre will continue to dominate long distance transmissions due to its high bandwidth, low signal attenuation and immunity to EMI.

Fibre is irreplaceable when it comes to campus-wide deployments, Metro Ethernet and backbone connections spanning hundreds of meters or kilometres. However, in the realm of short reach connectivity, particularly within data centres and edge computing environments, copper remains vital. It provides a practical, cost efficient and energy conscious

solution for interconnecting high speed servers, switches and storage systems within compact spaces.

HERE TO STAY

The complementary relationship between copper and fibre ensures that networks can scale efficiently while maintaining optimal performance and cost effectiveness. As technologies such as AI workloads, machine learning clusters and edge computing continue to emerge, the need for high speed, low latency and energy efficient connectivity will only grow, further cementing copper's place in the future of networking. ■



ALBERTO ZUCCHINALI

Alberto Zucchinali is solutions and services manager at Siemon. With over 20 years' experience in structured cabling, he has authored and presented numerous papers at worldwide industry conferences on various specialist subjects. Today he applies this learning to data centre infrastructure and designs network architecture for sites around the world.

Networks Centre

Available from Networks Centre, Siemon's TERA cabling system, initially designed for high bandwidth applications, also provides robust support for Single Pair Ethernet (SPE). This innovative solution leverages TERA's fully shielded design and high performance capabilities to ensure reliable SPE connectivity, particularly for industrial and building automation applications.

TERA's shielded quadrant construction effectively isolates the single pair, minimising electromagnetic interference (EMI) and alien crosstalk – crucial for SPE's reliable data transmission over longer distances. This superior noise immunity guarantees performance, even in



electrically noisy environments.

TERA's ability to support cable sharing allows for the simultaneous deployment of both traditional four-pair Ethernet and SPE over a single cable and outlet. This significantly reduces cabling infrastructure, lowers costs and optimises pathway utilisation. With its proven performance and versatile design, Siemon TERA offers a future ready

infrastructure that seamlessly integrates SPE alongside traditional Ethernet, empowering advanced connectivity solutions.

For product advice and registered installer training on the Siemon range, contact your Networks Centre sales rep.

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

HellermannTyton

HellermannTyton offers a complete copper system as part of its LAN product range. The Category 6A solution includes the Cat6A jack, patch panels, cable and patch leads. The Cat6A jack is designed to be toolless and does not require any specialist termination tools, while the Cat6A panels come in both a flat and a flat angled version.

The field termination plugs are used to create modular plug terminated links (MPTL) on-site for direct connection to fixed location devices. Like the Cat6A HTC jack, the MPTL is a toolless product,



providing engineers with a quick, flexible on-site solution. Along with the Category

6A products, HellermannTyton also has a range of Category 6 panels and outlets, along with a selection of LC and Euro modules, faceplates and backboxes.

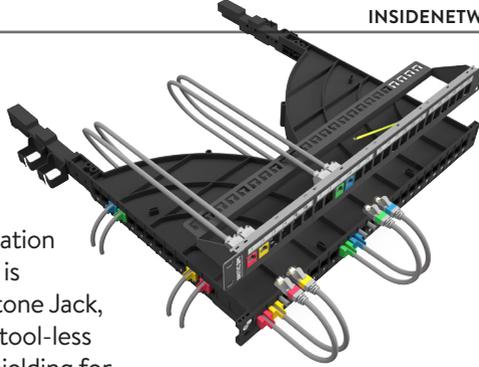
Products from HellermannTyton are supplied in plastic free packaging where possible, so the company can do its bit for the environment and the planet.

For more information **CLICK HERE.**
www.htdata.co.uk

Briticom

Briticom's copper cabling solutions deliver exceptional performance with an emphasis on organisation and ease of use. At the core is the KSJ STP Tool-Free Keystone Jack, which is designed for quick, tool-less installation and enhanced shielding for reliable, high speed data transmission. Pair it with Briticom's Category 6A Colour-Clipped Patch Cords, which are available in multiple colours for intuitive identification and seamless management across complex networks.

Supporting this ecosystem is the 1U Channel Cable Management Tray, which ensures neat, structured routing of cables – reducing clutter and improving airflow within racks. Completing the set-up is the 24-Port STP Patch Panel featuring



automatic shutters that enhance dust protection and streamline aesthetics.

Together, these colour coordinated components not only simplify installation and maintenance but also offer robust, high performance connectivity tailored for modern infrastructure needs. Briticom combines precision engineering with smart design – making copper cabling efficient, professional and visually organised.

CLICK HERE to find out more.
www.briticom.net

Excel Networking Solutions

As schools, colleges and universities plan summer ICT upgrades, Excel Networking Solutions' **copper cabling solutions** offer the perfect blend of performance, speed and sustainability. Our end-to-end Category 5e, 6 and 6A systems support the bandwidth and reliability that modern education demands.

Excel's **pre-terminated copper assemblies** accelerate project timelines, reduce installation waste and ensure top-tier quality control. For commonly used components like patch leads, keystone jacks and modules, we supply in plastic free packaging and ecofriendly multipacks – helping installers reduce single use plastic waste on-site.



We're committed to **responsible manufacturing**, with recognised credentials including Environmental Product Declarations (EPDs) and TM65 certification, EcoVadis Silver sustainability

ratings and Forest Stewardship Council (FSC) certified packaging. It's cabling that delivers best in class performance today – without compromising tomorrow.

Backed by a **25-year warranty**, expert technical support and excellent availability, Excel is the smart and responsible choice for summer term upgrades.

CLICK HERE to read more about Excel in the education sector.
www.excel-networking.com

A sense of direction

Harshang Pandya of AEM Precision Cable Test unravels the interconnected web of standards bodies and organisations

▶ Standardisation is critical and different standards bodies with clear focus areas define the operations of complex Ethernet networks. In terms of the physical medium, the popularity of multimode and singlemode fibre optic cabling is increasing over copper due to increased data rates and the reduced costs of fibre cables and components. However, copper cabling is still in great demand due to its advantages in terms of cost and ease of installation, as well as its ability to combine data and power delivery.

MULTIPLE CHOICE

There are several standardisation bodies around the world. The good news is that most of them collaborate well with each other.

IEEE develops standards for Ethernet communications for different speed grades, media types and operating distances. The IEEE 802.3 series of standards cover popular BASE-T networking technologies starting from 10BASE-T, 100BASE-T, 1GBASE-T, 2.5GBASE-T, 5GBASE-T and 10GBASE-T. These standards are all defined for 100m four pair twisted pair cables primarily using RJ-45 connectors. This consistency in physical medium, combined with universal appeal of TCP/IP stack, has made Ethernet one of the most popular communications technologies.

While IEEE defines communications standards, bodies like the Telecommunications Industry Association (TIA) and International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) focus on the requirement for the physical media itself. They define communications performance for the cabling without necessarily targeting a specific communications technology. Today, Category 5e (Class D), Category 6 (Class E), and Category 6A (Class EA) are among the most popular copper cabling standards for Ethernet communications.

WHERE ARE WE HEADED?

The hunger for higher data rates is never ending. However, twisted pair copper based Ethernet has not seen adoption of higher speeds. Several years after the IEEE 802.3bq standard was developed for 25Gb/s communications over twisted pairs, and corresponding cabling standards TIA Category 8 (ISO Class I, Class II) were ratified, this technology is still not commonplace.

There are some 25GBASE-T direct attach cables (DAC) in operation, but widespread usage has not picked up as expected. Higher power consumption in the copper physical layer, limited distance (30m on Category 8) and reduced cost advantage



over fibre optic cables are some of the factors responsible for this trend.

A LONG STORY

Adoption of copper cabling has been steadily increasing to cater for higher PoE power levels, and increased usage of 10GBASE-T for enterprise links, driven by Wi-Fi access points and other high speed connections. A significant trend is towards longer reach copper cabling systems. The 100m limit imposed by cabling standards has been a roadblock for many applications, particularly campus wide links for security systems and other internet of things (IoT) based connectivity.

Some industry experts are of the opinion that the standardisation activity has been

slow in responding to this trend. There are many proprietary implementations of longer reach cabling systems but users must strictly follow a cabling vendor's recommendations to ensure trouble free operation in longer than standards specified cabling links. There are examples of up to 250m functional links running slower data rates of 100Mb/s or less and the standards are taking note. The TIA, for example, is in the process of developing a white paper defining guidelines for extended reach cabling systems.

SINGLE LIFE

While extended reach cabling usage is an evolution for 4-pair cabling systems, Single Pair Ethernet (SPE) is designed to support

‘While IEEE defines communications standards, bodies like TIA and ISO/IEC focus on the requirement for the physical media itself. They define communications performance for the cabling without necessarily targeting a specific communications technology.’

longer lengths, as much as 1000m (1km) on single twisted pair. IEEE 802.3cg, popularly known as 10BASE-T1L, specifies 10Mb/s operation over 1km of SPE cables. This is a great way to connect and power up IoT devices in large campuses.

10Mb/s is sufficient for most devices and there are immense advantages in not having to install active repeaters with power supplies in the middle of the channels. SPE is a great example of technology enabling a cost effective and easier approach to a communications application. TIA 568.5 defines cabling and components for SPE and a 1000m link can have up to 10 connectors in its path. ISO/IEC 61156-13 also similarly defines SPE long reach cabling.

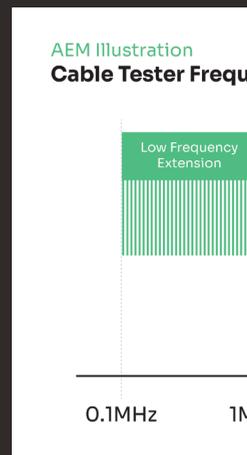
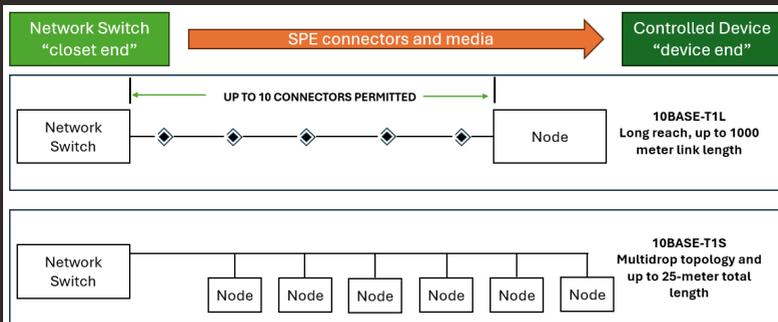
ISO/IEC 61156-11 specifies a shorter reach version of SPE cabling suitable for 100Mb/s. The standards recognise multiple connector types for SPE cabling. While the LC-type connector is widely accepted for premise environments, other connectors

are more appropriate for outdoor applications and industrial environments. Furthermore, ANSI/TIA-568.7 defines SPE cabling and components for industrial applications.

It is interesting to note here that SPE systems were originally envisaged for automotive usage. There are established industry standards for 1Gb/s and beyond for shorter reach automotive SPE communication links. It will be interesting to see these standards or their variants making way into industrial and commercial applications, given that modern intelligent connectivity caters to diverse applications that include mobile devices, like robots, too.

TESTING TIMES

SPE is quite mature in terms of standardisation. The complete operation has been defined and ANSI/TIA-5071 defines



field testing for SPE cabling. In fact, while SPE promises lower cost and ease of installation, it does require additional capability from testing equipment.

Given that the reach can extend to 1000m, a tester needs to be able to perform dual ended testing with main and remote units up to this distance. The spacing of test frequencies is much narrower for SPE long reach systems compared to 4-pair cable tests. The lower end of the test frequency starts at 0.1MHz instead of 1MHz for 4-pair cabling and, depending on the application, the higher frequency may be up to 1.2GHz. It is important to confirm the suitability of field test equipment for SPE testing to avoid additional capital spending at later date.

Another interesting variant of SPE cabling is multi-drop cabling systems. Multi-drop cables avoid the need to have separate link for every end point. Instead of a star topology, multi-drop uses taps on the same cable link to connect devices. This topology, first being defined for 50m and a 10Mb/s data rate, can be very cost effective for IoT connectivity or sensor networks. IEEE is developing IEEE 802.3da for multi-drop Ethernet communication.

GROWING CONCERN

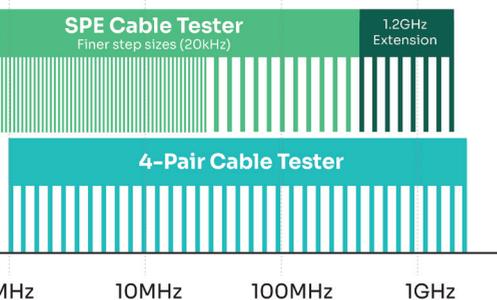
As our world makes technological progress, we are also concerned about sustainability. Standardised SPE systems including multi-drop systems provide not only cost effective connectivity, they also are more environment friendly – 1-pair instead of 4-pairs, reduced total cable runs, eliminating repeaters and additional power delivery channels etc. It is satisfying to see that standardised copper cabling systems are growing – and growing responsibly. ■



HARSHANG PANDYA

Harshang Pandya is general manager of AEM Precision Cable Test. He joined AEM in 2017, with the company's acquisition of InspiRain, a Singapore-based company he co-founded. He has extensive experience in leading the development of electronic test and measurement systems including leading the research and development and product planning team at Agilent Technologies. Pandya also holds eight US patents.

encies



Briticom strengthens leadership team with Justin Niles and Keith Sawyer

Briticom has expanded its leadership team with the addition of Justin Niles as sales director and Keith Sawyer as product and technical consulting director. These strategic hires reflect Briticom's continued commitment to innovation, growth and delivering exceptional value to clients across the industry.

Niles brings a proven track record in sales leadership and client engagement through building high performing teams and nurturing long-term partnerships. Sawyer offers extensive experience in product

development, strategic consulting and technical innovation.

He will lead efforts to enhance Briticom's product portfolio and deliver tailored solutions that address the evolving needs of customers.

'We are thrilled to welcome both Justin and Keith to the Briticom team,' said Wadii Kherfani, CEO at Briticom. 'Their combined expertise and leadership will be instrumental in driving our next phase of growth

and ensuring we continue to exceed client expectations.'



Steve Fearon joins Pulsant as chief commercial officer

Pulsant has appointed Steve Fearon as chief commercial officer.

In his role, and as part of the company's executive leadership team, he will drive Pulsant's growth agenda, leading sales, commercial and client relationship teams. With a wealth of experience managing complex business operations and technology solutions, Fearon brings expertise in strategic planning, market development and

client focused growth initiatives.

Commenting on his appointment, Fearon said, 'Mid-sized UK businesses are the backbone of our economy, yet they face mounting challenges – from data sovereignty concerns to rising IT costs – all while driving innovation and efficiency. I'm eager to bring my experience to the team and help our clients unlock their full potential in this rapidly evolving digital landscape.'



nLighten expands its senior management team with strategic executive appointments

nLighten has appointed two senior executives – Hans Nipshagen as vice president channel sales, AI and platform sales, and Arno van Gennip as vice president operations enablement. These strategic additions are part of nLighten's ongoing growth across Europe.

Nipshagen brings over two decades of experience in enterprise sales, channel strategy and regional leadership. He previously held the role of regional vice president, channel sales EMEA at Akamai Technologies, where he successfully restructured the company's channel sales organisation to improve scalability and alignment with the direct sales teams.

van Gennip most recently served as



vice president global IBX operations engineering at Equinix. During his nine years at Equinix, he also led strategic initiatives in operational environmental sustainability, facility operations and engineering transformation.

Harro Beusker, CEO and co-founder of nLighten, said, 'Hans brings invaluable expertise in building thriving partner ecosystems across complex markets, while Arno's operational leadership and sustainability focus will be crucial as we grow responsibly. Both will strengthen our capabilities and help position nLighten as a leading edge data



centre platform in Europe.'

CHANNEL UPDATE IN BRIEF

Bioscope Technologies and its sister company n2s have announced several key appointments. n2s CEO, Rob Bolton, will now serve as group CEO and Rob Edwards has joined as non-executive director to help guide the group on its expansion plans over the next five years. n2s chairman, Simon Taylor, will chair both companies with he and Nick Razey remaining as major shareholders.

Torben Christensen has been named chief financial officer at Danfoss Power Solutions.

MLL Telecom has appointed Kirste Johnston as strategic client director for Scotland and the north of England. With 30 years' experience in the tech and comms industry including, most recently, nine years at Vodafone, Johnston brings a wealth of knowledge and expertise in consultative technical sales, sales strategy and leadership.

AVK has taken a significant step forward in its drive towards true sustainability with the appointment of Sarah King as its new head of corporate social responsibility. King brings nearly two decades of experience in responsible business and social impact across Europe, Asia, Africa and the Middle East.

The spirit of the age

Traditionalists, baby boomers, Generation X, Generation Y and Gen Z all make up the modern workforce – with an age range of between 16-75 years old. Adelle Desouza of HireHigher offers some advice on navigating the multigenerational workforce

▶ With so much emphasis on recruitment, often at the younger end of the scale, are businesses taking hold of the attraction and retention requirements to truly embrace generational diversity? Generational diversity is not just the era in which you were born but covers much more – the role of work in broader life, work environments and working style, including leadership and management styles, as well as unique retention strategies. Understanding these differences, as well as the effects of society, war, economic peaks and troughs, pandemics and how technology is used, puts the C-suite in a much more informed position.

EVOLVING LANDSCAPE

It would be remiss to assume that expectations do not change – what your millennial workforce craved 10 years ago will have changed with their life experience. Being flexible, agile and open to that is vital. For example, Gen Z like to share everything about their lives, which runs counter to the data centre and network industry's more closed, security conscious culture. So

how do you engage and manage everyone across the different generations?

Building programmes, as well as policies that can support the workforce in full is hard work, but there are three key things that I believe can help:

- **Mentoring to help bridge the gap**

It's important to provide opportunities for all employees to learn and grow. This can include formal training programmes, workshops and mentorship schemes. It can also be more informal through opportunities like peer-led and reverse mentoring. Pairing younger employees with more experienced ones not only helps with knowledge transfer but also fosters mutual respect. Younger employees can also teach older ones about new technologies and trends, helping to reduce any divides between the generations.

Last year, we ran a student showcase welcoming 60 students to the UK's largest data centre conference. While the 16-17 year olds were chaperoned by recent graduates and apprentices just a few years older than them, they were also accompanied by industry all-stars who had



spent decades in the industry. The exercises undertaken by the students included a dive into technical industry questions through the use of social media for personal and professional branding, with several generations showcasing their expertise in different ways.

It was apparent how much all participants got out of the day from the positive feedback from the students and the employees participating. We all have so much to learn from every generation, so organisations must ensure their cultures enable this.

• Removing barriers to entry

Creating programmes that segregate based on age, and thus generation, implicitly implies that an organisation is not as inclusive as it could be. Whilst there is

recognition that firms can't deploy a unique programme for every generation, there are ways to ensure that special treatment, the creation of subcultures and preferential treatment don't result in ostracising team members – both current and potential.

Recruitment activities like graduate

schemes or apprenticeship programmes can often be blamed for creating a divide. Still, the smarter organisations out there look at it this way – once the recruitment element is complete, the new employees become part of the team, from training to meetings to reviews and progression

possibilities. There is no special treatment, but rather integration happens from the get-go.

Offering working options such as flexible hours and part time roles also helps to

'It's important to provide opportunities for all employees to learn and grow. This can include formal training programmes, workshops and mentorship schemes. It can also be more informal through opportunities like peer-led and reverse mentoring.'

‘Supporting generational diversity in the workplace is more than a DE&I gimmick. It is an ongoing strategic programme of work that will allow your business to make the most of its talent.’

accommodate the different life stages and needs of potential employees. However, remote working can be a challenge for some organisations. Companies need to keep an open mind and really look at what is possible to accommodate more flexible working, or they will find that their talent goes elsewhere.



• Review benefits

This one is not as straightforward as it seems. It is definitely for those who want to ensure generational diversity is something to be embraced and forms part of the strategy towards a high performing organisation. As mentioned, just because an employee is part of a generation doesn't mean their motivations, life circumstances and experiences are homogenous to their peer group. We often make assumptions about different generations based on media bias. It's important not to fall into that trap.

Having a wide array of benefits and opportunities that align and adapt to the needs of your workforce is perhaps the most progressive way to ensure you can support five generations in the workforce.

Providing benefits that cater to physical, mental and financial wellbeing can appeal to all generations. This might include gym memberships, mental health support and financial planning services. Offering a range of benefits that appeal to different age groups such as childcare support, eldercare assistance and retirement planning can also ensure that all generations feel valued and supported.

MORE TO IT

Supporting multiple generations in the workplace is more than a diversity, equity and inclusion (DE&I) gimmick. It is an ongoing strategic programme of work that will allow your business to make the most of its talent and ensure that every employee, regardless of

their generational background, feels connected to the overarching goals of the organisation. By integrating management practices with strategic objectives, companies can foster a cohesive and motivated workforce that is well equipped to adapt to changing market conditions and technological advancements. This approach not only enhances productivity but also promotes a

culture of continuous improvement and innovation, which is essential for long-term success. ■



ADELLE DESOUZA

Adelle Desouza is founder of HireHigher. She has turned her experience within the tech industry and passion for supporting young people into a professional endeavour. Frustrated by the constant talk – and no action – in the data centre, cloud and telco industries about the need to attract more talent, she set up HireHigher. It aims to revolutionise how career advice is delivered in schools and how employers build programmes for young people starting their early careers to encourage them to consider entering the industry.



Quickclicks

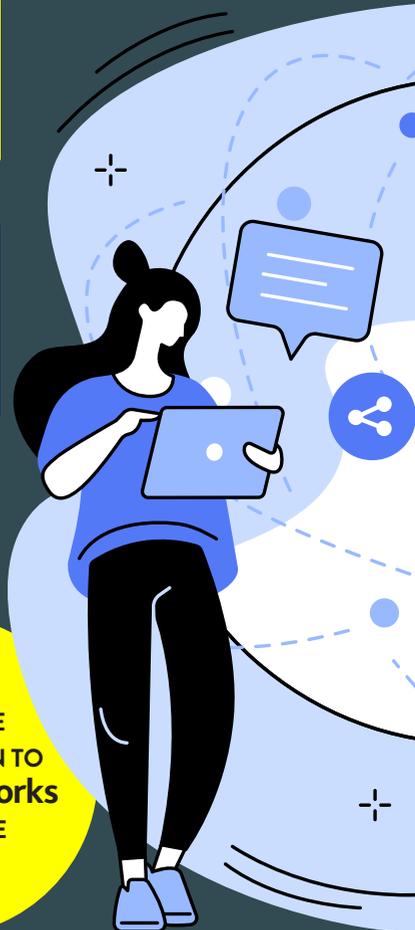
Your *one click guide* to the very best industry events, webinars, electronic literature, white papers, blogs and videos

An Introduction To Single Pair Ethernet is an application note by **AEM Precision Cable Test**. [CLICK HERE](#) to download a copy.

How Cable Choice Impacts Fibre Network Costs is a blog by Barrie Powell of **Aginode**. [CLICK HERE](#) to read it.

Unlocking AI Potential Through Seamless Data Center Connectivity is a blog by Gary Bernstein of **Siemon**. [CLICK HERE](#) to read it.

FOR A FREE
SUBSCRIPTION TO
Inside_Networks
[CLICK HERE](#)



Energy Efficiency Directive: KPIs and Metrics is a viewpoint document from the **European Data Centre Association (EUDCA)** that offers a technical assessment of sustainability metrics and calculation methodologies. [CLICK HERE](#) to request a copy.

Flexible Data Centers To The Rescue Of An AI-Induced Power Crunch is a blog by Steven Carlini of **Schneider Electric**. [CLICK HERE](#) to read it.

Simple And Efficient From 100G To 800G is a white paper from **R&M** that offers guidance on how to future proof the transformation of data centre infrastructure. [CLICK HERE](#) to download a copy.

Staying Green Under Pressure: How To Meet Environmental Regulations With Smarter Infrastructure is a blog by Maren Price of **Chatsworth Products (CPI)**. [CLICK HERE](#) to read it.



Getting a grip

Stu Redshaw of EkkoSense argues that when it comes to data centre energy management it's time for some serious engineering thinking

▶ Artificial intelligence (AI) sits at the heart of almost every corporate IT business strategy and every day we're seeing more news of new AI partnerships, business initiatives, AI-ready platforms and powerful AI applications. So, with graphics processing unit (GPU) intensive AI workloads now consuming more energy and generating increased heat within data centres, operations teams should be thinking hard about their IT infrastructure and what they need to do to accommodate accelerating AI demands.

FIRST THINGS FIRST

Top of the agenda should be a determination to reach a very clear understanding of precisely what's going on from an infrastructure and engineering perspective when deploying AI services and actually starting to run them at scale. This becomes increasingly important when you consider not just the dramatic increase in central processing unit (CPU) power consumption that we're already seeing, but also an associated increase in data centre energy usage.

There's clearly a huge gulf between the traditional CPU-based compute that characterised most data centres for the last five years and the workloads targeted by the latest GPU servers from vendors such as Nvidia. We estimate that the typical server racks currently deployed consume between 5-12kW on average, however,

we're already seeing AI compute loads that range between 30-120kW per rack. That's a whole new level of power density and energy consumption. And it's not stopping there.

This year's Nvidia GB200 NVL72 GPU is forecast to consume 120kW in a single rack. That's equivalent to around 120 houses worth of electricity being consumed by what's effectively a cubic metre box. From a thermodynamics perspective that's a fiery furnace! Fast forward two more years and Nvidia's planned Rubin Ultra NVL576 GPU is projected to require up to 600kW of power.

IN THE MIX

Clearly the whole industry isn't going to switch immediately to AI compute GPUs demanding this much power. Most of the IT equipment already installed still has potentially years of life left, with much of it already busy supporting current workloads as well as newer digital transformation initiatives. However, we're clearly moving quickly to a hybrid scenario where there will be a blend of CPU-based and GPU-based servers, as well as a mixed cooling infrastructure with both air and liquid cooling needed in the same room.

With the processing of GPU intensive workloads clearly set to generate more

These are

Liquids and air

Enhanced

Hot Aisle Containment

Immersion Cooling

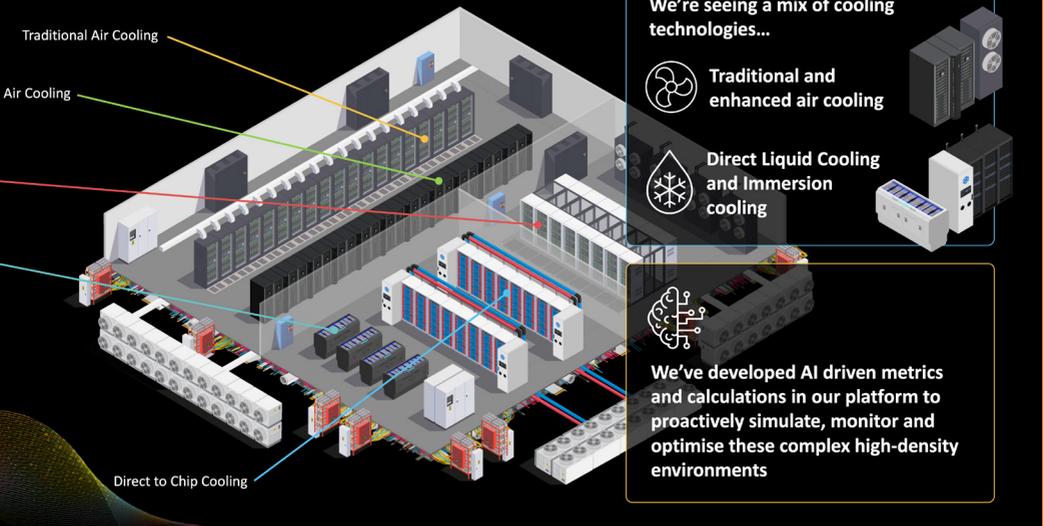
heat within data centres, operations teams need to think hard about their current infrastructure and how it will need to evolve. At EkkoSense we're already seeing AI-driven heat loads exhibiting significant

something very different to manage these loads.

AI places an increased premium on real-time white space visibility. Therefore, anything that we can do to help dial

Complex environments to manage

Air co-exist in hybrid cooling deployments



dynamic variability. It's all very different from the reassuring certainty of traditional enterprise workloads. AI applications load-up differently, obviously with very high heat loads, but it's the sheer rate of change that's more significant.

POINT OF DIFFERENCE

Until now there has been a familiar cadence to how traditional data centres run, but with AI workloads such as large language models it's much more dynamic. As AI compute loads kick-in things immediately get much warmer within seconds. Suddenly the heat is sitting across the rack tops as extra megawatts hit the room. It's exciting, but it also signals that you're going to need

down the stress levels for data centre management is becoming more important. Operations teams need to be confident of what's likely to happen from an infrastructure and engineering perspective when they launch or extend their AI services.

KEEP A COOL HEAD

Wider deployment of AI compute loads means they will need to be supported by a smart hybrid cooling approach – most likely some kind of direct liquid cooling to the chip or the chassis, as well as some kind of rear door plate heat exchange technology. Data centre operations teams will also still require some level of air

‘What’s needed now is absolute real-time white space visibility – the ability to look across your whole data centre estate and be able to check that the assumptions that you’re making on cooling, power and capacity are standing up.’

Some very practical engineering concerns with AI loads

AI GPU driven workloads represent a different energy profile

Standard loads



- Typical compute load profile today is fairly static with more predictable rises and falls

AI loads



- Significant heat rejection challenges
- Loads peak and fall rapidly causing heat surges that damage hardware
- Reduced computational performance (throttling) due to temperature excursions with IT components

cooling in the room, as you’ll always get some heat via conduction across the board. Bringing all this together leads to inevitable challenges. Given that it’s not possible to run completely liquid cooled data centres, the reality for most data centre operators is that liquid cooling and air cooling will both have an important role to play in the cooling mix.

Data centre operations teams need to answer key engineering questions before deploying liquid cooling, particularly around the exact blend of air and liquid cooling required, and how to handle the complexity of managing hybrid cooling within the same

room. Getting it right first time is critical, and that’s why people are placing so much importance on having everything ready and in place. AI compute racks represent a major investment, so you’ll need to be sure that your infrastructure is 100 per cent, that all the cooling is deployed and that you’ve got all the right back-ups in place. There’s a lot of commitment needed to ensure that it all works straight out of the box.

REDUCING THE RISK

What’s needed now is absolute real-time white space visibility – the ability to look

across your whole data centre estate and be able to check that the assumptions that you're making on cooling, power and capacity are standing up. Applying best practice AI-powered optimisation is an important first step in getting your evolving infrastructure operating as efficiently as it can.



Having access to this kind of insight is vital, particularly the ability to understand exactly where you stand in terms of your current power, cooling and capacity needs. However, given the acceleration towards AI computing, there are also now some more profound engineering questions that need answering. These include:

- How much power are we likely to need?
- What spaces can we use for high density AI loads?
- What would be our best cooling strategy?
- Where are the infrastructure capacity bottlenecks for increasing IT loads?

Decisions are needed now, and organisations simply can't afford to get things wrong. These are questions that need very precise answers – and quickly.

So how can IT and facilities teams be certain that they have made the right choices when it comes to deploying and operating the AI platforms and liquid cooling infrastructure needed to support escalating high density data loads?

BEST FOOT FORWARD

That's where the value of a digital twin approach for automating data centre

simulation and modelling can make a huge difference. Data centre teams can zero in on the right decisions by creating, testing and analysing the results of multiple data centre scenarios. What they get to see is whether it's possible to take their infrastructure forward so that they can bring in the capacity needed to deliver AI compute at scale within their business timeframe. So, when asked if they are ready for AI, they will – for the first time – be able to answer with confidence. ■



STU REDSHAW

Stu Redshaw is joint founder and chief technology officer at EkkoSense. He holds a doctorate in heat transfer and thermodynamics from Nottingham University and specialises in revolutionary clean tech and energy efficient systems. He is particularly recognised for his focus on resolving thermal challenges and has led many breakthrough academic projects in this area.

Schneider Electric

Schneider Electric's Easy UPS 3-Phase Modular is a robust uninterruptible power supply (UPS) designed to protect critical loads. Easy UPS 3-Phase Modular is available in 50-250kW capacity with N+1 scalable configuration and supports the EcoStruxure architecture, which offers remote monitoring services.

With scalability top of mind, Easy UPS 3-Phase Modular enables you to pay as you grow, allowing you to optimise capital investment. It is a part of Schneider Electric's Green Premium portfolio, which ensures energy efficiency, durability, recyclability and transparency to help reduce environmental footprint.

In addition, this system features advanced technology such as a high efficiency design, intelligent battery management, real time monitoring and control capabilities. These features combine to make it one of the most cost effective and energy efficient UPS solutions available in the market.

To find out more [CLICK HERE](#).

www.se.com



50

Panduit

Panduit's uninterruptible power supply (UPS) range provides a flexible, customer-centric solution, offering lithium-ion and valve regulated lead acid (VRLA) batteries across various capacities. It includes 1/2/3kVA options for lithium-ion and 5/6/10kVA, as well as 10/15/20kVA configurations, for VRLA that are available in both single-phase and three-phase set-ups.

The right UPS system is crucial for ensuring business continuity, especially as the transition between utility power failure and UPS switching takes a matter of milliseconds. Furthermore, interruptions lasting

more than 20 milliseconds can cause IT systems to crash. Panduit's UPS range not only delivers power back-up but also offers intelligent network management, environmental monitoring, security

sensors and the ability to connect to external battery packs.

Choosing the right UPS solution is essential to meet the demands of the IT load, especially for systems running critical applications. Also, as modern processors become faster and generate more heat, ensuring the UPS supports cooling

systems is increasingly important.

To find out more [CLICK HERE](#).

www.panduit.com



EkkoSense

EkkoSense launches new AI-driven data centre management software that releases stranded cooling capacity, removes power and thermal risk, and cuts cooling energy costs.

EkkoSense has launched EkkoSoft Critical 9.0 – a major new version of its 3D visualisation and analytics data centre management software.

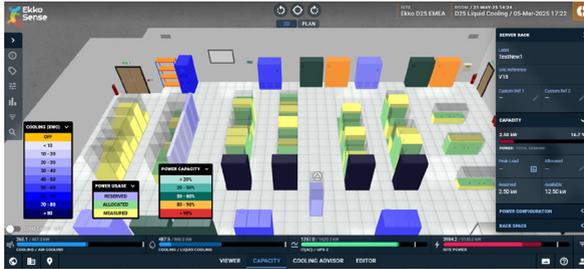
EkkoSoft Critical 9.0 unlocks support for the largest and most complex data centre rooms. It offers the optimisation of

hybrid liquid and air-based cooling within the same room, and introduces advanced power management capabilities including three-phase balancing and residual current monitoring.

‘EkkoSoft Critical 9.0 becomes the essential AI tool for operators – including hyperscalers, colocation facilities and financial firms

– looking to balance legacy and digital transformation workloads with AI demand’, said EkkoSense CEO, [Dean Boyle](#).

For more information [CLICK HERE](#).
www.ekkosense.com



The image shows a tablet displaying the Inside_Networks website. The main article is titled "Emission impossible?" and discusses the challenges of reducing carbon emissions in data centers. The website header includes "Inside_Networks" and "HollermannTyon". A call to action box on the right side of the tablet reads: "GET YOURSELF SEEN BY THE TIME YOU READ THIS YOUR COMPETITORS' ADVERTISEMENTS WILL HAVE BEEN SEEN BY OVER 23,000 READERS OF INSIDE_NETWORKS. IF YOU WOULD LIKE TO PROMOTE YOUR PRODUCTS AND SERVICES AND MAXIMISE THE POTENTIAL OF YOUR ONLINE ACTIVITIES, CLICK HERE."

FOR A FREE SUBSCRIPTION TO [Inside_Networks](#) [CLICK HERE](#)

Checks and balances

Ben Pritchard of AVK explains why effective data centre energy strategies are essential to minimise environmental impact and ensure resilience, grid stability and long-term operational viability

As digital technologies continue to shape the modern world, data centres have emerged as the vital infrastructure underpinning countless sectors – from finance and healthcare to artificial intelligence (AI) and entertainment. However, with their growing significance comes an equally expanding environmental footprint. As the urgency to address climate change intensifies, the spotlight is firmly on how data centres can balance rising demand with responsible energy management.

CLOSING THE GAP

In today's environment, achieving sustainability goals requires both immediate action and a long-term vision. The data centre sector is uniquely placed to lead by example, demonstrating how innovation, flexibility and collaboration can forge a path toward a net-zero future.

Data centres are among the most energy intensive facilities globally, with demand projected to rise steadily in the coming years. According to industry forecasts, global electricity consumption from data centres could reach up to eight per cent of total demand by 2030. Meanwhile, although promising, the expansion of renewable energy infrastructure has not

yet matched the pace required to meet this growing need sustainably.

Bridging this gap calls for adaptable, forward thinking energy management strategies. Deploying scalable microgrid solutions that integrate renewables such as solar and wind alongside transitional fuels like hydrotreated vegetable oil (HVO) offers a pragmatic route to strengthening both on-site and grid level resilience. These hybrid systems allow data centres to optimise their own energy use while contributing to broader energy transition efforts.

HARNESSING FLEXIBILITY

In the shift towards a greener energy landscape, grid flexibility is paramount. Data centres have a significant opportunity to support grid stability by adopting intelligent energy management systems. By embracing technologies that enable



dynamic load management, on-site energy storage and grid responsive operations, facilities can become active participants in balancing energy supply and demand.

Microgrids, particularly when combined with smart control technologies, allow facilities to operate independently or in synchrony with the main grid. During periods of peak demand, surplus energy can be exported back to the grid, reducing the need for carbon intensive peaking plants. This approach transforms data centres from passive consumers into active contributors to a more sustainable and resilient energy system.

Looking ahead, the integration of large scale campuses – sometimes exceeding 1GW of capacity – into local energy ecosystems will become increasingly critical. Flexible energy assets will not only underpin site reliability but will also play

a central role in national decarbonisation strategies.

PREPARING FOR TOMORROW

Forward looking designs incorporating adaptability ensure that today's investments remain relevant as the energy landscape evolves. Systems engineered for fuel flexibility can transition seamlessly from current low carbon alternatives to fully renewable fuels, future proofing infrastructure and reducing the risk of stranded assets.

Innovation must also extend beyond technology. Investing in the next generation of skilled engineers, project managers and energy specialists is fundamental. Training programmes, apprenticeships and industry collaborations are vital to cultivating a workforce ready to meet the complex challenges of



‘By embracing technologies and approaches that bridge today’s realities with tomorrow’s aspirations, data centres can not only meet the demands of the digital economy but also do so in a way that champions environmental stewardship and social responsibility.’

sustainable energy management in data centres.

WORKING TOGETHER

Achieving meaningful progress towards net-zero demands extensive collaboration across the supply chain and wider community. Early engagement between power systems specialists, renewable energy providers, planning authorities and utility companies can unlock synergies that drive more effective project outcomes.

For instance, planning data centres as integrated components of local energy ecosystems opens up opportunities for waste heat recovery. Excess thermal energy generated during data centre operations can be harnessed to supply district heating networks, benefitting residential developments, swimming pools and businesses. Proactive stakeholder engagement can help identify such opportunities early on, ensuring that projects deliver broader societal benefits and foster positive community relationships.

Collaboration can also help optimise energy strategies across portfolios. Coordinated approaches to load balancing, site clustering and shared renewable generation assets could further reduce emissions and enhance the digital economy’s overall sustainability.

RAISING THE BAR

While technology and collaboration are critical, supportive regulatory frameworks and industry standards



are equally important. Clear policies that incentivise the deployment of low carbon technologies enable flexible grid participation and encourage investment in future ready infrastructure, which will accelerate the journey towards sustainable data centre operations.

The development of internationally recognised green certifications and energy performance standards for data centres is also helping to raise the bar across the industry. These frameworks not only provide benchmarks for best practices but also offer reassurance to stakeholders that sustainability claims are underpinned by verifiable metrics.

Organisations operating within this sector must advocate for policies that enable progress while remaining agile enough to adapt to evolving requirements.

Building an open, transparent dialogue with regulators and policymakers will be key to shaping a supportive landscape that enables innovation to flourish.

LEADING THE WAY

The transition to a net-zero future represents one of our time's most complex and urgent challenges. Energy management is no longer a back-end concern but fundamental to business resilience, reputation and responsibility. By embracing technologies and approaches that bridge today's realities with tomorrow's aspirations, data centres can not only meet the demands of the digital economy but also do so in a way that champions environmental stewardship and social

responsibility. The path ahead will require ambition, investment and ingenuity, but it offers immense opportunity for those ready to lead the way. ■



BEN PRITCHARD

Ben Pritchard is CEO of AVK. After an injury ended his plans for a professional rugby career, he joined AVK as a part-time service engineer and gained hands-on experience across engineering, commissioning, project management and sales. Over more than a decade, Pritchard rose through the ranks to lead the company's expansion, focusing on sustainable innovation in critical power infrastructure. Appointed CEO in 2023, he is committed to combining AVK's 35-year legacy with forward thinking strategies, helping data centres meet evolving energy needs through solutions like microgrids and battery storage.



Zelim saves lives at sea with Pulsant

Pulsant has been chosen by Zelim as its digital infrastructure partner. As part of a vision to deliver the world's first unmanned search and rescue capability, Zelim launched ZOE Intelligent Detection in 2024. ZOE applies inference artificial intelligence (AI) to video feeds to deliver real-time detection and alerts about passengers or crew who fall overboard. This guides search and rescue operations, making them faster and safer.

Due to rapid growth, Zelim identified a need for a colocation partner. Having initially hosted its servers on-premise, it quickly realised it faced not only high

energy costs but also an unacceptable level of risk. This exposure ranged from

the threat of power outages and fire to flooding and theft. Any compromise to the resilience of the infrastructure is unacceptable, as it stops Zelim from delivering lifesaving services.



Zelim chose the Pulsant facility at South Gyle, Edinburgh. The physical proximity of the data centre to the Zelim headquarters was key to the decision, as the team at Zelim need fast access to implement new hardware, switches and firewalls. The connectivity offered by Pulsant has enabled it to run a 10Gb/s, 5G LTE out to 12 nautical miles from South Gyle.

Schneider Electric and Start Campus establish a scalable and sustainable foundation for AI and cloud infrastructure in Portugal

Schneider Electric has partnered with Start Campus to deliver and operate its 26MW SIN01 facility in Sines. The SIN01 facility, operational since Q4 24 and the first building of Start Campus' 1.2GW campus, leverages a comprehensive suite of solutions from Schneider Electric's

EcoStruxure for Data Centers portfolio and Sustainability Services to set new benchmarks for resilient and sustainable workloads for AI, cloud and graphics processing unit (GPU) accelerated

computing clusters.

The groundbreaking facility, built



on repurposed industrial land near a decommissioned power station, has been designed to deliver advanced energy efficiency. By leveraging intelligent data from Schneider Electric's connected infrastructure solutions, and

utilising the real-time insights enabled via Schneider Electric's EcoStruxure software, the company can achieve unparalleled levels of operational efficiency, reliability and scalability at SIN01.

Portus Data Centers announces additional facility for Munich

Portus Data Centers has announced the further expansion of its Munich colocation campus with the construction of an additional 5.5MW facility – Portus Data Centers Munich 2 (MUC2). This will add a further 2.200m² of white space and increase the total IT load capacity available to 7MW.

Construction of the new Tier III+ carrier neutral data centre has already started on the Munich campus and initial capacity will be delivered in late 2026. The new data centre will be fully EnEFG compliant and will cater for workloads ranging from normal power densities all the way to artificial intelligence (AI) and high performance computing (HPC) including

ultra-high density using liquid cooling.

Portus has developed an AI native reference design that makes the data centre fully future proof. Providing industry leading energy efficiencies of PUE 1.2 or lower, it will use 100 per cent renewably sourced power and the latest cooling technologies.



Aligned and Lambda partner to power next generation AI infrastructure

Aligned Data Centers has partnered with Lambda to provide customers with data centre infrastructure and an artificial intelligence (AI) cloud platform. Lambda will occupy Aligned's newest Dallas-Fort Worth area facility, DFW-04, which will be designed to be a liquid cooled data centre capable of supporting the highest density graphics processing units (GPUs).

Aligned builds and operates adaptive data centres that future proof IT infrastructure and provide seamless flexibility for transitions between a variety of deployments. While committing to

sustainability as a core pillar of its customer focused business strategy, the company has

been an industry leader in advancing data centre energy efficiency and cooling technologies.

Aligned's patent-pending DeltaFlow liquid cooling system delivers

unparalleled performance for AI innovation, supporting virtually any density and GPU cloud requirement. The company's scalable, sustainable infrastructure is enabling next generation AI workloads. Aligned's partnership with Lambda exemplifies its dedication to leading AI service providers.



Telehouse inaugurates new AI-ready hosting platform at its Magny 2 data centre

Telehouse Europe has completed a new phase in the development of its Magny 2 data centre, located at its TH3 Paris Magny campus. This investment includes the

availability of a new high density artificial intelligence (AI) ready infrastructure combining innovative cooling, optimal energy efficiency and AI sovereignty.

The Telehouse TH3 Paris Magny campus is uniquely positioned as a data centre hub.



With a capacity of 3MW and 2,000m² of dedicated IT space, the new AI infrastructure at the Magny 2 data centre stands out as a strategic component of digital infrastructure, hosting high density systems optimised for the

specific requirements of AI applications. Every square centimetre of the new AI infrastructure is designed to maximise the performance of the most powerful AI machines, providing the perfect environment for tomorrow's technologies.

Kao Data and PepTalk join forces to champion worker led culture at KLON-03 data centre

Kao Data has partnered with PepTalk to bring a people first approach to the construction of its new KLON-03 data centre, combining cutting edge engineering with a proactive focus on team wellbeing, safety and performance. By embedding PepTalk's workforce intelligence into site operations, the project

aims to elevate decision making, anticipate risks early and foster a stronger, safer site culture.

PepTalk's platform gathers live, anonymous feedback directly from the workforce,

offering leadership a constant pulse on team morale, communication and engagement. Instead of using feedback purely as a sentiment check, the system enables site managers to identify blindspots, unlock opportunities for improvement and build a shared culture of accountability.



PROJECTS & CONTRACTS IN BRIEF

Secure IT Environments (SITE) has completed a fire suppression upgrade project for the Isle of Wight (IoW) Council's main data centre and comms room at County Hall in Newport.

Nokia has been selected by ResetData to supply a networking backbone that supports its immediate rollout of sovereign 'AI Factory' data centres across Australia. The Nokia IP solution will deliver the speed, scale and reliability required for lossless, low latency performance as ResetData targets an Australian cloud services market that in 2024 saw a 19 per cent year on year increase.

Colt Technology Services has announced the divestment of six of its data centres in major cities across Europe to NorthC. Colt will also divest two of its data centres in London to a UK-based data centre business, also owned by funds which are managed by DWS Group.

St Oswald's Hospice has integrated its telephony into Britannic's Microsoft Direct Routing solution to streamline and unify communications on a single platform.

Start Campus' SIN01 and planned SIN02 data centres have been officially certified as Open Compute Project (OCP) Ready v2 for hyperscale data centres.



TO SHARE [Inside_Networks](#) CLICK HERE

All you need to know

Inside_Networks

THE NETWORK INFRASTRUCTURE E-MAGAZINE WWW.INSIDENETWORKS.CO.UK

BY TERRY/LEEDS/ TERTITE
CC BY-NC-ND 4.0
WWW.INSIDENETWORKS.CO.UK

ISSUE 25

PHOTOGRAPHY

MEDIA KIT 25

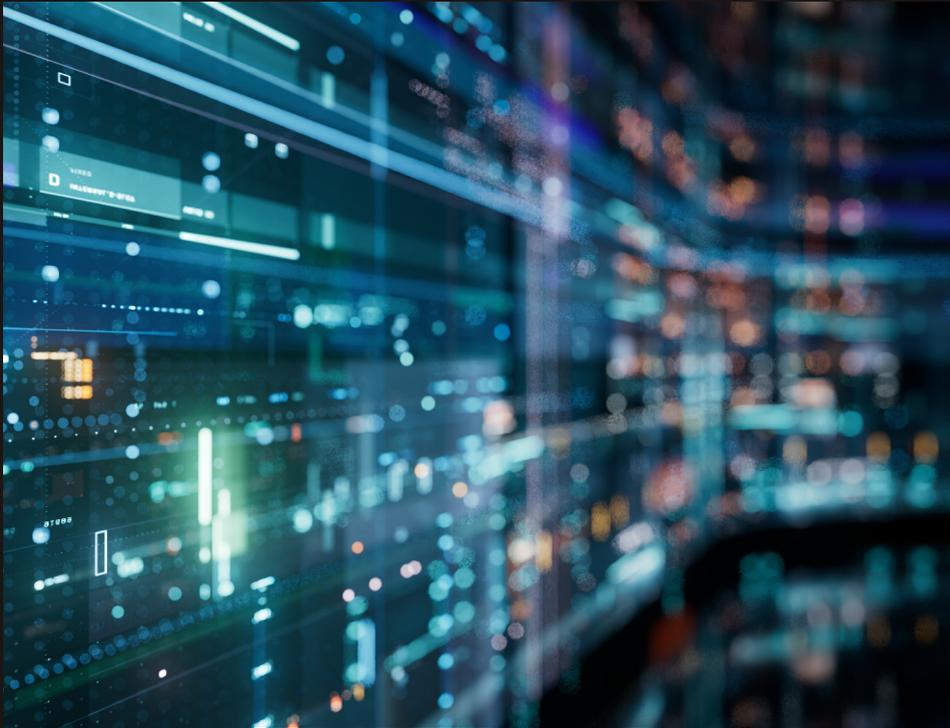
SECURITY NETWORKS
CLOUD OPERATIONS
INNOVATION
DATA ANALYTICS
NETWORKS

DATA ANALYTICS
INNOVATION
CLOUD
OPERATIONS

CLICK ON THE COVER TO VIEW THE **2025 MEDIA KIT**

Core competency

Pierre Sillard of Prysmian Digital Solutions explains how to unlock the potential of light speed transmission for artificial intelligence (AI) chipsets



▶ AI-optimised chipsets generally deliver lower inference latency for batch operations or large neural network models due to parallel processing. Hollow core fibre can play a key role in making the most of AI chipsets by optimising latency performance.

TASK MASTER

AI workloads typically rely on graphics processing units (GPUs) instead of traditional central processing units (CPUs) for several reasons. GPUs are designed with thousands of cores that are

optimised for simultaneous operations. This makes them ideal for executing many computations in parallel – fundamental for AI tasks like neural network training and inference.

However, latency is key to getting the most out of these chipsets. By minimising latency performance is optimised, but suboptimal latency means these advanced processing units aren't used to their fullest advantage.

GPUs excel at parallelisable tasks and offer higher performance per dollar for these workloads. However, whereas

enterprise/server grade CPUs may cost several thousand Euros, server grade GPUs such as Nvidia Tesla, A100, H100 or AMD Instinct series can cost tens of thousands of Euros. Anyone investing in this technology will want to get the absolute maximum performance out of every chipset.

SIZE MATTERS

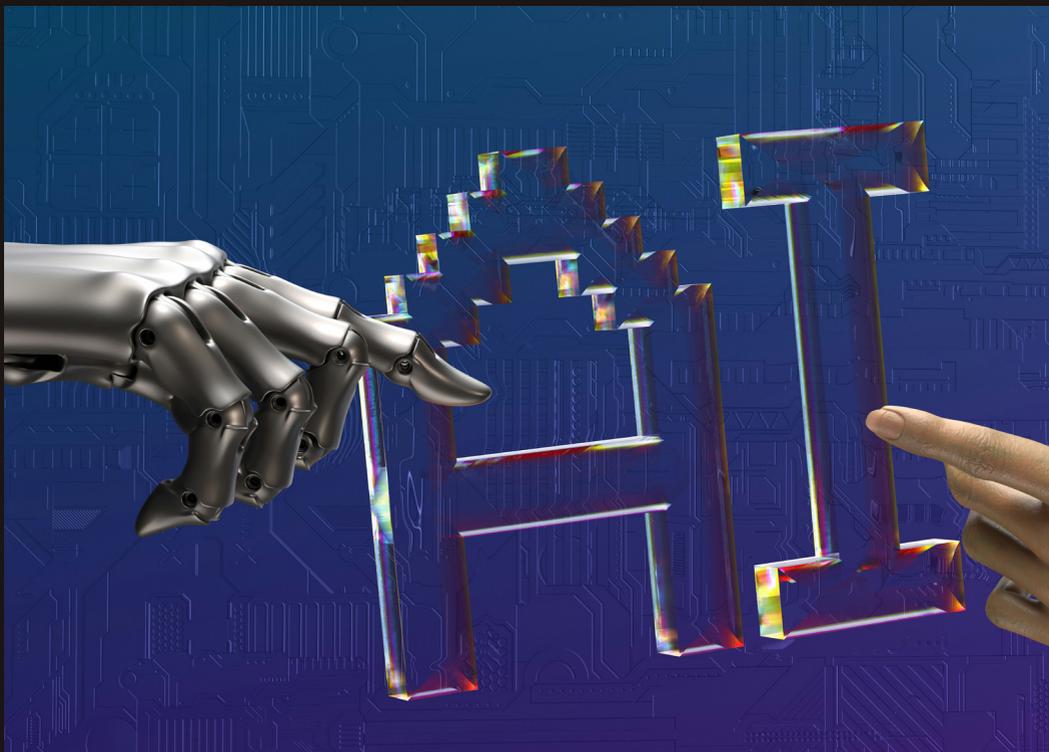
As AI data centres become larger and larger, reducing latency between GPUs will allow the industry to optimise the utilisation of compute power. Lower latency can directly translate to optimisation of GPU compute power in AI data centres, offering energy efficiency, cost savings and improved sustainability. These are significant considerations, as AI

workloads increasingly demand substantial energy resources.

Lower inter-GPU latency allows GPUs to exchange gradients and parameters faster during parallel training, thereby shortening iteration times. Reduced latency also improves efficiency in splitting large neural network layers across GPUs. This enables very large models to train faster.

HOW LOW CAN YOU GO?

Latency within and between racks is crucial to data centre performance because it directly affects how quickly data moves between switches and GPUs. Low latency enables faster data processing, quicker response times and improved real-time decision making – critical for intensive workloads like AI.



Lower latency also facilitates smoother and faster communication between nodes, enabling more efficient load balancing and workload distribution across multiple servers. Furthermore, reduced latency enhances the effectiveness of distributed computing clusters by enabling faster synchronisation and coordination among nodes, thus speeding up overall task completion. High latency, on the other hand, reduces system efficiency, leading to underutilised GPU compute power and slower overall performance.

Singlemode and multimode fibre optic cables minimise latency by enabling extremely high speed, high bandwidth data transfer. Unlike traditional copper cables, fibre optics transmit data as pulses of light, significantly reducing signal degradation, interference and energy loss. This allows data centres to maintain rapid, consistent data communication across racks and between geographically dispersed sites. Advanced optical

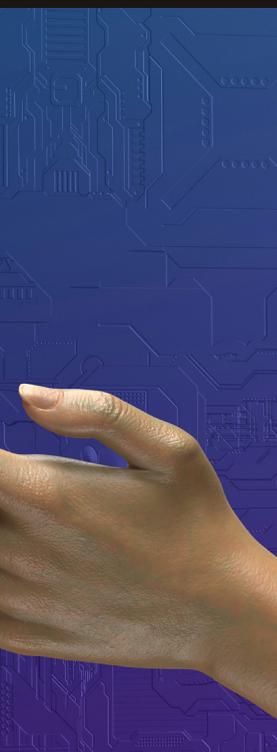
‘Hollow core fibre is a novel optical fibre technology that guides light in an air filled core, significantly enhancing data transmission speed. Utilising precision engineered anti-resonant structures, it confines light in a hollow core, allowing light to travel approximately 50 per cent faster than through glass core fibres.’

fibre technologies, such as hollow core fibre, further enhance these benefits by reducing latency even more – up to 30 per cent lower than traditional glass core fibre – allowing data centres to optimise the performance and efficiency of their computing resources over greater distances.

AIR FORCE

Hollow core fibre is a novel optical fibre technology that guides light in an air filled core, significantly enhancing data transmission speed. Utilising precision engineered anti-resonant structures, it confines light in a hollow core, allowing light to travel approximately 50 per cent faster than through glass core fibres, thereby reducing signal latency by 30 per cent.

With its ability to support ultra-high capacity data transfer over extended distances without significant latency penalties, hollow core fibre helps data centres scale more effectively. This scalability supports growing AI workloads, enabling efficient expansion and accommodating future innovations without regular infrastructure overhauls.



A WORLD OF POSSIBILITIES

Lower latency enables faster exchange of gradients and parameters between GPUs during parallel training, shortening each training iteration and speeding up overall model convergence. This improved communication boosts GPU utilisation, allowing GPUs to spend more time performing computations rather than waiting for data transfers, thereby increasing performance and reducing idle power consumption. Furthermore, ultra-low latency facilitates efficient distribution of workloads across multiple GPUs, optimising resource usage, reducing total processing time and leading directly to lower operational costs and energy consumption.

What's more, hollow core fibre's significant latency reduction enables data centres to be located farther apart without performance loss. This improvement allows latency sensitive applications, such as intensive AI workloads, to function effectively across larger data centre campuses. Organisations can therefore choose data centre locations based on renewable energy availability and lower operational costs, without typical latency constraints. For hyperscalers, this expands viable locations, increasing buildable area by approximately 2.25 times – extending acceptable latency thresholds.

LESS IS MORE

Reducing latency between data centres and racks is crucial for increasing application performance, enabling real-time responsiveness, ensuring efficient resource utilisation and improving overall system reliability and scalability. However, when looking for a hollow core fibre solution, it's vital to make sure it works seamlessly with existing infrastructure

out of the box, doesn't require expensive upgrades or training and is equipped with industry standard connectors. ■



PIERRE SILLARD

Pierre Sillard holds an engineering degree from Télécom ParisTech and a PhD from Paris VI University. He has over 20 years of experience in the field of optical fibre and is currently a member of the R&D – Fibers Department at Prysmian. He has contributed to the development and deployment of new optical fibres for data centres, local area networks, FTTx and long haul networks. He is the author or co-author of more than 350 peer reviewed scientific publications and holds over 100 patents.

WE HOPE YOU HAVE ENJOYED

Inside_Networks

COMING UP IN **AUGUST 25'S ISSUE:**

SPECIAL FEATURES:

- > MICRO-MODULAR DATA CENTRES
- > SECURITY AND ACCESS CONTROL

**TO FIND OUT MORE ABOUT PROMOTION
WITHIN THESE FEATURES [CLICK HERE](#)**

- > [ALL THE LATEST NEWS, VIEWS, COMMENT AND ANALYSIS](#)
- > [WHY HAS THE ADOPTION OF LIQUID COOLING IN DATA CENTRES BEEN SO SLUGGISH?](#)
- > [OVERCOMING THE CHALLENGES OF AI AT THE EDGE](#)
- > [HOW SMART BUILDING ACCESS CONTROL PROTECTS PEOPLE AND PLACES](#)
- > [TIPS ON CHOOSING AND DEPLOYING MICRO DATA CENTRES](#)
- > [INSIDE_NETWORKS 2025 CHARITY GOLF DAY REVIEW](#)
- > [NAVIGATING THE SHUTDOWN OF LEGACY DATA CENTRES WITH DATA AGILITY](#)
- > [WHY THE RIGHT BLEND OF PHYSICAL, TECHNICAL AND HUMAN SECURITY IS THE ONLY WAY TO PROVIDE A SAFE AND CONTROLLED DATA CENTRE](#)
- > [MOVES, ADDS AND CHANGES IN THE CHANNEL](#)
- > [NETWORK INFRASTRUCTURE CASE STUDIES FROM AROUND THE WORLD](#)
- > [THE LATEST PRODUCT, SYSTEM AND SERVICE DEVELOPMENTS](#)

[FOR A FREE SUBSCRIPTION CLICK HERE](#)