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CHINA FOCUS
Channelling China's Data

FIBRE SPECIAL
New fibre solutions
make business future-ready

DATA CENTRES
Global energy leaders
powered by data

THANK YOU

Alexander Reid • Alice Pagès • Anne-Mie Vansteelant
Ben Jiang • Birgit Heintz • Bob Blancato • Bujar Marevci
Chin Lian Oh • Christian Ogris • Cornel Coman
David Messara • Elise Koenig • Emmanuel Delsart
Evgeniy Vlasov • Gerd Backhaus • Harry Forbes
Henk Smits • James Withey • Jesus Roman • Jim Mathers
Joost Grillaert • Larry Paniccia • Leonardo Martinez
Marianne Servez • Mark Rogers • Martin Rossbach
Matt O'Rourke • Mike Holmes • Mircea Modran
Nord van den Aakster • Olga Ostrovskaya • Philippe Berte
René Fraiquin • Rob Cardigan • Silviu Ardeleanu
Tony Buckingham • Yingying Zeng

RESPONSIBLE EDITORS

Oene-Wim Stallinga • Yves Debroyer

COPYWRITING, DESIGN & PRODUCTION

Living Stone n.v., www.livingstone.eu

NEXANS CABLING SOLUTIONS

Alsembergsesteenweg, 2, b 3
B-1501 Buizingen — Belgium
Tel.: + 32 (0)2 363 38 00
Fax: + 32 (0)2 365 09 99

PHOTOGRAPHY

Getty Images, Van Beek Images, Philippe Berte

NEXANS (GROUP'S HEADQUARTERS)

8, rue du Général Foy
75008 Paris — France
Tel.: + 33 (0)1 73 23 84 00
Fax: + 33 (0)1 73 23 84 84

MAIL ANY OF YOUR INFORMATION QUESTIONS TO

thefuture.ncs@nexans.com

<http://www.nexans.com/LANsystems>

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IT expertise available in real and virtual worlds

Belgium
Nexans Cabling Solutions
Head Office
Alsembergsesteenweg 2, b3
1501 Buizingen

United Kingdom
Nexans Cabling Solutions
2 Faraday Office Park
Faraday Road
Basingstoke
Hampshire RG24 8QQ

Algeria
Nexans Algeria
5 Place Laperrine
16405 Hydra

Brasil
Nexans Brasil S/A
Alameda Jau N°1754
01420-002 Sao Paulo

Czech Republic
Nexans Cabling Solutions
Klapalkova 7/2241
149 00 Praha 4

China
Nexans Cabling Solutions
N°135 Lane 82 Nanchen Road
200444 Shanghai

France
Nexans Cabling Solutions
4 — 10 rue Mozart
92 587 Clichy cedex

Germany
Nexans Cabling Solutions
Bonnenbroicher Strasse 2 — 14
41238 Mönchengladbach

Ghana
Nexans Cabling Solutions
Heavy Industrial Area
Near Tema Oil Refinery
P.O. Box CO 157
Tema

Editorial

RETHINKING THE NETWORK



Whilst the rate of change for IT systems has always been fast-paced, attitudes guiding the direction and purpose of IT networks have evolved more slowly. That's now changing.

Here are some interesting shifts in network philosophy that are emerging amongst progressive IT directors and infrastructure managers around the world:

Since the dawn of structured cabling the choice of cabling category has been exclusively linked to network speed. Today this choice centers on the move to Category 6A or to the economies of installing a future-ready, high-bandwidth Category 7A or fibre network capable of migration to 40G and beyond. However, we now have additional factors which are influencing the choice of media. Improved energy efficiency, Power over Ethernet (PoE) as well as Intelligent Infrastructure Management (IIM) for better security and environmental monitoring to help control carbon footprint are all entering the decision making process.

By expanding the factors influencing cabling choice designers are increasingly considering more advanced passive networks. These new non bandwidth focused decision making factors have been seen first in the Data Centre. However, the use of Data Centre / Computer Rooms as an integrated part of large building infrastructure projects has increasingly meant these new considerations are forcing their way into the more traditional commercial building environment.

At Nexans we've seen a very high take up of Multi Fibre Push-On (MPO) products that support true 'plug and play' fibre connectivity and in copper network's, there's been excellent growth in Nexans' GG45 two-in-one connector to handle both legacy equipment and future high bandwidth technologies. These technologies have been increasingly deployed in pre-terminated, factory prepared & customised configurations which have ensured quality first time and helped to reduce time and cost on site.

New trends are emerging involving changing views on the role of network equipment suppliers. Mature IT markets have evolved with clear demarcation in the roles of IT managers, IT consultants, IT integrators and the vendor. Their vision is centered on the best products from a wide range of suppliers and experts. Often it is every involved supplier's role to take ownership to ensure all pieces fit together.

Just the opposite is now occurring in emerging markets. IT professionals are increasingly seeking a primary supplier to provide a full range of products and services. The chosen vendor works closely with these IT professionals, at times even on a daily basis, long after the project would typically be considered complete. Having one large firm coordinate multiple project aspects is increasingly commonplace.

As a global supplier that for years has deployed in-house technical and project management

professionals, Nexans has a viable and proven record of supporting large IT projects in China, Singapore, Korea, Egypt, UAE to name but a few. Recent efforts in China are described on page six, along with a similar project involving our broad support of a new Data Centre for a Romanian energy firm on page four.

Other attitudinal changes center on what goes into an IT project. The emerging belief is once a project commitment is made, only 'best of breed' products are considered. This is influenced by the desire to be "ahead of the game" against traditional competitors and be ready for tomorrow's needs. Of course value remains a key consideration. However, the temptation to 'cut technological corners' simply by choosing low-cost solutions is less of a factor. It's here that Nexans has a proven record worldwide of thoroughly analyzing each project's requirements and recommending solutions that meet optimal cost versus long-term savings ratios.

I hope you find these insights interesting and take time to explore this issue's articles including preparing for the bandwidth boom, the new growth of PoE and the latest advances in fibre and copper solutions.

Mark Rogers
Managing Director
Nexans Cabling Solutions

India
Nexans Polycab Pvt Ltd
Flat # 218, "E" wing
Royal Tower Co-op Housing Society
Near Corporation Bank
I.C.Colony, Borivali (west)
400103 Mumbai

Korea
Nexans Korea
7th Floor I'Park Tower
160 Samseong-Dong
135-881 Gangnam-gu — Seoul

Morocco
Nexans Maroc
Bd Ahl Lghlam
Sidi Moumen
20400 Casablanca

The Netherlands
Nexans Cabling Solutions
Overschieeweg 317
3112 NC Schiedam

Nigeria
Nexans Cabling Solutions
28 Henry Carr Street
Ikeja Industrial Estate
P.M.B. 21253
Ikeja
Lagos

Norway
Nexans Norway AS
Regnbeuveien 7
PO Box 100
N-1403 Langhus

Poland
Nexans Polska Sp. z o.o.
Ul Wiejska 18
47-400 Raciborz

Romania
Nexans Romania
26 Av. Mircea Zorileanu Street
2nd Floor, Sector 1
012055 Bucuresti

Russia
Nexans CIS LCC
Pokrovka street 47A
Business center 'Pokrovsky'
4th Floor
105062 Moscow

Singapore
Nexans Singapore Pte Ltd
111 Somerset Road, #09-06,
TripleOne Somerset,
238164 Singapore

South Africa
Nexans Cabling Solutions
Association House
146 Newlands Avenue
Western Extension
Benoni 1501

Spain
Nexans Cabling Solutions
Avda. de Europa 26
Edificio Atica 5-2°C
28224 Pozuelo de Alarcón
Madrid

Sweden
Nexans IKO Sweden AB
Företagsvägen 2
SE-435 33 Mölnlycke

Turkey
Nexans İletişim Endüstri Ve Ticaret
Sifa Mahallesi
Atatürk Caddesi
81700 Tuzla

United Arab Emirates
Nexans Middle East
P.O. Box 47889
Abu Dhabi

United States
Nexans Cabling Solutions
30 Jericho Turnpike, #140
Commack, NY 11725



Global energy leaders powered by data

Separate Data Centres supporting two prominent EU energy giants can now go the distance thanks to their respective network infrastructures

A major Data Centre project for Électricité de France (EDF), combined with a new headquarters and data complex for OMV Petrom, tests the product excellence, installation ease and teamwork of Nexans and its value added partners. Service interruptions of any degree during these projects were not an option, testifying to the vital role data and voice transactions play in each businesses successful daily operation.

INSTALLATION EXCELLENCE IN RECORD TIME

One of the world's leading electricity providers recently selected Nexans fibre for its new, main Data Centre in France supplied and installed by a regional, value added business partner.

Headquartered in Paris, Électricité de France (EDF) is amongst the globe's foremost electricity producers and distributors. In recent years, it has provided 22% of the EU's electricity. In January 2010, EDF issued a call for bids for installing its main Data Centre in Val-de-Rueil which was won by RJ45 Technologies, a Nexans partner, for a proposal centred on Nexans technologies performance.

Called Noé, the project involved the complete infrastructure installation of six of the Data Centre's eight rooms, each having 500m² of operating surface area. RJ45 Technologies provided full backbone support using Nexans'

LANmark-OF cables pre-fitted with multifibre push-on (MPO) connectors. Also, 915 MPO modules were provided, consisting of MPO connectors at the back and 24 traditional LC connectors in front, as well as 257 panels. There was a particularly tight, one month deadline involved to ensure minimal downtime of critical data flows, not only for network design, but installation as well.

RJ45 Technologies' vital know-how, installation methodology and unique ability to manage costs and adhere to very tight project deadlines proved highly valuable. It was a real challenge to meet EDF's deadlines, since for legal reasons, the technical teams were unable to access the site before the Data Centre extension works were completed. Exploiting Nexans cabling expertise, the partner installed new fibre cabling equivalent to more than 172,000 traditional connectors by working staggered night hours. As a result, EDF's staff

down time was minimised with no service interruptions. The site's operating efficiency was never compromised.

HIGHER THAN 99% CUSTOMER SATISFACTION RATE

By offering a modular, economical solution that was quickly implemented, RJ45 Technologies was able to meet the expectations of the EDF group, which was completely satisfied with the services provided. The integrator boasts a higher than 99% overall customer satisfaction rate, based primarily on consistent quality service.

EASTERN EUROPE'S PETROL POWERHOUSE

OMV Petrom is a Romanian oil company privatised in 2004 and today majority-owned by Central European energy giant OMV in Austria. OMV Petrom remains Romania's largest corporation and Eastern Europe's



largest gas and oil producer which, among other energy-related enterprises, operates 540 petrol stations in Romania and 270 in Moldova, Bulgaria and Serbia. It also has operations in Hungary, Kazakhstan, Iran and Russia.

Its new headquarters, Petrom City, was opened in December 2010 to house the company's core activities in five buildings on 100,000 m² of sculpted woodland. Its three storey Data Centre contains offices and a 1,000 m² data room with raised floor that's home to various servers, switches, data SANs and sensor networks, and network and building security.

SUPPORT FOR OIL DRILLS TO PETROL PUMPS

The company relies heavily on data and voice communications to serve 1,200 of its Romanian business locations, as well as interface with OMV Group headquarters in Vienna. There are also digital links to locations in 26 other

“LANmark-7 with GG45 is an investment in the future which keeps costs reasonable.”

MIRCEA MODRAN

HEAD OF IT DEMAND – BUSINESS PARTNER & CORPORATE SOLUTIONS, OMV PETROM

countries. Its Data Centre supports financial, operational, logistical and sales transactions used to maintain its daily business activities. It also handles special infrastructure support for exploration, drilling and production, retail filling station operations, refinery processes and energy sales to other firms.

Says Mircea Modran, Head of IT Demand at OMV Petrom, “The original Data Centre was in a rented Bucharest facility with cabling based on 2005 practices. Though adequate for its time, this infrastructure could not properly handle the demands and growth placed on it following privatisation and grouping with OMV.”

Adds Christian Ogris, OMV Business Solutions-Lead IT, “The Petrom City centre was specially designed with two separate yet redundant data rooms each having multiple SAN servers linked by copper. Since both rooms are on the same floor, we specified Cat.7 cabling for the horizontal link that supports 10 Gigabits per second line speeds. This way, we are adequately prepared for future increases in bandwidth.”

FUTURE READY YET COMPATIBLE WITH TODAY'S SYSTEMS

Nexans through its regional business partner, CORIL, won OMV Petrom's bid to install 45,000 metres of cabling in a LANmark-7 system, 5,232 GG45 revolutionary “2-in-1” Snap-In connectors, and 213 LANmark patch

panels upgradable for eventual Intelligent Infrastructure Management (IIM). A variety of patch cords and angled panels were also included. Nexans solutions were not totally unknown to the energy giant. Many have been deployed at OMV Group's Vienna headquarters. As for CORIL, they also had an excellent record in Romania with OMV Petrom.

“CORIL is a networking partner we've collaborated with for some time,” Mircea Modran adds. “They've repeatedly supported us in other projects and their planning skill, quality workmanship and prompt response is highly valued. This also makes them an excellent partner in the daily running of our network.”

The Data Centre's IT foundation is now based on a LANmark-7 system as well as Nexans' unique backward compatible GG45 connectors used throughout the building. •

Summary

Challenges

- Both Data Centres manage multiple functions/processes in large EU energy companies
- New infrastructure must handle data needs for decades, yet keep costs in check
- Reliably support multiple servers and support devices crucial to maintaining daily business functions
- Global functionality – 24/7 uptime with maximum security of all systems

Solutions

- LANmark-7 cabling system with GG45 connectors for 10G vertical network
- LANmark-OF with pre-fitted MPO connectors
- LANSense upgradeable patch panels to support IIM

Benefits

- Cost-effective management of current and future systems/platforms
- Future-ready infrastructure that also supports legacy equipment. Enough bandwidth for evolving systems
- Pre-connectorised cabling helps speed installation
- Complex network upgrade successfully achieved under tight deadline with no downtime



Channelling China's Data

China's demand for data is huge and is the life force behind its expanding industrial, business and financial might

Two major companies, one financial and one public broadcasting, poised for the explosion of services and devices employ cutting edge Nexans cabling and Intelligent Infrastructure Management solutions to support future demand.

COMMUNICATIONS FOR A FLOURISHING PROVINCE

Today, considered amongst China's wealthier regions, Fujian Province on the south-east coast has only recently come of age thanks to considerable foreign investment. With this growth comes the need for advanced communications services, including news and entertainment through radio and television broadcasting as well as cinema. Provincial government leaders recently opened a new Radio and Television Centre in Fuzhou City, the region's capital, to better serve the province's 36 million inhabitants.

The 143,748 m² complex consists of separate TV, transmission and studio centres in an impressive series of buildings on 7.74 hectares. It's one of the largest such projects and is second only to national broadcaster China Central Television's

(CCTV's) new building in Beijing. The 149 metre tall TV Centre has one floor underground and 29 above, whilst the transmission Centre has 19 storeys. The four storey studio centre contains five fully-equipped sound stages and also production facilities.

China's broadcasting standards are extremely high, as are specifications for the Centre's core data network which is designed to support uninterrupted transmission of streaming media. This requires high bandwidths and no interference from outside environmental noise that may affect the quality of external video/audio signals.

As such, Fujian Province sought the highest quality solutions to support the Centre's data needs and contacted Nexans for a proposal.

The proposal consisted of LANmark-6A copper cabling and Nexans' LANsense Intelligent Infrastructure Management (IIM) solution. The LANmark-6A system is used in the Centre's core network due to its high bandwidth capacity supporting 10Gb Ethernet up to 100 metres. As a foiled twisted pair (F/UTP) solution, it also offers superior shielding of the link to block external crosstalk during transmission.

NETWORK MANAGEMENT HELPS REDUCE ERRORS

The LANsense system is designed to provide real-time monitoring via hardware and software and was fully able to meet the Centre's requirements for link security and significantly reduce the time required for network troubleshooting. This significantly lowers the MTTR (Mean Time To Repair) for the network.

For this specific IIM application, the ability of LANsense to identify and track patch cords during changes, which significantly reduces operator errors and provides better control of data links, through the use of an LCD display in the HMI intelligent patch panel was crucial. The software interface with its customised graphical user interface also allows the creation of work orders, monitors their status and detects unauthorised patching, raising alerts. These attributes dramatically improve accuracy and reduce on-air transmission mistakes or downtime, two key considerations when broadcasting to an ever demanding public.

LANsense is a comprehensive and scalable solution for the management of networks and structured cabling. When coupled with unique iTRACS™ software, LANsense provides a live view of the physical layer and all devices that run over it. LANsense enables real-time monitoring of network connectivity with minimal traffic overhead and communicates with all active network equipment at layer 2 and 3. This provides 100% accurate connection documentation.

In all, these Nexans copper systems and IIM solutions provide a modern, standards-compliant, intelligent and future-ready infrastructure to help Fujian's new Radio and Television Centre exceed audience demands.

FINANCIAL FIRM GROWS IN HONG KONG

One of the largest financial companies in Hong Kong, Sun Hung Kai & Co. (SHK) has also selected a LANmark-6 and 6A network infrastructure from Nexans for its new main office. The colossal tower block includes 8,000 nodes of Cat.6 and 5,000 nodes of Cat.6A cable, as well as 500 nodes of Nexans OM3 fibre.

The firm, established in 1969 when the city was a separate political entity, currently holds assets exceeding HK\$70 billion. SHK today seeks to expand from its traditional

Hong Kong base to all of China; a big goal that requires nothing short of the highest quality data infrastructure to help achieve it. In communications, this means supporting the latest desktop digital devices such as IP telephony, smart phones, laptops or tablets. In the Data Centre itself, both copper and fibre solutions are required to support a design like a wheel, with the Data Centre at the hub and various data station connections as spokes.

The LANmark-6A F/UTP with low smoke-zero halogen (LSZH) jacketing is therefore the perfect solution. Moreover, the LANmark RJ45 connectors installed throughout the Data Centre ensure maximum network uptime, even during intensive use. LANmark-6A high-speed screened copper cabling for its horizontal network enables 10G data rates for a fraction of the cost of fibre optic alternatives.

The 360-degree screened design is completely immune to alien crosstalk (AXT), and allows placement of up to three connection points within ten metres to further save costs and provide critically needed space. Proper shielding also eliminates costly on-site testing for AXT following installation, as well as expensive remedies should any difficulties be revealed. In addition, unshielded Cat.6A cabling is usually thicker and requires extra space creating patching difficulties in tight situations. Thinner, screened cables take less space and are easier to connect.

QUALITY WORK SPEAKS FOR ITSELF

LANmark-6A cabling solutions were signed off as a significant success. Much of this was thanks to the professional approach and technical know-how of Nexans' staff on the project. Their versatility and responsiveness to changing customer demands was impressive and gave SHK staff peace of mind. This includes the copper network's LSZH jacketing which ensures the highest level of protection against flames and smoke – a critical safety concern in any high-rise tower and especially important in highly congested Hong Kong.

An interesting spin-off was the number of SHK customers that later selected Nexans for their own cabling needs, mainly due to the excellent workmanship and quality demonstrated at the new headquarters. In their business of electronic data management, they cannot afford to take any risks with the security and connectivity of mission-critical customer data. SHK further believes that many of its customers will increasingly demand outsourced data management services to allow operational managers to get on with their core functions. It's also rarely cost-effective to build dedicated Data Centres for non-IT businesses. LANmark-6A has performed its role well at SHK, and is poised to continue this accomplishment for the foreseeable future. •



Did You Know?

- The Hong Kong dollar is the ninth most traded currency in the world
- Fujian Province is primarily mountainous, described as eight parts mountain, one part water and one part farmland



Nexans' LANmark-7A system used in cancer treatment centre

The Creekside Cancer Care facility in Lafayette, Colorado, needed to have the best technology available as it would be home to the world's first CyberKnife VSI system, so planners turned to Nexans and found that its LANmark-7A system gave them the convergence, future-proofing and transmission speed needed to make the centre one of the most high-tech facilities in the US.

CYBERKNIFE VSI

In June 2010, Creekside Cancer Care in Lafayette, Colorado, became home to the world's first CyberKnife VSI system. This system is the new version of Accuray's CyberKnife Robotic Radiosurgery System, widely recognized as the best way for cancer sufferers to receive non-invasive radiation treatment.

The CyberKnife system was first used in the 1990s and delivers radiation with sub-millimetre accuracy anywhere in the body.



The robotic nature of the system means that doctors are able to treat any area of the body with accuracy and to reposition the source of radiation very quickly which speeds up treatment times. The system also uses continual image guidance which means that it can target tumours extremely accurately and can respond to any movements of tumours during the treatment process.

One of the benefits of the CyberKnife system is its frameless design. Conventional radiosurgery systems are frame-based, with a rigid frame secured to the patient's skull and the positioning of the treatment directed through CT or MRI scans. In contrast, the frameless CyberKnife means that scans can be taken at any point prior to the treatment, and the patient simply has to be positioned on a table for the system to complete the treatment. This means that planning and preparation for each treatment

is quicker and clinical staff can therefore spend more time directly assisting patients. The system also allows patients with fragile heads or young patients to receive treatment, which is much harder with a frame-based system.

CREEKSIDE CANCER CARE

Planning for the Creekside Cancer Care centre began in 2009 and opened in June 2010. It is an independent, physician-owned, free-standing centre committed to cancer care, and is one of the most high-tech facilities in the United States. The building itself is architecturally sophisticated and includes features such as lead lining in order to protect local residents and members of the public against any possible effects of radiation.

It was clear when planners started designing the building that it would need the best



telecommunications network available. Managing Partner Matt O'Rourke explains: "Naturally, the first thing we were concerned about when designing the centre was that we had the technology necessary to support the CyberKnife VSI system itself. It is crucial that there is no downtime during treatments so we needed a network that could provide high transmission rates and low latency. We also wanted to make sure that the additional applications such as medical imagery and video conferencing were well supported. Lastly, I was determined to future-proof the facility as much as possible so we wanted a network that would last longer than a few years."

TECHNOLOGY

In addition to the transmission rates the network would need to support, there were other considerations to take into account. As well as performing the robotic treatments, doctors at Creekside would need to be able to collect medical images such as CAT scans and MRI scans of patients and transfer these to both internal and external contacts very quickly which would put pressure on the network. They also needed sophisticated videoconferencing technology in order to discuss treatments in real-time with remote consultants.

Jim Mathers, Chief Development Officer at Creekside, remembers the concerns they had regarding the network: "Most US organizations use Category 6 cabling to provide 1 Gig networks but we wanted better than that. Medical scans are large files and we needed to be able to store these and move them very quickly. We wanted

our clinical staff to be able to share information with external contacts and make real-time decisions about treatments."

"In addition to all this we had concerns about interference from all the electronics in the facility so we knew that we needed a shielded solution, and we wanted all this to be converged onto one single network that would be backwards compatible with existing equipment."

NEXANS

Matt's research for a network that would provide all the centre's needs whilst being backwards compatible quickly led him to Nexans. "I was immediately impressed with the benefits Nexans' LANmark-7A solution could bring, including shielding to protect against interference, convergence capabilities and the speed to move a 200MB file in just a few seconds! However, the most impressive aspect was that when I got in touch with Larry Paniccia he was willing to fly over to the site and meet me in person to discuss the project."

SOLUTION

Larry Paniccia, Business Development Director of Nexans Cabling Solutions, was immediately interested in the Creekside project. "Matt was very clear that he wanted the best cabling infrastructure he could get with low total cost of ownership. It needed to be backwards compatible while also providing potential for 40G in a high noise environment, which



meant that Cat.7A cabling was really the only solution."

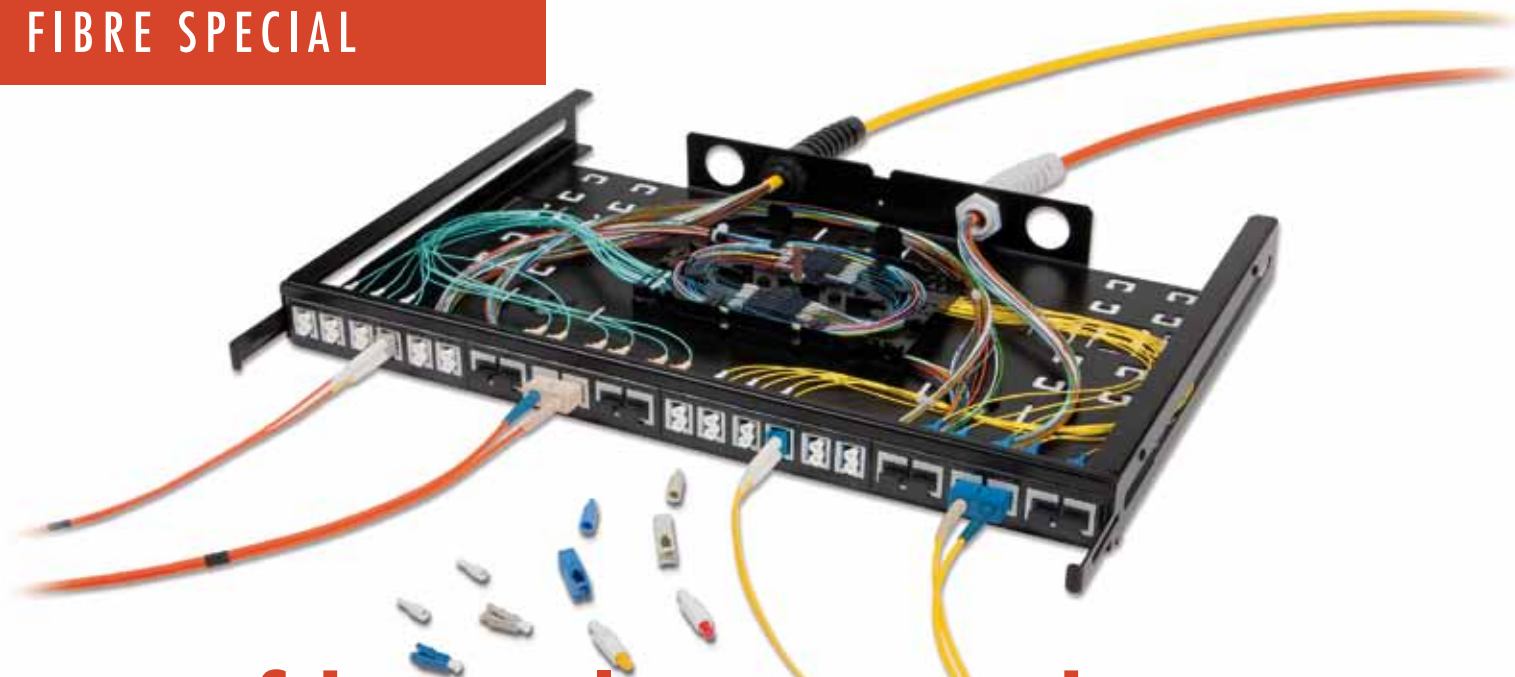
The LANmark-7A system provides double the bandwidth and half the crosstalk of Cat.6A, maximizes energy efficiency and has 360° screening for alien crosstalk immunity. However, the key to the project was Nexans' GG45 connector which contains a full Cat.6A RJ45 as well as Cat.7A interface. The system installed at Creekside uses a shielded Cat.7A backbone with shielded Cat.6A patch cables. This means that the network is compatible with existing RJ45 equipment but is still capable of supporting higher bandwidth simply by switching patchcords.

CONCLUSION

"It is always a pleasure to see the real-world impact of our cabling infrastructures," says Larry, "so I was delighted when Matt told me that Creekside had completed treatment of its first patient in July 2010."

Matt and Jim are just as pleased with the infrastructure they have put in place, with Matt commenting: "As well as the financial benefits of a good network – we are saving thousands of dollars each month by emailing rather than couriering medical images to remote colleagues – we are also able to treat more patients more quickly and to improve the standard of care we can offer through increased collaboration." •





New fibre solutions make business future-ready

Offices, factories, hospitals and even ships and airports are amongst the many business and industrial settings benefiting from the fast, future-ready bandwidth provided by fibre optics. Nexans has played an active and influential role in fibre development, and today supports a variety of uses with its fibre cabling expertise, R&D knowledge and innovative products.



Joost Grillaert

Cable the Future caught up with Nexans' Joost Grillaert, Product Manager, to ask about the company's fibre optic history, current capabilities and future trends.

Nexans is well-known for copper cabling. But what are its credentials in fibre?

"Actually they're quite extensive. We've guided development of optical fibre technology for communications since the 1970s. For 30 years, Nexans Opticable has been our specialised fibre cable manufacturing arm based at a sophisticated plant in Belgium. When opened, it was amongst the world's first dedicated fibre cable production sites, and today produces cables used throughout the world. Horizontal networks, backbones and supporting solutions have been developed that reinforce major IT infrastructures worldwide.

Also, we today maintain two R&D laboratories, one each in Brussels and the UK, focusing on network strategy and fibre product design, standardisation and energy efficiency. In North America, we have our Data Communication Competence Centre (DCCC) specifically equipped to study and test new products and emerging technologies. New fibre connectivity units and cables are examined to see if they meet or exceed the latest Ethernet protocols. Product compatibility with active equipment is also studied using bit and frame error rate testing."

You said Nexans has guided development of fibre technology. Exactly how?

"Through decades of intense involvement with engineering groups and standards committees worldwide.

In particular, Nexans helped direct the standards defining fibre and cable performance as well as specifications for enterprise and Data Centre networks. We also participate in the IEEE committees defining protocols for the next generation of high speed applications, such as the recently approved IEEE 802.3ba for 40/100G. A key feature of this standard is the introduction

of parallel optics and the multi-fibre connector MPO, a development that forms the foundation for 40G. In addition, Nexans joins other world-class IT organisations as a principal member of the Ethernet Alliance. This association serves the IT industry by supporting the continued incubation, development, interoperability testing and support of technologies based or dependent upon Ethernet standards.”

We’ve heard about the future infrastructure needs of Data Centres. But what about offices, schools, hotels or similar settings? What’s their future?

“There is a basic trend occurring across the board in industries apart from Data Centres - in a word, devices.

The proliferation of digital tablets, 4G mobile phones, connected appliances and other IP-based machines will drive the office infrastructure needed to support it. Technology giant Cisco Systems this year predicted the number of Internet connected devices is set to explode in the next four years to over 15 billion – twice the world’s population by 2015. For the typical business, this means major challenges in handling all the data streaming through its horizontal network without packet loss, ‘time-outs’ or other slowdowns.

Fibre cables will greatly assist in supporting such needs.

Each organisation will have unique needs for higher bandwidth and longer distances to support these new services. Practically all these needs can be met with fibre cabling like Nexans’ LANmark-OF OM3 and OM4 multimode solutions, especially in backbones. Each can transmit over longer distances than other fibre products.

And while some think all fibre cabling is identical, Nexans stands out by what it puts around the fibre. We’ve developed pliable protective sheathing that permits a tight bending radius for demanding installations in cramped spaces. This also offers superior resilience when pulling cable through packed conduits, across walls or underground, and offers exceptional outdoor resilience to soil, water, UV sunlight and rodents. Outdoor cables are

jacketed in corrugated steel (UC) or dielectric (UD) armouring.

Many fibre installations will benefit from innovative Micro-Bundle cables. Whilst Loose Tube remains a good construction, new Micro-Bundle technology offers several advantages including flexible and smaller tube construction optimised for both horizontal and vertical installation. A Micro-Bundle tube’s diameter for 12 fibres is roughly the size of one Tight Buffered fibre. Micro-Bundle cables have a small bending radius that’s extremely beneficial in serving tight spots in office blocks, schools, hotels as well as Data Centres. (See box)

Our cable range is complemented with a wide variety of connectivity products, from pigtails and connectors to various types of patch panels. Cables and connectivity products are optimised for an integrated system approach. Successful installations across the world including airports, government buildings and headquarters of multinational firms prove that customers benefit from the Nexans integrated system approach.”

So the need for future-ready networks capable of 40 to 100G is already upon us?

“Yes it is. And Nexans encourages network professionals in every setting to be ready for it. On our end, we’re developing new solutions to address such challenges, many of which involve fibre optic technology.

Implementations for Pre-Term fibre will continue to grow for Data Centres. Our pre-terminated LC assemblies are complemented with preloaded angled and straight panels. MPO also continues to grow in popularity. It’s amazing that a multi-fibre connector like MPO achieves low loss connectivity for every fibre. Nexans MPO pre-terms support complex Data Centres for 10G with multiple cross connects with up to 6 MPO modules in a 10G channel. MPO modules allow migration from 10G based on LC connectivity to 40G based on MPO, giving customers an upgradable infrastructure for the foreseeable future.

We distinguish ourselves by supporting a systems approach to infrastructure versus a product one.

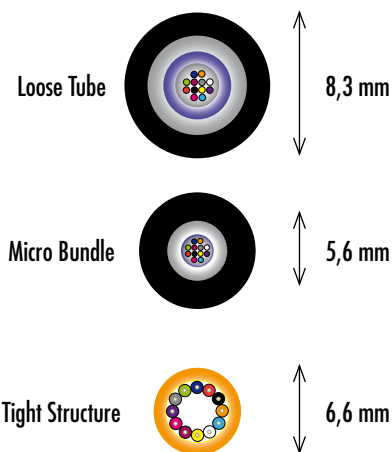
For example, in a recent Frame Error Rate test for 40Gbps performed at our DCCC, LANmark OM4 preterminated fibre with a 9-connector channel successfully transmitted beyond 600 metres, greater than 4 times the reach with more than 4 times the connectors specified by the IEEE 40GBASE-SR4 standard. This insight will impact future product development, showing how experience and R&D investment pays off for our customers.”

What final advice do you have for IT professionals?

“Plan your network today for the bandwidth boom of tomorrow. Change is accelerating faster than originally thought. In these tight financial times, you more than ever need knowledgeable specialists to assess the cost of future-proofing your network now versus the heavy liability of not being able to meet its needs a mere five years hence.” •

NEXANS’ ALTERNATIVE TO LOOSE TUBE CABLE – THE INNOVATIVE MICRO-BUNDLE

Micro-Bundle holds a maximum of 12 fibres permitting a small bending radius.



- Bending radius reduced by 50% compared to Loose Tube.
- High fibre count (12F-96F).
- Excellent flame and fire retardant properties complies with IEC standards: IEC 60332-1 and -3.
- Easy to clean & no drip effect of gel.
- Could be used for horizontal as well for vertical installations.
- Lighter cable, easy to pull and to install in patch panel.

Fibre solutions brochure available online

A new brochure featuring technical information, product listings and other data on Nexans full line of fibre optic solutions can be requested or downloaded at www.nexans.com/LANsystems.

Planning for the bandwidth boom



The demand for bandwidth in Data Centres is spiralling. Chip manufacturers are preparing to support the increase in data traffic used by mobile equipment, home computers and e-commerce. What are the current developments and what is the effect on the cabling infrastructure in Data Centres?

ICT Networks are coming under pressure as organisations are using more interactive media, such as mobile broadband and HD video-on-demand, as part of their day to day operations. In other words, the amount of data traffic is increasing. Deutsche Telecom is one industry voice predicting that traffic will soar tenfold in the coming four years and a hundredfold in the next eight years.

Different types of network environments can be identified where this increase in data traffic translates into a need for higher bandwidth. The first is in Metropolitan Networks, where the 'early adopters' are increasingly demanding more bandwidth. This sector will be the first to implement 100G data speeds. High-Performance Computing (HPC) applications have shown rapid growth across many industry sectors where demands for 100G already exist. And finally, Data Centres, where servers and

storage devices are driving the demand for 10G and beyond. The demand for speeds of 40G and 100G is expected within the next 4 years at the network edge, and in switch-to-switch backbones. After 46 years, Moore's Law which states that the number of transistors on a chip doubles every 24 months, is being challenged as our demands for bandwidth are accelerating.

LOSSLESS ETHERNET

An improved version of Ethernet Protocol, Data Centre Bridging, has been defined by the Institute of Electrical and Electronics Engineers (IEEE). This is a 'lossless' Ethernet with features designed to eliminate packet loss and time-outs. It provides for a unified Ethernet network fabric in the Data Centre through Fibre Channel over Ethernet (FCoE). Maintenance and administrative costs of the total ICT infrastructure are lowered as managers no longer have to occupy

themselves with three physically separate network solutions, Ethernet, Fibre Channel and Infiniband.

The protocol standards, collectively called Data Centre Bridging, include priority flow control, congestion notification, shortest path bridging, link layer routing and an enhanced transmission selection. This creates lower latency, eliminating traffic congestion and increases network efficiency. Another workgroup within IEEE has standardised HSE protocols (High-Speed-Ethernet) for speeds up to 40 and 100G and products adhering to these standards are becoming available on the market. These new standards employ twinax, multimode and single mode fibre for 40G and multimode and single mode fibre for 100G.

There is room for another 40G standard to increase the reach of copper using balanced twisted pair cabling since distances on twinax

are limited up to 7m. This means the thermal load of equipment can be better spread, enabling efficient cabling management. The advantage compared to fibre optic will chiefly lie in the savings of cables and equipment.

	40G	100G
1m Backplane	✓	
7m Twinax	✓	✓
100m Multi-mode fibre	✓	✓
10km Single mode fibre	✓	✓
40km Single mode fibre		✓

Twisted pair also allows 'auto-negotiation', with legacy equipment as it can scale up and down previous generations of Ethernet speeds.

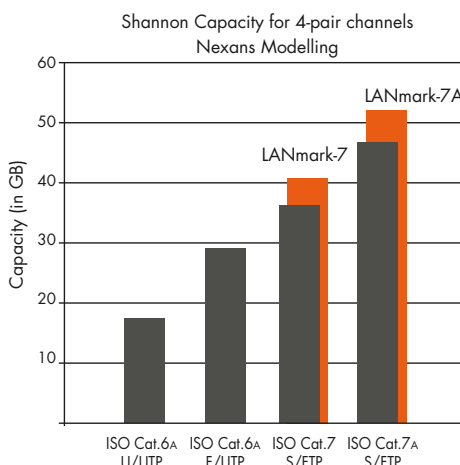
10GBASE-T PROBLEM

The development of 10GBase-T, however, did not go smoothly. The original idea was to develop 10G to run on unshielded Cat.6 cables. This was too ambitious and therefore a new Cat.6A cable standard was defined. The sensitivity for alien crosstalk - picking up interference from nearby cables and especially wires - resulted in the first 10GBase-T equipment versions demanding too much energy, the latency was too high and it turned out to be too expensive. Only now, with the third generation silicon, do the problems seem to have been overcome and a breakthrough in growth is expected.

HIGH-SPEED OVER TWISTED PAIR

Learning from this experience, there has been increasing support to use shielded cables to minimise the energy consumption, achieve lower latency and cut the costs of the electronics. Independent research at Penn State University has shown that standardised Cat.7A copper cabling can support 40G because of the lower signal loss and a superior immunity to noise over a large frequency spectrum (see chart). As more than 90% of the server connections are shorter than 50m,

a protocol is needed that can bridge these distances. The traditional maximum length of 100m, as defined for Cat.6A, will probably not be retained but be restricted to 40-50m to cut costs chiefly in the electronics of switch equipment.



PARADIGM SHIFT

For the first time in the history of structured cabling we need to understand that switching to higher Ethernet speeds requires a different type of cable as multi-mode fibre optic requires eight or more fibres per connection. Each fibre transports a signal of 10G. This also means a new connector type, the multiple push on connector, is required which can connect this number of fibres.



The traditional copper RJ45 connector will no longer be able to support speeds beyond 10G and a new connector will be required such as the standardised GG45 connector. The connector is fully backwards compatible with legacy equipment with RJ45 connections and able to support bandwidths of 40G and higher. Organisations will have an optimum network infrastructure at their disposal without having



to replace all servers and other equipment if just one part is required to upgrade to this higher speed.

PREPARING FOR THE BOOM

Improving the infrastructure of Data Centres to meet increasingly higher requirements is a significant challenge. As most organisations require almost continuous uptime there is limited opportunity for refurbishment or re-cabling in Data Centres. A cabling system typically has a life span of ten to fifteen years. However, due to increasing regulatory and other issues associated with acquiring land, planning permissions, and adequate power availability, Data Centre managers are now seeking networks with longevity up to and beyond 20 years. This puts added emphasis on managers to ensure the infrastructure is suitable for future technological advances, as well as providing a cost effective migration strategy. The key consideration is that cables for 40G and 100G will be different, and a migration strategy needs to be developed that takes this into account.

Although Data Centre planners and managers are under enormous pressure to increase the bandwidth infrastructure, retain backwards compatibility and improve energy-efficiency with a tight budget, techniques are available to help them. By planning well, considering the return on investment in the long-term using appropriate metrics and making optimum use of new developments in the cabling industry, they can ensure that their networks will be efficient in the long-term and remain competitive. •

This subject is discussed in more detail in a webinar held 14th June 2011. It can be viewed at www.nexans.com/bandwidthboom together with links to white papers.

PoE+ poised for growth



The newest form of Power over Ethernet (PoE) couldn't come at a better time. Whilst future-proofing network bandwidth remains a key consideration in choosing Cat.6A or above for horizontal cabling, technology firms are now readying new devices to exploit improved PoE-Plus technology over higher copper categories. Here's what you need to know to prepare wisely.



Gerd Backhaus

PoE was originally designed to send small operating currents (about 13 watts) through twisted pair horizontal networks to power small, desktop devices like IP telephone sets, governed under the IEEE 802.3af standard. The benefits of consolidating voice, data and power in a unified IT network is now being realised and adopted by many enterprising companies. The latest devices to be PoE-powered are video cameras for surveillance in businesses, warehouses, factories, airports and rail stations, amongst others.

As enterprise customers continue to invest in their data network infrastructure to enhance unified communication,

productivity and support growth, selecting the right PoE solution can literally 'power' their business.

ISO REPORT ADDS EMPHASIS ON CABLES/CONNECTORS

Since 2009, the new IEEE802.3at standard for POE+ has offered marked improvements over the original in terms of delivered power, yet requires some additional consideration when selecting cable and connectors to support it.

Because of the higher wattage offered by PoE+ (up to 25 watts), new applications such as physical perimeter

security using power pan-tilt-zoom cameras have begun to emerge. Two-pair cable bundles can transmit 30 watts, with up to 60 watts for four-pair wiring bundles, either of which stay within a 15-degree (C) heat limit. By embracing PoE+, businesses can take advantage of physical perimeter security solutions that are reliable, provide fast response, and deliver complete physical visibility. They will also be 'future-ready' for the new devices and technologies now in development that exploit PoE+ benefits. The growth of PoE is therefore assured because it will help increase the value of the Ethernet.

WHY THE 'PLUS' IN POE+?

The primary benefit of PoE+ is nearly doubling the usable delivered power:

	PoE	PoE+
Current	0.35A	0.6A
Voltage	44 V min	50 V min
Power	12.95W	25.5W
Cabling	Cat.3 min	Cat.5 min

A technical report from the International Standards Organisation (TR 29125) states an unshielded twisted pair (UTP) Cat.5 cable is the minimum requirement for PoE+.

due to the cable's slower temperature rise. This is made possible by the shield and low attenuation copper wire.

Although IEEE 802.3at for PoE+ does not address this situation, the ISO technical report does, which has since become an 'informal' benchmark for PoE+. As the bar graph shows, at the minimum level of U/UTP Cat.5 cable bundles, the temperature increase is quite remarkable. Not only does this require more cooling and escalating energy costs, but higher temperatures also increase attenuation, resulting in potentially lower network performance and shorter drive distances of the channel.

UNMATING CABLES UNDER LOAD

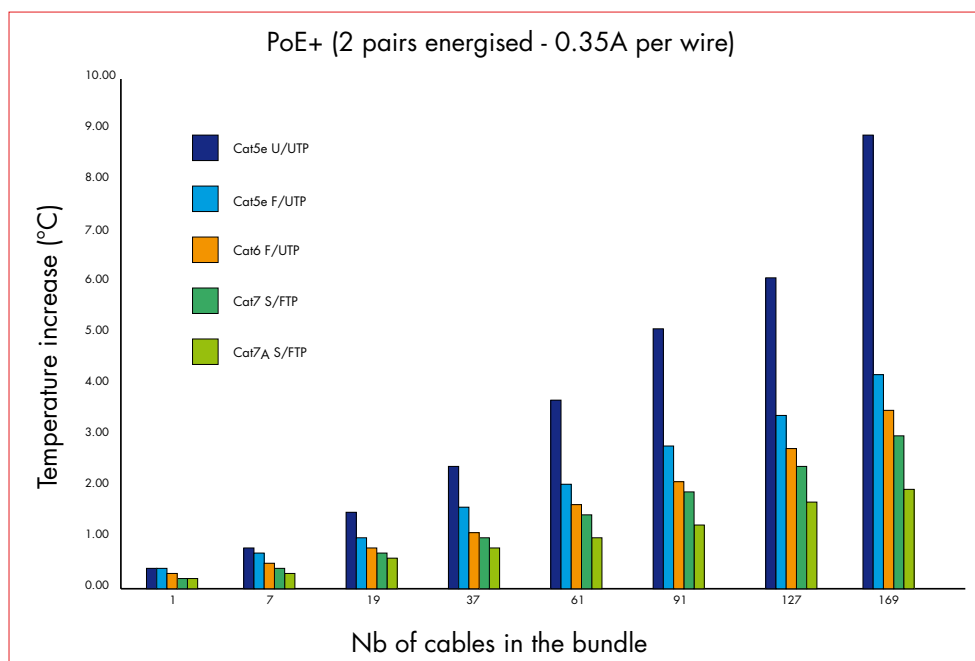
Another difference of PoE+ is how its higher wattage affects connectors used in a LAN layout. Due to the increased

caused by sparks will not negatively influence performance over time.

An often overlooked advantage of PoE is related to environmental stewardship. A recent installation at a large media agency in Mumbai employs a horizontal network of LANmark-6 using PoE to power more than 500 IP telephones throughout a nine storey tower block. A particularly important criterion for this highly environmentally conscious firm is to reduce its carbon footprint through less reliance on the regional power grid, without increasing cooling costs in a hot, tropical India. Using a higher category of cable such as Cat.6 in the horizontal LAN helps achieve this goal. It is today amongst only eight structures in India with LEED (Leadership in Energy & Environmental Design) Gold level certification.

Thanks to LANmark-6's reduced heating effects, the firm is also ready to support PoE+, a critical benefit as more devices used in the media profession will certainly employ some capability to power themselves off the Ethernet. For example, there may soon be a web-based tablet computer used to access broadband services powered by an Ethernet. This removes the reliance on a time-limited internal battery or power transformer plugged into a wall outlet.

LAN installations able to support such devices offer enormous cost-saving, environmental, safety and even aesthetic benefits. When unwieldy electric cords and bulky step down transformers plugged into hard-to-reach wall outlets are eliminated, so are tripping hazards and excessive cooling and power costs. For progressive businesses, it's time to embrace PoE and PoE+.



Whilst Cat.5 is acceptable for PoE+, our studies indicate challenges will arise due to the heating effects when multiple cables of this category are bundled in a PoE+ construction.

Furthermore, research by Nexans specifically performed for IEEE has concluded that for an optimal PoE+ configuration, shielded cables are preferable to unshielded, whilst a Cat.7A network incorporating connectors specifically designed for PoE+ is the ideal infrastructure. In particular, LANmark-7 and 7A cables reduce the heating effects inside of cable bundles

wattage involved, sparks will occur when disconnecting (unmating) cables when devices are moved, added or changed on the network. These sparks are usually not noticeable and not personal safety hazards. But over time, they can damage contacts on a typical RJ45 jack.

Therefore, suppliers of the connectors need to make additional tests to ensure the damage does not affect the connector's actual contact point. Nexans R&D tests show that on LANmark-6, 6A and 7A connectors, any damage

“For an optimal PoE+ configuration, shielded cables are preferable to unshielded. Cat.7A with connectors specifically designed for PoE+ is the ideal infrastructure.”

GERD BACKHAUS, MARKETING MANAGER
NEXANS CABLING SOLUTIONS



Empowering tomorrow's leaders

Like the academic institutions they serve, future-ready networks help students and faculty prepare for the challenges to come

Administrators at two leading institutions and their network consultants turn to Nexans' LANmark copper and fibre solutions as well as Power over Ethernet (PoE) technology to provide economically efficient, high performance infrastructures that put them at the cutting edge of education delivery.

A NEW FUTURE FOR LEARNING

Textbooks and chalkboards may still exist, but it should be no surprise that today's educational institutions are on the front lines of a digital revolution. After all, look at who they serve; typically young, tech-savvy students solidly linked through social media using the latest smart phones, tablets, laptops, game consoles and similar IP devices. Many have never known a world without the Internet.

For this reason, progressing establishments are ramping up their network infrastructure, not only to support these diverse devices, but to use them in a wide range of learning programs within the curriculum. Pencils and paper are out. IT is the future!

In the UK, South Cheshire College (SCC) recently opened a new flagship campus at the forefront of IT education delivery which allows it to take advantage of new and emerging technologies. The £74 million (€85 million)

campus houses high-tech classrooms featuring a high bandwidth, flexibly networked campus where students can log-on virtually any place at any time.

The college's architectural design enables curriculum areas such as business, computing, engineering and construction to be grouped together in clusters and connected by vibrant social spaces in a blend of indoor and outdoor zones. At the heart of the new building is a central student hub with facilities and areas to showcase their work. There are dedicated learning development zones and a learner support area enabling a dynamic and flexible use of space and digital devices by students and teachers.

The new campus needed a flexible, future-ready network infrastructure to support the multitude of student devices as well as digital programs and tools used for education, whilst at the same time, accommodate its existing technology.

In the Netherlands, a different type of school with a new campus sought similar goals. Royal Dutch Kentalis is a nationwide healthcare organisation providing diagnostic, care and scholastic services to young people with hearing or communication difficulties. The result of a recent merger of similar but separate Dutch institutions, Kentalis wanted to combine a patchwork of residential and educational networks at 180 locations into a single digital WAN. Twisted-pair lines in homes or workspaces supported by fibre-based backbones would provide powerful networks

"In our tenders, we always define our requirements in terms of Nexans Cabling Solutions performance."

NORD VAN DEN AAKSTER
KENTALIS TEAM MANAGER, ICT

across the country to help youngsters with sensory or communication impairments connect to the world.

EXPERT CONSULTANTS GUIDE CHANGE

In Britain, SCC's IT consultant, AECOM, recommended a Nexans cabling system for the new campus project. Says AECOM's Tony Buckingham, "South Cheshire is a technology-led college, so the structured cabling system required to support the new campus had to be based on the highest performance levels available, ratified by international cabling standards. The college specified this from the project's outset and took a very progressive approach towards cabling. All too often, this essential element is overlooked restricting the use of future technologies."

Only Nexans' LANmark-7A solution with its revolutionary GG45 two-in-one connector could meet the college's requirements for future-ready headroom and backwards compatibility with current systems and devices. Although featuring high-speed contacts, the GG45 is also an RJ45 formatted connector, making it fully compatible with older equipment whilst capable of supporting bandwidths of 40G and beyond.

This clinched the deal. "Along with ensuring it could accommodate its existing technology, the LANmark-7A solution means that SCC will be future-proof for the next 15 years, and able to scale up capacity in its own time as the technology used by students changes and teaching aids continue to develop," adds Tony Buckingham. "SCC is today one of the largest Cat.7A installations in the UK's education sector."

At Kentalis, Nord van den Aakster, the institution's Team Manager of ICT, said students there use multimedia-driven educational training solutions mostly through laptops and desktops where the visual element is extremely important. "And with more than a hundred sites over the country, videoconferencing is rapidly gaining importance. In our tenders, we always define our requirements in terms of Nexans performance."

"The LANmark-7A solution means that SCC will be future-proof for the next 15 years, and able to scale up capacity in its own time."

TONY BUCKINGHAM
IT CONSULTANT, AECOM

As a result, Nexans value-added reseller HTC International recommended a wide-ranging Nexans solution of copper and fibre.

"In its current 45,000 m² new building site, we integrated a LANmark-OF OM3 fibre network with a LANmark-6A copper solution connecting each residential room to the site network. In all, 7,000 LANmark-6A double outlets and fibre connections are ensuring occupants' access to national television, radio and broadband services," says Henk Smits, Account Manager at HTC International.



South Cheshire College – UK

He adds future-readiness also plays a key role in network design. "Today, the quality of the Nexans cabling solution is such that it exceeds by far the bandwidth capacity of the active network components, which means the need for fibre in the home is steadily pushed back. 10 Gigabits per second to the workspace via Cat.6A copper twisted pair cables and 40G on the fibre backbone is possible today."

PoE SAVES ENERGY & INSTALLATION COSTS

Another major benefit of each institution's LANmark infrastructures is the ability to support Power over Ethernet (PoE) technology, which has evolved from the 802.3af standard through 802.3at and is still being developed. By powering

devices through the data cable rather than local power supplies, PoE will enable both schools to cost-effectively add new IT equipment in the coming years.

"Reducing energy consumption is key, but PoE also brings considerable benefits in ease of installation and costs. We can now run an S/FTP cable to less accessible locations where no standard electric outlet exists and still power devices. It also allows us to manage UPS backup battery devices centrally," says Nord van den Aakster at Kentalis.

Alexander Reid, Business Development Manager at Nexans, concurs: "Schools are under increasing pressure to reduce power consumption, and yet there are typically hundreds of portable DC power transformers constantly in an 'on' condition, consuming power and never being turned 'off'. By using network software already available, the PoE enabled device can be managed, meaning individual devices only consume precious power when needed."

He adds, "There are PoE devices today that exceed IEEE power recommendations, and the development work Nexans has already done for the IEEE committee to determine the 25 watt standard of 802.3at showed that implementing higher performance Cat.7A cabling allows a higher wattage. This means today's Cat.7A system has the potential to double the power supported to 50W."

Nord van den Aakster says all new applications at Kentalis must now be PoE enabled. "We want the right network software to manage the on/off control of these devices, such as remote cameras, fixed telephones, or Wi-Fi access points."

More savings will soon be possible. "As new generations of Ethernet are deployed in years to come, features like the Power Back-off feature in 10G Ethernet (which measures the installed cable properties) will have the potential to reduce the port power required when higher performance cabling is detected, which can deliver year on year power savings," concludes Alexander Reid. •

IT expertise available in real and virtual worlds



Nexans provides personal and online forums for network managers and consultants to share insight about IT issues and infrastructure solutions

Helping IT and Data Centre professionals network with their peers and learn more about optimal solutions to their specific infrastructure needs is the purpose behind the Nexans Technology Network (NTN). Activities occur through actual meetings at one of its demonstration centres or through an online portal that includes a resource centre, webinars and discussion groups. Whether you prefer learning in real or virtual worlds, Nexans has created an ideal environment to exchange insight and find solutions.

Data Centre and network managers can now tap a wide range of IT and cabling expertise through the Nexans Technology Network, a unique alliance between Nexans and industry that provides regular access in a variety of venues to leading technical, research and engineering authorities.

The first component is the Nexans Technology Network Centre near Brussels, a meeting and demonstration facility where IT professionals can meet Nexans experts, explore solutions and actually evaluate them in a virtual Data Centre environment. Cabinets and racks facilitate the study of high-density patching or fibre/copper links to servers and storage areas. How Intelligent Infrastructure Management and environmental monitoring perform in real-world environments can also be demonstrated.

The new Centre also provides a fully-equipped meeting facility and classroom to discuss issues and challenges around standardisation, IP convergence, energy efficiency and network strategies and design.

MANAGEMENT FORUM TO EXCHANGE IDEAS

Oene-Wim Stallinga, Nexans Marketing Director said, "For years, Nexans has been providing installers with a wide range of web-based instruction and consultative services including network design tools and templates, calculation tools, technical support documents as well as on-site training. We now want to offer end users a similar outreach specifically tailored to their needs in a forum they best relate to."

The NTN Centre and its sister facility in the UK offer more than just product displays, presentation and meeting rooms. "They're primarily a means to take up key IT and infrastructure challenges, tapping the resources of our specialists and the expertise of outside partners as well as industry leaders," Oene-Wim Stallinga adds. "For example, how do Data Centres and networks easily anticipate new and evolving technology changes in short and long terms?"

A major new technology driver is IP convergence that will increase the number of devices on the IT network. And through Power over Ethernet technology, IP is not only for data transmission but also to power devices on the network, eliminating the use of low voltage direct current transformers. This reduces the number of cable types (both for signalling and power purposes) and requires more structured cabling.

Another key trend is virtualisation. Data and processing will move from the desktop to the server and will be pushed back through the network towards the desktop. The result is more network traffic since users can access information and applications from anywhere via a personalised profile. In Data Centres, protocol virtualisation is happening which require fewer ports but more bandwidth and a network topology capable of supporting smart migration paths to these higher bandwidth solutions.

"NTN's main objectives are to explain these issues and 'connect the dots' for IT professionals,

such as determining optimal migration paths to meet higher bandwidth needs, increasing energy efficiency to make IT more environmentally sustainable, and determining new ways to increase network security in a consistent way. At the same time, we aim at reducing total cost of ownership," Oene-Wim Stallinga said.

WEB-BASED EDUCATION SUPPORTED

The second NTN component involves web-based interaction for those unable to visit the Brussels or UK Centres. A password-protected website allows live, online attendance at private NTN meetings where IT managers and consultants can meet with their peers, along with special access to webinars conducted by Nexans experts. Technical 'White Papers', multimedia presentations on new technologies, case studies, trends forecasts and analysis are also accessible.

"It is increasingly important that these professionals are up-to-date with the multitude of new technological advances happening almost daily, and understand how these developments can impact their organisations," Oene-Wim Stallinga said. "The Nexans Technology Network makes this knowledge exchange happen." •

IT professionals and consultants can visit the website and register for free at www.nexans.com/technologynetwork.



Does your fibre system tick all the boxes?

- 
- ☒ Maximise reliability
 - ☒ bending radius
 - ☒ insertion loss budget
 - ☒ Minimise cost
 - ☒ save space
 - ☒ high density
 - ☒ installation time
 - ☒ 40G/100G ready
 - ☒ life time
 - ☒ **LANmark-OF**

LANmark-OF : Competitive Fibre Optic Solutions

- Micro-Bundle cables save up to 50% trunk space
- Slimflex cords offer 7,5mm bend radius saving 30% space in patching areas
- Pre-terminated assemblies reduce installation time
- MPO connectivity enables cost efficient migration to 40/100G

LANmark-OF brings the best fibre technologies together to ensure maximum reliability and lowest operational cost.

**Accelerate business
at the speed of light**



OF brochure

40G

100G