CONNECTIONS 55

Digital Building
Building automation today and tomorrow

Allegiance Supply, California
Promotes R&M's products to the US federal market

Premium Connectivity
Why better is affordable

IT Asset Management
It's worth it

R&M

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Editorial

From Concrete **to Bytes**

Dear Business Partners

Digitalization will continue to change the world of building concepts. With the Internet of Things, more and more devices and installations within our own four walls will be communicating with one another, the «smart home» is increasingly becoming reality. That does not just lead to more comfort and security, but also plays an integral part in an energy revolution: Our research suggests that energy costs can be reduced by up to 40% using well-thought-out building automation.

If a building is planned to be smart from the outset, the futuristic infrastructure can be elegantly incorporated in the plans. Standardized interfaces are required to make sure that information flows smoothly between the systems. One solution could be the network operating system Ethernet. The basis is clear: structured cabling. Without a smart connection, there is no smart home – and that is where we come in with our core competency: «connectivity that matters».

In our lead story, you will find out more about the opportunities emerging in building automation and the solutions R&M is offering. We have followed this trend for many years now and are supporting the industry long term as a partner in the transition from concrete to bytes. It is important to us not just to manufacture components but to offer holistic solutions – and to further develop them with you, our esteemed customers. This is why we make major investments in our innovation process because: «The whole is greater than the sum of its parts.» Find out about the work we are carrying out today on the technologies of tomorrow in our latest Trends articles.

Our approach is a winner on the market, something that is reflected in our figures for the first half of 2018: Sales have once again made a double-digit increase; we are growing faster than the industry. We want to capitalize on this momentum to drive on business – internationally and also in terms of our vertical range of manufacturing.

This can be seen in moves such as the takeover of Czech cable producer Dixi at the beginning of May, now trading under the name Reichle & De-Massari Czech Republic a.s. The wide range of FO cables is strengthening our position in all business areas; we can now manufacture top-quality cables ourselves which means we pull the strings of a large part of our solutions' value added chain.

And we are also increasing in geographical terms, too. The international sites are growing, we are establishing ourselves on all continents. Another mixed selection of interesting case studies from all over the world impressively bears witness to this. R&M is a long-term partner for all kinds of requirements.

Thank you for your interest in our solutions. I hope you enjoy reading the latest issue of our customer magazine CONNECTIONS.

Michel Riva
CEO

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Publication details:
CONNECTIONS 55 | October 2018

Cover picture:
The Pacific Coast near Encinitas in Southern California (USA) – Location of Allegiance Supply, a distribution partner of R&M USA

Publisher:
Reichle & De-Massari AG, Binzstrasse 32, CHE-8620 Wetzikon, Switzerland, www.rdm.com
eCONNECTIONS: www.connections.rdm.com

Editorial team:
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Layout: KplusH, CHE-Amden, Markus Kuhn

Printing: Uhl-Media GmbH, DEU-Bad Grönenbach

Print run: 13,000 copies

CONNECTIONS is published twice a year and can be ordered from the publisher.

Digital Building:
More Convenience, Fewer Costs, Diminished Resource Requirements

Buildings should be the perfect place to live, work, learn, play and of course shop. The industry is constantly striving to further perfect them. The latest trend focuses on networking building automation components entirely with one another. The journey to achieve this goal takes in both cabling and digitalization. A journey we are just embarking on.

One cable for electricity. One cable for the phone. One coax line for the TV. Perhaps a few cables for smoke alarms and to control the air-conditioning. In former decades, that was all you needed in terms of building infrastructure. Then came IT networks in large office buildings. The infrastructure they each needed was planned and set up independently of one another. Their development was not coordinated and their digitalization also took place independently from one another. The networking of these different systems is still an additional function level which has to be executed separately – and which is correspondingly time-consuming.

Today, modern buildings are full of electronics, cabling, sensors and all kinds of controls. An inconceivable number of systems is installed from the front door to the attic windows. To be able to control and use buildings in the best possible way, the best idea would be for these systems to be networked with

one another and linked in to a supervisory building master control system.

The need for intelligent, networked building automation is increasing all the time driven, among other things, by the demand for increased convenience, security, efficient use and cost control. Other factors, such as saving energy and minimizing CO_2 emissions, add to these demands.

Everything over IP?

To date the many modules of building automation have tended to work with their own protocols and transmission technologies. Over the last 30 years, several independent standards have become established on the market, such as BACnet, LON, EIB, KNX, DALI and SMI. With the help of special gateways, these systems can be linked to one another and the superordinate IT. In recent years, more focus was placed on the idea of communicating using a single protocol: the Internet Protocol (IP). Based on Ethernet network technology with its standardized interfaces, the IP enables a surprising number of new, efficient applications – not just the World Wide Web.

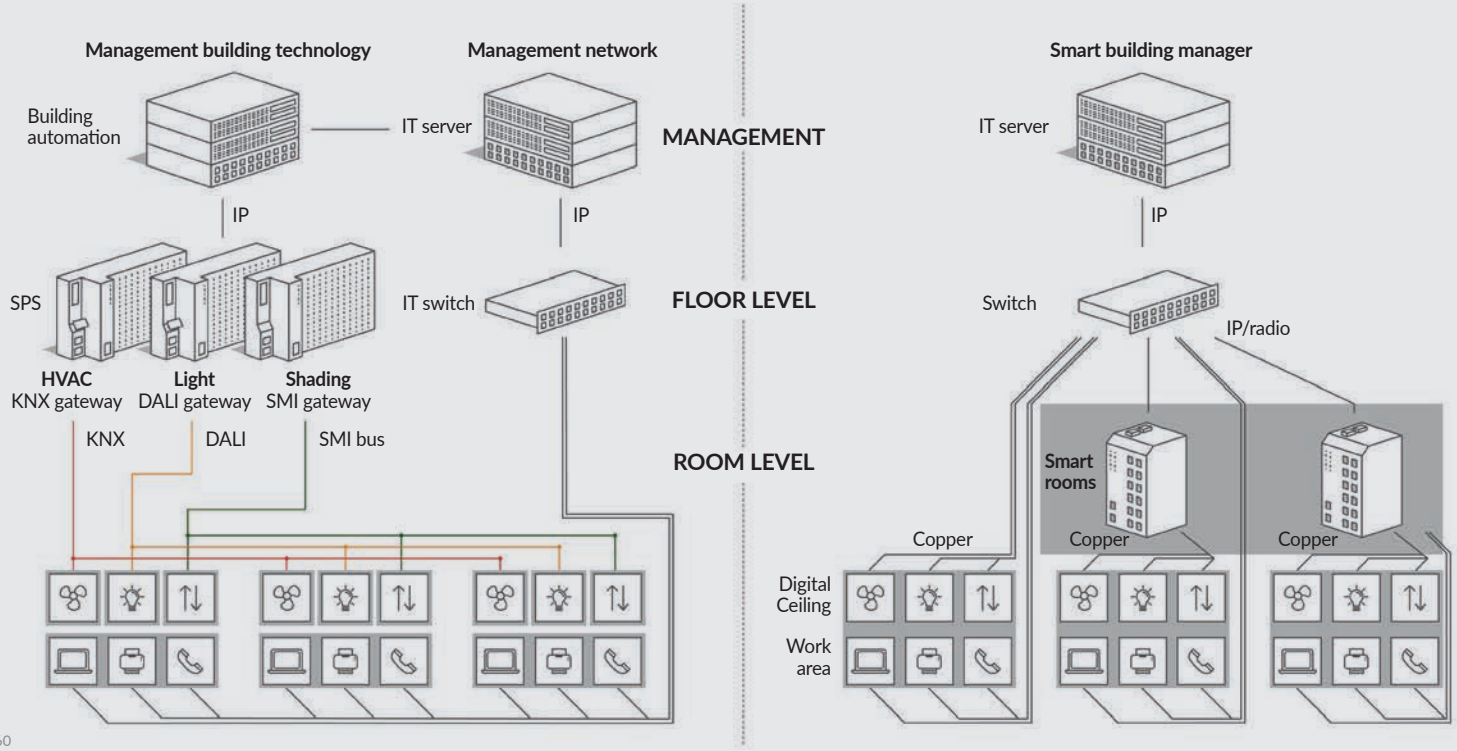
And that is why the IEEE further developed the Ethernet protocol systematically to ensure it could also be used for building automation. From today's standpoint – in the era of digitalization, the cloud and the Internet of Things – this consolidation would be a logical step. The result would be more intelligent buildings with standardized, affordable Ethernet connectivity and uniform IP addresses for every building technology module.

Such intelligent buildings have no problem exchanging information between the systems. They could be controlled remotely over LAN and the Internet. People could talk to buildings using a virtual assistant. Due to the better exchange of information between the individual parts, buildings could save significant amounts of energy and resources. University surveys have shown that operating expenses in buildings could be reduced by up to 40% in this way.

Building automation today and tomorrow

Today
Building automation works independently from the data network technology. It is used to monitor, control, regulate and optimize systems and building technology. The components (sensors, actuators, devices) are usually networked using independent bus systems and protocols. Building automation and data networks are connected to each other using complex interfaces (gateways).

Tomorrow
Building automation migrates to IP/Ethernet and communicates via the standard IP protocol. Manufacturer-independent network technology connects the individual components. This consolidated IP infrastructure simplifies planning, installation, maintenance and operation. Component costs are reduced due to scaling effects.



Cabling evolution

Structured cabling has proven itself over decades in local networks (LANs) on the IT and documentation side and so far has been implemented billions of times. Ethernet/IP turned out to be the perfect, omnipresent solution. To date such cabling has primarily been used for connecting computer workstations and for LAN applications.

Now, further innovations are increasing the possible uses of IP/Ethernet. For example, Power over Ethernet (PoE), launched 15 years ago. Originally it was mainly used to operate VoIP telephones, IP cameras, monitors and smaller end devices in office environments. But it can also be used for the simple connection of devices and sensors in the building automation system. With a suitable cabling structure, the LAN could thus become the backbone for the entire building automation system as soon as the latter communicates over Ethernet/IP.

«Digital Ceiling» is the latest cabling concept for building automation for which R&M already has a holistic installation solution. This involves having an appropriate number of service outlets pre-installed on room ceilings at regular intervals. WLAN access points, LED lamps, building technology modules and distributed network switches can be installed in a flash whenever required at these service outlets. Using this kind of structured building automation cabling, the devices can not only be supplied with data but simultaneously with electricity using PoE feeding.

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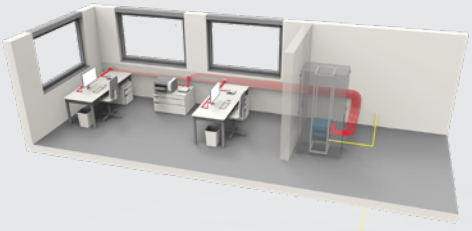
Advantages of consolidation

All over IP. The migration of building technology right down to the sensor/actuator level to Ethernet/IP in connection with Digital Ceiling, Power over Ethernet (PoE) and Single Pair Ethernet (SPE) offers a whole range of advantages:

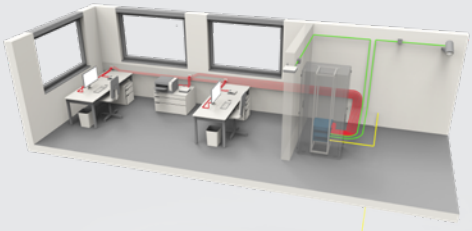
- **open and manufacturer-independent digital systems**
- **standardized cabling, interfaces, protocols**
- **no special knowledge necessary for field bus systems**
- **relatively low material, device, operating expenses**
- **simple network installation and maintenance**
- **space-saving, energy-saving infrastructures**
- **central management of networkable components**
- **comprehensive real-time analysis of building systems**

Equipping building automation systems with IP/Ethernet is still in its infancy. Now virtually every building automation function can be found in this setup. This development opens up as yet undreamed of application possibilities and must be seen as a major step on the road to smart buildings. With continuous, standardized networking on an IP basis, there are no more interface problems and the integration of all information in one standardized building master control system is simplified. Instead of half a dozen independent systems, in future it will only be necessary to maintain one system.

When creating Digital Ceiling cabling, it must be ensured that it can cope with the expected current load. R&M provides calculation tools



Structured LAN cabling (red) with Ethernet/IP data transmission has been used to connect workstations for decades.



Power over Ethernet (green) came onto the scene in the last 15 years. It incorporates, for example, cameras and WLAN antennas into the LAN and at the same time supplies them with electricity.

For a short while now, the structured LAN cabling has been able to integrate first building functions (blue) e.g. individual sensors and LED light sources. Digital Ceiling is the ideal way to expand the LAN cabling for this purpose.

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Single Pair Ethernet features

Single Pair Ethernet transmission rates are currently defined in a range of 10 Mbit/s to 1 Gbit/s. The link ranges decrease as the transmission speed increases between 1000 m and 15 m according to the cabling type. SPE cabling should be able to provide end devices with 50 to 60 Watts of electrical power via Power over DataLine (PoDL). Faster transmission speeds and longer transmission distances are being discussed by the IEEE and new SPE protocols can be expected in future.

which help customers plan cabling to suit future needs.

The constant electricity load also makes special demands on the quality of the connection points in the cabling. Products with the PowerSafe seal from R&M fulfill these requirements.

Everything with RJ45?

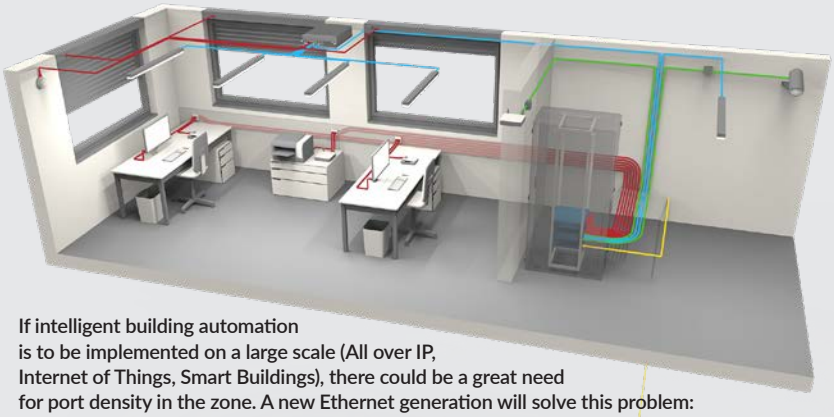
As the Internet of Things (IoT) spreads, a further increase in the number of connection points is to be expected. Ever smaller devices are to be incorporated over time via Ethernet/IP: switches, controls, small antennas, controllers, motors, tiny computers with actuators and sensors in the most remote corners of a building. The Digital Ceiling concept with closely installed service outlets is the perfect basis for this.

However, it is clear that the RJ45 will begin to reach its limits in this area due to port density and the size of the devices. This is why standard-setting bodies and manufacturers such as R&M are already planning a further evolutionary step. It is called Single Pair Ethernet (SPE) and is likely to be extensibly available on the market from 2020. A lightweight, slimline cable with a single twisted pair and small connectors will extend the local data network. With SPE, the number of possible connection points in a given volume can be quadrupled. As is already the case with PoE, SPE will not only be able to transmit data but also supply power to IoT end devices.

A combination of the «Digital Ceiling» concept with an SPE connector system which can be seamlessly integrated in the RJ45 world, as proposed by R&M, would be the ideal solution for the infrastructure of smart buildings. Digitalization can thus be taken to the most remote corner of a building at an affordable price and ready to face the future.

Strongly wooed growth market

Building automation is a growth market. This is something shown by analyses carried out by various market research companies. Different technologies are competing for this market. The classic building automation systems, such as KNX and BACnet, will increasingly be extended with wireless technologies and IP/Ethernet and could even be replaced by them in the longer term.



If intelligent building automation is to be implemented on a large scale (All over IP, Internet of Things, Smart Buildings), there could be a great need for port density in the zone. A new Ethernet generation will solve this problem: Single Pair Ethernet.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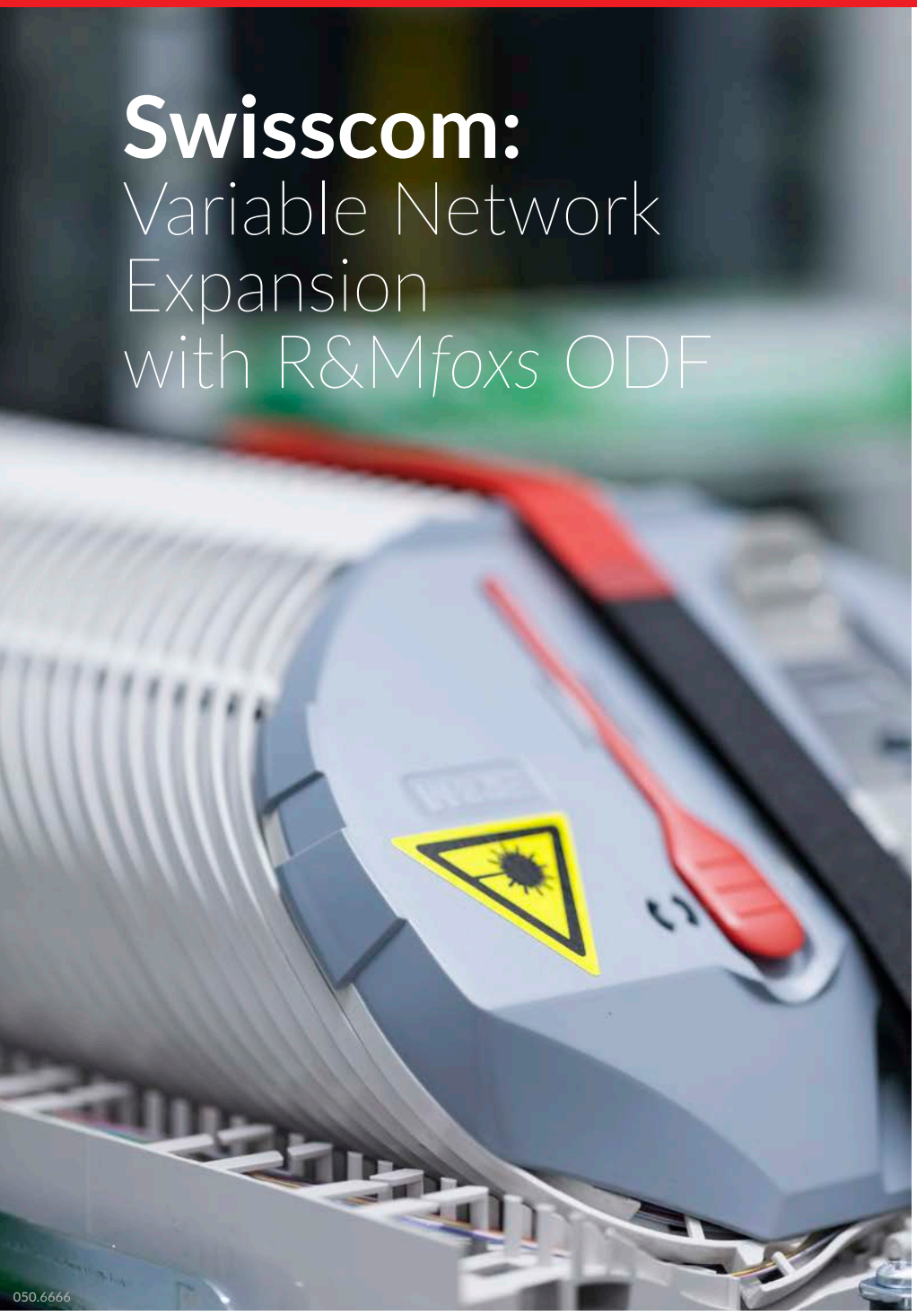
Swisscom: Variable Network Expansion with R&M*foxs* ODF



«I value R&M as a reliable, innovative and stable partner long term with a top-quality product range that meets market requirements. We enjoy constructive, target-oriented support and consulting services from expert employees in all our projects.»

Hansjörg Weimer, Technical Manager and ODF Evaluation Project Lead, Swisscom (Switzerland) AG

Generational change in the FO network. Swiss telecommunications group Swisscom is introducing new optical distributors in the core network: R&M*foxs* ODF. The new platform gives Swisscom ideal planning freedom.

«When we install a distributor in a head office today, we are faced with the specific needs of an initial installation. But we don't know what new requirements are going to come along later,» says Hansjörg Weimer, Technical Manager and ODF Evaluation Project Lead at Swisscom (Switzerland) AG, of the initial situation. It could be that additional breakout cables will be used later or that fibers have to be subsequently spliced. Additional splitters, single-fiber or multi-fiber connectors may have to be installed for new services.

Because the future is so open, Swisscom's planners and assembly teams want more flexibility. They want to be able to extend or re-organize FO distributors in the core network to whatever extent that is required at any time. Hansjörg Weimer explains: «For us modularity means that we procure a distribution frame today and part-assemble it, and that we can then add other sub-racks and plug-in units later whenever we need to. And that is something that simply isn't the case with the old distributors.»

That is why Swisscom was looking for a new generation of distributors for its head offices. The company envisaged as simple a basic construction as possible that could quickly be adapted to both current and future scenarios – with low port costs. All network expansion variants should be easy to implement.

The national core network, the backbone of all Swisscom services, has consisted almost exclusively of FO cabling for more than 30 years. These basic fiber-optic infrastructures will continue to gain in significance. Business clients, data centers, cellular phone networks, remote head offices and Swisscom's rapidly growing access networks (FTTH, FTTS, FTTB etc.) will increasingly put a strain on the core network. And variable expansion has to be ensured because this is how Swisscom can guarantee fast broadband data transmission over large distances anywhere and at any time.

In the search for a new, modular distribution platform, Swisscom did not only want

Comprehensive evaluation process at Swisscom

As part of its evaluation of a new distribution platform, Swisscom assessed more than the technical data. Select products from five manufacturers were subjected to a two-month practice test in Zurich.

The test team was composed of internal and external installers, splicers and field service employees. The team assembled and equipped the racks, at times under extreme time pressure. This included the:
- splicing of underground cables
- insertion of breakout cables
- connecting of patch cord connections
- monitoring of assembly processes
- evaluation of the degree of modularity

The evaluation team gave the test assemblers a questionnaire that had to be completed in detail. This ensured a wide range of information for further evaluation. Using the test results, they could also estimate how much work the platform generates – an important factor when it comes to operating expenses.

The R&M*foxs* ODF cut a convincing figure in particular because of its modular principle and intuitive assembly technology. All areas of work are easily accessible. Once assembly has been completed, everything is fixed at the right place. There are no fiber movements, a factor which increases operational reliability. The test installers rated this very highly. Technical Manager Hansjörg Weimer describes the material used in the R&M*foxs* ODF as high-quality and fit for purpose. The price-performance ratio also corresponds to expectations.

As Weimer says: «With the R&M*foxs* ODF, we are getting a considerably more modular system than we have been using to date. It means we can use cables and connectors much more precisely. The lower costs per port and the simple handling reduce investments and operating expenses, something our customers benefit from. With fundamental questions such as the evaluation and launch of new infrastructure products, we feel it is worthwhile to subject the products to in-depth practice tests in as realistic an environment as possible. Only then are the challenges and costs in everyday business clear. Infrastructure products are implemented long term and incur operating costs over a long period. You have to try to determine and compare these as precisely as possible.»

to rely on technical descriptions, service catalogs and prices. Numerous stakeholders in the company were asked to define their requirements and technical specifications were created on this basis. Swisscom spent two months testing suitable products from several suppliers.

Port costs optimized

The R&M*foxs* ODF came out on top in the overall examination of commercial and technical requirements, in accordance with the technical specifications, costs and practice test results. This means two fundamental changes for Swisscom: flexibility because the R&M*foxs* ODF offers more possibilities in terms of connector and module selection. Secondly, lower costs per port, something customers will benefit from in the form of favorable prices.

Once the telecommunications group had decided on the R&M*foxs* ODF, Swisscom and R&M prepared the generational change together. Some components were adapted and standardized to suit Swisscom's desires. R&M defined the specific ordering and logistics processes. Racks and modules can be delivered as soon as they are required. Furthermore R&M offers training sessions and provides an installation manual as well as other documentation. Installers can call up the documentation digitally using the QR codes on the racks.

The plan long term is to equip more than 900 sites throughout Switzerland with the R&M*foxs* ODF. The distributors will be in operation for several decades. Installation commenced in the summer of 2018.

The pilot project in Zug

Swisscom equipped its Central Office (CO) in Zug first with the new R&M*foxs* ODF. The distributor is used as a classic ODF. This is where all underground cables in the core network end. This is where the connections to other COs, data centers, mobile communication antennas, primary transfer points and the direct cables to business customers are. Furthermore, Swisscom switches internal connections to proprietary equipment or to the equipment of collocation partners over the ODF.

At the Zug site, around 3,000 outdoor cable fibers had to be re-spliced. Added to this there were around 1,000 fibers from internal trunks to switching devices, collocation partners, mobile communication antennas as well as trunks to the FTTX network.

The basis of the R&M*foxs* range introduced by Swisscom includes 180 and 220 cm high open R&M*foxs* ODF distribution platforms. In Zug's central mail office, there are currently six R&M*foxs* ODF 220cm in use, equipped in various ways.

Left: Hansjörg Weimer, Technical Manager and ODF Evaluation Project Lead, Swisscom (Switzerland) AG; right: Roger Albisser, Technical Lead for the Central Region, Network Site Management, Swisscom (Switzerland) AG

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Time for 400G

Fiber-optic signal transmission is reaching a new dimension: 400 Gigabits per second. The subject dominated the specialist OFC 2018 congress in San Diego. 400G chips will be commercially available from the end of 2018.

The Optical Fiber Communication Conference and Exhibition (OFC) has once again broken a record. This year, 15,500 experts traveled to the conference to swap stories on their experience with technologies for the fastest possible data transmission. The R&M Innovation Team was also present to find out about new and upcoming high tech developments which will then immediately be incorporated in innovation planning.

The general consensus of opinion at the OFC 2018 was: The time has come for 400 Gigabit/s. This will give data centers the opportunity to work even faster than they are working now. A further focal point was the launch of 5G services which will require a massive extension of FO networks both in expanses and between the base stations and antennas.

The OFC exhibitors presented a wide range of 400G chips, components and modules which will soon be available commercially. There are basically three formats which will be competing against one another, supported by well-known manufacturer groups (multi source agreements, MSA).

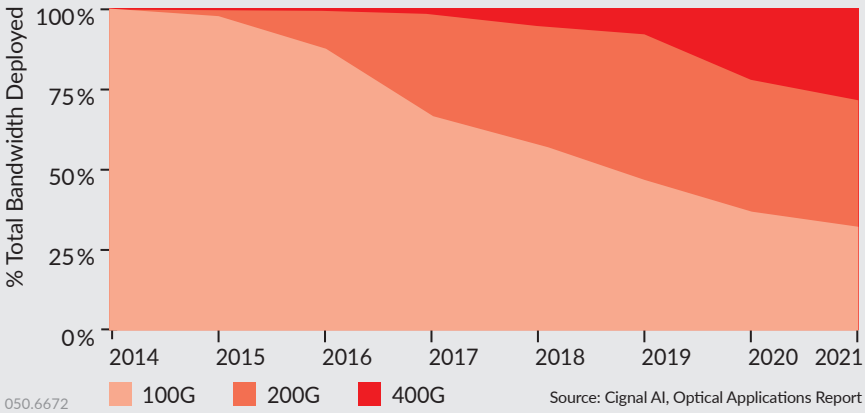
The two market-ready transceiver formats – QSFP-DD and OSFP – are the logical continuation of conventional connectivity with plug-in, active connectors on the front panel of a switch. Frequency, modulation and transmission speed will increase, the form factor is becoming more compact, energy consumption will fall in comparison to common transceivers used to date. The QSFP-DD concept is currently seen as the clear leader on the way to 400G.

COBO chooses a new path

The COBO consortium is proposing an even more radical change. The COBO concept envisages the plug-in transceiver module moving to the main board. The copper path between electronics and interface will thus be greatly reduced. The modules are likely to transmit 400 Gbit/s or 800 Gbit/s. Small, passive fiber-optic connectors take on the connection function in the front panel.

The consortium led by Microsoft published a first specification for COBO connectors at the OFC.

Deployed Coherent Bandwidth by Speed



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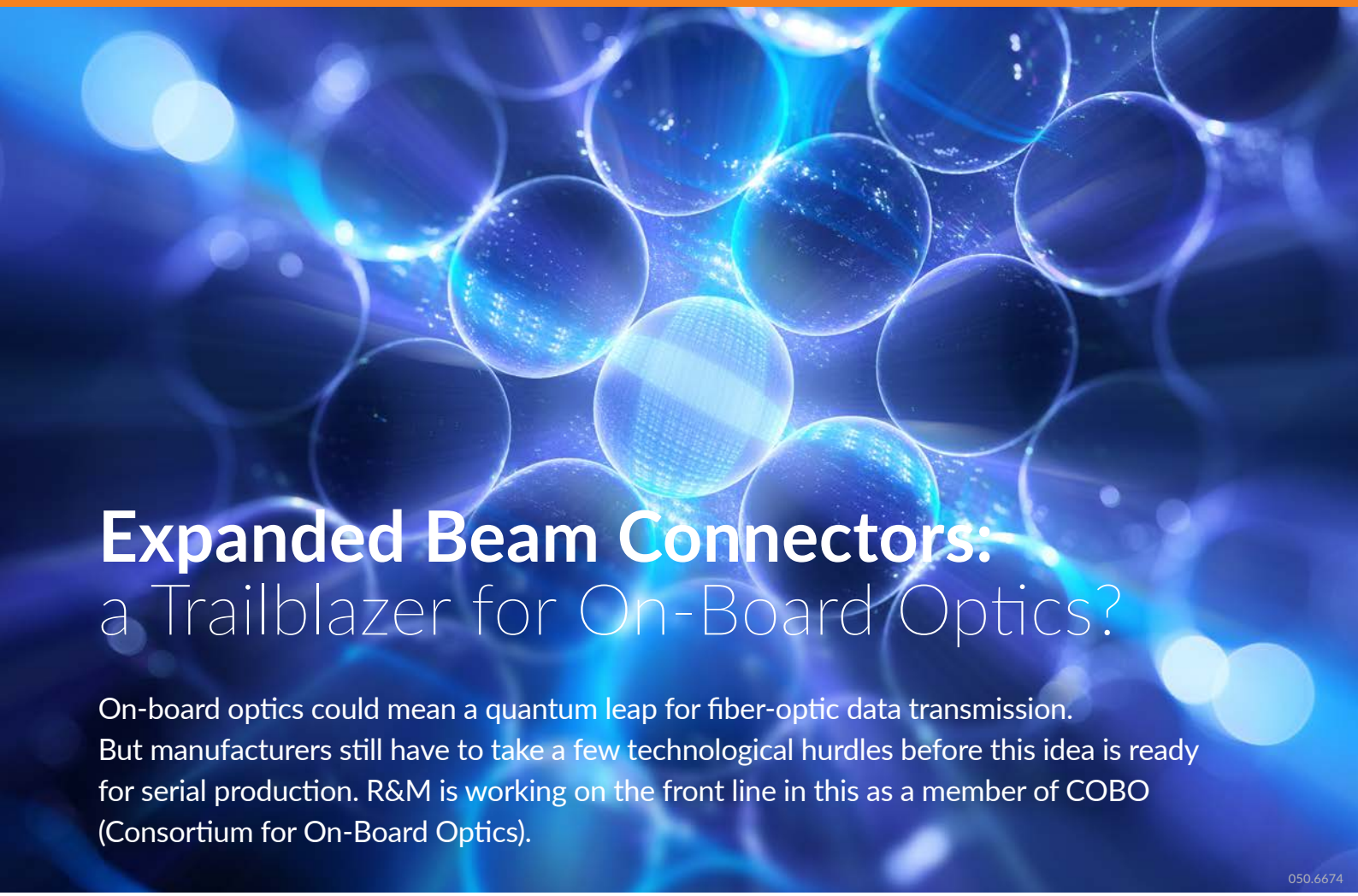

Expanded Beam Connectors: a Trailblazer for On-Board Optics?

On-board optics could mean a quantum leap for fiber-optic data transmission. But manufacturers still have to take a few technological hurdles before this idea is ready for serial production. R&M is working on the front line in this as a member of COBO (Consortium for On-Board Optics).

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COBO was founded three years ago under the aegis of Microsoft and this year has defined first specifications (see the report on the previous page). Ultimately it is about catapulting fiber-optic data transmission beyond the 400 Gbit/s mark.

The idea: The space-consuming electro-optical converters (transceivers) will move from the housing to the board. Internal glass fibers connect them with miniaturized, passive multi-fiber adapters in the housing front. This would mean more fiber connections could be accommodated in the front panel – a prerequisite for more optical channels and more data transmission.

A crucial question is how masses of multi-fiber connections and connectors in the front panel can be best connected and maintained. In the conventional parallel optical connection method, all fiber stubs would have to be pressed together tolerance free with high pressure. This would require a top-flight connection mechanism and the many uninsulated fiber stubs would be very difficult to clean. Expanded beam connectors are a solution for this.

R&M in Wetzikon has developed its own expanded beam technology. Micro lenses on the fiber stubs ensure the perfect transition of light – even without physical contact. That makes things much easier. Even in the case of connectors with a high number of fibers, all that is needed is gentle contact pressure to ensure the low-attenuation transition of light between all fibers. The coupling mechanism can be simplified and the packing density in the front panel increased. The lenses tolerate faults, are robust, insensitive to dirt and require virtually no cleaning.

Expanded beam connectors thus minimize the effort involved in the assembly, operation and maintenance of multi-fiber connections. This is why they are suitable for applications with a high fiber density, such as for example active devices which use on-board optics. R&M estimates that expanded beam connectors will be a pioneer for the era of on-board optics.

This is why the R&M innovation department is focusing on developing expanded beam technology and thus supporting the goals of the COBO group at an early stage. R&M presented the development project in September at the ECOC 2018 in Rome and provides information on expanded beam technology on a dedicated website.

www.onboardoptics.org

050.6675

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R&M Supports St George Hospital in Optimizing its Healthcare Infrastructure

050.6364

The St George Hospital in the South Eastern Sydney Local Health District is an accredited principal teaching hospital of the University of New South Wales, Australia.

St George Hospital treats more than 68,000 sick and injured people every year at its emergency department and in October 2017 expanded the existing A&E department to serve the growing demand of the surrounding area. The new acute services building covers 24,000 m^2 and was constructed above the existing working hospital floor with a total investment of AUD 210 million.

Business challenge

With day-to-day operations to contend with, the biggest challenges for this project centered on integration with the existing facility, where downtime during periods of construction needed to be minimized to ensure that the hospital remained in an operational state.

The project

The project consisted of providing cabling solutions for the construction of eight new communication rooms, all horizontal copper cabling, one campus distributor with diverse fiber pathways between levels, and the pathway and cable installation for the fiber backbone between the new and existing campus distributors. In addition, the project also included 487 wireless access points.

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R&M solutions

With some cable runs verging on the 90-meter mark, R&M suggested using the company's extended channel solution, which allows copper links over 100 meters when tested as a channel. This was well received by all parties, including builder Brookfield Multiplex, and subsequently incorporated in the design documentation by the consulting engineering company JHA. In the end, most of the 5,600 R&M Cat. 6_A U/FTP links were under 90 meters, but those that exceeded that distance tested out perfectly and were covered under the R&M*freenet* lifetime application warranty.

«R&M is known for delivering innovative solutions in the structured cabling industry and, I am happy to say, provided us with excellent support throughout the project.»

Stan Krainovic, Technical Portfolio Manager, Information Management Services, St George Hospital

R&M provided a 650 MHz Cat. 6_A U/FTP cable as opposed to the industry standard Cat. 6_A F/UTP 500 MHz, which supports traditional Ethernet systems as well as uncompressed UHD video: All of R&M's cabling and components far exceed the minimum defined levels to satisfy customer needs and concerns.

In the project, R&M provided standard R&M*PowerSafe* copper patch cords, which use IDC contacts inside the plugs instead of the more unstable piercing technique used by others: Installed today, these can easily cater for PoE++ applications in the near future. Furthermore, R&M customized the solution to fit into St George Hospital with a new 2RU FOBOT brought in for this client.

The final installation, which was expertly completed by Datalec Services, included R&M Cat. 6_A U/FTP cable, OS2 cabling, blown fiber and a voice backbone.

Only the best is good enough for healthcare

R&M offered multiple walkthroughs with the client to ensure they were kept up to date on the progress of the installers. R&M teams were also present on site compiling several detailed reports and making sure the whole project execution was seamless with no interruption to the hospital's daily operation.

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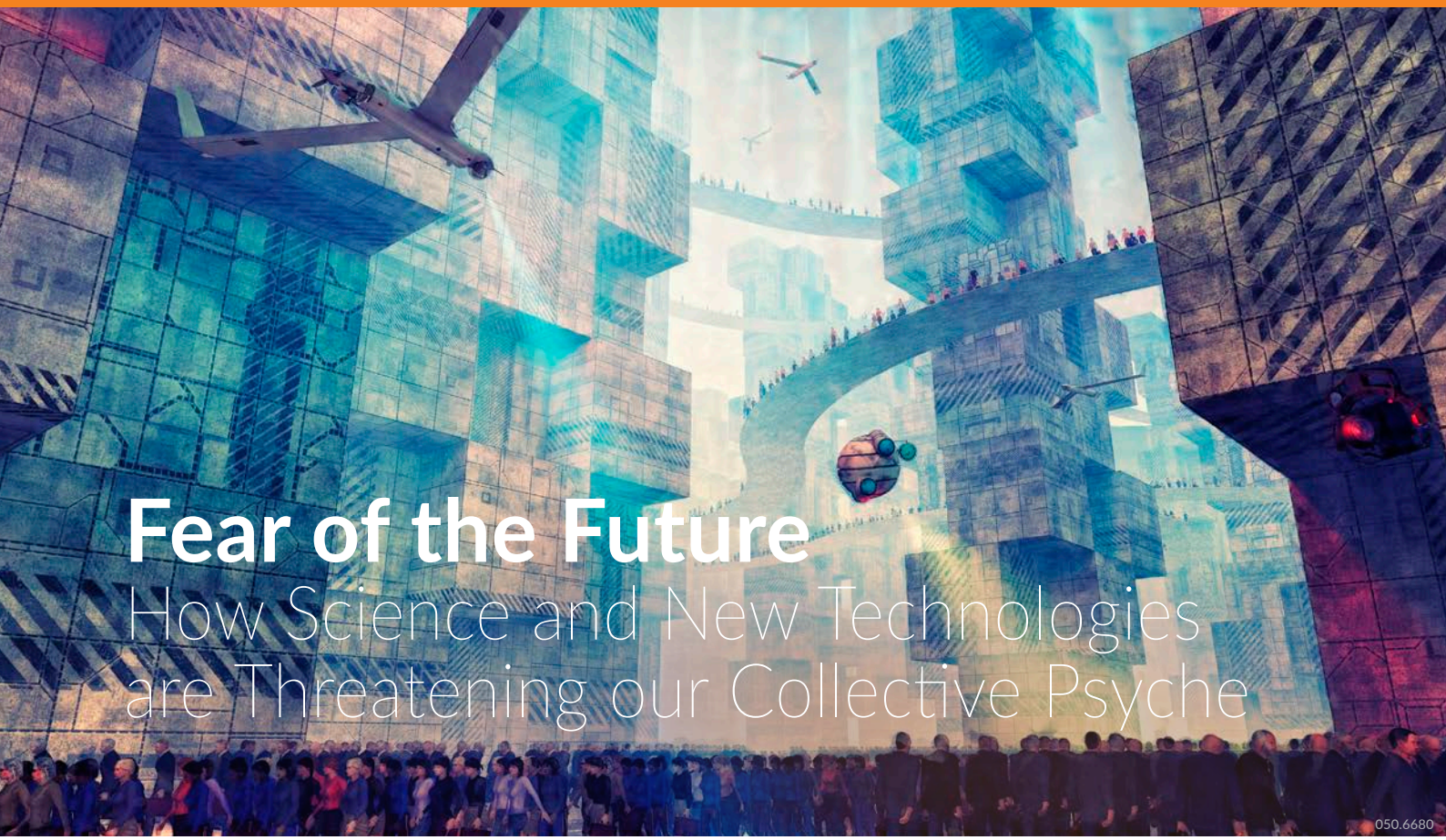

Fear of the Future

How Science and New Technologies are Threatening our Collective Psyche

A remarkable paradox is shaping our time: Technological progress enables us to live in unprecedented safety, enjoy the highest ever levels of health and experience a quality of life no past generation has ever known. But at the same time many people depict a future in which everything we know is destroyed or even humanity as a whole is wiped out.

This contradiction is a phenomenon of our time. Right into the nineteenth century philosophers and writers painted extremely positive pictures of mankind's future. In «Utopia», for example, Thomas More described a world in which all people (more precisely, all men) have the same rights. The working day consists of six hours, everyone can freely choose his profession and has full access to educational facilities. And everyone gets his needs provided for by the community. For a long time, such utopias were fictitious future worlds that represented bright contrasts to dreary everyday life.

In the twentieth century, that picture changed. A look into the literary visions of the last hundred years mainly reveals unpleasant worlds: ecocide, atomic apocalypses, homicidal robots, totalitarian regimes. Orwell's «1984» and Huxley's «Brave New World», the figureheads of the science fiction novel of the twentieth century, describe worlds of nightmares created by despotic dictatorships made possible only by modern technologies.

That is not without irony. Because the «culprit» of the expected deterioration or destruction of our living conditions is identified to be scientific and technological progress, i.e. the very power that made it possible that today we live in a society that far exceeds the optimistic scenarios of More's «Utopia». The fact that it was the sciences of the seventeenth and eighteenth centuries and their heroes such as Isaac Newton and Galileo Galilei, who decisively contributed to the Enlightenment and thus to liberalism, democracy, and the open society, no longer counts. A general criticism that is leveled against science even goes as far as saying that it subjects people to the constraints and laws of technology and economics, thus degrading them to pure objects.

Five reasons why we are increasingly afraid of progress

How can we understand our emotional affinity to decline in an age when science and technology are reaching ever-greater heights and providing us with an ever better quality of life? How can one explain this contradiction, in which we are driven by both a comfortable but blind belief in technology and a fear-driven curse of science and its technologies? We blindly trust the functioning of smartphones, computers, digital data communication, antibiotics and many other technologies, but at the same time demonize technological progress as a whole. Five reasons for this:

1. Technologies force their beat and rhythm upon us. Time constraints created by technical and mathematical optimization processes in our jobs (just-in-time production and distribution) – all of this creates the feeling of losing control over our lives.
2. Most people hardly understand what is going on behind the curtains of the scientific stage. At the same time they feel that there are powerful processes at work. It is this combination of intuitive sensing and lack of concrete knowledge and understanding that creates anxiety.
3. The sheer velocity of technological change and the associated complexity of social change overwhelm us mentally and emo-

tionally. Over the past 250 years, people have at given times faced several singular technological upheavals; technological advances have been comparatively slow. Today, we are not just dealing with a single «sorcerer's apprentice» experience but with a whole bunch of them.

4. The consequences of technological developments are no longer locally confined. They no longer stop at national borders or oceans. Topics such as nuclear war, environmental destruction, overpopulation, climate catastrophe, artificial super-intelligence and genetic engineering affect and threaten humanity as a whole!
5. We are forced to abandon the comfort zone of absolute certainties, be these of religious, philosophical or scientific nature. What began with Copernicus and the loss of our central position in the universe, continued with Darwin (we are not the center of creation, either) and Freud (we are not even masters of our own mental home) and found its next manifestation in quantum theory: If a particle can at the same time be a wave and if the outcome of a physical measurement depends on the standpoint of the observer, then it is entirely possible that two opposing world views can coexist next to each other.

Technological revolutions have in the past repeatedly come with a redefinition of ethical, political, social, spiritual and religious norms. They shifted truths, destroyed world views and created new ones. Alongside computers, lasers and modern medical diagnostics, quantum physics also brought us the atomic bomb. The Internet comes with exciting new opportunities for social, political and economic exchange as well as completely new ways of governmental (and corporate) surveillance and massive interference with our privacy. New algorithms solve previously insoluble problems, but the development of a superior artificial intelligence threatens to enslave us. And from the hunger of our modern technologies for energy leads a direct path to the destruction of our natural resources.

Dynamism of technological progress virtually impossible to steer

But who or what is actually in a position to steer technological progress towards tolerable outcomes? Several social players spring to mind. However, two which are often mentioned are, individually, undoubtedly overwhelmed by the task:

- The responsiveness of societal decision-makers (politicians, business leaders, media designers, etc.) whose job it also is to increase the common good is far too slow to steer the accelerating dynamics of technological change. Among other things, this is due to the fact that our political, business and cultural leaders' knowledge of the state of scientific development is usually scarce.
- The scientists themselves are equally incapable of controlling technological progress. On the contrary: Just like all other members of society, they too are largely subject to the free-market logic. They can even become billionaires themselves by developing new technologies based on their insights.

A third social creative force is the free market. And indeed technological progress has hitherto almost exclusively followed a market (or military) exploitation logic. In other words: What was possible and meant a financial (or military) advantage for some has indeed been developed. Can we hope that the mechanism of market competition steers the technological progress in the best way possible for us? This would mean hoping that Google, Facebook and Amazon would decide on the development and use of quantum computers and higher artificial intelligence to everybody's benefit or that pharmaceutical and genetic engineering companies employ CRISPR so it serves all of us in the best possible way. Even the most believing followers of the free market ideology would upon honest inspection consider such an expectation as far-fetched.

Fighting information filters and neutralizing particular interests

Next to ethical integrity we must demand a commitment to intellectual integrity from

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politicians and other social and economic decision-makers. This means that deliberate falsehoods, information distortion as well as information filters for the purpose of enforcing particular interests must be effectively fought against. It is, for example, unacceptable that a startling number of politicians are still seriously doubting climate change or Darwin's theory of evolution.

The shaping of future technologies requires the democratic engagement of each and every one of us. And that includes an obligation to keep abreast of the times. Unfortunately there is still too little talk about physics, chemistry and biology when journalists and other opinion leaders inform us on world events and important social developments.

A more detailed version on this subject by Dr. Lars Jaeger can be read at:
www.connections.rdm.com/trends/fear-of-the-future

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GTT Benelux Reduces Downtime and the Cost of its Fiber Optic Network with SYNO Dome Closure

GTT Communications Benelux was looking for a better closure in order to simplify network management. After comparing and testing different solutions, the company opted for the SYNO Dome Closure from R&M.

A flexible, scalable and modularly expandable solution for any FTTx application was needed, ideally providing advantages such as the intended ease of use, less downtime and lower installation costs.

Challenge: higher availability at lower cost

GTT provides multinationals with expansive network reach and a diverse suite of cloud networking services, securely connecting them to services, applications and cloud service providers around the world. Because the company has grown through acquisitions, their tier 1 IP network consists of components from various suppliers. «I have been responsible for the Northern European infrastructure for 15 years, which up until the end of May 2018 was part of Interoute, acquired by GTT,» explains Mark Zuijdendorp, Field Engineering Manager Benelux & Nordics at GTT Communications. «In order to simplify management and reduce the inventory of products required for servicing our network, we had been searching for a better fiber closure for a number of years. R&M drew our attention to the SYNO Dome Closure in 2017. After extensive independent testing, it appeared to offer us several benefits the most important of which are lower installation and management costs and higher availability of our network connections.»

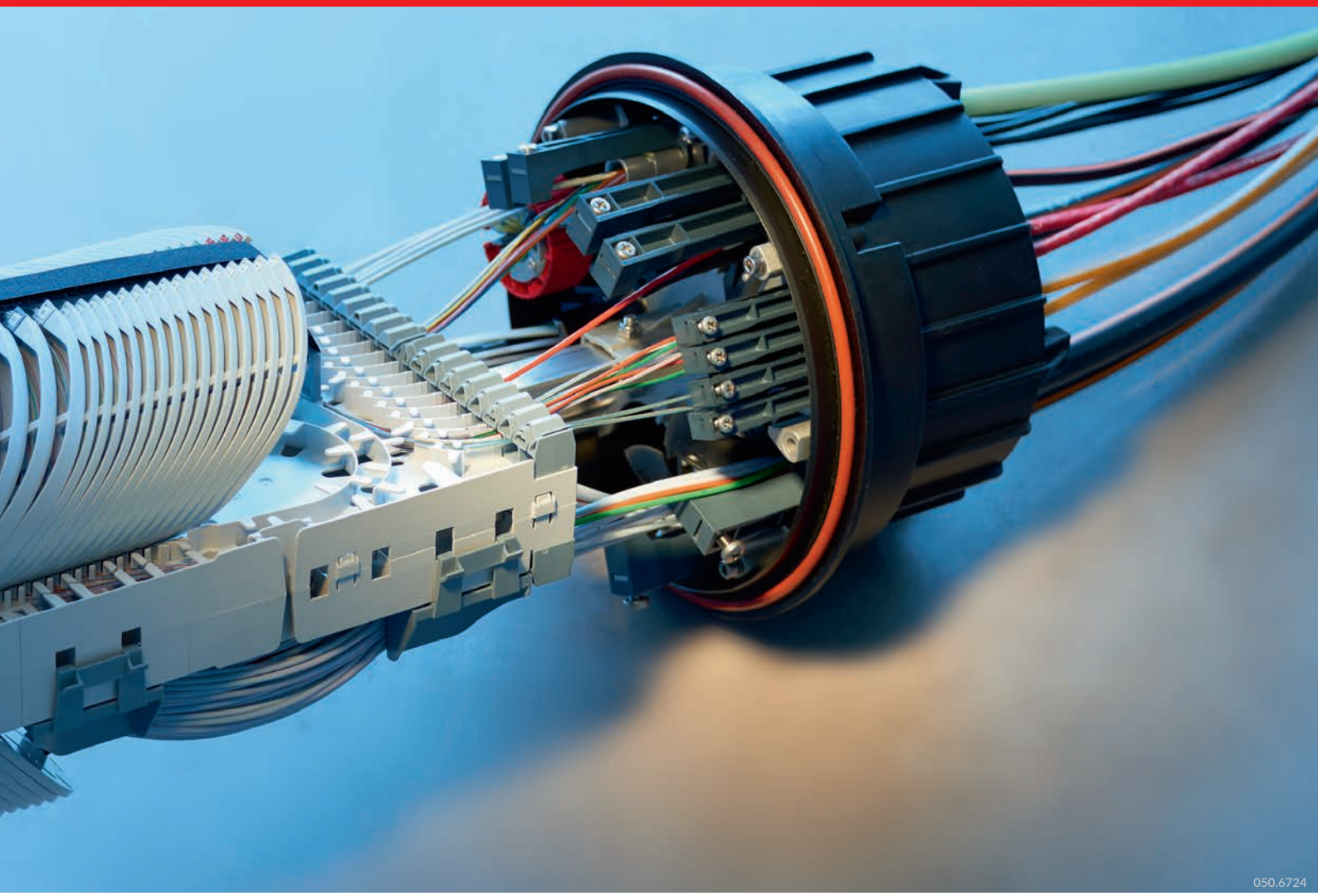
050.6682

Solution: reusable SYNO Dome Closure

An important functional requirement for GTT Benelux was that the new closure had to be suitable for 12 to 432 fiber cables. Other requirements were installation time, ease of maintenance and durability. «The main benefit of R&M's SYNO Dome Closure is the short installation time,» says Mark Zuijdendorp. A further advantage the client emphasizes is

«The R&M SYNO Dome Closure is a high-quality connection with which we are better prepared for the future of ever faster networks.»

Mark Zuijdendorp, Field Engineering Manager Benelux & Nordics. GTT Communications



that, on average, the dome closure saves an hour and a half per connection, both for new connections and for troubleshooting. This reduces their service window, which means they are less likely to exceed customers' SLA response time. Another advantage is its durability, as R&M's dome closure can be easily reused thanks to the cold gel sealing. This is useful both in terms of new connections that may require modifications at a later date and for replacement work. Finally, the SYNO Dome Closure can be expanded modularly, allowing the more flexible upgrading of existing connections.

Innovation: flexible FTTx solution

Thanks to its reusability and modularity, R&M's SYNO Dome Closure is a flexible solution for every FTTx application. Eight radially placed input kits support all common cable types and configurations, while different types of fiber optic cables are particularly easy to insert through the bottom. They are also easy to open and close for modifications, which gives GTT Benelux the aforementioned savings in installation and service times. The Single Circuit Management System by R&M in the SYNO Dome Closure is scalable to 1,152 connections and has a 40 mm bend radius to support the glass fibers. Furthermore, the innovative reusable cold sealing gel ensures optimum protection of all fibers and thus improved availability and performance of the fiber connections.

Practical experience: R&M project support

GTT Benelux has been working with the SYNO Dome Closure with complete satisfaction since the beginning of 2018. The use of other components also has consequences for the installation partners of infrastructure suppliers, system documentation and inventory of products. In order to prepare the first implementations, a dedicated Product Manager from R&M Headquarters in Switzerland trained the main contractor and installation partners at GTT Benelux at a central location in the Netherlands. «Thanks to the knowledge, experience and collaboration between R&M and the distributor 6X International, our transition to the new closure has been a smooth one,» concludes Zuijdendorp. «After the training all fiber optic technicians were enthusiastic about the ease of installation. The R&M SYNO Dome Closure is a high-quality connection with which we are better prepared for the future of ever faster networks.»

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Precise Planning of LAN Modernization

PANSA focused on Swiss quality in the project of modernizing the LAN network. The Air Traffic Management Data Center in Warsaw has been equipped with a new LAN network from R&M. The modernization of the existing network in the operating Data Center required both precision and organizational skills.

How can a LAN be modernized fast without disturbing operations? And how can the new cabling be accommodated in existing, narrow cabinets and conduits? R&M partners Telpom and S&T had to find an answer to just that question. It was their task to completely replace the active network infrastructure and to modernize the backbone network (between network nodes) in the CZRL building of the Polish Air Navigation Services Agency (PANSA). Among other things, the CZRL Data Center processes the operating data of the Air Traffic Management Center, making high demands of security.

S&T took on the job as general contractor and commissioned Telpom to carry out the work. Telpom is the installation company of experienced Polish partner Rudolf Pomper certified by R&M.

Paweł Tynecki, Head of Telecommunication Unit, PANSA

Perfect High Density platform

First of all the planners proved that R&M's High Density platform fits in occupied, narrow cabinets – both for copper and for fiber optic cabling. For this purpose they put the cabling into groups each with 12 links. The numbering of the module holders was prepared accordingly. It had to be adapted at short notice. This took place without any delivery delays.

The greatest challenge was to coordinate the working steps on site and the punctual delivery of cables and components. Modernization in the older infrastructures was seen as a complex task. But the customer was not prepared to accept any incidents or delays. Precise preparation, organizational skills and professional execution all played their part in the task being completed correctly.

The necessary working steps and resources were determined beforehand. This was followed by accurate measurements. Based on this preparatory work, the partners drafted a detailed execution plan. For example they were able to determine the link lengths precisely. With this information, they were able to prepare the cables accordingly and lay them directly between the connection points.

The R&M solution

PANSA's modernized LAN of the Air Traffic Management Center and the CZRL Data Center comprises:

- **110 OS2 and OM4 fiber optic cables, terminated with LC Duplex**
- **220 FiberModules HD in both splice and breakout version**
- **Class E_A links with 10 km copper cable**
- **Cat. 6_A ISO ports**
- **More than 90 High Density (HD) patch panels**
- **All connections were applied on HD patch panels, R&M*inteliPhy* ready**
- **Structuring in groups of 12 links each**

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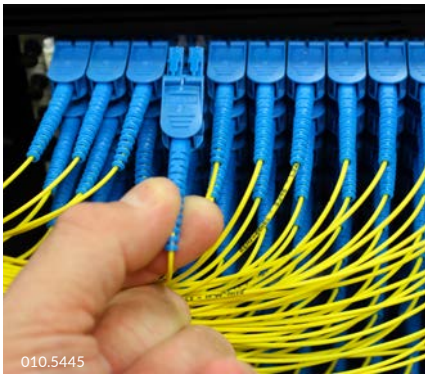
Mercury
Modular High Density Fiber Platform

Campus networks and data centers are literally growing out of their spaces. An incredible number of ports and cables have to be accommodated in the most confined of spaces. R&M is solving the problem with Mercury, a new high-density splice distributor.

The Mercury fiber platform developed by R&M USA is a modular splice distributor system. It is suitable for use both in campus backbone rings and for connecting two data centers. The big advantage for users: Mercury saves you time. Installation, test and commissioning can be halved in comparison to conventional solutions. In terms of packing density, handling and modularity, Mercury is setting new standards.

The chassis occupies two height units in a 19" rack. The housings feature a modular patch panel on the front which can accommodate up to 288 LC connections per section. The connections are in two blocks each with six trays. A typical configuration occupies 6RU and terminates 864 fibers. With 48RU, the Mercury boxes connect up to 6,912 fibers in a rack.



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Like the patch panels the SD-08 splice trays are designed for 288 fibers. The 1:1 ratio simplifies planning. The splice trays contain large inputs and outputs for high count fiber cables, space for storage and repositionable splice protection holders.

Faster with ribbon fiber

The cabling is based on ribbon fiber cables which are widely used in the US. Ribbon cables consist of several fibers lying next to each other in the shape of a ribbon in an adhesive matrix. Several fibers can be spliced simultaneously. And that speeds up work incredibly. R&M offers versions with 200 µm and 250 µm fibers. In comparison with 250 µm, using 200 µm ribbon fiber cables can save 30% space in the cable runs.

To save even more valuable installation time in the secure area of the data center, the patch panel modules are optionally available with factory-pre-terminated ribbon fiber trunks. The effort involved in installation and verification is minimized as the connections and trunks are factory-measured.

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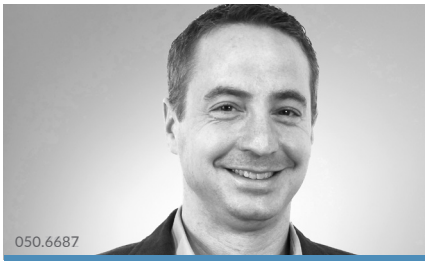
Simple handling with LC-QR

In such a densely packed patch panel, it is impossible to plug conventional patch cords in and out without using tools. This is why R&M recommends patch cords with the innovative LC Quick-Release Uniboot connectors (LC-QR). A push-pull mechanism enables locking and unlocking via the boot.



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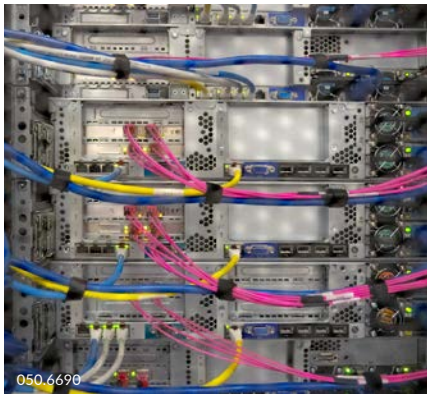
R&M in the Largest Commercial Data Center in Central Switzerland

CKW is the leading service provider for energy, data and infrastructure in Central Switzerland. For 125 years now, the company has been supplying its end customers, now more than 200,000 in total, from the cantons of Lucerne, Schwyz and Uri with electricity. Added to this they supply innovative products and services from the connectivity & data center, electro & light, energy technology, IT & communication as well as security sectors.

The Fiber Services division provides connectivity and IT infrastructure services to business customers and telecommunications providers. Geographically, CKW covers the entire Central Swiss business region and adheres to customer requirements prevalent throughout Switzerland. Furthermore the company is gradually extending its existing FO network as well as its data center services and uses partnerships for the comprehensive fulfillment of customer requirements.

Largest commercial data center in Central Switzerland

Due to the strong growth, the company decided to build a new ISO 27001 certified TIER IV data center in Lucerne-Littau in 2015. With a usable space of 1,270 m² it is the largest commercial data center in Central Switzerland. With a PUE value of less than 1.2, the efficiency is more than 60% above the average of all Swiss data centers. The private and public customers can either rent a «white space», a «rack lounge» or a «rack space».



CKW AG itself has decided to build its own data center in the new, ultra secure data center of its subsidiary CKW Fiber Services. The data center was planned in accordance with the precise specifications and requirements of CKW.

Perfect project planning from A-Z

Walter Epp, system engineer and the man responsible for data center operations at CKW, was made project lead. As the timetable was very ambitious from the outset,

«The importance of the Layer 1 infrastructure is often underestimated. With R&M I have a partner that gives me optimal support and offers me the right solutions for this sector.»

Walter Epp, Data Center Project Lead, CKW AG

exact deadlines were drafted with precisely defined interfaces.

Werner Helfenstein, Head of Infrastructure and Operations at the CWK data center, has worked together successfully with R&M for many years. Once again he was able to recommend the leading supplier of Layer 1 solutions to take on this case. Walter Epp examined tried and tested cabling solutions with customers already renting space and was impressed: «I felt immediately that R&M had great experience with data center projects and in particular with rack cabling.»

«As data center project lead I have a large number of tasks that all have to be taken care of at the same time. And that is why I need an expert and transparent advisor in the cabling sector too, a partner I can totally rely on at all times. And I found that partner in R&M.» Walter Epp also stresses that communication in such a complex project is of crucial significance, concluding: «The customer advisors were always available for me whenever I had any questions. And during the installation phase, they were even often to be found on site.».

Top of rack infrastructure

CKW opted for a top of rack infrastructure for the switches which simplified cabling. R&M developed a customized solution with compelling cable management.

In the data center, several thousands of copper and FO connections have already been installed. The copper installations were equipped with the current Cat. 6_A 10 Gigabit technology. In the FO sector, the flexible MPO MTP system with interchangeable LC Duplex trays and OM4 cabling was implemented. To protect the FO cables, the R&M raceway system and the lateral 19-inch rack cabling channels were used.

Optimal project support

The R&M team supported CKW throughout the project with consulting and planning services and stood out with perfect delivery quality. For example, all patch cords were delivered at the right lengths with precise instructions on how to position them in the racks. «Everything was delivered as planned and on time,» says a highly satisfied project lead Walter Epp. Adhering to the precisely defined delivery times was very important as installation work in projects of this magnitude quickly explode in terms of costs when delays occur. Furthermore the installation team was trained in specifics on site by R&M.

In the spring of 2017, CKW was able to commission the new data center. «Our newly constructed data center works perfectly,» says a satisfied Walter Epp. «Every connection worked perfectly from the word go, at full performance. That really impressed me.»

From left to right: Werner Helfenstein, Head of Infrastructure and Operations and Member of the Management Board, CKW Fiber Services AG; Walter Epp, Data Center Project Lead, CKW AG; Nadja Brechbühl, Marketing & Sales Assistant, CKW Fiber Services AG; Roger Berther, Head of IT Run, CKW AG; Daniel Gyger, R&M Switzerland

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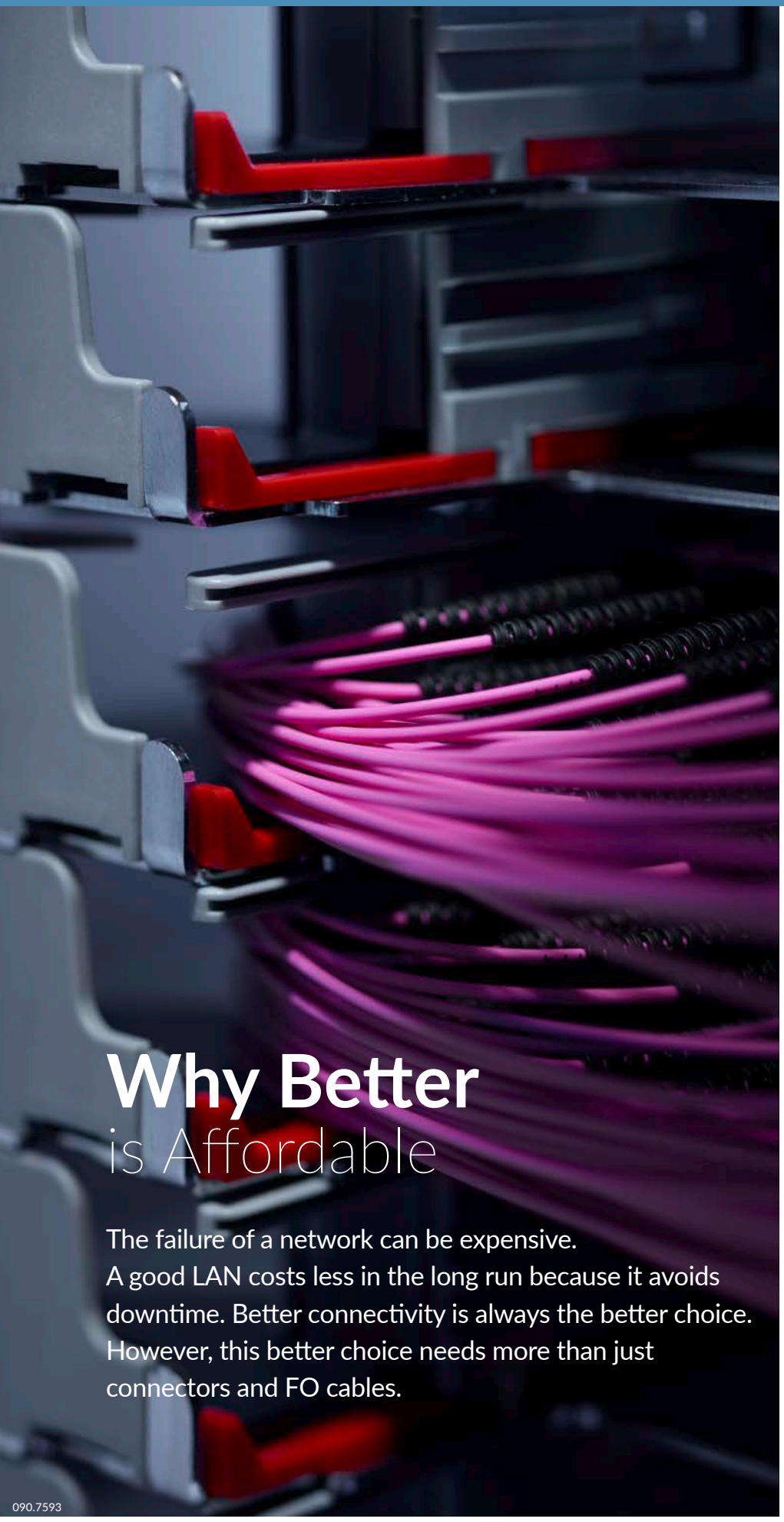
Centralschweizerische Kraftwerke AG

CKW domiciled in Lucerne has written a piece of Swiss electricity history. For more than 125 years it has been supplying Central Switzerland with electricity – from turbines to power outlets. What started off as a hydroelectric power plant in Rathausen, is now a company with more than 1,700 employees and a service portfolio ranging from electricity through to building and data networks.

CKW is a company organized under private law. Its majority owner is Axpo Holding AG. Another important shareholder is the canton of Lucerne.

The utility provides electricity for most consumers in the canton of Lucerne. The CKW subsidiary Elektrizitätswerk Schwyz AG supplies a few municipalities on Lake Lucerne. The Group also includes: Elektrizitätswerk Altdorf AG, Steiner Energie AG, CKW Conex AG, CKW Fiber Services AG and SicuroCentral AG. The CKW Group is the largest energy service provider in Central Switzerland. It has more than 200,000 customers.



Why Better is Affordable

The failure of a network can be expensive. A good LAN costs less in the long run because it avoids downtime. Better connectivity is always the better choice. However, this better choice needs more than just connectors and FO cables.

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The major network breakdowns of recent years caused immense damage. Companies lost millions in terms of revenue within just minutes, not to mention their good reputation. Customers lost faith in the cloud, the Internet of Things and convenient online services.

Incorrect handling and the subsequent failure of components are two of the three most common causes of network downtime. When this kind of error leads to the failure of a data center, it is expensive.

And that means data network operators must ensure comprehensive protection: regardless of whether it is a public network or a LAN in an office building or data center. Far-sighted planners and installers select secure, durable and unassailable components. Experience shows that downtime is reduced when those responsible make the right choice from the very beginning. The right choice: Usually that means better and higher-class products.

Less expensive long term

In the long run, better products cost less. And that is something R&M is convinced of. When examining the Total Cost of Ownership, higher initial costs for planning, material and installation are offset by lower costs for maintenance, repairs, upgrades and migrations. A network experiences less downtime when better technologies and well-devised protection programs are used. The longer a network is available, the more stable the network operator's sales revenue.

Experts always look at the costs of an installed network over its entire life cycle. In this process, R&M takes much more into consideration than just the connectors and FO cables. It is true that the passive infrastructure is the basis of every LAN. But in supplier and project partner evaluation, other factors play an important role: planning, installation, operation, service, maintenance and compliance as well as later upgrades and migrations.

The R&M initiative «Better connected» at www.rdm.com provides more details on this. Visitors to the website will find out why the better solution is less expensive and saves money long term. Here, you can take a look at a catalog of criteria which can be used to select the right infrastructure and services.

Six factors

Anyone wanting to plan and operate a data network not only focuses on product quality but also takes the following six cost and reliability factors into consideration:

- Planning reliability
- Installation reliability
- Operational reliability
- Expansion possibilities
- Minimal maintenance
- Compliance support

Project partners are sure of planning reliability when they are presented with a complete information package at the outset. This includes calls for tender, data sheets, certificates and approval documents from independent institutes.

In the long run, better products cost less.

R&M extends the service with local support. Technically experienced R&M employees are available as soon as planners or installers have to solve a specific task. If required, they provide a tailor-made range, act as troubleshooters and support installations right through to measurements for formal acceptance. The icing on the cake in every project is the warranty provided by R&M. As part of its Qualified Partner Program (QPP), R&M grants a system warranty for 25 years. R&M partners improve their skills further and gain additional expertise and security through know-how transfer. In the QPP training sessions, they gain expert first-hand knowledge.

Guaranteed plug & play capability, user-friendly design and top-quality material ensure that R&M products are the better choice. Experienced specialists install and maintain the components straight away without any errors. The modular principle of the R&M world supports any later changes and add-ons. Parts of a network can be replaced and upgraded in a flash, and new features can be added just as easily. That makes it possible to invest in stages if so required.

Nowadays data networks are subject to compliance regulations. R&M is also on hand to support such measures. Among other things, customers are given proof of ROHS and CE conformity as well as UL, GL, ISO 9001 and ISO 14001 certificates. Networks that fulfill compliance regulations are very definitely the better choice.

R&M extends the service with local support.

Examples of cost drivers in network projects

- Bad documentation = higher planning costs
- Optimal cabling attenuation values must be determined by trial and error = longer assembly times, higher installation costs
- Sensitive products = longer installation time, more errors in assembly
- Frequent network downtime = higher operation costs
- Unsuitable material, incorrect handling with Move, Add & Change = higher maintenance and upgrade costs
- Demands from insurance companies, exchange of material that does not meet security criteria = higher compliance costs

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5G Networks
Diversity as a Challenge

050.6695

In the future, everyone should be able to connect with everyone else and every device, every sensor and every machine get in contact with each other. The fifth-generation cellular phone network (5G) adapts to suit the particular communication requirements.

This is just as true of security- and time-critical communication between vehicles or manufacturing plants as of the remote control of coffee machines using a cell phone. At the same time, videos in 4K format and virtual reality (VR) scenarios can be transmitted without error. Existing network infrastructures would break down with such a cocktail of applications. 5G networks adjust the infrastructure and performance of the relevant application.

The International Telecommunication Union (ITU) has specified three application groups for 5G networks:

- **ultra-Reliable and Low Latency Communications (uRLLC)** are digital industrial applications with high security and latency requirements over short distances. Example: automatic control of vehicles.
- **enhanced Mobile Broadband (eMBB)** is designed to transmit broadband streaming applications. Example: mobile video and VR.
- **massive Machine Type Communications (mMTC)** is to provide considerable range with low energy consumption and a low data rate for an exponentially growing number of connected devices. Example: sensors.

A simple update from LTE to 5G would lead to a very complex and expensive infrastructure. The solution delivers a new architecture with technologies such as end-to-end network slicing, which permits the operation of exclusive virtual networks.

One possible approach is based on a three-layer data center infrastructure: distributed edge data centers close to the cellular phone network base stations, local as well as regional data centers. They are all equipped with hardware for the three application classes and are based on a mutual fiber optic infrastructure, best of all with wavelength division multiplexing technology. Upgrades on Demand are then possible without much effort.

Setting up a 5G network will cost around one and a half times as much as a 4G network. Depending on the existing infrastructure, around one and a half to three times as many base stations and two to three times more optical fibers are required. With support from R&M, these challenges can be overcome.

050.6696

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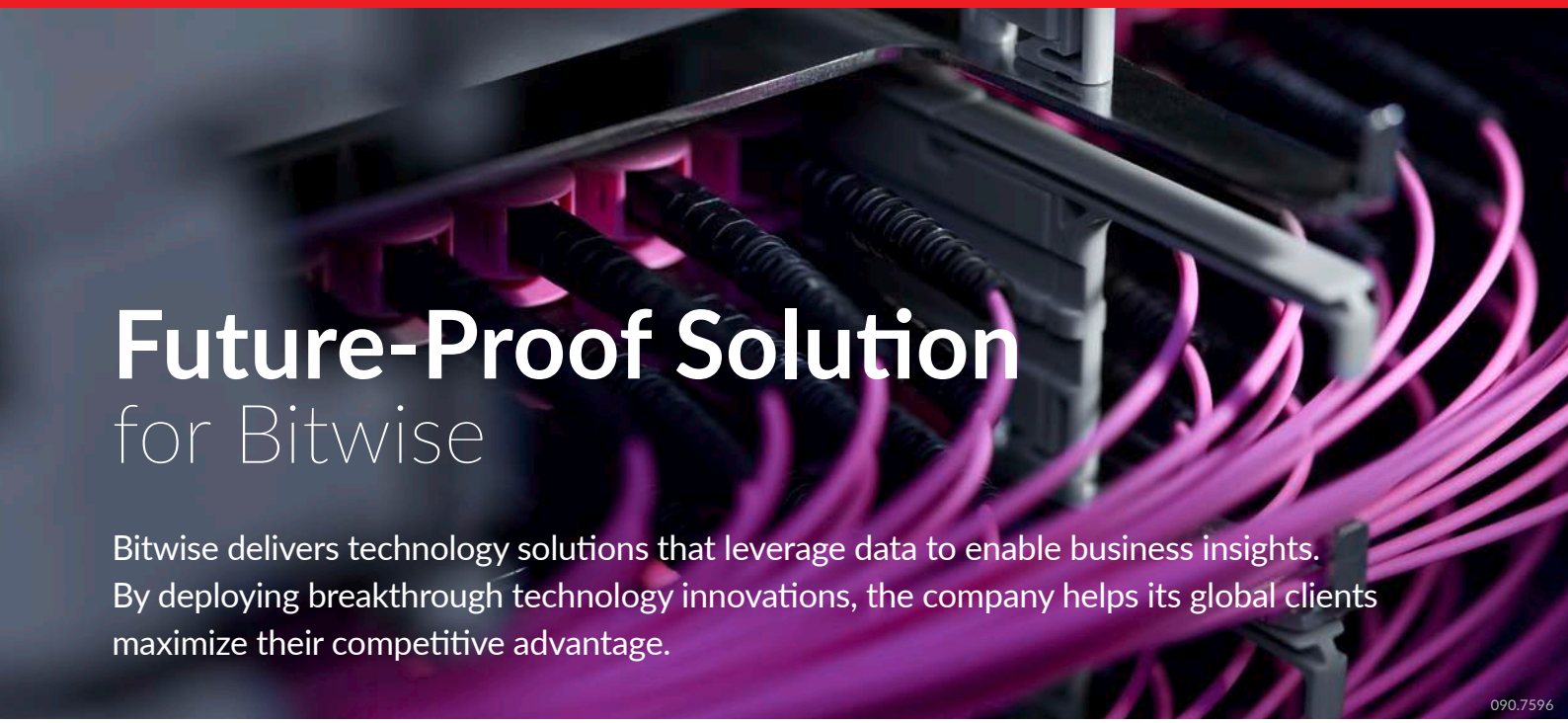

Future-Proof Solution
for Bitwise

Bitwise delivers technology solutions that leverage data to enable business insights. By deploying breakthrough technology innovations, the company helps its global clients maximize their competitive advantage.

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The company has the industry's most experienced and dedicated team of data professionals, optimizing value for clients through its global delivery model and with proprietary technology tools that reduce the time, complexity and cost of data initiatives. Together, Bitwise's people and technology provide the insights clients need to continue to lead in their fields.

Rather than accepting traditional methods of data management, Bitwise developed an expanding suite of Excelerators – proprietary technology tools that take the time, complexity and cost out of storing, moving and leveraging data. These Excelerators are changing the way corporations think about the possibilities of data, and transforming it into a core strategic contributor to the success of the enterprise.

050.6698

«R&M has helped us get a secure network with faster data transfer capabilities. We can rely on the solution provided by R&M and this will also enable us to have a future-proof network as well.»

Harish M Shrivastava, General Manager IT Infrastructure, Bitwise

Other companies choose to do everything in technology. Bitwise is best in class in a multitude of areas: data warehousing, business intelligence, big data and application development. In spite of fast growth, the company remains nimble enough to respond quickly and effectively to clients' always changing needs.

Bitwise is not just an outsourcing solution but a valued and integral member of its clients' teams – proposing new ways to solve business challenges using breakthrough technology. As it advances the field of data management, Bitwise accompanies clients along the way, engaging them in new approaches and technologies that strengthen their competitiveness while bringing recognition to IT as an indispensable strategic contributor to success.

R&M and Bitwise

The IT team at Bitwise Global was convinced that R&M's cabling was the best option to address network requirements. R&M's network solution is future-proof, offers excellent transmission speeds and saves space. Other factors that convinced the client were the simple and user-friendly handling, the quality of the products and the security solutions in R&M's portfolio.

R&M provided Bitwise with a Cat. 6 LSZH solution for horizontal cabling, an OM4 fiber solution for backbone and the cabling of approximately 2,300 nodes for a 13-floor building. With R&M's network Bitwise can ensure high-performance network connectivity and expect interruption-free connections. Bitwise Global is impressed with the solutions provided by R&M and the two companies will continue to work together on future projects.

050.6699

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Etisalat Plays a Fundamental Role in Extending the FTTH Network across the Country

The UAE has the highest Fiber to the Home (FTTH) penetration globally, with a coverage of 94.3%. A significant amount of this coverage is provided by Etisalat and, as part of its commitment, the service provider is continuously enhancing this network connectivity.

Etisalat, a multinational Emirati-based telecommunications services provider, now operating in 16 countries across the Middle East, Africa and Asia, is currently working closely with R&M to upgrade and extend its FTTH network with the innovative SYNO Dome Closure solution from R&M. This undertaking enables Etisalat to have one of the first patch-free connectivity solutions in the region, which translates to a resilient, tamper-proof network that increases the reliability and uptime of crucial connectivity services for both home and business users.

Esmaeel Alhammadi, Senior Vice President, Network Development, Etisalat: «With Etisalat's corporate strategy focused on **Driving the Digital Future to Empower Societies**, the network forms a significant component of this digital transformation journey. Etisalat has continuously focused on investing in innovation and on next-generation technologies and services to expand and enhance the network.»

Etisalat's new FTTH infrastructure is designed to support upcoming technologies and is highly adaptable.

«This achievement signifies that we have maintained consistent leadership globally in FTTH penetration, setting a benchmark in the global telecom industry. It was only possible due to the continuous support and vision of the leadership of the UAE in the development and modernization of the infrastructure. Etisalat aims to further increase the quality of our FTTH network focusing on reliability, scalability and flexibility.»

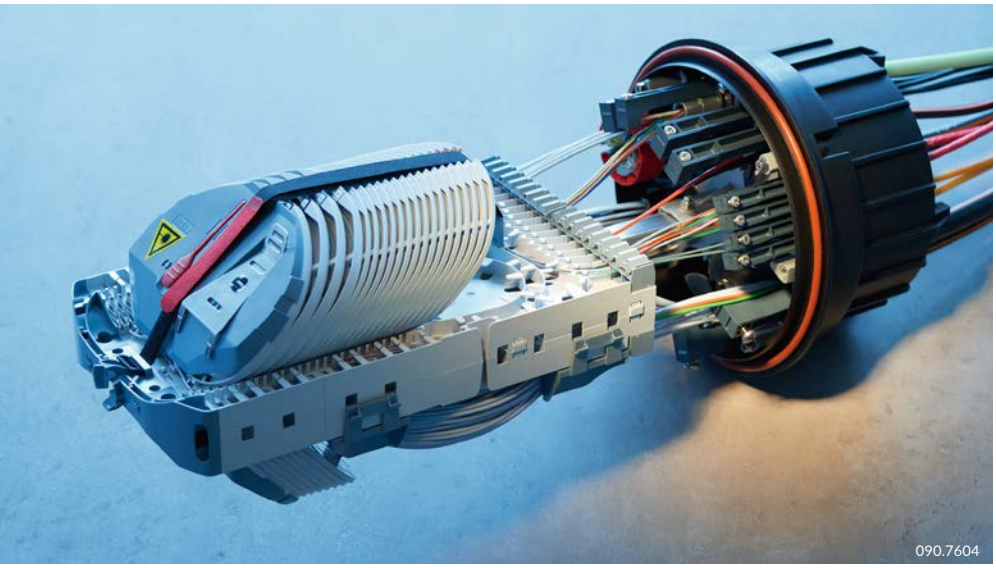
Increased resilience

Prior to the upgrade, Etisalat utilized above-ground fiber cabinets, which required maintenance on a fortnightly basis. Not only was this time-consuming, but it also added to the risk of disruption of services due to the unintentional disconnection of fiber cables. The harsh conditions in the Middle East also meant that contamination and corrosion were both common challenges the service provider had to face. With such an extensive network, maintenance of the network was proving to be extremely challenging and a drain on its resources. The telco now employs a set-and-forget approach as the SYNO Dome's gel cold seals conform to IP68, the industry's highest ingress protection ratings, and require no maintenance. At the same time, the modular nature of the cabinet allows technicians to make modifications to the connections very easily, and with minimal risk to services of other customers.

By leveraging the SYNO Dome Closure, Etisalat has now moved the critical Fiber Distribution Hub (FDH) units underground, which is not only more aesthetically pleasing, but has also greatly reduced the cost of civil contracting. The patch-free nature of the new systems eliminates the possibility of tampering or unintentional disconnection of cables.

A network for the future

Etisalat's new FTTH infrastructure is designed to support upcoming technologies and is highly adaptable. For example, currently industry standard duct cables are being used, but as future systems, such as micro cables and micro ducts, become mainstream, they will be supported within the existing network and incorporated in future developments.



Etisalat received round-the-clock support and extended comprehensive training sessions to not just their staff, but partners and technology providers as well. This means that everyone involved in the deployment and maintenance of its FTTH network has the skills required to ensure it is truly world-class. It is with the support of technology partners such as R&M that the UAE is capable of leading the world with innovative future-ready projects.

R&M is proud to be a part of the FTTH projects that are shaping the future of the Middle East.

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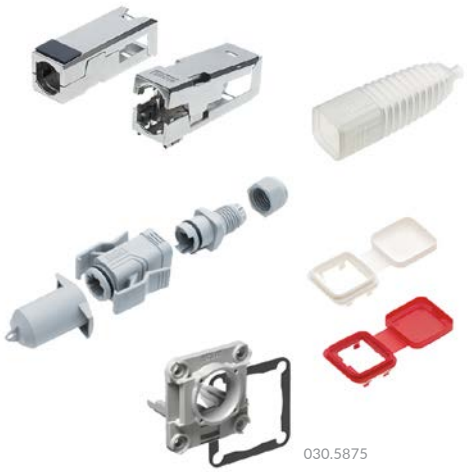
The FM45 is Fit for 4PPoE

Strong and versatile like a Swiss multitool. That is how installers rate R&M's FM45. The field-mountable RJ45 connector is suitable for virtually every area of application. And now it is proving that it can master even the toughest Power over Ethernet.

R&M has subjected the field-mountable RJ45 connector FM45 to a further endurance test. It had to prove that it was suitable for transmitting high electrical power on all four twisted pairs. The result: The FM45 passed the test with flying colors and has been awarded the PowerSafe quality seal. With this quality label, R&M guarantees that a particular cabling product is suitable for PoE applications.

The new four-pair Power over Ethernet (4PPoE) takes twisted-pair copper cabling to its technical limits. When using 4PPoE, the local data network will in future supply end devices with up to 90 Watts of electrical power. Cables and cable bundles can heat up because of this and lose their good performance. Contact resistance can increase in the case of poor-quality contacts in the wiring.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The insulation displacement contact (IDC) technology also used in the FM45 by R&M excludes such risks. R&M recommends the IDC connection as the one and only basis for using Power over Ethernet with high currents in continuous operation.

Incidentally, the FM45 was already PoE-capable when it was launched more than ten years ago. The tin-coated R&M IDCs guarantee gas-tight, vibration-resistant and corrosion-protected wiring with tensile strength and long-term stability. They are perfect for PoE applications.

The FM45 family continues to grow. R&M is now launching a version of the unshielded, angled Cat. 6_A connector. It has the same housing as the tried and tested Cat. 5e connector. The new, unshielded and angled FM45 Cat. 6_A is suitable for simpler network installations and direct connections.


030.5870

All FM45 models from Cat. 5e to Cat. 6_A now feature the combined A/B wiring possibility. The range is thus being condensed. It covers both shielded and unshielded versions. Apart from that, R&M makes it possible to use the FM45 outdoors and in industry.


090.7783

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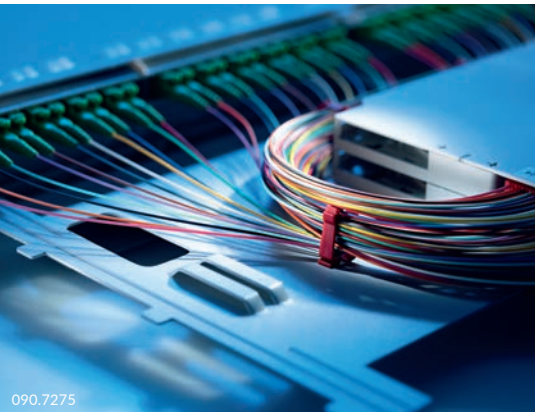
R&M Solutions – a Reliable Basis for the IT Infrastructure of the Mariinsky Palace

050.6703

After long-term reconstruction, the Mariinsky Palace was opened in Kiev at the start of 2018. The Palace is the official ceremonial residence of the President of Ukraine.

After the opening, the President of Ukraine, together with the First Lady, held an official diplomatic reception attended by heads of diplomatic missions of foreign countries and international organizations accredited in Ukraine.

The Mariinsky Palace was built in 1752 in Baroque style by the architect Bartolomeo Rastrelli and today it is one of the most valuable architectural monuments of Ukraine. After the proclamation of Ukraine's independence in 1991, the Mariinsky Palace became the official residence of the Ukrainian President. There are more than 25 rooms in the palace, each of which has a specific purpose, both for negotiating and for holding banquets. The White Hall of the Palace hosts summits, official receptions at the highest level, awards ceremonies, foreign delegations, as well as the inauguration of the President of Ukraine.



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«The R&M solution was chosen because it could cater to these high-level requirements.»

Oleksandr Korotych, State Enterprise Ukrainian Information and Telecommunication Networks

A reliable and high-speed IT infrastructure is needed to ensure effective negotiations. And R&M was chosen to build the new cabling system in the Palace. The class E cabling subsystem became the IT network base in the Mariinsky Palace. R&M's fiber optic solutions helped to organize and streamline the Palace's Building Distributor.

According to Oleksandr Korotych from system integrator State Enterprise Ukrainian Information and Telecommunication Networks, engaged in the Palace IT infrastructure update, the most difficult challenges arose at the design and installation stage and were related to the status of the object and its architectural value.

It was essential to build a highly efficient and durable cabling system. The R&M solution was chosen because it could cater to these high-level requirements.

The R&M solution

- Total number of ports – 220
- Installation cable Cat. 6_A, S/FTP, 4P, 650 MHz, LSZH – 8000
- Connection modules Cat. 6/s DIN – 110
- Total FO Mini Breakout Cable I-V(ZN) BH – 4500 m
- FiberModules – 11

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Safety for Poland's Airspace

Every day, more than 2,500 civilian airplanes with around half a million passengers on board navigate Polish airspace. To make sure they all get to their destinations safely, 500 air traffic controllers from the Polish Air Navigation Services Agency are tasked with controlling air traffic. Their mission: safety in the air. R&M solutions are part of the concept for the security of the data network.

European air traffic is increasing all the time. Every year there is an increase in the number of passengers and scheduled flights. And this increase in air traffic also concerns Polish airspace. At Kraków Airport alone, Poland's largest regional airport, there is an annual increase of 9 % in the number of passengers. In 2017, 5.8 million passengers used the John Paul II International Airport Kraków-Balice.

f.l.t.r.: Andrzej Zagólski, MD R&M North East Europe; Bartłomiej Górka, R&M-inteliPhy Service Partner API Smart; Jacek Nowiński, CEO API Smart; Bogdan Bogdał, Sales Manager R&M Poland

The Polish Air Navigation Services Agency (PANSA), responsible throughout the country for safety, communication and air traffic control, is reacting to the development with a medium-term investment program. At a cost of one billion złoty (250 million euros) it is extending and modernizing the infrastructure at 14 locations.

The most recent project was the Air Traffic Control (ATC) tower at Kraków Airport. Poland's Infrastructure Minister Andrzej Adamczyk, PANSA CEO Janusz Niedziela and the CEO of Kraków Airport, Radosław Włoszek, opened the building after 17 months of construction in February 2018. The 45-meter high-tech tower is responsible for three functions: the Approach Control Office (APP), the Aerodrome Control Tower (TWR), and the Flight Informatlon Service (FIS) for southern Poland.

State-of-the-art operations room

The operations room, at a height of 38 meters, is currently Poland's most modern workplace in the air safety and air traffic management area. PANSA CEO Janusz Niedziela at the opening: «This is the most modern workspace of its kind in Poland. It guarantees good working conditions for the air traffic controllers and the highest level of safety for the system required for monitoring air traffic.»

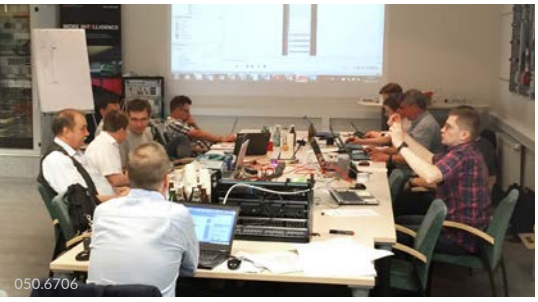
The agency's slogan is: «Safety in the air. It is our job. It is our mission.» In accordance with the safety philosophy there can never be a possibility of improvisation. Every step has to be well thought out and controlled continuously, and the airplanes have to be routed through the airspace extremely precisely and with great technical accuracy. This is why PANSA places great demands on information and communication technology.

For the ATC tower, a data network had to be planned featuring components which would offer the greatest possible safety and security. The data network connects the operations room and the controller workstations with a local data center. Thanks to a compelling presentation as well as the

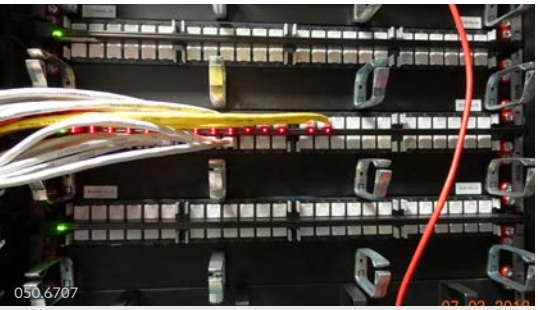
long-established collaboration, PANSA and the general contractor decided on R&M as cabling supplier. For decades now R&M products have had a good reputation in the Polish air traffic sector thanks to their quality and operational reliability.

Management solution for the LAN

Along with safe cabling components, PANSA was looking for a new kind of solution for network monitoring and management. The second most important planning criterion after safety and quality was that electronic documentation and monitoring of the LAN infrastructure had to be possible at all times. Consequently there was great interest in R&M*inteliPhy*. After a product demonstration, it was clear to those responsible that this was the key to the desired operational reliability, transparency and automation in the new tower.



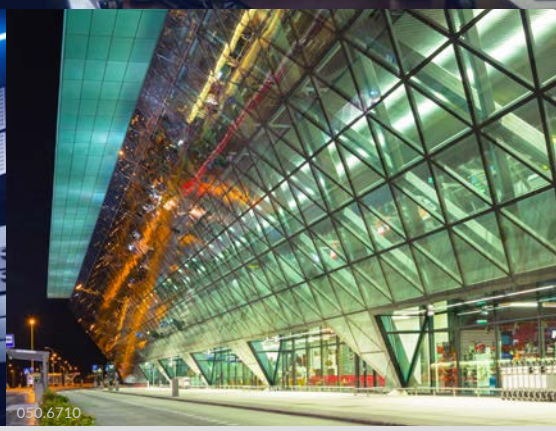
Training for the Kraków ATC Team Leaders at R&M in Warsaw



The R&M solution for PANSA

R&M provided the structured cabling for the ATC tower of the Polish Air Navigation Services Agency at Kraków Airport with:
- **Cat. 6_A ISO connector modules**
- **1U 48 port high density panels**
- **110 km S/FTP copper data cable**
- **OS2, OM4 FO cabling**
- **UniRack2 FO patch panels**

as well as the Automated Infrastructure Management system R&M*inteliPhy* for the management of 15,500 ports with
- **30 analyzers**
- **328 sensor strips**
- **geographical information system software**



The customer

The Polish Air Navigation Services Agency (PANSA) is responsible for the safety and efficiency of air traffic in Polish airspace. Every day PANSA ensures the safety of passengers in more than 2,500 flights over Poland. And every day there are almost half a million passengers on board all planes flying over Poland. More than 500 air traffic controllers employed in the agency look after more than one million flights per year with overflights, approaches, take-offs and landings as well as the Flight Information Service.

The air traffic controllers are supported by advanced technology. Over 200 devices located throughout Poland guarantee the safety of air traffic within Polish airspace and consist of air-ground communication systems, area navigation systems, ILS-DME systems (which support smooth and precise landing in low visibility), and radars.

PANSA is responsible for advanced aviation infrastructure, and both builds and develops it. All safety critical systems are continuously maintained by the company's own technical experts and checked by flight inspection. It is the only organization in Poland which trains and employs civilian air traffic controllers.

R&M*inteliPhy* allows users to detect and localize physical connection problems in real time and rectify them immediately. This represents a significant increase in the operational reliability and degree of availability of the network. R&M*inteliPhy* is used to document the LAN infrastructure centrally on a server. The one-hundred-percent overview of ports, assets and sites created automatically makes an IT officer's work much easier.

R&M*inteliPhy* team set up

Together with installation and service partners Elektromontaż Rzeszów and API Smart, R&M quickly took care of the cabling tasks. Among other things, a special team was put together and trained for the extensive implementation of R&M*inteliPhy*. R&M will be able to use the valuable experience with the selection, training, organization and scheduling of the R&M*inteliPhy* implementation team for future projects. The team installed 328 sensor strips which monitor 15,500 ports.

PANSA is rapidly continuing the investment program. In December 2018, another new ATC tower is to go into operation. It is being set up at Katowice Airport and is being equipped with the same R&M solution as the tower at Kraków Airport.

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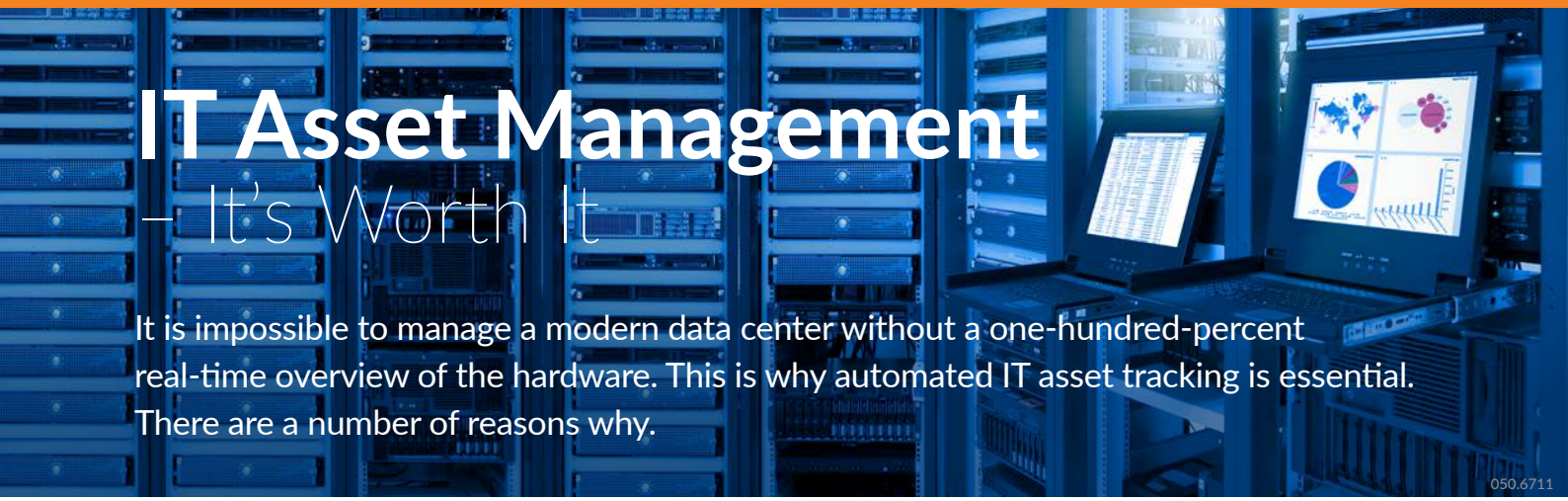

IT Asset Management – It's Worth It

It is impossible to manage a modern data center without a one-hundred-percent real-time overview of the hardware. This is why automated IT asset tracking is essential. There are a number of reasons why.

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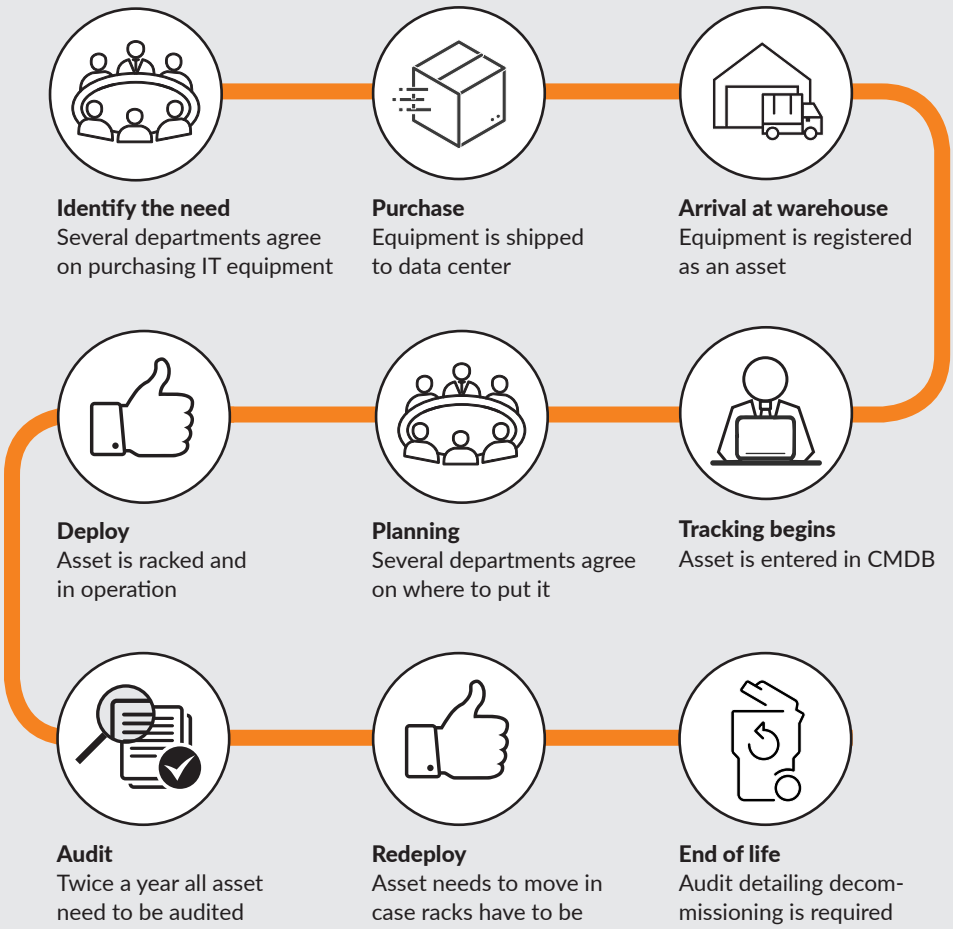
IT asset tracking is a system for digitally managing all IT assets of a company or data center. This approach extends well beyond just a snapshot of the current situation. It also covers the management of the life cycle of computers, memories, servers, networks and everything associated with them.

An asset will typically pass through more than a dozen areas of responsibility from being purchased to being decommissioned. Along this path there can be misunderstandings, inefficiency and mistakes. Only carefully carried out asset management can reduce or even exclude such problems.

Further reasons and benefits:

- **Finances:** Financial accounting requires an overview of the company's assets. IT asset tracking helps to create overviews which are as precise and as up to date as possible.
- **Quality:** Quality and asset management (e.g. ISO 55000) require regular audits. An IT department will cut a convincing figure in every audit if it practices good asset tracking.
- **Geography:** Those responsible often work decentrally or not where IT is situated. They can still have an overview with asset tracking.
- **Outsourcing:** More and more external specialists are coming into data centers because services have been outsourced. Asset tracking supports monitoring in such cases.
- **Knowledge:** The planning, operation and control of IT are often based on the implicit knowledge of just a few people. What happens if these privileged few are not available? Asset tracking makes detailed knowledge available to all those responsible at all times.
- **Documentation:** People responsible for IT are still working with manual methods to acquire operating data, share information and manage capacities. IT asset tracking with systems available today automates this process.
- **Decommissioning:** Obsolete hardware is simply ignored or forgotten about so as not to have to disturb the operating procedure or endanger service level agreements. This decommissioning process would be taken care of in a flash with continuous asset tracking.

Asset Management Process Overview



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Reference Infrastructure and Technological Excellence in Portugal

Energy company REN, Redes Energéticas Nacionais, has inaugurated the Riba de Ave Data Center, making it possible to significantly increase the security of the telecommunications network (RTS – Rede de Telecomunicações de Segurança) and of the other critical information systems of the national transmission network operated by the electricity company.

All about security

The new data center infrastructure has been up and running since February 2018. It is highly efficient thanks to the copper and fiber R&M solutions installed by Eurico Ferreira, an infrastructure engineering company responsible for the project and a company which is increasingly providing services to the telecommunications and renewable energy sector.

Eurico Ferreira is a key partner of R&M in Portugal and was the driving force behind the installation of R&M products in this project. The relationship between Eurico and R&M is based on professionalism and technical excellence with both companies sharing the same objectives.

With a global supply of Cat. 6_A, OM4 FO E2000/APC and 19" cabinets, the REN Data Center has become a reference model in terms of security ensuring best-in-class data security for all RENTELECOM clients, the telecom network operator of the REN group. The data center covers an area of about 5,000 m^2 and includes 1,200 m^2 of technical rooms dedicated to the housing of the equipment that hosts the country's most diverse and critical information and telecommunications systems.

Trusted solutions

For the achievement of the main objective of the project – an increase in network security – Eurico Ferreira demanded a premium brand with a complete Cat. 6_A UTP solution.

Once construction was completed, the data center was subjected to thorough commissioning tests and trials to verify its levels of resilience to failures. It has been awarded Tier III certification from the Uptime Institute, making it an infrastructure of reference and technological excellence in Portugal.

eurico ferreira
Portugal

«We believe that top infrastructures need a premium brand to fulfill every single requirement in terms of technical quality. Our collaboration with R&M has given us the trust to ensure a top security data center.»

Manuel Silva, General Director, Eurico Ferreira

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Running out of Duct Space:
Ribbon Fiber Resolved the Issue


050.6655

Nested along the coast next to the Pacific Ocean, Allegiance Supply promotes R&M's products to the US federal market.

Allegiance Supply was founded by John McKinley, Capt. USMC (Ret.), as a disabled veteran company which specializes in selling communications hardware. The company is located in Encinitas, a town with a rich surfing history and beach culture that has been thriving since the mid-1900s. Allegiance Supply, along with R&M, has made significant inroads in selling to US military installations in the military bases on the US West Coast and in the Pacific Rim.

Part of Allegiance's success is due to R&M's ability to provide cost effective, versatile, and high-performance connectivity product lines, such as the 4RU universal housing which will accept three different cartridge footprints. This system allows maximum flexibility and it also lowers the customer's inventory stocking requirements.

The company has also had success with connectivity solutions, such as the pre-stubbed 3RU panel which was developed for Hyper Scale Data Centers. Just like data centers, the Marines needed a fast to deploy connectivity solution which requires minimal human resources to implement. The pre-stubbed patching solution eliminates half the splicing and testing required on site.


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«Ready for Duty»

Traditionally the military uses loose tube OSP cable designs. Like other high bandwidth users, they needed a solution for over-crowded ducts and systems which are quick to deploy and repair. Allegiance was instrumental in introducing R&M platforms utilizing ribbon technology to help alleviate their issues. Having ribbon specific platforms has given them a significant advantage over the competition.

Other attractive features include the robust aluminum construction, ability to document, and the products' flexibility. R&M USA's Commercial-Off-The-Shelf (COTS) panels meet and exceed military specifications.

Allegiance Supply is a QPP certified partner and successfully resolves US military requirements with R&M's products. Much of this success can be attributed to the founder's past military experience and R&M's ability to customize unique solutions in a timely manner. Thanks to partners like Allegiance Supply, R&M's offerings will continue to gain traction and be «Ready for Duty».


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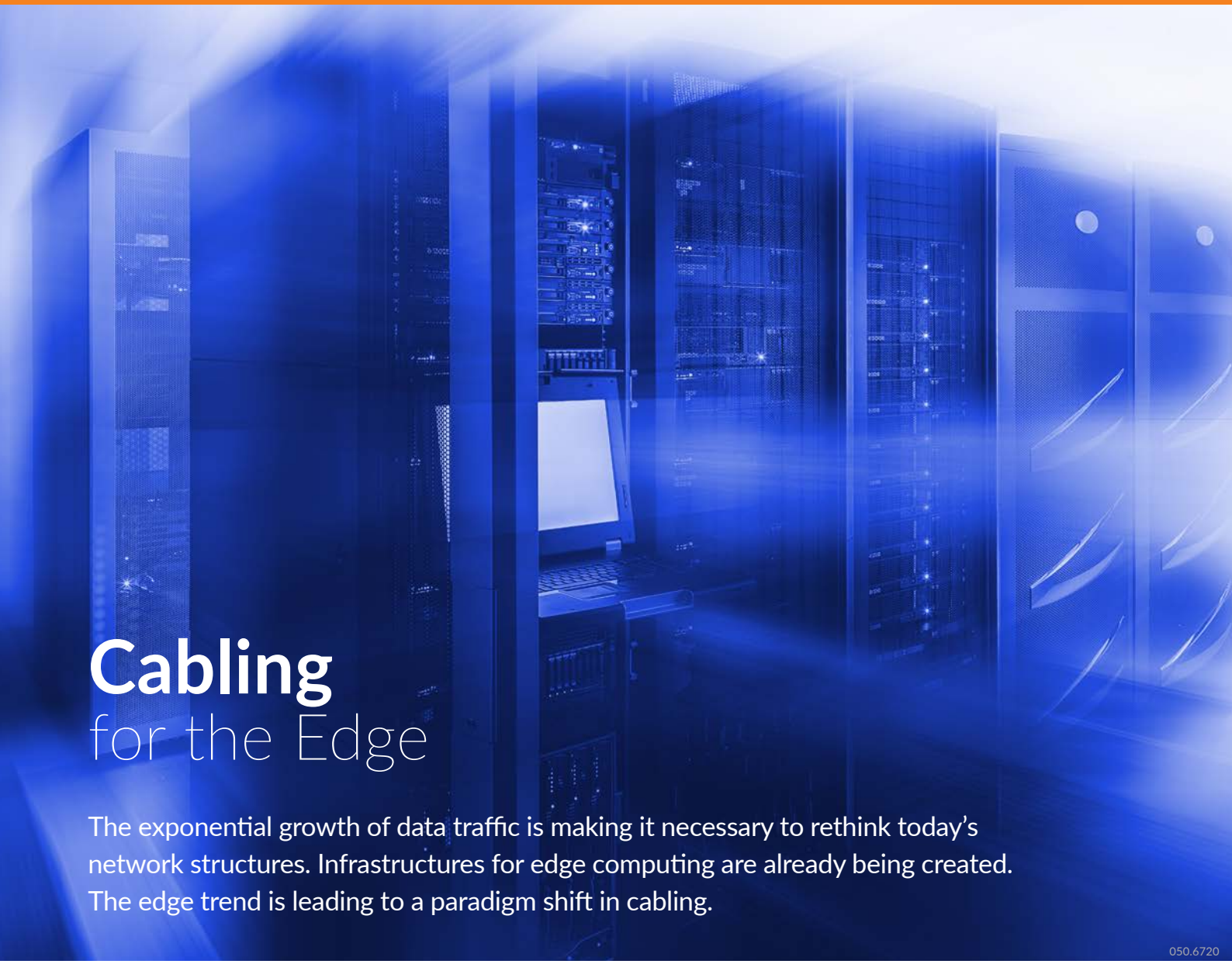

Cabling
for the Edge

The exponential growth of data traffic is making it necessary to rethink today's network structures. Infrastructures for edge computing are already being created. The edge trend is leading to a paradigm shift in cabling.

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The sheer mass of data, some of which has to be processed in real time, is making it necessary to move computing performance to the edge of wide area networks. There can be no bottlenecks on the way there or in the edge infrastructures themselves. The edge needs high bandwidth and low latency everywhere.

Providers need large amounts of fiber cables to be able to provide the necessary transmission performance. The many fiber optic connections are installed in highly dense, sensitive operating environments. Quantities of this scope as well as the packing density can no longer be managed in a traditional way. They have to be monitored fully automatically from a distance.

New monitoring systems offer such automation possibilities. But they have to be able to do more than just support technical management. They also have to be able to be used for compliance, economy and asset management.

Integrated hardware and software solutions are just the thing. They control the inserting and removal of cords. They document the passive infrastructure and the equipment, follow changes and contribute to increased efficiency. The entire infrastructure is represented in a consistent, permanently up-to-date database.

Ensuring simple handling

It is important to reserve sufficient space for cables and cable management. Poor cable management can lead to transmission errors, a loss of performance and even network downtime.

Naturally the cabling should not influence the cooling of the edge equipment. High-density patch panels and slimline patch cords leave plenty of space for airflow.

After all, it is the patching that counts. It is very difficult to grip connectors with highly dense cabling. Push-pull connectivity simplifies the work. By using pre-terminated and factory-tested modules, the effort involved in installation is reduced and reliable functionality guaranteed.

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We value
your feedback!

Dear Readers
Our customer magazine regularly provides you with information on products and solutions, trends, case studies and with corporate news. Readability is a central objective. That is why we are asking for your assistance. Please take five minutes to answer our questions. Your input will help us continuously optimize the CONNECTIONS magazine. Please complete the questionnaire by December 10, 2018, at the latest at:

www.getfeedback.com/r/9pmlpwkh

As a token of gratitude for your effort, we are raffling off attractive prizes:

3 x iPad Wi-Fi 128GB in space gray
5 x R&M watch
10 x power bank 4000 mAh

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The judges' decision is final.
No correspondence will be entered into in connection with the competition.
The information collected is intended for internal use only. Answers will not be shared with third parties.

Thank you!

Join us on social media!

We see social media as a valuable tool to inform about our culture, engagements, products and solutions and to include audiences in a fruitful conversation. By communicating who we are, what we do and how we play a role in the connectivity market, we hope to bring us closer to our customers and partners. On a global level, we are mainly active across Facebook, Instagram, LinkedIn, Twitter and Youtube.
R&M global social media channels:

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