

## Europe-wide tender project: tde – trans data elektronik GmbH equips energy service provider with passive cabling

### Ready for Future: RheinEnergie AG installs Spine-Leaf architecture



**Electricity, gas, water, heating: the energy and drinking water supply of the economy, industry, trade and commerce as well as private households must be always reliable, efficient and safe. The prerequisite for this is a highly available infrastructure with high transmission speeds. In order to meet this requirement in the long term, RheinEnergie AG redesigned its data centre: the energy service provider brought the technology of its infrastructure systems up to date with regard to energy efficiency aspects and implemented an innovative Spine-Leaf concept. RheinEnergie is thus already responding to the growing demand for higher transmission rates and has one of the most modern data centres in the region. The final expansion meets the quality requirements of a Tier 3+ data centre, explains Björn Friedrich, Head of Information Technology at RheinEnergie. Despite numerous challenges – such as the change during operation and a very tight schedule – the network specialist tde – trans data elektronik GmbH mastered the demanding project.**

The energy of an entire region: RheinEnergie AG is a nationally active energy supply company anchored in Cologne and the Rhineland region. With around 3,000 employees, together with its partners it is responsible for around 2.5 million people, industry, trade and commerce in the supply of electricity, gas, drinking water and heating. In addition, it provides a comprehensive range of services, making it successful nationwide particularly in the business customer segment. Thanks to its connection to Stadtwerke Köln, RheinEnergie is able to offer entire service packages, for example in connection with the development of residential districts – from energetic redevelopment and sustainable digitally controlled settlement energy management to mobility hubs, digital data infrastructure and waste disposal.

In 2012, RheinEnergie AG decided to redesign its data centre. One of the most important requirements was to bring the power supply, air conditioning, raised floor and fire protection of the infrastructure systems up to the latest state of the art. At the same time, the project managers wanted to make the power consumption of ICT operations more energy-efficient. In addition, the new passive cabling structure had to be prepared for the requirements of future transmission rates and be redundant in order to minimize latency times: "Structured cabling with a star topology, which would have supported network expansion without problems, was not consistently possible," says Dieter Schaefer, infrastructure manager for the data centre at RheinEnergie AG, concerning the previous cabling solution.

By 2019, the energy service provider had built a total of six houses, each with twelve system cabinets, two side-cooler systems for energy-efficient rack cooling, two building entry points and a dual power distribution network (A and B supply). A further three houses are currently being planned. RheinEnergie has installed server and storage systems as well as central network switches in the new buildings. The energy service provider uses the newly built building entry point rooms to ter-

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minate external connections and at the same time disconnect the data centre space.



House 3 and 4 in the data centre

### Great project-specific challenges

From the very beginning, it was clear that the installation of the new passive cabling solution would be particularly demanding: in order to ensure the productive operation of RheinEnergie, one of the central conditions and challenges was to carry out the conversion during ongoing IT operations without affecting them. In addition, the redesign had to be carried out in individually completed and precisely scheduled construction phases up to the complete expansion – all within a very tight schedule. All ICT systems remained on site during the conversion. "It was crucial for the success of the project that all project participants stick to the specified schedule," says project manager Oliver Scholl at RheinEnergie AG. "This was the only way that the trades could carry out their work at the same time.

RheinEnergie required the passive cable system to have a 1:1 polarity, with fibre rotation only at the network switches. The minimum requirements for fibre optic cabling were 16 Gbit/s for Fibre Channel and 40 and 100 Gbit/s for Ethernet. Since the network components had to ensure interference-free trans-

mission, the project tender for the fibre optic measurements after installation defined the OTDR (Optical Time Domain Reflectometry) method in connection with the smart loop measurement method. The measurements had to be carried out demonstrably within the scope of an extensive measurement documentation. The energy service provider also had special technical requirements for the cable types and cabling components to be installed: fibre optic cables with an above-average transverse compressive strength and a small outer diameter were required. RheinEnergie also made special and more stringent requirements for the acceptance test: a very tight loss budget was specified for each connector and the entire link.

In order to be prepared for future requirements, the passive cabling should be able to be expanded at a later date. "Two aspects were particularly important to us: the expansions should be feasible without significant changes to the overall system and should not impair or even interrupt the productive ICT operation in any way," explains Oliver Scholl. Naturally, all network components had to comply with installation specifications, regulations, DIN standards and guidelines.

### Convincing quality

In the Europe-wide tender, tde – trans data elektronik GmbH from Dortmund succeeded in the passive cabling trade. The network specialist scored particularly well due to the very high quality of its products at a good price-performance ratio. In addition, tde presented the project implementation convincingly with Elmar Herwig as Sales Consultant, complied exactly with the requirements of the tender and demonstrated a high sense of responsibility. "We expected the tde solution to provide the required bandwidth also in the future and hoped for a high packing density in the central patch cabinets," says Dieter Schaefer, IT service engineer at RheinEnergie. tde not only provided the passive network components, relocated and installed them, but was also responsible for the installation planning. As they have done for many years, they relied on their long-standing competent partner Netsystems. As project manager, tde network expert Rainer Behr was responsible for the

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implementation. In order to meet the high demands placed on the cable types to be installed, tde, in cooperation with its long-standing partner and cable manufacturer, developed a fibre optic cable especially for RheinEnergie with very high crush resistance and a small outer diameter. Before commissioning, tde tested all installed links with OTDR measurements in accordance with IEC regulations and also performed microscopic testing of the fibre optic connector end surfaces. RheinEnergie commissioned an external planning office for the planning and the associated specifications with regard to the EU tender. After the tender was awarded to tde, RheinEnergie and tde carried out the implementation in cooperation with the external planning office.

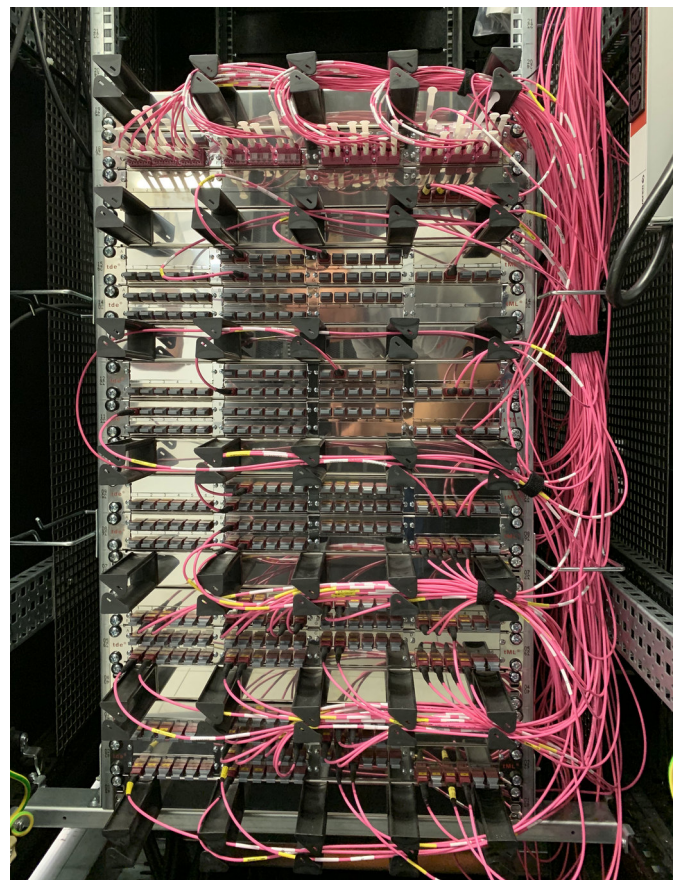
### With tML to Spine-Leaf architecture

The new cabling solution consists of central active network components from RheinEnergie on the one hand and decentral passive network components based on the tML tde Modular Link System on the other: the patented modular cabling system consists of the three key components module, trunk cable and rack mount enclosure. The system components, which have been pre-assembled and tested under laboratory conditions at the tde factory, enable plug-and-play installation on site within a very short time. Heart of the system are the rear MPO/MTP connectors, which network administrators can use to connect at least six or twelve ports at a time. Fibre optic and TP modules can be used together in a module carrier with a very high port density. RheinEnergie uses the HD fibre optic module with 2x MPO/MTP on 12x LC duplex, partial front panels with 6x LC duplex as well as 6x MPO/MTP and the RJ45 Cat.6A module. When fully mounted, the 19-inch rack mount enclosure offers space on one height unit for 96 LC duplex, 96 MPO/MTP or 48 RJ45 ports.

While the tML provides the basis for structured cabling in the rear area, RheinEnergie achieves a highly available and fail-safe Spine-Leaf architecture by patching with LC duplex patch cords: the fully meshed network topology connects the aggregation layer (Spine) with the access layer (Leaf) by means of

point-to-point cabling. This relieves the highly frequented East-West communication in the network. Latency times can be significantly reduced.

Thanks to the new infrastructure, RheinEnergie benefits from an Ethernet transfer rate of up to 400 Gbit/s.



Cabinet with tML TP and FO modules

The tML solution was also convincing in terms of its packing density, which is unique on the market: since modules can be exchanged easily and at any time, the energy service provider keeps all options open when migrating to higher transfer rates: "With our tML, we can implement all migration stages from 1 to 400G and higher on one and the same tML platform. We now even have a 32-fibre MPO available for this purpose," explains André Engel, Managing Director of tde, and continues:

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"With increasing data volumes, each fibre can be used further. Thanks to the modular structure of the tML, RheinEnergie is ideally equipped for all future requirements".

### Despite challenge on schedule

From December 2016 to January 2019, tde carried out the installation work in houses one to six and the two building entry points: this initially included determining the length and creating the occupancy views in the cabinets. "These measures are particularly decisive in connection with our plug-and-play-capable tML cabling system," says André Engel, Managing Director of tde, "because they enable clean cable routing without overlengths and fully exploit the advantage of space-saving cabling". tde then laid the cables between the Spine and the Leaf layers under redundancy aspects before the tML plug-and-play solution could be installed, tested and measured. The reason for this was the structural project phase for a central and redundant network location (Spine)," recalls Dieter Schaefer. For this reason, tde had to ensure the planned conversion to the new location, including the necessary measurements, within a certain timeframe. tde also met this challenge to its complete satisfaction: "tde provided the appropriate cable lengths for the final location, taking into account the cable routes still to be built," explains Dieter Schaefer. tde carried out the conversion work at the new location on schedule. Before RheinEnergie accepted the solution, tde photographed each fibre optic port individually and then measured it according to very specific requirements. The energy service provider also called in an independent testing laboratory.

### Close cooperation and regular exchange for success

In order for such a demanding and complex project to succeed, the client and the project executor must work closely together and exchange information on an ongoing basis. "The cooperation with tde went very well – an important prerequisite for being able to successfully complete the specified sched-

ule," says Oliver Scholl. During the two-year project, RheinEnergie had the experienced tde construction and project manager André Dierkes at its side at all times. "His advice went far beyond the project. In addition to aspects of cable and module assignment, he informed us about product innovations," says Schaefer. The project also included experience with components from other manufacturers and the resulting changes.

The high quality of the tde products contributes significantly to the success of the project: "The tML cabling solution gives a high-quality impression. The fact that we now have a high level of security is demonstrated not least by the very good measurement results", Dieter Schaefer sums up and adds: "With the tde solution, RheinEnergie has a future-proof cabling at a high level of quality. Thanks to the redundantly designed cabling, we can guarantee high availability. And thanks to the Spine-Leaf architecture, latency times can be massively reduced." The project managers' conclusion was correspondingly positive: "It was and still is a very good decision to carry out the passive cabling with tde and its future-oriented solutions. The high quality is reflected both in the project implementation as well as in the products used and their features," says Oliver Scholl.

In addition, the data centre footprint offers space for three additional buildings, which can be built if required and also rented to customers. "Together with tde, we have already designed the passive cabling so that we can use these expansion stages," says Dieter Schaefer. RheinEnergie will thus continue to ensure high availability and high speed in the future.

### About tde - trans data elektronik GmbH

For more than 25 years the tde - trans data elektronik GmbH, an internationally successful company, has specialised in the development and production of scalable cabling systems for highest packing density. The nuclear research centre CERN relies on the know-how of the leading company in multi-fibre technics (MPO) as well. The company's portfolio "Made in Germany" contains complete system solutions with a focus on

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Plug-and-play for high speed applications in the field of data-com, telecom, industry, medical and defence. tde offers both planning and installation services through its own service department and supports the "European Code of Conduct" when it comes to energy efficiency in data centres. For more information, visit [www.tde.de](http://www.tde.de)

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