MINKELS MAGAZINE

2017
#2

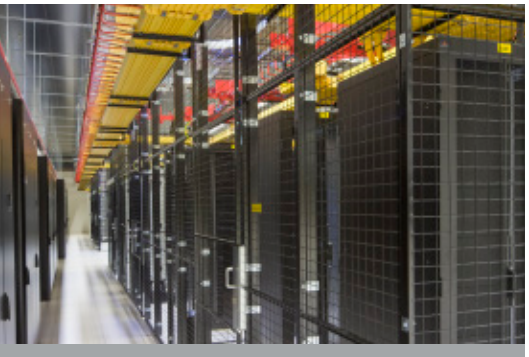
BULK NORWAY:

building the world's largest data centre campus on renewable energy

How IoT is changing the data centre

Minkels partner All IT Rooms uses Legrand Data Center Solutions in Heerlen (NL) Municipality project

New white paper on micro data centres: from strategy to implementation



Equinix makes rolling out IT architecture easier with 'Global Consistency' Strategy

From 3D design to reality: Complete data centre solution for Infonet DC Estonia

Tieto is expanding the biggest commercial data centre in Finland

Minkels offers new

Legrand PDUs

19" 1-U PDU

Zero-U PDU

'Cord locking' system

SOLUTIONS FOR EACH CONFIGURATION!

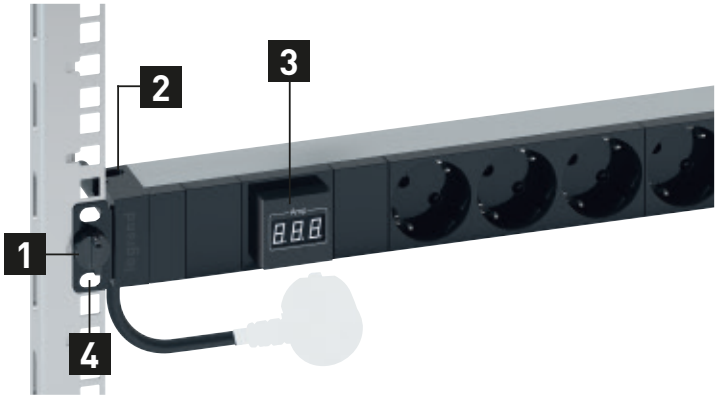
The new Legrand PDUs offer you innovative and high-quality solutions for data centres and local networks. As a standalone solution, this series can be seamlessly integrated into each installation.

INNOVATION & PERFORMANCE

Every detail is important! The unique and innovative solutions of Legrand include security features, simplified installation, integration and usage indicators.

Watch the video on the Minkels YouTube channel:

Youtube.com/c/minkelshq



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MORE INFORMATION?

www.minkels.com/solutions/power-and-connectivity/legrand-basic-pdu-s

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COLOFON

Minkels is a knowledge-driven producer and worldwide supplier of high-quality solutions for data centre infrastructure. Minkels is part of the brand portfolio of Legrand, a publicly traded company (NYSE Euronext Paris: LR) with worldwide sales in the low voltage installation, data network and data centre markets. Legrand operates in more than 180 countries and achieved worldwide revenues of 5 billion euros.

Minkels' products stand out for their innovativeness and flexibility. Customers can always be assured of getting the very latest data centre technology, modular solutions that respond to evolving, customer-specific business requirements.

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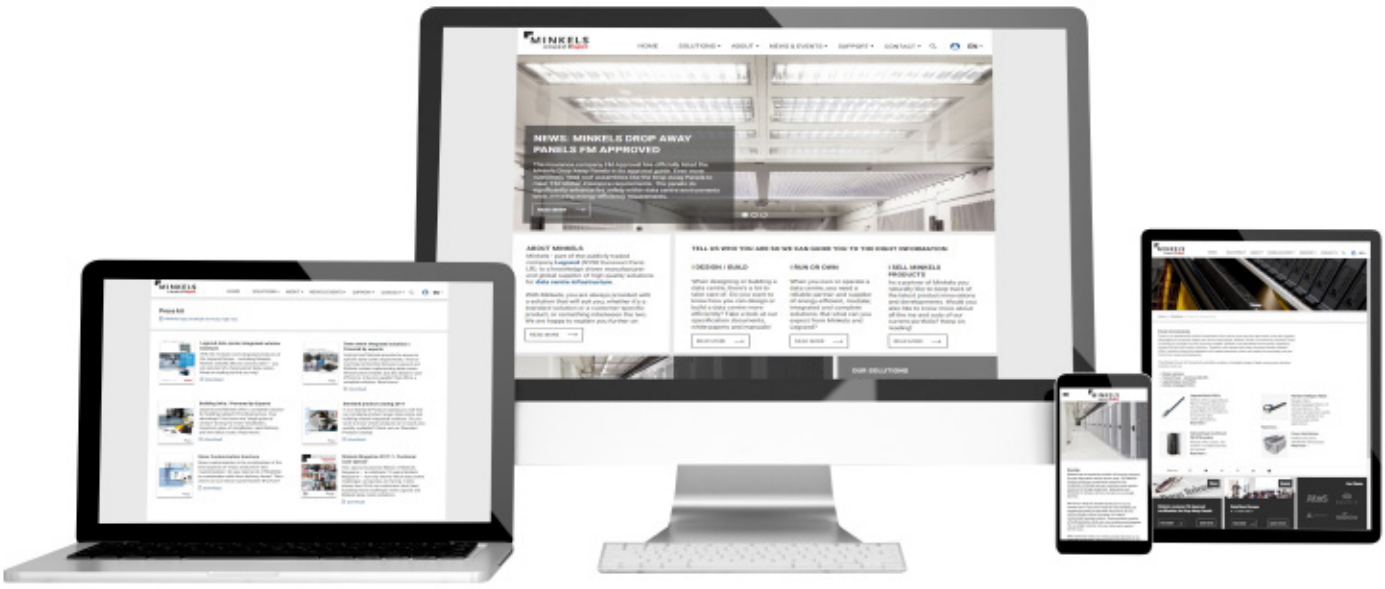


NEWS

WWW.MINKELS.COM REDESIGN

In the past months, Minkels worked on redesigning www.minkels.com. The result: a modern responsive website that is optimally displayed on your smartphone or tablet. But what else has changed?

NEW: LOGO AND CORPORATE IDENTITY

The synergy between Minkels and parent company Legrand is visualised by aligning the logo and the corporate colours in the style of Legrand. In addition, the Legrand products – and its expert brands – are integrated strategically into the Minkels portfolio and the website.

NEW: CUSTOMER JOURNEYS

So-called customer journeys guide you – based on your profile – to the right information. We distinguish between visitors who design or run a data centre and visitors who sell data centre products. Read more on page 34.

NEW: MICRO DATA CENTRE SOLUTIONS

In addition to our existing product portfolio – Housing, Cooling, Power & Connectivity and Monitoring – we now also offer the product group Micro Data Centre solutions. Micro data centres are very compact and have all the functionality of a complete edge data centre: from housing to cooling. For more information about Micro data centres see page 14.

NEW: IMPROVED SEARCH ENGINE

Do you need specific information quickly? Make use of our improved search engine! The information you are looking for is now available in Dutch and English. In the coming months, the website will be expanded to also include information in French and German.

TIPS OR COMMENTS?

We have made every effort to improve our website. But have we succeeded? Let us know via our contact form or marcom@minkels.com! Your tips or comments are more than welcome! Based on your comments, we will optimise and expand the website further in the near future. ■

STRONG DEMAND FOR 52U RACKS

Until recently, Minkels developed its 52U racks on a customer-specific basis. The demand for higher racks has increased significantly because of the high square meter prices. To achieve a faster delivery, Minkels has included the 52U racks in its mass customised product portfolio.

FROM CUSTOMER-SPECIFIC TO MODULAR

Minkels has standardised the 52U server rack and is now available as a mass customised solution. It's possible to easily configure the 2.5 meter racks. Minkels uses a smart product configurator for this. Fast delivery and the same quality and logistics – anywhere in the world – is the result. And that is a huge plus for customers like Bulk (page 8), given the high demand for housing more servers per square meter.

Are you interested in this specific solution? Visit our website: **www.minkels.com/solutions/housing/mass-customised-cabinets** ■

MINKELS SHARES KNOWLEDGE THROUGH WHITE PAPERS

Minkels recently updated White paper 05 on the integration of aisle containment with fire suppression systems. This knowledge document deals with a topic that – until recently – was not well documented. That it is a relevant topic is apparent from the many requests **(www.minkels.com/whitepapers)**.

WHITE PAPER 05 UPDATE – FIREPROOF DATA CENTRES WITH AISLE CONTAINMENT

White paper 05 pays attention to the latest legislations and regulations on fire extinguishing and the most recent fire safety and data centre standards. The test results from the white paper also offer readers clarity. Without testing themselves, it is possible to design fireproof data centres with aisle containment – thus allowing multiple systems to work together successfully in the data centre environment.

Minkels announces a new white paper! This time about micro data centres...

WHITE PAPER 09 – NEW WHITE PAPER ON MICRO DATA CENTRES: FROM STRATEGY TO IMPLEMENTATION

Minkels launches white paper 09 on the rise and deployment of micro data centres. Micro data centres are the solution now that centralised data processing is no longer sufficient for the Internet of Things (IoT). A lot of IoT requires this data to be handled locally – and thus by using micro data centres. Do you want to continue reading? Check out page 14 or request the white paper at:

www.minkels.com/whitepapers ■

Complete data centre strategy

for complex customer demands in a changing market

Minkels, Raritan and parent company Legrand (NYSE Euronext Paris: LR) have aligned their strategies over the past few years into a complete data centre strategy. The sales teams are now taking the next step in France, Belgium, UK - and soon in Switzerland and the Netherlands - to form one data centre specialist team per country called: 'Legrand Data Center Solutions'. These sales teams represent the complete data centre product portfolio of Legrand, powered by specialist brands – to better serve and support our customers and partners. In this article, Christiaan van Terheijden (CEO of Minkels) talks about this new direction. In addition, he addresses some developments in the data centre market with the challenges and opportunities.

SPECIALISED TEAM

Minkels, Raritan and Legrand have been providing integrated solutions for the data centre market[1] for some time. Van Terheijden: "While Minkels supplies data centre solutions in the areas of housing and cooling, Raritan offers solutions in the area of power and energy management. Legrand is a specialist in building-dependent infrastructure, such as data communication & energy distribution. In order to serve the market with our complete integrated offer for the white space faster, Legrand, Minkels and Raritan have decided to create specialised sales teams per country called: 'Legrand Data Center Solutions'."

WHAT DOES THIS MEAN FOR OUR CUSTOMERS?

Legrand Data Center Solutions has positive consequences for the customers: one single point of contact that combines a complete solution with years of knowledge and expertise. "In complex projects, the support of a well-informed, trustworthy partner is essential. The Legrand Data Center Solutions team offers global expertise and a wide range of sustainable and innovative data centre solutions. Both for the infrastructure – with solutions for racks, containment, cooling and PDUs – as well as micro data centre solutions, UPS, fibre optic, copper cabling and cable management. Legrand takes a targeted, selective approach for external growth to ensure a complete product portfolio. The strategy of bolt-on acquisitions focuses on companies that complement the Legrand Group's activities and have leading positions or proven technological expertise on promising data centre markets."

FOCUS ON THE DATA CENTRE MARKET

The dynamics in the data centre market requires a business model to support the fast growing data centre developments and innovations. With a specialised team Legrand, Minkels

"Legrand Data Center Solutions provides flexible, proven and scalable solutions. A reliable partner with more than 30 years of experience in the data centre market with an excellent service", Christiaan van Terheijden, CEO of Minkels.

and Raritan expect to meet the market needs better. "Focus is important", says Van Terheijden. "The data centre market is evolving constantly, driven by innovation and the continuous growth of data and applications. We therefore want to be able to respond quickly to new developments. For this reason, we were involved in the early stages of the development of micro data centres. These small data centres play an ever-increasing role, thanks to the Internet of Things (IoT). IoT asks for another approach to infra. Infra is no longer used to only consume content, but IoT also stimulates local creation and analysis of data in the edge."

FROM MICRO DATA CENTRE TO HYPERSCALE

For local data processing, Minkels developed the MatrixCube and the MiniCube (page 14). "But Minkels also offers solutions for data centres in the core layer (including hyperscalers): from standard to customer-specific solutions. This diversity in our product and customer portfolio is also reflected in this edition of Minkels Magazine. For example, there are interviews with the company Bulk (page 8) – building the world's largest data centre campus on renewable energy – and Infonet (page 12) on 3D design versus reality. Also in this edition, attention is given to new product developments and standards, such as EN 50600 (page 18). As data centre specialist, we are pleased to share our knowledge with you. Recently Minkels launched a new white paper about micro data centres (page14).

For more detailed information, we would like to refer you to our website (www.minkels.com/downloads). Online you will find updated documentation (page 34) and white papers on current topics (page 14)." ■

[1] You can find the complete offer of the Legrand Group for the data centre market at: datacenter.legrand.com

Bulk Norway:

building the world's largest data centre campus on renewable energy

Bulk is an industrial group with operations in the areas of Real Estate Logistics, Real Estate Data Centre, Data Centre Services and Fibre Infrastructure. Working together with Minkels as strategic partners – to innovate sustainable hyperscale solutions – was a logic choice, according to Peder Nærbø (President and Founder of Bulk Infrastructure AS). Both companies are very customer oriented and focus on innovation, creative power, sustainability and ethics; solid ground for building the world's largest data centre campus on renewable energy!

Peder Nærbø, President and Founder of Bulk Infrastructure AS

SHARED DNA

Minkels and Bulk share a lot of DNA, according to Nærbø. "That's why we decided to work together on building the world's largest data centre campus on renewable energy – according to the new EN 50600 standard. At first, we discussed a completely standard solution: the Free Standing Corridor. We saw the Free Standing Corridor as an easy starting point for our project. We liked this particular solution because it has proven itself to be an innovative, scalable and efficient solution that has been implemented by many market players. We also saw it as a good platform when customers decide for wholesale colocation and to support converged IT."

SECOND OPTION

After some discussions, the engineers of both companies came to a second option: Minkels' cooling concept Vertical Exhaust Duct (VED) in addition to the Free Standing Corridor. "Both options can be used in the data centre depending on the customer requirements. Due to the diversity of customers, much flexibility is required. There are customers that require a high degree of standardisation, which means that the Free Standing Corridor fits better and there are customers who demand a high degree of diversity (completely other load per rack). The VED is the ideal

Bulk data centre site in Kristiansand, Norway. First building of the campus is ready!

solution in this situation. With VED above our racks, there is an ambient temperature which is consistent throughout the room. This enhances the performance of other infra and fits well with the restrictions that we had concerning the design for cabling and power."

52U RACKS

Bulk is the first company in Norway to use 52U racks for its data centre. "The racks offer more space and are completely separated from each other. They are also pre-equipped before they are transported into the room. During installation, there's no interference with other cabinets in the rows – ensuring their performance isn't impacted. Because of the plug & play installation there is also no need to change any walls or panels."

FAST COMMUNICATION AND ORDERING PROCESS

Bulk and Minkels were able to reach a customer-specific solution based on standard elements. "We also put together a custom 'Bulk catalogue' with all the specific solutions that we co-developed. So, in a way we standardised customised solutions to ensure a fast communication and ordering process. The chosen approach also decreases delivery times and will make frequent mutations in the data centre easier for us."

OPTIMISING LOGISTICS

To achieve Bulk's goal – building the world's largest data centre campus on renewable energy – more is needed than just the technical solution. "We need to have optimised logistics. That's why we have consignment stocks on site to support

quick changes in the data centre and to meet SLA's. We made special agreements on this topic and merged supply chain processes to support this."

RECYCLING AND UPDATING RACKS

Besides logistics another important topic for Bulk is recycling. "Our philosophy is more of a cradle-to-cradle approach. At some point in time, the racks used in the data centre will be removed and transported on the campus to a recycling point. Racks will be partly disassembled and locally recycled and/or updated (refurbished & upgraded) to the latest specifications – to be used in another cycle. From a product point of view, we really liked the fact that the Minkels racks are very eco-friendly and can consist of up to 80% recycled aluminium."

BEST RESULTS

According to Nærbø the match between the companies and the willingness to cooperate and really work together led to the optimal solution. "It's not only about a product, there is so much more to it – like the relationship, knowledge sharing and creating a win-win situation. To get the best results for all parties, it is necessary to work together from an early stage on: from strategy to operations. It also makes the certification process a lot easier when a data centre is designed according to a standard from the very beginning."

CERTIFICATION

The Bulk data centre is one of the first to be designed and build according to the new EN 50600 standard [page 18]. "The standard covers not only technology but risk management and sustainability as well. The 'European Code of Conduct for Data Centre approach' is also covered in the EN 50600 – ensuring a sustainable and energy-efficient design. Our design is a textbook example of an EN 50600 implementation. That's why we are quite confident that we will be EN 50600 approved in the near future." ■

New to the Norwegian market 52U racks

In the Norwegian market, 42U racks are still the standard. Bulk is the first company to use 52U racks, creating an extra 25% rack space on the same footprint. This is a major USP for Bulk.

52U racks

because m² are expensive!

Minkels has an extensive portfolio of housing solutions for your data centre and / or server room – such as the 52U racks. These higher racks are ideal when the floor space (m2) is limited or if you want to make a more efficient use of the available space.
The Minkels housing solutions are very suitable for the installation of (blade) servers, switches, patch panels, routers and storage equipment. Modularity and flexibility are always key in the design of our products.

MORE SPACE

The 52U rack offers up to 25% more space than a standard rack.

SAVE M2

A higher rack allows for more space thus enabling you to save on expensive data centre m2.

REDUCTION OF ENERGY CONSUMPTION

Airflow management accessories allow for an energy-efficient solution.

ULTIMATE FLEXIBILITY

The 52U rack is a mass customised solution and can be configured as desired.

HIGH LOAD

The 52U rack has a maximum (static) load of 1,500 kg.

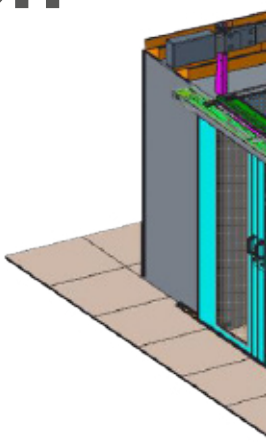
PROPER CABLE MANAGEMENT

Better performance and optimal availability through proper cable management.

MORE INFORMATION?

www.minkels.com/solutions/housing/mass-customised-cabinets

From 3D design to reality: Complete data centre solution for Infonet DC Estonia



Infonet AS was established in 1993 as an internet service provider (ISP). Nowadays, Infonet owns high-speed optical networks in major districts of Tallinn (Estonia) and is one of the capital's main ISP's. Three years ago, Infonet decided to expand their business and build a data centre to offer colocation services: Infonet DC.

COMPLETE HIGH-QUALITY SOLUTION

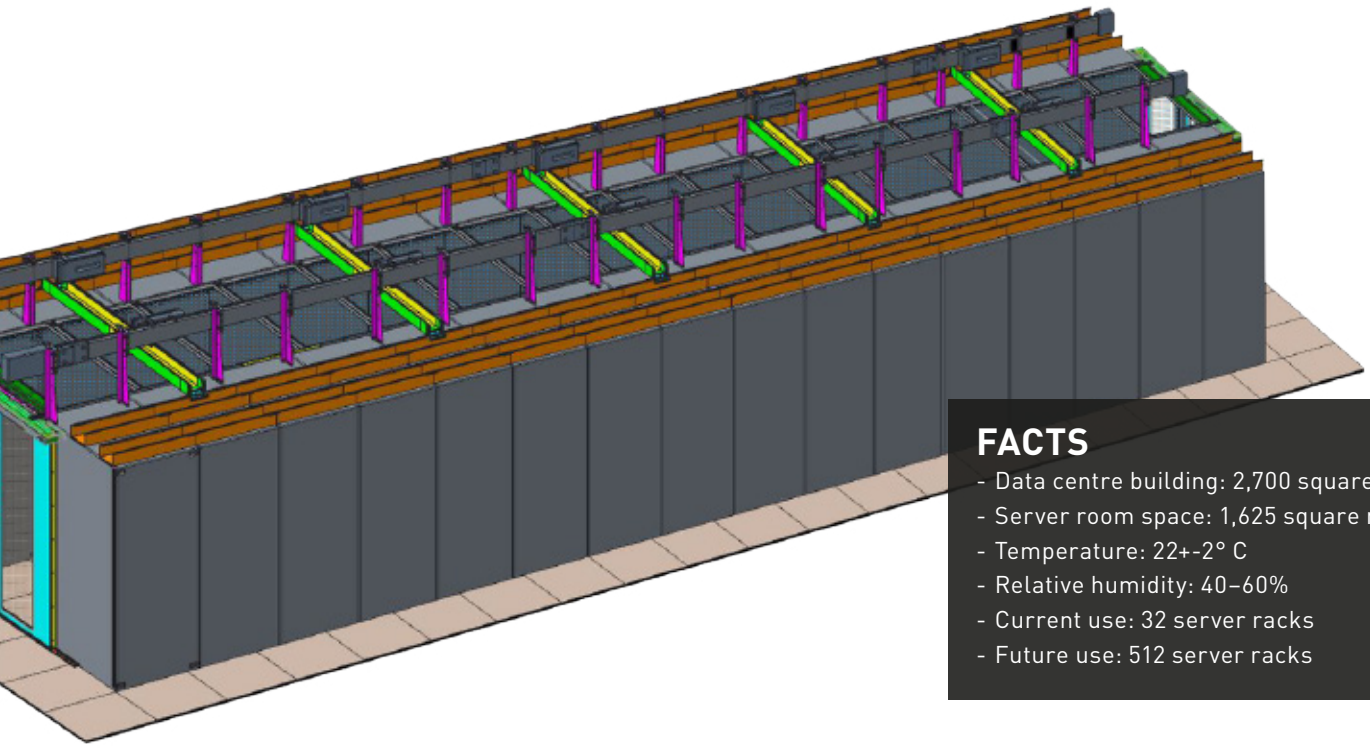
Infonet DC is a part of Infonet AS, one of the leading telecom providers in Estonia. "Infonet DC is the only specialised Tier-III commercial data centre in Tallinn", Sergei Zavolner, CEO at Infonet DC, explains. "The land and the data centre building are the private property of Infonet DC. The data centre building is 2,700 square meters and the server room space is 1,625 square meters. The data centre has been designed to allocate 512 professional server racks: 4 stages of 128 racks each. Right now, we are in the process of setting up the data centre – after a careful selection process."

LEGRAND DATA CENTER SOLUTIONS

Infonet DC had been in contact with some major data centre suppliers. "We also got

Sergei Zavolner, CEO at Infonet DC

Roman Antonis, Legrand Data Center Solutions Manager in the Nordics



FACTS

- Data centre building: 2,700 square meters
- Server room space: 1,625 square meters
- Temperature: 22+-2° C
- Relative humidity: 40–60%
- Current use: 32 server racks
- Future use: 512 server racks

to know 'Legrand Data Center Solutions'; a cooperation between Legrand and its' daughter companies – such as Minkels and Raritan – to provide customers with a complete data centre solution. We were invited to visit the Minkels' factory in the Netherlands and were very impressed with the racks production process and technology. In the course of the selection process, we found out that 'Legrand Data Center Solutions' was the only party that was able to offer a complete high-quality solution of cold aisle containment with racks of the required width and integrated busbars for a reasonable price. The engineering team was able to design the data centre solution in 3D, showing us that the design matched our needs. We could therefore proceed to production with confidence. I might say that the customer-specific solution looks even better in reality."

FROM PRODUCTION TO OPERATION

The Minkels production process went smoothly. "The assembly instruction was also very comprehensible. It takes only a couple of days for two people to assemble the aisle." Right now, Infonet has one complete corridor of 32 Minkels racks and about 20 meters of Legrand busbars. "The racks are located in the separate cold aisle containment with the busbars on top of the corridor, supporting on the racks. The racks are provided with individual locks and the possibility to install additional access control systems. The data centre has been supplied with a very early warning smoke detection and alarm system and an automatic gaseous fire suppression system, using inergen as an active agent – which is environmentally friendly."

FUTURE CUSTOMER DEMAND

The purchased cold aisle is only the first small part of the planned rack space. "When reaching the full data centre capacity, we will have 16 corridors and 512 racks in total. At the moment we are looking at colocation racks with dividers and we are also checking out the Free Standing Corridor – all depending on future customer demand." ■

New white paper on micro data centres:

from strategy to implementation

The role of data centres is quickly changing, driven by the cloud, data growth and IT cost reduction. This leads to new challenges when it comes to future-proofing data centre infrastructures. Minkels' experts have published a number of white papers which can be used as a guide to creating a future-proof and energy-efficient data centre. Minkels is now launching a new white paper about micro data centres. Edge Computing and IoT demand for these preconfigured solutions, according to Minkels' Lead Data Centre Expert and author of the white paper: Niek van der Pas.

SNEAK PEEK

This article offers a quick look at the developments in the micro data centre market. The white paper on micro data centres – written by Minkels' Lead Data Centre Expert Niek van der Pas – describes the micro data centre landscape and the different stakeholders in further detail. In the new white paper, Van der Pas also gives his vision on business continuity, future needs, risks and how to integrate IT and facilities. But first... a sneak peek!

DATA HANDLING

In 2014, there were about 14 billion devices connected worldwide. By 2020 there will be 50 billion (source: Cisco). This will also mean a boost for the micro data centre market, globally: from 2.67 billion dollars in 2017 to 8.47 billion dollars by 2022 (source: Markets and Markets). This is because centralised data processing does not always fit the Internet of Things (IoT) applications, for instance because of low latency requirements (edge analytics). The IoT therefore requires this data to be handled locally by using micro data centres.

CONTINUE READING?

Do you want to learn more about the micro data centre landscape, the different stakeholders, future needs, risks and how to integrate IT and facilities? Request the white paper at:

www.minkels.com/whitepapers

SHRINKING DATA CENTRES

More and more applications are ending up in the cloud as well. Take office automation, for example, or CRM and ERP systems. That means that you are able in many cases to shrink your data centres, simply because your physical hardware requirements are less. In addition, IT miniaturisation and virtualisation are advancing, which means that less space is needed. As a result, many companies only need a small and clear data centre – though it still has to meet the requirements of a large one. These companies are choosing to accommodate operationally critical applications and information – with a high level of reliability at low costs – in these micro data centres. You also see these small data centres being used as a (ROBO) backup or fallback.

REDUCING COSTS

Companies that outsource their IT to commercial data centres or cloud data centres often do so because these large data centres can operate extremely efficiently in terms of energy because of their size. That's also positive for a company's green image, of course. In the meantime, they can also reduce the size of their in-house data centres, which means lower energy use. Standardised and pre-configured micro data centre solutions make the (operational) costs much more predictable and remove one source of worry for an IT manager. ■

"Goal of the new white paper is to guide the reader in the process from forming a strategy up to practical implementation", says Niek van der Pas.

Equinix makes rolling out IT architecture easier with ‘Global Consistency’

Martijn Kooiman, Sales Director, Benelux Equinix

In a digital economy where enterprise business models are increasingly interdependent, interconnection is essential to success. Equinix operates the only truly global interconnection platform. Within each of Equinix’s 185+4 data centres worldwide – aptly named International Business Exchanges, or IBX’s - companies come together and interconnect to spark new business opportunities. In this environment, global consistency in services is becoming more and more important – for both Equinix and its customers. Minkels Magazine sat down with Martijn Kooiman – Sales Director, Benelux at Equinix – to talk about this topic.

Can you tell us something about your ‘global consistency’ strategy?

“Equinix is active across the globe in 48 markets, across 5 continents: from Singapore to Amsterdam, from Sydney to Dallas. When you visit our IBX in Singapore, the building itself can be very different from the one in Amsterdam. Local rules and regulations apply to the building in terms of size, appearance and layout. However, the IT floors are very much alike and consistent with any other Equinix IBX. For one and the same customer, the IT floor and services in Amsterdam and Singapore can hardly be distinguished. This global consistency – in terms of products, services, operations and support – is very important to our customers: it means ease of doing business, speed of operations, and lower risks, to deliver a consistent user experience regardless of location In particular, when it comes to rolling out their infrastructure worldwide.”

Can you give an example?

“For example, enterprises can rearchitect and build out their entire global IT architecture in a very fast way. Most of our enterprise customers are undergoing an IT overhaul, driven by digital transformation, and have the need to build an agile, future-proof and more flexible IT platform. We remove the complexity in this process by developing a global standard for their IT architecture, guiding them towards locations where interconnection can add the most value in their specific business. This way, they can roll out an interconnection oriented IT architecture around the world very consistently in the most efficient manner.”

Strategy

What exactly do your customers expect in relation to global consistency?

"This depends very much on the customer. For example, across many industries, enterprises look to us to be a global full-service data centre and interconnection partner. They value our knowledge and expertise when setting up their IT rooms within our IBX's. Many enterprises are relatively new to architecting a hybrid, cloud connected infrastructure, and very much appreciate our years of experience in designing, building and maintaining these types of deployments. On the other hand, for example, public companies have different demands. They are active locally and don't design for global consistency. They are more concerned with national consistency, redundancy and security, from one city to another, from one data centre to another. However, we have found that most companies do anticipate growing their businesses internationally, and as such, a globally consistent platform ensure it can scale with them and help futureproof their IT investment as business needs change."

What does Equinix expect from their partners in terms of global consistency?

"It's not easy keeping up with the pace of our demanding customers. For example, when our customers update something in their global standards, our partners need to be able to act quickly by designing and supplying the necessary products. That's why Equinix likes to dig deep to uncover what's actually going on behind the 'marketing and sales talk' of (potential) partners. We want to know about production facilities and inventory management. We demand open and transparent communication and engagement, across the right levels. The more we are able to align with our partners, the better the experience for our customers. To make sure that our customers can standardise on a certain brand around the globe, we prefer partners who can offer global agreements. This ensures an efficient delivery and the same set-up worldwide. This frees our customers to focus on their business. Of course, this is only possible when we can count on our partners the same way that our customers can count on us."

What makes the partnership between Equinix and Minkels successful?

"We have known Minkels for a long time. They have won our trust over the years and live up to our expectations. We can count on delivery times and their expertise. We're working closely together to respond quickly to new trends. This leads to a more relevant offer for our joint customers – which we are both continuously focused on. We started with a local partnership, which grew to an agreement in the EMEA region. Right now, we are providing customers around the globe with Minkels products."

Which data centre infrastructure is used?

"We have made agreements with Minkels to standardise on the most relevant components. This ensures we have a pre-sorted, validated program available which fits optimally with our IBX's and customers in terms of costs, consistency, quality and speed of delivery. Minkels also provides us with expertise and development of specials – depending on the customer demand. The main Minkels products that we use are cabinets, corridors and cabling infrastructure. Some customers have specific and challenging requirements for security, but we have always been able to provide them with an appropriate solution – using our combined expertise."

Do you aim for 100% standardisation?

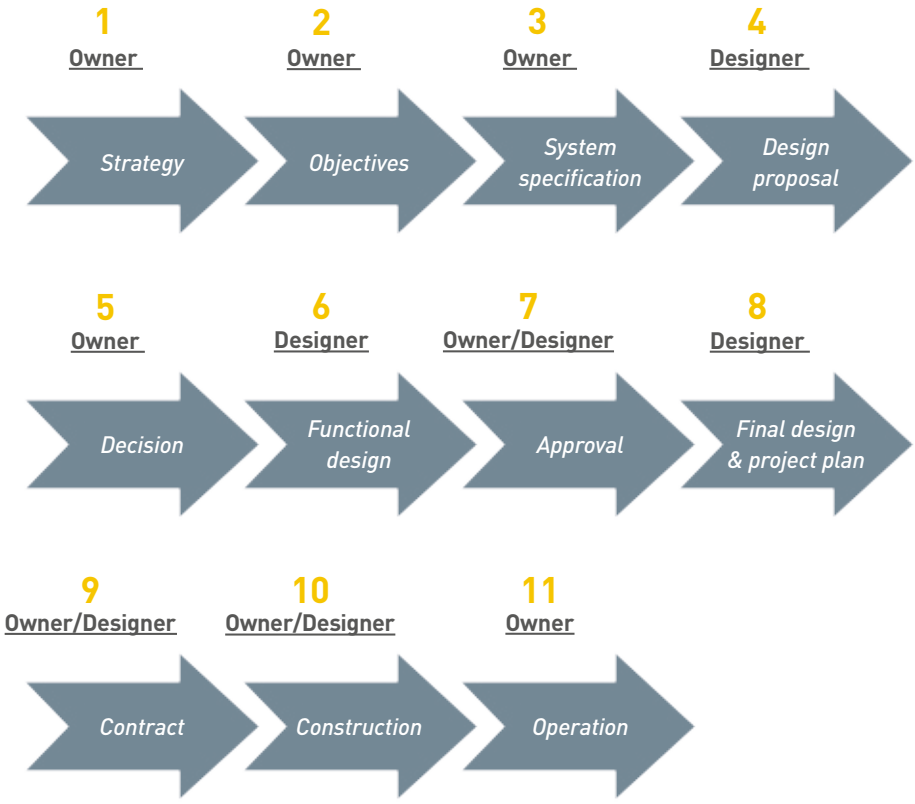
"We are not aiming for 100% standardisation. We strive to design and deliver the optimal solution for each individual customer, in each individual situation, and in some cases this does not match with what we have defined as our standard offering. However, in most cases customers choose our standards because of the quality, convenience and efficiency in deployment."

What do you expect of the future?

"Platform Equinix interconnects the infrastructures that power trends such as IOT, Machine Learning and Virtual Reality. We are growing rapidly, and we expect a lot from our partnership with Minkels. We have recently expanded our Amsterdam Science Park campus with a new IBX known as AM4. At AM4, we have 12,000 m2 of new, high dense data centre space in one of the world's most densely connected campuses. We have also announced our expansion into Spain and Portugal, as well as a new data centre we acquired in Istanbul. Exciting times, with many new customers joining our platform, makes global consistency – and our partnership – even more important." ■

International attention for renewed data centre standard EN 50600

Data centre norms are continuously in motion. The Tier classification was de facto standard for a long time. But the new European Standard EN 50600 is on the rise. The step to the international ISO / IEC standard is already in full swing. In this article, Niek van der Pas (Chairman Standard Commission / Lead Data Centre Expert at Minkels) addresses EN 50600 and the growing international attention for this standard.



The different phases in the design process of a data centre - from phase 1 'strategy determination' to phase 11 'operation'.

DESIGN PROCESS

The first part of the data centre standard EN 50600 "Information technology - Data centre facilities and infrastructures" was presented five years ago. Since then, the norm committees have not stopped evolving. Van der Pas: "Meanwhile, the EN 50600 is ready as a European standard and revision has already started, based on reactions from the field. More and more data centre owners and ICT managers use the standard for effectively setting up data centres and server rooms. The standard not only provides insight into the design process – from strategy determination to operation – but also into KPIs, best practices and data centre operations."

QUALITY

Data centre owners who take the EN 50600 as a starting point emphasise quality. "Due to operational excellence, data centres can distinguish themselves – it's the piece of security customers are looking for" says Van der Pas. "For this reason, the EN 50600 is gaining more and more support. If a data centre owner does not take the EN 50600 as a starting point, nothing is against it. The EN 50600 is just a guideline and does not have a compelling character. However,

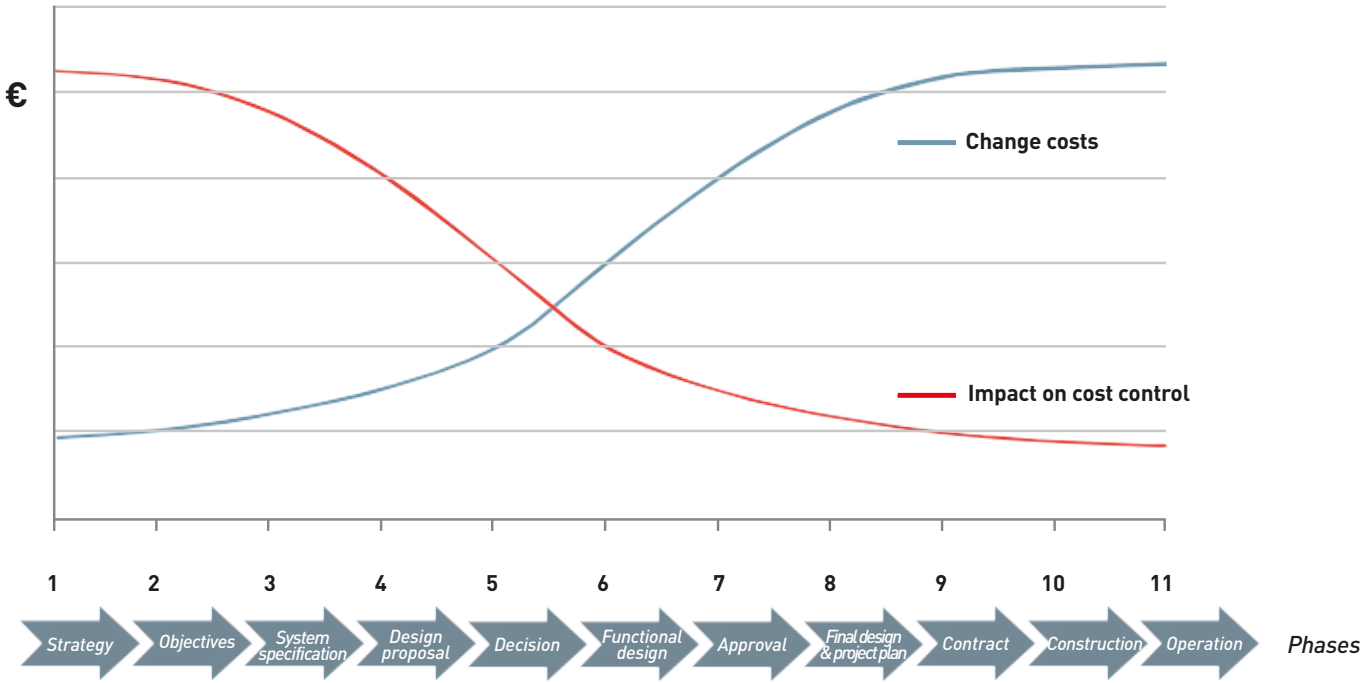
customers are expected to ask for more quality assurance – and thus certification according to EN 50600. Changes to the data centre at a later stage will cost more than in the beginning of the design process. As a consequence, there is less control over the process and costs." Van der Pas sketches a striking image.

According to the EN 50600, three pillars together determine the quality of a data centre: availability, security and energy-efficiency. "At an early stage, it is possible to estimate costs for, for example, a certain level of security or a certain energy-efficiency. The standard provides guidelines for determining which level is desired in these three areas."

AVAILABILITY

By means of a business risk analysis, it is possible to determine the availability level. "Two factors play an important part: downtime costs and risks. If a very high availability is desired based on this analysis, a redundant system implementation is necessary. You can imagine that the availability within the air traffic control data centre must be at a higher level than for example a law firm. These levels range from 1 to 4, where class 1 stands for low availability and class 4 for very high availability."

Niek van der Pas, Lead Data Centre Expert, Minkels



Changes to a data centre are becoming more expensive at a later stage of the design process (with a peak in Phase 11). The EN 50600 invites data centre owners to think about data centre design from an early stage on (from phase 1) so that there is more control over the process and costs.

ENERGY-EFFICIENCY

The Power Usage Effectiveness (PUE) largely determines the energy-efficiency of a data centre. "It's not realistic to calculate the PUE at a 100% occupation if a data centre will not be fully used for 100%. You can compare this to a car. A car could be very fuel efficient in a lab test but uses far more in a city drive. The same goes for a data centre. That is why the EN 50600 uses the 'designed' PUE (dPUE): design based on the expected capacity. The EN 50600 provides guidelines for determining the dPUE and for measuring improvement."

SECURITY

It is also possible to determine the desired level of security through the EN 50600. "You can think of protection against unauthorised persons, but also against effects within the data centre environment (fire, water) and external influences (earthquakes and floods). Furthermore, the EN 50600 also – to a lesser extent – focuses on subjects such as scalability, modularity and adaptability."

INTERNATIONAL ATTENTION

Meanwhile, the step up from European to international ISO / IEC standard is in full swing. "The ISO / IEC Technical Specification is expected to be ready within one year. Then the process begins to turn it into a standard." But what's all the international attention about? Van der Pas explains: "There is a clear need for professionalisation. The EN 50600 is a broad, complete and internationally applicable set – wider than the Tier classification that was the de facto standard for a long time. The American Tier format only deals with data centre availability. Thus, it looks at the design and the construction of a data centre, but not at the data centre use. Energy efficiency and security are therefore not discussed – just like best practices. Another difference is that the American 'Uptime' takes care of Tier content, but also of its certification. The EN 50600 separates content and certification. All European countries that wanted to participate have contributed to EN 50600 and maintain it from national standardisation committees. Separate institutes carry out the certification."

FUTURE

Van der Pas expects the design of data centres and server rooms to become simpler in the future. "When the step to the international ISO / IEC standard has been taken, the norm applies in several countries. Data centres only need to meet one standard. A data centre design can then be used in different countries. This leads to lower costs for data centre owners: less product adjustments and lower costs. The (end) customer can also benefit from this. Minkels already takes this standard as a starting point. Customers are assured of an energy-efficient, secure data centre solution that contributes to an optimal availability." ■

Data explosion

And the impact on data centre power infrastructure

Data centre managers are facing a huge challenge: a data explosion caused by among others IoT, the use of smart phones and the use of data in healthcare operations. Everyone feels that this data explosion has a strong impact on the power infrastructure of the data centre, but how do we make sense of this? Edwin de Boer (Director of Marketing EMEA) of Raritan shares his vision.

Edwin de Boer, Director of Marketing (EMEA), Raritan

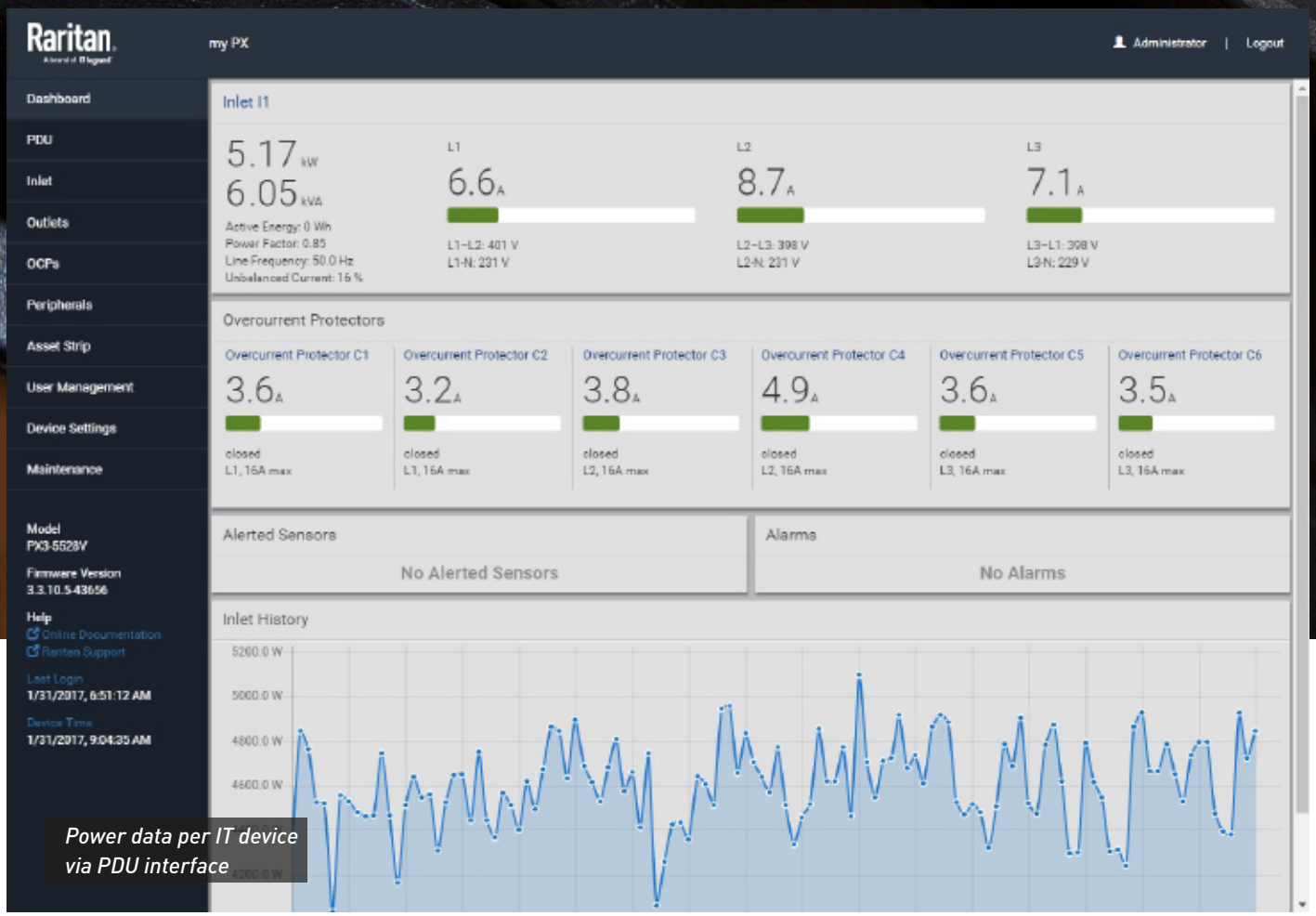
ONE MAJOR TREND: BIG DATA

Many market analysts see a direct relationship between IoT[1] and that other major trend: Big Data. Often, individual devices will be subject to modest amounts of data being sent, but huge amounts of connections will generate a huge amount of data. And all that data must be brought to one or more central places so that they can be analysed and money can be earned.

CHALLENGE

This creates an interesting challenge for data centre managers. Furthermore, it is also another new trend that has major consequences for the data centre infrastructure. Many data centres are still in the middle of transitioning from traditional client / server applications to cloud applications. It's obvious that the demand for computing and storage will greatly increase because of IoT. But

[1] The Internet of Things is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment (Gartner).



Power data per IT device via PDU interface

it's a misconception that companies and governments can just simply place some extra servers and storage devices. A very important question will be: can the electrical infrastructure of our data centre handle this additional demand?

HYBRID INFRASTRUCTURE

Many data centres use a power infrastructure that is often many years old. The requirements which were important at that time – and formed the basis of this power supply – have now become obsolete. This applies to almost any data centre, but especially to data centres that support hybrid infrastructures (on-premise applications and cloud services). In all cases, it is crucial that the power infrastructure is carefully investigated. How is it put together? What about the energy consumption per room, corridor, rack and (preferably) per individual IT device? How much energy can we supply and how much stretch is there? Not just for the entire data centre – also take the distribution to halls and corridors into account. Where are the bottlenecks? Where are the boundaries?

CAPACITY PLANNING

Next, an overview has to be made of the new IT equipment that will be used in the coming years. This is, of course, a typical example of making a capacity planning – but one with many uncertainties. With regard to existing IT workloads, we often have a good historical picture of the development of energy consumption and its distribution across the data centre. With a new trend like IoT, these estimates are much more difficult to make. The customer – whether this be the own business organisation or external parties – often has no idea of the developments we can expect in the future with regard to IoT. It is often not clear what projects will start and how fast an IoT service will become popular or widely used. Many companies are in the phase of the first pilot projects,

which are by definition small scale. If experiences have emerged, they are therefore based on tests and not on large-scale projects.

HARD TO ESTIMATE

Existing methods for achieving a good capacity planning (see Raritan's white paper 'Data Center Power Distribution and Capacity Planning'[1]) can be used. However, we will have to gain experience with making correct estimates of the new demand for energy. But there is another point that should not be forgotten: delivery certainty. Traditional data centres – with mostly classic client / server applications – were striving for a very good availability of these IT systems. Often uptimes of '5 x 9's' or 99.999% were mentioned. In practice, almost no enterprise data centre achieves such uptimes. But this is often not that important. Occasionally some downtime can of course be annoying – especially for the employees of the own business organisations who are using these classic client / server applications – but it's kind of accepted in a sense. With the migration to the cloud and now the rise of IoT, this is very different.

MEASUREMENT DATA

As we do not accept long waiting times ourselves when opening an app on our smartphone, IoT also requires 100% availability. The measurement and usage data must come in continuously and a failure in the power supply is no longer acceptable – since we want to earn money with this data. Thus, a redundant energy supply becomes crucial when a data centre wants to properly support IoT projects or applications. This demand for absolutely uninterrupted service also has an impact on the question of where to best host IoT applications. Are we going to do that through a cloud provider or a hosting company? And if so, what warranties can this type of party give to ensure that the system environment is actually available 100% of the time? Or is it better to keep these important applications in-house?

CONSIDERATIONS

The underlying question is: is minimising the cost of energy supply the highest priority? Or would it be better to invest a bit more money in our power infrastructure so that we're absolutely sure that we can benefit – also financially – from the IoT projects that we are running? At first, taking care of IoT projects at the data centre might seem quite easy; just a bit more IT equipment. That attitude, however, would be wrong. IoT offers huge opportunities to businesses and governments, but we must be absolutely sure that these applications are available 100% of the time. Then we suddenly have to deal with a surprisingly complex issue, with many considerations to be made. Therefore, ensure that you have a proper capacity planning, but also make a good balance between requirements and desires regarding availability and costs. ■

[1] *www.raritan.com/landing/power-distribution-and-capacity-planning-white-paper*

Minkels-partner

uses 'Legrand Data Center Solutions' in

The Dutch municipalities of Heerlen, Kerkrade, Landgraaf, Brunssum, Nuth, Voerendaal, Simpelveld and Onderbanken together form 'Parkstad Limburg'. Within this partnership, the municipality of Heerlen plays a leading role in the field of ICT; all eight municipalities in Parkstad Limburg participate in the Heerlen data centres. In addition to scale enlargement, 24/7 online availability of the site is also important to the citizens. This places high demands on the data centre. Minkels partner All IT Rooms and Legrand Data Center Solutions were challenged to upgrade the server space of the municipality of Heerlen!

IMPROVING POWER SUPPLY

The municipality of Heerlen had the desire to improve the power supply of the city hall's server space. Ronald Kok, Director of All IT Rooms: "The municipality of Heerlen has been a customer of All IT Rooms for a number of years. They asked us to think about a better redundancy, bearing in mind that all eight municipalities in Parkstad Limburg are participating in the Heerlen data centres."

PRICE-QUALITY VERSUS SPACE

All IT Rooms assessed a number of UPS systems from different suppliers. "After a careful selection, we chose the UPS systems of 'Legrand Data Center Solutions' because of the good value for money. In addition, there was little room for a UPS system in the server space. The Legrand UPS has batteries that are placed internally in the cabinet. Other systems have batteries placed externally. As a result, Legrand's footprint is smaller. With other UPSes, we would also need an

All IT Rooms

Heerlen (NL) Municipality project

Ronald Kok, Director of All IT Rooms

additional cabinet for the batteries, plus UPS cabling for batteries. This all takes up space that wasn't actually there", said Kok.

LIVE ICT RENEWAL

In the old situation a single power supply was used. "Thus a single point of failure, which gives a higher risk of failure and reduces reliability. In a live and up-and-running ICT environment, we first built feed B and switched over to this feed. After that, we replaced feed A and redesigned it. In the new situation, both energy paths have their own UPS, resulting in a 2N solution. With this solution, we have adapted the data centre to the wishes of the municipality; we realised an increased availability and a reduced chance of errors. This redundancy is necessary in case of malfunction or maintenance work. Then the other feed will take over."

LEGRAND DATA CENTER SOLUTIONS

As a system integrator, All IT Rooms works with a few brands. "Minkels has been a reliable partner for years and that led to our link to Legrand. Now that Minkels and Legrand offer their joint data centre solutions through the 'Legrand Data Center Solutions' teams, this has a big advantage; one single point of contact, offering a complete solution. Recently, we worked together on a project for the municipality of Krimpenerwaard. This experience with Minkels and Legrand made us decide to utilise this combination again during the project for the municipality of Heerlen. For the municipality of Heerlen we chose the Keor UPS system. We used the three-phase UPS with 60 kVA and five minutes of autonomy time. This means that the battery provides five minutes of backup time. This is enough because there is also an aggregate in Heerlen. Otherwise, a longer autonomy time would have been necessary."

SUSTAINABLE AND MANAGEABLE

The municipality had one special demand: the installation had to be sustainable. "The Legrand UPS has a high efficiency of 96%. To ensure this, the consumption of the systems had to be measurable. This was a customer-specific demand and therefore required customisation: an external kilowatt hour meter had to be installed. The municipality has been able to make huge savings: from a decentralised solution with about 60 small UPSes to a central solution with one large UPS for each energy path. Furthermore, an increase in manageability and space has been realised, against a much lower energy consumption", Kok concludes. ■

Legrand releases next generation connectivity with its LCS3 Portfolio

PRODUCT FEATURES

Performance
- High speed solution (up to 100G)
- Easy locking system

Efficiency
- Automatic extraction
- Fast snap connectors
- High density - up to 48 ports
- Angled solutions
- High density - 96 LC-1U
- Rear cable management
- Ultra high density - up to 144 LC-1U
- Smart Splicer

Scalability
- Push & connect solution
- Cords guide management
- Modular splicing cassette
- Cords management system
- Large space modular drawer

Rising volumes of data exchanged, increasing numbers of networks, the need for higher speeds and the density of equipment all make it necessary to have more reliable, secure, and high performance electrical and digital building and data centre infrastructures. LCS3, and in particular, Legrand's new structured cabling range, is especially designed to meet these needs.

STRUCTURED CABLING SYSTEMS

The Legrand Group currently provides high-quality connectivity to more than 200 million devices. Its investment in the development and design of structured cabling systems and solutions has enabled Legrand to expand its range of products. Legrand has moved from standard to premium copper and fibre global solutions for structured cabling – both in data centres and LAN.

COPPER AND FIBRE GLOBAL SOLUTIONS

LCS3 offers advances in terms of performance, scalability and efficiency. The new connectors can cope with the most critical environments, with copper solutions as high as Category 8 (CAT8). LCS3 also includes a considerably expanded fibre optic range, allowing speeds of as much as 100 Gbps. The new structured cabling solutions are modular, easy to install (no tools needed) in enclosures, and optimised for maintenance.

COPPER INNOVATIONS

With LCS3, Legrand introduces some

major innovations in both the field of copper and glass fibre. We now take a look at some of the copper innovations for LCS3:

Higher speeds
Category standards defined by ISO/IEC 11801 include the characteristics of telecommunication cabling systems for both twisted pair and FO cabling. The next standard in network copper cabling is the CAT8 (Category 8) standard. With the implementation of CAT8 it is now possible to support higher speeds of data: 25 and 40 GBps.

High density
LCS3 offers a higher density per rack unit (RU), with a maximum of 48/RU. The system is completely modular and has improved in terms of maintenance and installation speed.

Airflow management
Legrand offers 'angled panels' that improve cable management. They are particularly suitable for airflow management – and thus for data centre environments.

Ease of installation
The connectors offer a new design which increases the ease of installation. The connector is also very suitable for Power over Ethernet (PoE) applications. This superbly matches the strong demand for these applications, especially for LAN.

GLASS FIBRE INNOVATIONS

Fibre optic enables a larger bandwidth to be used than copper cables. We now take a look at some of the fibre innovations for LCS3:

High speed and high density
When describing the performance of a structured cabling system, the transmission speed (Bit rate) is the reference point. Legrand's LCS3 system offers a complete fibre optic system with 40 Gbps and 100 Gbps for high speed and high density applications in the data centre – a high-quality connection with fewer losses.

Plug & play
LCS3 offers prefabricated systems on a plug & play basis – using MPO/MTP connections. This ensures a constant and high level of quality with the benefit of lower installation cost. The portfolio is applicable for normal and high density applications.

Smart Splicer
Legrand has launched the Smart Splicer to make simple, affordable fibre connections.

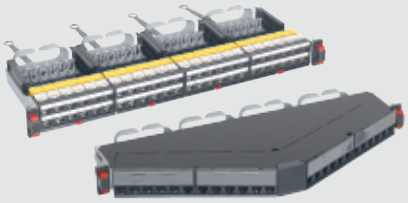
The innovative system is easy to handle because it is one of the smallest tools in the market. It's also easy to use – thanks to its simple program with easy intuitive feedback – and offers a quick return on investment.

Renovated and redesigned patch panels
The patch panels are completely renovated and redesigned with optimal cable management. They are suitable for modular cassettes and welded connections. The option of high and very high density versions exists especially for appliances in data centres; from 96 connectors per unit to 144 connectors per unit.

NEXT STEP

LCS3 is the next step in offering a complete solution for data centre and server room appliances. LCS3 can be integrated in racks – taking airflow management, energy savings and cable management into account. ■

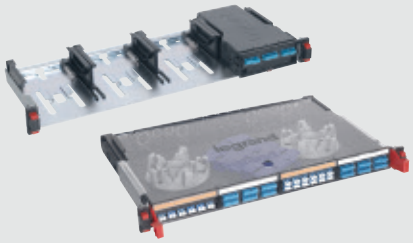
PATENTED DESIGN



Modular copper patch panels: 48 ports per U and angled panels

Smart Splicer

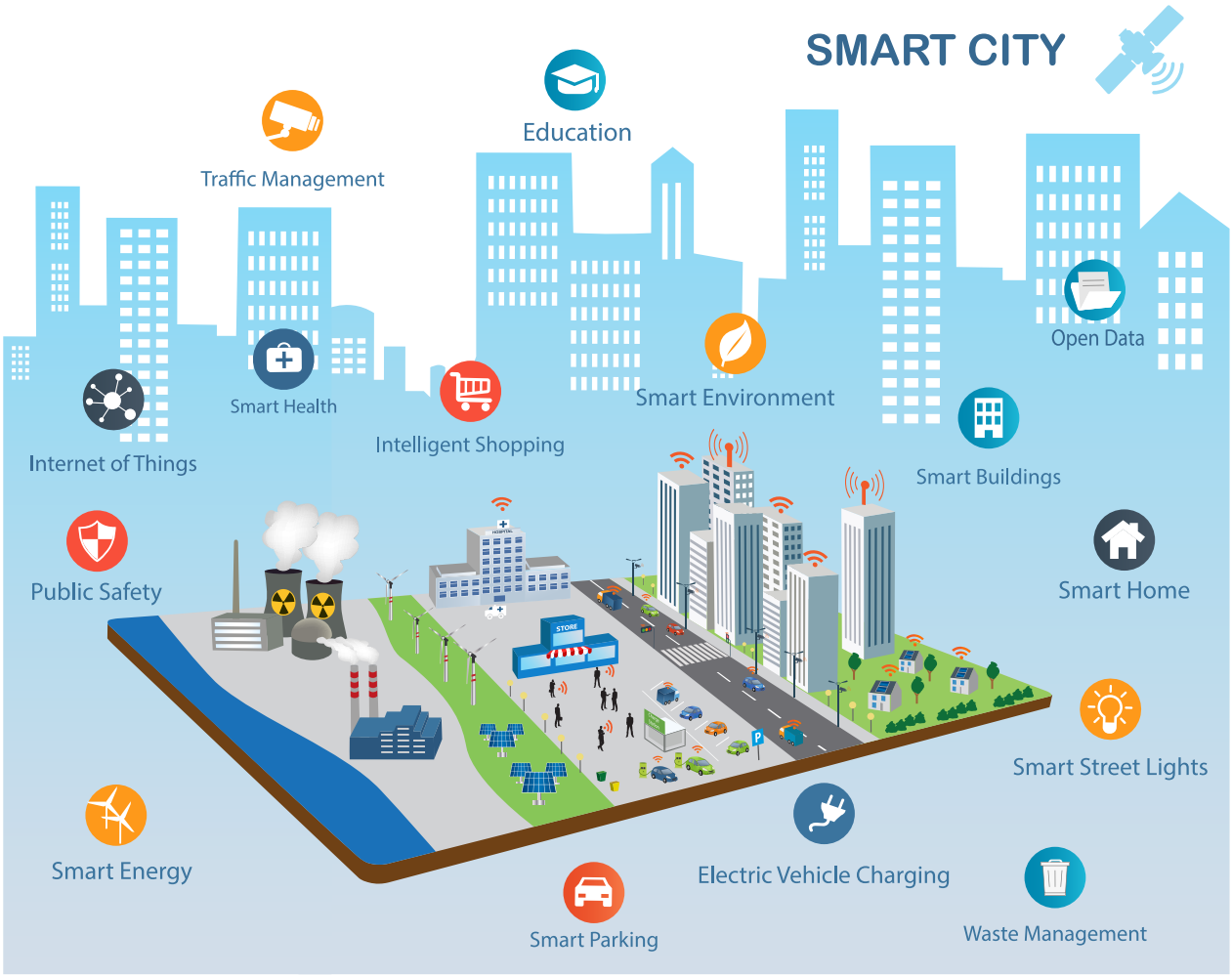
Mix copper and fibre connectivity on 1U



Innovative modular cassette systems

How IoT is changing the

The strong rise of Internet of Things (IoT) will have a major influence on our daily lives; everything will be connected to the Internet. Less visible - but something we deal with in our daily business - is the changing world of the data infrastructure. In this article, Vincent Liebe (Marketing Manager Minkels) looks at the link between IoT developments and its impact on the data centre ecosystem.



data centre

"The Internet of Things is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment." – Gartner

THE FOURTH INDUSTRIAL REVOLUTION

The fourth industrial revolution – also called Industry 4.0 – is emerging, according to experts. During the third industrial revolution, it was all about computers and digitisation. Industry 4.0 on the other hand, is about self-driving cars, 3d printers, virtual reality and robotisation. "The Fourth Industrial Revolution is characterised by a range of new technologies that are fusing the physical, digital and biological worlds", says Klaus Schwab, the Founder and Executive Chairman of the World Economic Forum. Due to this fusion, Industry 4.0 will have a huge impact on our lives; devices are increasingly thinking for us, taking over more of our tasks and becoming more integrated into our lives.

INTERNET OF THINGS

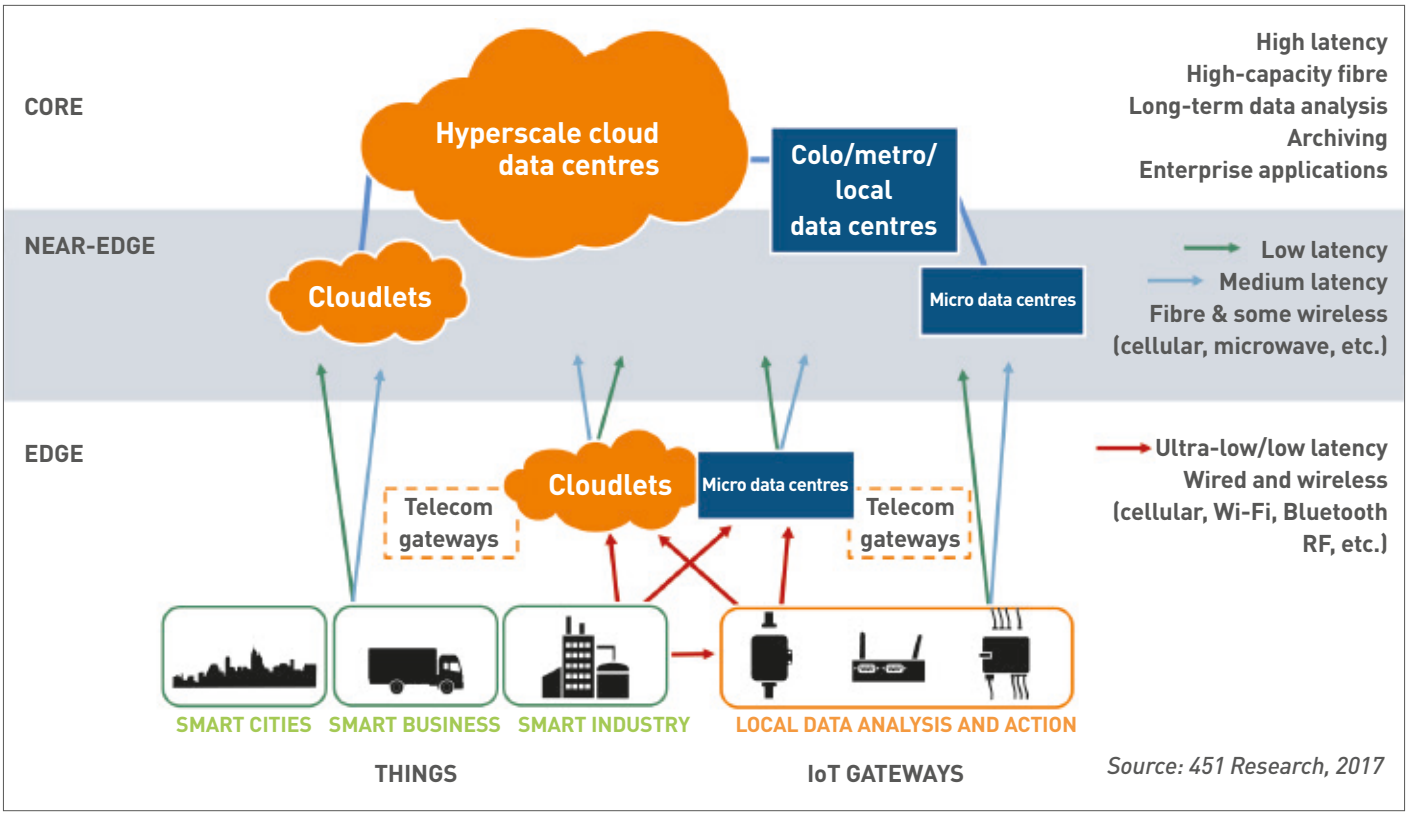
This development changes complete industries, but also our view on labour and productivity. And this new industrial revolution is approaching fast... In 2014, there were 14 billion connected devices worldwide. By 2020, there will be 50 billion (Source: Cisco).

The Internet of Things ensures that all these devices can communicate and interact with themselves and the external environment. Examples in this area include projects like Connected Industry and Smart City (see the image on page 28), with results like smarter energy usage, less crime and smart products – such as a refrigerator that warns when food is approaching the expiry date or when you are about to run out of vegetables.

THE CORE AND THE EDGE

It is obvious that IoT will lead to a substantial growth of data. Also the way we look at data will change. Data is no longer centralised information that we simply consume, the decentral character of IoT will also lead to decentral data processing and analysis. This provides new

Vincent Liebe, Marketing Manager Minkels



SOLUTIONS FOR THE EDGE AND THE CORE

Minkels offers a range of solutions for any data centre challenge in the edge or core. Starting with the compact MiniCube (single rack, up to 4kW) and MatrixCube (multiple racks, 22kW) for the edge layer. The MiniCube and the MatrixCube have all the features of a fully-fledged data centre: housing, power, monitoring and cooling, all in a variant that has been kept as compact as possible. For the core layer Minkels offers modular aisle containment solutions and the recently introduced 52U racks.

challenges in how to cope with this. Extra factor is the fact that communication with the IoT devices in some cases requires (ultra) low latency connectivity. Basically we can define two layers supporting IoT, the core layer with big data analytics and the decentralised (near) edge layer with fast connectivity to the devices (things). Each layer has its own data centre infrastructure, for instance hyperscale and cloud data centres in the core and decentralised micro data centres in the (near) edge.

CHANGING DATA CENTRE ECOSYSTEM

The changing data centre ecosystem introduces some challenges to the players in both the core and the edge layer:

Challenges in the core

Hyperscale data centres are super large and homogeneous. They have one goal: to offer economies of scale. These hyperscalers - like Google or Microsoft - predominately use their own IT equipment. The changes in the market force them to develop a different perspective on their infrastructure. Colocation data centres on the other hand are heterogeneous and work with universal equipment.

Challenges in the (near) edge

This relatively new layer in the data centre ecosystem provides opportunities for various players. Applications which require (ultra) low latency might need a decentralised micro data centre infrastructure. For example, the supporting edge infrastructure for self driving cars needs to be fast and reliable. Micro data centre solutions such as the MatrixCube and the MiniCube are characterised by their small-scale, standardised set-up. They are heterogeneous, provide space for universal equipment and process data locally. The roll-out speed, ease of installation and processing capabilities are the biggest challenges for these small data centres. Micro data centres are used for example by enterprises and government companies.

MAKE THE DIFFERENCE

In short: IoT is changing our world at a rapid pace. It has a major impact on the data centre ecosystem and on connectivity. Especially the (near) edge layer offers new chances and challenges; everything needs to be faster and more efficient. The use of the right solutions in both the core and the edge layer can make the difference. Legrand and Minkels provide standard, customer-specific and mass customised solutions to solve these challenges (page 14). ■

LCS 3

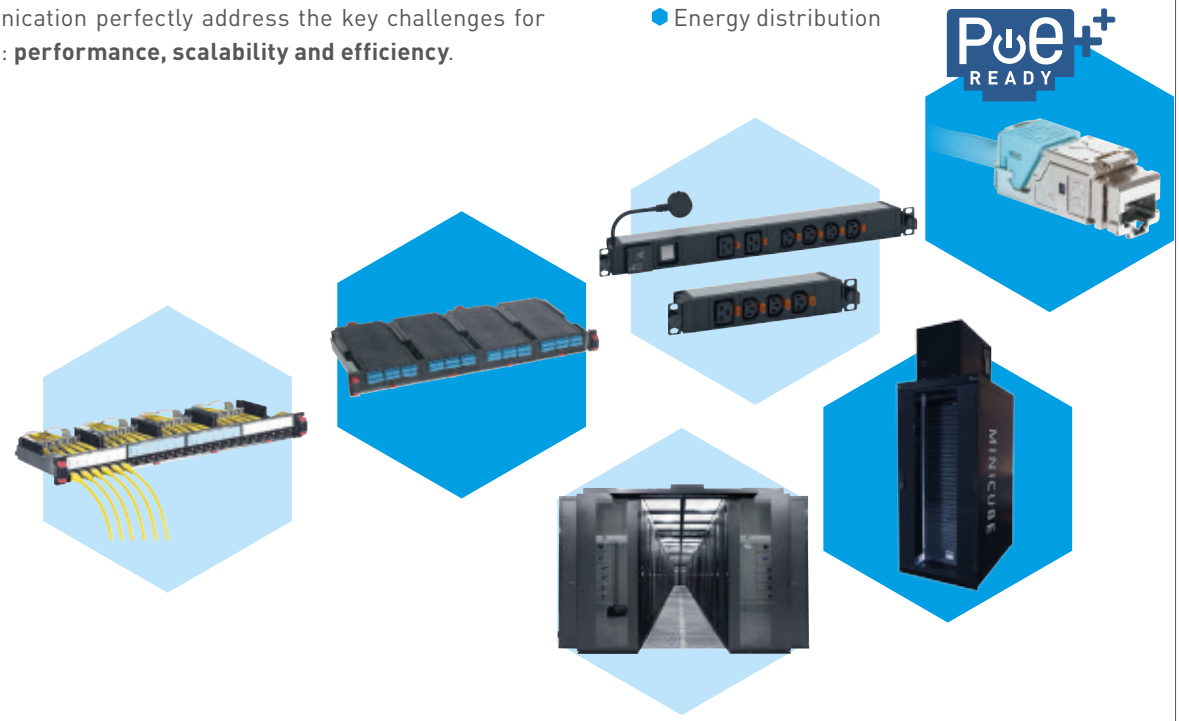
3 Dimensions of Excellence

● Performance ● Scalability ● Efficiency

From control and connection interfaces to cable management, energy distribution and data distribution systems, Legrand provides a variety of solutions designed to manage lighting, energy, networks and building access. Legrand's complete global solutions for data communication perfectly address the key challenges for digital networks: **performance, scalability and efficiency**.

4 KEY AREAS OF EXPERTISE

- Digital infrastructure
- Control and command
- Cable management
- Energy distribution



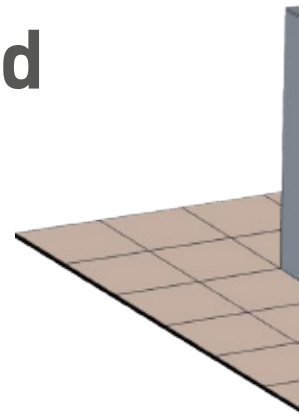
Legrand Group

A leading company for all your IT networks

Legrand is the global specialist in electrical and digital building infrastructures. The Group offers a comprehensive range of solutions and services tailored to residential, commercial and industrial applications. The scope of its offering and its leading positions make Legrand a worldwide benchmark.

legrand®

tieto is expanding the biggest commercial data centre in Finland



Today, more than 150 large Nordic companies and organisations use Tieto's cloud services. Additionally, Tieto has several hundreds of data centre customers and multiple data centres in Finland, Sweden and Norway. In response to the growing amount of data and the demand for stricter security measures, Tieto is currently expanding Finland's largest data centre in Espoo by thousands of square metres. Erwin de Bont, Vice President, Infrastructure and Platform Services at Tieto and Tom Grönqvist (Senior Technical Architect) of Tieto discuss this innovative project.

INCREASING AMOUNT OF DATA

The Espoo data centre opened its doors in 2011 and was first provided with a 10 million euro expansion in 2014. The investment budget of the current expansion project is approximately 17 million euro. But why is Tieto constantly expanding? "The amount of data is increasing exponentially", says De Bont. "Each image taken or sent through e-mail is saved to a server in a data centre. Companies are starting to use larger amounts of data for more efficient operations, for example, by introducing predictive analytics-based capabilities. As a result, the demand for local and secure data centre services is on the rise."

EVER-GROWING SECURITY REQUIREMENTS

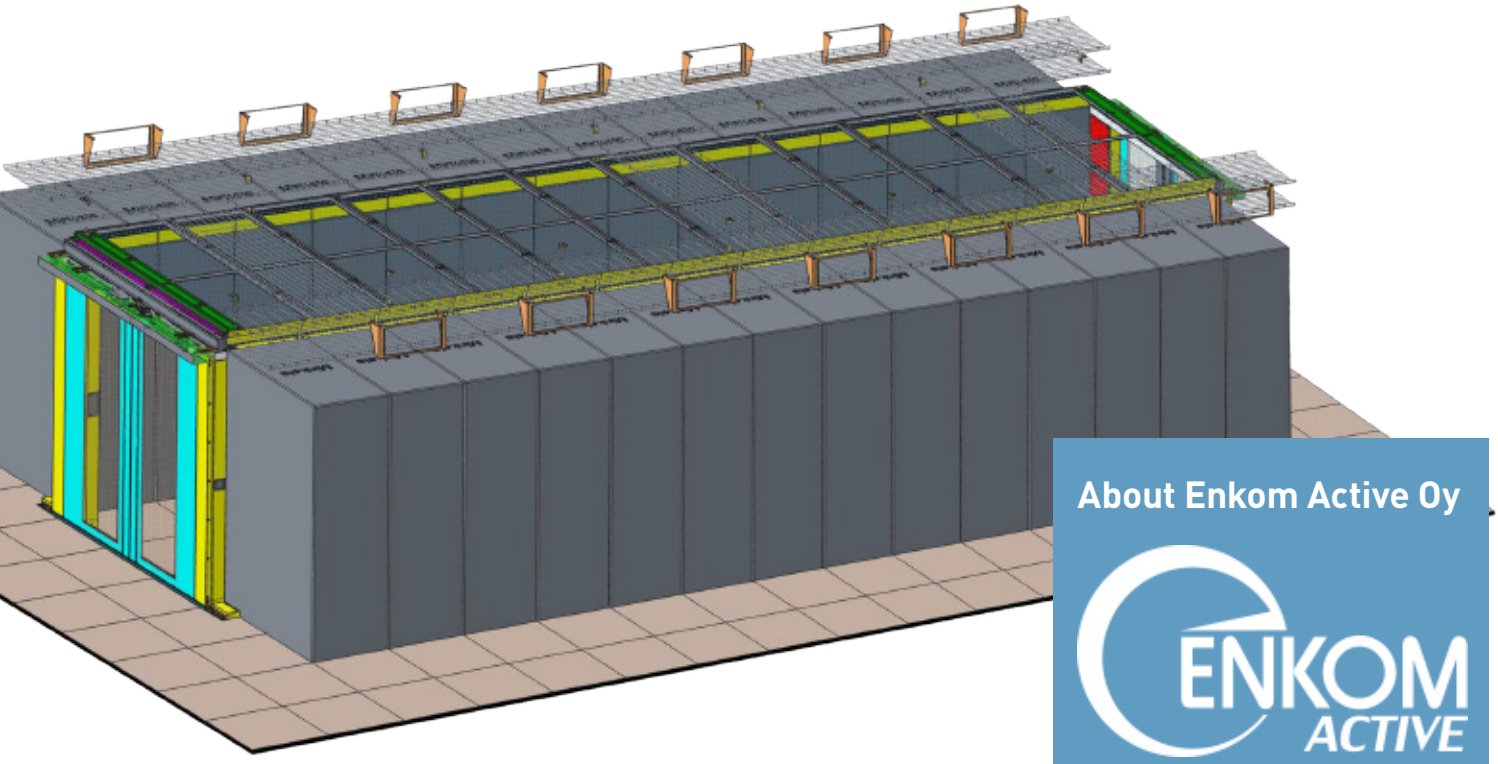
In the coming years, legislation related to the protection of privacy will become quite strict, for example, with the addition of the EU's General Data Protection Regulation (GDPR). "Tieto's data centres in Finland are able to respond to the ever-growing security requirements particularly well.

About Tieto

In a rapidly changing world, every bit of information can be used to provide new value. Tieto aims to capture the significant opportunities of the data-driven world and turn them into lifelong value for people, business and society. Having a strong role in the ecosystems, they use their software and services capabilities to create tools and services that simplify everyday life of millions of people; to help their customers renew their businesses by capturing the opportunities of modernisation, digitalisation and innovation and to foster new opportunities based on openness, co-innovation and ecosystems.

Building on a strong Nordic heritage, Tieto combines global capabilities with local presence. Headquartered in Espoo, Finland, Tieto has around 13,000 experts in close to 20 countries with a turnover of approximately 1.5 billion euro. Tieto's shares are listed on NASDAQ in Helsinki and Stockholm.

tieto



Tieto's data centres are already able to offer a service environment with an elevated level of data security for the preservation of sensitive data." And this is important to Tieto's customers. "Companies and organisations are increasingly interested in where and how data is stored. The European Union's General Data Protection Regulation for all companies comes into force in May 2018. Then each operator involved with data must be able to indicate where the end-user data is stored. In particular, it is important for our governmental agency customers that citizens' data are stored within the borders of Finland."

RAPID GROWTH

The safe location of the data centres, as well as the long-term development of innovative technology have enabled the rapid growth of Tieto's cloud services. In the third quarter of 2016, the use of Tieto's cloud services increased by 29%. "Tieto is not only expanding and investing in security measures[1]. We are also investing in environmentally friendly energy solutions and services, such as virtualisation and cloud services, in all of our data centres. With our services, our customers modernise their applications and IT infrastructure but they also innovate and renew their business in a sustainable way."

PROJECT CONSTRAINT: LOW CEILING, CUSTOMER-SPECIFIC SOLUTION

Tieto will get access to its new premises in stages between 2017 and 2022. Minkels and its partner, system integrator Enkom Active Oy are committed to realising this innovative expansion. "Minkels and Enkom offered us a true customer-specific solution", says Tom Grönqvist, Senior Technical Architect. "We had to deal with a limited height for the first data room, i.e 2.5 meters from the raised floor to the ceiling. We had to fit the cabinets, a cold aisle containment system, cable management and patch panels on top of it. That's why we started looking for a supplier that could provide a customised solution package. Legrand, Minkels and Enkom were convinced that they could design a solution that would fit under the ceiling. And they have succeeded! Right now, we are in the process of building six data rooms with corridors that are supported by cabinets with cable management above – just like we requested." ■

[1] Tieto was the first supplier in Finland to receive heightened data security certification from the Finnish Communications Regulatory Authority (FICORA) for its data centre services.

About Enkom Active Oy

Enkom Active Oy is a value-adding distributor of electromechanical products, communication systems and fibre optic equipments. Their business foundation is based on excellent products and smooth logistics. However, their true added value is coming from customer understanding, product knowledge and from close partnerships between customers, themselves and suppliers.

Enkom Active Oy was created when Enkom Oy and K&K Active Oy joined operations in 2015. Both well established players in their fields of experience and both part of the Swedish Lagercrantz Group. Lagercrantz is a technology group that offers world-leading, value-creating technology, using either proprietary products or products from leading suppliers. Lagercrantz is active in seven countries in Europe, in China and the US. The Group has more than 1,200 employees and a revenue of approximately SEK 3 billion. The Company's shares are listed on Nasdaq Stockholm since 2001.

Minkels guides you to the right information

Minkels has not only completely redesigned its website, but also revised its documentation. All this to support you to find the right information. Do you want to know what information is available? Then keep on reading!

All documentation is available online!

All documentation discussed in this article is available at: **www.minkels.com/downloads**

In addition, you can sign up for Minkels Magazine (paper and digital version) at **www.minkels.com/magazine**

This will keep you informed of developments in the data centre market.

CUSTOMER JOURNEYS

The new responsive Minkels website is not only suitable for all devices, but also matches your needs better. So-called customer journeys guide you – based on your profile – to the right information. We distinguish between visitors who design or run a data centre and visitors who sell data centre products. For our partners selling Minkels products, there is a separate online environment.

WHAT IS YOUR ROLE?

Are you responsible for the design of or building a data centre?
Our specification tools and white papers offer you relevant information to make effective data centre designs.

Do you run or own a data centre?
Our white papers offer you tremendous value. In addition, the customer cases in Minkels Magazine show you how our customers handle various data centre challenges. In our brochure you will discover what Minkels and Legrand stand for in terms of mission, vision and core values.

Do you sell Minkels data centre products?
Then you can get access to our partner portal. Here you will find technical documentation, brochures and manuals. You also have access to an online configurator to create 'mass customised' solutions. But what do we mean by this?

BUSINESS MODES

Minkels has divided its product portfolio into three 'business modes'. For example, Minkels offers standard solutions, customised solutions and a mix of these two elements: mass customisation. A brief explanation of these terms is in place (see page 35)!

What is your role in the data centre? In the table below, you will find relevant information per customer journey profile:

I design / build	I run / own	I sell Minkels products
SPECIFICATION DOCUMENTS www.minkels.com/specification-tools	DATA CENTER INTEGRATED SOLUTION BROCHURE – with Legrand's vision on the data centre market www.minkels.com/downloads	CONFIGURATOR www.minkels.com/partner-login
WHITE PAPERS www.minkels.com/whitepapers	MINKELS MAGAZINE with customer cases www.minkels.com/magazine	MANUALS www.minkels.com/partner-login
	WHITE PAPERS www.minkels.com/whitepapers	TECHNICAL DOCUMENTATION www.minkels.com/partner-login
		BROCHURES www.minkels.com/downloads

WHAT ELSE...?
What other documents can you find on our renewed website?

www.minkels.com/downloads

LEGRAND DATA CENTER INTEGRATED SOLUTIONS

This brochure describes the possibilities of the entire Legrand Group for the data centre market.

BUILDING INFRA

This brochure addresses the total solutions offered by Minkels and Legrand for your building infra.

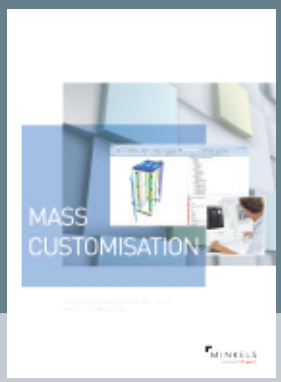
DATA CENTRE INTEGRATED SOLUTIONS

In this brochure you will discover what Minkels and Legrand can specifically mean for a data centre.

STANDARD PRODUCTS

In our standard product catalogue you will find our complete product range: data centre and building related integrated solutions.

MASS CUSTOMISATION



Mass customisation is the combination of the best aspects of 'mass production' and 'customisation'.

MINKELS MAGAZINE

Minkels issues the Minkels Magazine twice a year. The magazine is full of interesting and relevant customer cases, product introductions and the latest market trends.

Standard solutions
Standard solutions are predefined products that are – largely – in stock and available immediately. You can choose from different types and sizes. Ordering can be done directly from our standard product catalogue.

Customer-specific solutions
Our customer-specific solutions are created through co-development between yourself and our engineers. You get exactly the custom solution you're looking for. Many of our customer-specific projects are described in the Customer Case Special or Minkels Magazines.

Mass customisation
Mass customisation is a lot like LEGO; standard 'building blocks' with an enormous number of possible combinations. All solutions mentioned in the mass customisation brochure can therefore be combined and integrated using a smart product configurator. The wonderful thing about this is that you get a suitable data centre solution – that meets your requirements – while you also benefit from a fast delivery and the same quality and logistics, anywhere in the world.

If you have questions or comments, please send your feedback to: marcom@minkels.com ■

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