### **Rittal – The System.**

Faster – better – everywhere.

# Discover it.



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DATA CENTRE AS A SERVICE

### **Discover it – the new world of solutions.**

The digital transformation in business, trade and industry offers a whole host of opportunities but also throws up new challenges for IT infrastructures. Dealing with complex tasks and huge volumes of data calls for increasingly fast, flexible and efficient IT solutions.

Our response to this is a comprehensive product portfolio for all challenging IT scenarios, including scalable container platforms with preconfigured hardware that are ready to use in just three months instead of two years. This solution can be implemented faster and thus up to 30% more cost-effectively than conventional data centres. In collaboration with Innovo Cloud, we also offer a private, virtual data centre with OpenStack software (BCC = Balanced Cloud Center). A number of different platforms are available for using a private cloud, which can also be operated as a managed service. In addition to infrastructure and software, Rittal offers a data centre location that is unique in Europe – the Lefdal Mine Datacenter.

All this provides a wide range of efficient and reliable options that can be purchased both quickly and costeffectively. These product solutions can be combined, from site and IT infrastructure to private cloud data centres and service models such as ITaaS (IT as a Service) and DCaaS (Data Centre as a Service). They can also be scaled at will, from micro to hyperscale data centres.

In conjunction with our consulting expertise, this offers a multitude of options for all requirements. That way, you can focus on what really matters – your core business.



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IT INFRASTRUCTURE SOFTWARE & SERVICES

#### LIFECYCLE IT

### Creating your ideal solution from numerous modules. Discover the possibilities.



'We're there for our partners throughout the lifecycle of their data centres – from the initial idea all the way through to the ultimate operation. We have perfect, tailor-made solutions for each and every phase."

#### Martin Kipping

Director International IT Projects at Rittal

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Digitisation is leading to ever more profound changes in virtually all areas of life. Industry 4.0, the Internet of Things, big data, analytics and edge computing are the driving forces behind this process. The business world as you know it is also affected. It must therefore use innovative IT infrastructures to meet the associated requirements – and this will apply even more in the future. To meet these challenges, you need an efficient, solution-oriented IT partner such as Rittal.

#### Maximum modularity and efficiency

You can totally rely on our portfolio of solutions for meeting these complex, holistic requirements – from individual IT racks to a complete data centre solution that offers maximum modularity and efficiency. Combined with all our expertise, this creates the right solution for each and every requirement.

#### Three dimensions – one perfect solution

All solutions are integrated into a cyclical process that offers you the full support of our experience and consulting expertise. The IT solutions can be scaled flexibly to suit your precise needs. The range of services offered by Rittal and its partners also includes comprehensive application solutions that are perfectly tailored to your specific requirements.

The end result is a wide range of data centre modules that can be up and running in no time at all. They are cost-efficient, reliable and of the quality you have come to expect from Rittal.



### **Coming full circle.** Rittal and Lifecycle IT.

Data centres are in a constant state of flux. They need to be flexible and "alive" so as to be able to change when necessary, because IT solutions that work well one day can be outdated the next. Rittal offers support in this area with Lifecycle IT, which describes the periodic lifecycle of each and every data centre.



#### Your benefits at a glance:

- Scalable and flexible
- Available fast
- On or off-premises
- Run in-house or as a service
- Purchase or lease possible

As the layer model shows, scalable products and solutions are offered for all phases of the lifecycle and also across all integration levels. For example, the Rittal IT components – IT rack, IT power, IT cooling, IT monitoring, IT security and service – can already be integrated at the physical infrastructure level (OT – operational technology) to create system solutions ranging from individual rack applications and edge data centres all the way through to security room solutions and complete data centres based on the modular RiMatrix system.

Working with partners, IT components such as servers, switches and storages can be integrated into each of the above-mentioned system solutions. The data centre can be set up (delivery) on or off the customer's premises depending on the operator model selected. Full virtualisation (server, storage and network) enables flexible resource management in the integration level with the help of partners, thereby laying the foundation for needs-based allocation for applications, which can also belong to different users.

The flexible modules of the relevant layers provide a basis for devising innovative solutions for customers such as DCaaS and ITaaS. These solutions can be offered either on or off the customer's premises and also, for example, at Lefdal.

Solutions Integration Delivery IT Components

**OT Infrastructure** 

IT Racks IT Power IT Cooling IT Monitoring IT Security Service RiMatrix Solutions Security Room Solutions Data Center Container Edge Data Center Micro Data Center Rack Solutions



**IT INFRASTRUCTURE** 

#### **EDGE DATA CENTRE**

### Cool planning for sweet treats. Rittal and the chocolate factory.



"Perfect availability of the IT infrastructure is a must for our production. For instance, we need to be able to trace which batch of hazelnuts has been used for every pack of wafers."

Wolfgang Reimitz, CIO and CPO (left), and Richard Feiertag from IT and Networking (right), Josef Manner & Comp AG

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Who doesn't enjoy Manner's world-famous Original Neapolitan Wafers? To ensure this remains the case, the long-standing Austrian wafer manufacturer enlisted Rittal's help to plan, develop and implement a new data centre that meets the many different requirements necessary to ensure the future viability of production.

#### 100% availability and high efficiency

Rittal's task was to equip the data centre with IT racks and energy-efficient climate control for reliable server operation. Documenting production is mandatory throughout the food industry, so the IT infrastructure must ensure 100% availability and enable perfect traceability of the production process.

Manner's servers were installed in 14 Rittal TS IT racks – arranged in two suites facing each other – to form the cold aisle. This setup prevents cold and warm air mixing and makes the cooling system more efficient.

Manner also operates a monitoring solution from Rittal. The Computer Multi Control III (CMC III) system uses sensors in the racks to monitor temperature and humidity, while any leak triggers an alarm. A central fault signal unit then notifies the technical support service.

#### Successful collaboration

Manner's entire IT team got involved in planning the data centre. The cooperation between Rittal and Manner extends beyond the commissioning of the system, with a customised maintenance contract rounding off the service package.





**IT INFRASTRUCTURE** 

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### Know the shortest route and you'll get there faster. Evaluating your data is no exception.

The digital transformation means a radical shake-up for many sectors of industry. New technologies such as smart cities, connected cars, streaming services and mobile data naturally offer new opportunities, but huge volumes of data also need to be held and processed rapidly to ensure success in the era of Industry 4.0.

You need increasingly flexible and modular IT solutions to make sure this works efficiently, quickly and reliably. Ideally, these should be located where the data is produced, i.e. close to your production operations. This is where edge data centres come into their own, combining short latency times with exceptional computing power and optimum reliability.

The Rittal Edge Data Centre is a platform for rapidly devising a solution that can be used flexibly in any IT environment. It is made up of Rittal TS IT racks and modules for climate control, energy distribution, UPS, fire protection, monitoring and access protection. The assemblies are available in various performance classes and can be combined to create a ready-to-use solution in no time at all. This greatly speeds up the process of putting a data centre in place and ensures optimum operating efficiency.

Rittal Edge Data Centre solutions are available with 2, 4 or 6 racks that incorporate predefined components for energy supply, cooling, IT security and monitoring. You have the option of installing the racks in a basic room, an IT security room or a container, thus giving you a high degree of flexibility in choosing your location.

Split units appropriate for the rack loading are used for climate control purposes. Either an LCP (Liquid Cooling Package) or an LCU (Liquid Cooling Unit) DX can be selected. The smart CMC III monitoring system keeps a close eye on all relevant parameters. Despite the larger range of functions, the administrators' workload is reduced to just the essential tasks.

Rittal uses a web-based configurator developed in-house with integrated CFD (computational fluid dynamics) analysis for edge data centre planning. The analysis enables targeted optimisation of rack and IT room climate control in line with predefined environmental conditions.

#### Your benefits at a glance:

- Modular and easy to extend
- Fully preconfigured for plug & play
- Straightforward planning with configurator





CFD (computational fluid dynamics) takes into account the geometrical and thermal properties of a housing and the components installed and generates a thermal image.



Computer Multi Control III (CMC III) monitors temperature, air humidity, smoke, energy and access. The CAN (Controller Area Network) bus system reduces the amount of wiring and installation work required.



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STANDARDISED DATA CENTRES

### **It's your move.** With standardised, scalable data centres.



"We were greatly impressed by the high quality of Rittal's products. Quite simply, all the components fit together and this helps in running an efficient and fail-safe IT environment."

#### Peter Both Head of IT at RAIL.ONE

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RAIL.ONE's track systems ensure fault-free, reliable rail transport worldwide. Having a fail-safe, high-capacity in-house data centre is essential for managing the international projects efficiently. So what happens if company headquarters is relocating but the data centre cannot be moved into the new building straight away? Rittal's flexible container solutions kept things on track.

#### Reliable, robust and flexible

A Rittal Data Centre Container (RDCC) was quickly produced that could be used flexibly at different locations and required no structural changes at the new headquarters. The robust design with multi-layer wall, roof and floor elements offers reliable protection against unauthorised access. The completely pre-installed energy distribution system, which guarantees a full energy supply to the container even in an emergency, and the fire detection and extinguishing system also help ensure maximum reliability. Redundant 20 kW cooling systems were installed for climate control in accordance with the requirements, while cold aisle containment was implemented for the Rittal TS IT racks installed. This efficient free-cooling technology cuts costs by up to 40% compared to conventional systems. Last but not least, the Rittal CMC III system takes care of all monitoring requirements.

#### Joint success

In Rittal, RAIL.ONE had an experienced partner at its side to offer advice and support. The resulting robust and reliable high-performance data centre was quickly ready to use again on the day of the move.



**IT INFRASTRUCTURE** 

**SOFTWARE & SERVICES** 



### **Off the shelf.** But made to measure.

The need to become faster and more flexible is something every company is aware of. Product lifecycles are getting ever shorter, the number of different versions is increasing and competition is growing. When time-to-market is a vital factor, standardised data centre architectures offer an ideal basis for installing a new data centre or optimising an existing IT infrastructure using preconfigured solutions.

Data centres can be completed very quickly and efficiently using modular, predefined container solutions from Rittal. This enables them to be configured, delivered and put into operation in the shortest possible time, creating made-to-measure solutions with cost-effective, standardised modules. Incorporating all the functions and components of a typical data centre, the standardised industrial containers fit on ordinary trucks, freight trains and ships. They enable quick and cost-effective transportation and are also suitable for augmenting existing IT infrastructure. The containers can be individually configured but can also be supplied as predefined solutions that cover most typical requirements - as a RiMatrix BCC turnkey cloud data centre, as a data centre for small and medium-sized

companies (branch concept) and for flexible cloud applications or as a fully preconfigured refrigeration container.

A Rittal Data Centre Container includes all the physical infrastructure components necessary to operate the IT components of a data centre, including server and network racks, climate control and power distribution/back-up. The containers come in various sizes (20 feet, 40 feet) and availability classes. A range of climate control options are available depending on factors such as the average rack loading.

The CMC III system (CMC = Computer Multi Control) records all operating parameters. The DCIM software package RiZone displays all measured values, including refrigeration (cooling container) and power supply (power container), on a central dashboard that administrators can use to control their data centres. A fire extinguishing system for the server module can also be provided as an optional extra.

Container solutions from Rittal are used with great success in numerous customer installations. All solutions include full documentation comprising detailed operating and installation instructions and the documents needed for data centre management.



Standardised data centre cooling modules with an output range of 60 – 200 kW, complete with redundant chillers and integrated free cooling for high efficiency.



Standardised modules for power supply/back-up, infeed, distribution and UPS systems with batteries in 2N redundancy in the range 60 – 200 kW.

#### Your benefits at a glance:

- Low investment costs
- High efficiency (PUE 1.15 1.5)
- Easy to extend and excellent future viability



#### **HIGH-PERFORMANCE COMPUTING**

### Small but powerful. Maximum cooling output in the minimum of space.



"Rittal has exceeded our expectations with the LCP system, which combines a high cooling output in a small space with optimum availability."

#### Heiko Krupp

Research assistant at the University of Kaiserslautern's Regional University Computing Centre

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High-performance computers are particularly important in the world of science for fast and reliable computation of data-intensive processes such as simulations or 3D models. The University of Kaiserslautern was therefore looking to boost its computing capacity.

#### Limited space and high output requirements

However, the existing data centre did not have enough space for the computers required to create a high-performance computing infrastructure. The solution was a new infrastructure room that was just large enough to accommodate racks with a total of 650 height units. With so many computers packed into such a small space, a cooling output of 200 kW to 250 kW was required – which is equivalent to the cooling output of the existing data centre but in an area more than five times the size. The new infrastructure was also to be implemented as a system solution in order to prevent any delays resulting from the need to coordinate components from different manufacturers.

#### Cool, customised solutions

This was a task made to measure for the Rittal solutions from the Liquid Cooling Package (LCP) range, which take up little more than a third of a square metre of space. They achieve the necessary output and redundancy with a small footprint and provide more computer space than originally requested. The arrangement offers the necessary redundancy and is made up of 16 racks in two suites. Five climate control enclosures were integrated between the racks in each suite. The number of LCPs, their output and the power distribution to the suites of racks were configured with redundancy built in and ensure maximum availability.

This efficient room solution benefits from the permanent availability of cold air to prevent hot spots and also offers reserve space for future growth.







**IT INFRASTRUCTURE** 

# When the heat is on in data centres. Efficient cooling of high-performance servers.

High power density is a key requirement in high-performance computing (HPC), where there may be several thousand processors in a single IT rack. And because a latest-generation CPU generates more heat than a hotplate, an increase in power density places great demands on the cooling system.

When HPC clusters are running simulations or other computationintensive applications, the processor cores often operate at full load for days. When that happens, every single processor generates enormous quantities of waste heat, which have to be dissipated reliably. This task is often made more difficult by the fact that the rack systems are packed so full.

An HPC cooling system therefore needs to produce a high cooling output of up to 55 kW per rack while also minimising the volume of air, ensuring dynamic adaptation of cooling when switching the blade servers on and off, and protecting the expensive hardware if individual components fail.

TS IT racks and the Liquid Cooling Packages (LCPs) from Rittal meet all these requirements and are ideal for modern-day data centres where flat, powerful server nodes introduce increasingly high loads and levels of heat into the server racks.

The space-optimised LCP Inline CW solution from Rittal is a compact water-based cooling solution that enables straightforward suite cooling, including for HPC centres. An air/water heat exchanger unit is installed right next to the IT racks. The warm IT waste air is extracted at the rear of the unit, cooled and then blown into the cold aisle at the front. Maximum efficiency is achieved in combination with an aisle containment system.

Monitoring and remote management can deliver lasting maintenance and operating cost savings and also increase availability. For example, comprehensive monitoring, measurement and control tasks minimise the risk of failure and facilitate preventive intervention.

In the case of emergency cooling with automatic door opening, for instance, the doors of the IT racks open automatically if an alarm is triggered. This means the cold air in the data centre room can be used to shut down the HPC cluster in a controlled manner for a certain period of time.

Rittal's HPC racks are based on the TS IT platform. The flexible extension options of this system ensure high investment security. An intelligent modular system of racks and accessories and the assembly-friendly snap-in technology ensure that virtually all requirements relating to modular, flexible network and server racks are met.

#### Your benefits at a glance:

- Individual climate control concepts for rack, suite and room cooling
- Monitoring of all system-relevant parameters
- Tried-and-tested system solutions for demanding HPC applications





Bayed suite cooling with the Rittal LCP Inline is extremely powerful and the ideal climate control solution for exceptionally high cooling demands, particularly when server racks cannot be cooled via the room climate control.



The comprehensive PDU range delivers smart power distribution in IT racks with measuring, switching and monitoring – right down to each individual slot if need be.



**IT INFRASTRUCTURE** 

**OPEN COMPUTE PROJECT** 

### Achieving more together. Standard practice for OCP.

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Big data is the key issue driving many sectors of business, trade and industry. Not only will data volumes grow exponentially in the future, but a company's success will increasingly depend on fast and efficient data processing.

#### Standardised IT architectures as a solution

There are probably few companies anywhere in the world that need to process larger volumes of data than Facebook. Close to two billion people use this platform to share their day-to-day lives with fellow users. Facebook not only needs a powerful IT infrastructure but, above all, control over the costs incurred and the high energy requirements.

In order to tackle this task, Facebook started the Open Compute Project (OCP) with partners including Intel, Rackspace and Goldman Sachs. The aim is to use an innovative, completely standardised IT architecture to lower the investment and operating costs for a data centre while also being more environmentally friend-ly. The OCP platform is open to everyone. Sharing ideas and know-how drives progress on ground-breaking standards for future-proof data centres.

#### **Rittal and the OCP ecosystem**

As a leading IT infrastructure manufacturer, Rittal is also part of the OCP community. Thanks in particular to its expertise in standardising data centre architectures with solutions such as preconfigured modules and the RiMatrix S concept, which is quickly ready to use, Rittal has the appropriate specialist knowledge for this challenging OCP task.



### **Open standards. Open future.** OCP components from Rittal.

The Open Compute Project was initiated to create a standardised, freely accessible basis for a low-cost, highly efficient IT platform for use in data centres. As a leading manufacturer of IT infrastructure solutions, Rittal has been supporting and promoting the open rack platform in particular for a number of years – both for existing hyperscale data centres and for customers that need efficient, low-cost IT infrastructure solutions.

The aim of the freely available open rack specifications is to make the best possible use of a 600 mm-wide rack in terms of usable space (number of servers, number of hard drives in one withdrawable unit). Servers with a width of 21 inches and a depth of 36 to 48 inches can be accommodated. The racks have no doors at the front so as to improve ventilation. They are designed for 48 open height units and have a maximum height of 95 inches. Equipment can be installed half an (open) height unit apart.

The active components in the rack do not have their own power packs and are instead supplied with power via a DC busbar that they dock into. The DC busbars are powered by central DC power packs. The UPS systems are housed separately in the suite of racks.

As an OCP partner, Rittal offers racks that comply with versions 1.2 and 2.0 of the Open Rack specification. The racks support the supply of power to components with 12 V or 48 V DC and a power consumption of 13.2 to 40 kW per rack.







#### DATA CENTRE AS A SERVICE

## **Perfectly honed IT solutions.** Scalable complete configurations for every need.



"RiMatrix S combines transparent costing with quick delivery – the ideal solution for Modler."

Stefan Sickenberger Director of iNNOVO Cloud GmbH

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Johann Modler GmbH is a highly capable SMB specialising in grinders for small, high-precision mass-produced parts. It requires a stable, reliable and scalable IT infrastructure to ensure the increasing networking of production processes. When the server room became too small, the computers were no longer powerful enough and the noise emissions were getting too high for employees, the company set about finding a new, high-performance solution.

#### Highly efficient and available fast

Instead of a conventional data centre with a standard planning and implementation phase of between one and two years, Modler opted for the turnkey RiMatrix S solution from Rittal. A fully configured data centre with six server frames, a network frame, climate control, uninterruptible power supply and coordinated energy distribution plus the Computer Multi Control III (CMC III) monitoring system was the ideal solution and met all the requirements. What's more, it was ready to operate in just a few weeks and only required a small amount of space outside rather than being located inside as before.

#### Private cloud ensures security

Together with its partner Innovo Cloud, Rittal also provided the necessary hardware and software, which is operated in a private cloud on the customer's premises and meets the most stringent security requirements. Incorporating Modler's existing system was not a problem either.

This complete modular turnkey solution met the customer's requirements to the full. In addition to saving both time and money, it also freed up space in the building by locating the container outside.

IT INFRASTRUCTURE



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### **Growing to meet challenges.** Rittal's Balanced Cloud Center. A turnkey solution.

One challenge of IT environments is that the IT platform needs to grow along with the company. The Data Centre as a Service (DCaaS) approach, which offers a virtual data centre as a service, helps small and medium-sized companies overcome this challenge and enables them to focus on their core business.

Innovo Cloud in Frankfurt is Rittal's partner for implementing innovative services such as ITaaS, DCaaS and managed private cloud data centres. In addition to applications and IT components, this company also provides the management tooling that can be provisioned separately for different IT platforms. Rittal's contribution to this partnership is its expertise in fail-safe IT infrastructures and energy-efficient data centre modules.

The jointly developed services are based on the RiMatrix BCC (Balanced Cloud Center) platform, with components such as racks, climate control and power supply available as predefined modules. This enables complete Data Centre Containers as a Service (DCaaS) to be provided. Server, network and storage are all optionally included in the scope of supply.

The RiMatrix BCC uses OpenStack cloud management software. The well-established open source framework consists of a multitude of open source software components so that server, storage, network and applications are run in the data centre in as standardised a way as possible, thus laying the foundations for giving customers their own personalised cloud platform. OpenStack can be configured on a turnkey basis in the RiMatrix BCC according to customer-specific workload requirements. Customers can elect to purchase a modular cloud data centre of this kind or lease it in the form of a DCaaS operated by Innovo Cloud. This solution can also be implemented as a private cloud in the customer environment and thus takes into account the need for a high level of security.

Another joint project between Rittal and Innovo Cloud is the creation of a cloud park in Frankfurt. This is intended in particular for companies that are required to obtain their cloud services from a data centre location in Germany.

#### Your benefits at a glance:

- Maximum flexibility thanks to cloud-based services
- Fully virtualised data centres
- CAPEX and OPEX models available

#### IT as a Service





### **Buried treasure of the future.** A former mine for your data.



"Lefdal Mine Datacenter is unprecedented in terms of scalability, security and cost effectiveness. In combination with renewable hydropower this puts Lefdal in a leading position to handle a rapidly increasing market."

Jørn Skanne CEO, Lefdal Mine Datacenter

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Data will be the most important resource for companies in the future. This means it is not only well worth protecting but will also increase exponentially in volume in the years ahead. Already, billions of gigabytes of data are generated on a daily basis, and all of them need to be administered and stored. Experts estimate that the global data volume will continue to double every 18 months.

#### Scalable and modular

Accordingly, there will be far greater need for scalable and modular data centre spaces in the future. Together with its partners Lefdal and IBM, Rittal is offering a solution that is unique in Europe. The Lefdal Mine Datacenter – which will be one of the world's largest data centres – is currently being built in a decommissioned mine on the west coast of Norway.

#### Thinking big, acting smart

Thinking big is one thing, but it's also vital to think smart. In addition to its incredible size, the Lefdal Mine Datacenter impresses with its exceptional cost-efficiency, security, flexibility and sustainability.

As well as being up to 40% more cost-effective than any other data centre in Europe, it also ensures maximum flexibility thanks to standardised data centre modules. What's more, the servers will be cooled using water from the neighbouring fjord, which is an extremely green solution. And where could your data be more secure than in the depths of a decommissioned mine?



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**SOFTWARE & SERVICES** 

### Solutions with depth. Rittal and the Lefdal Mine Datacenter.

The Lefdal Mine Datacenter (LMD) sets new standards. The five-storey tunnel system with 75 chambers provides 120,000 square metres of infrastructure space with a potential total capacity of 200 megawatts. "The Lefdal Mine Datacenter will put everything else in the shade", claims Andreas Keiger, Rittal's Senior Vice President, Sales Europe. Rittal is on board with this super-lative project as a strategic technology partner.

Rittal will supply standardised RiMatrix S data centre modules to the LMD, which score highly in terms of flexibility and cost efficiency. The preconfigured, space-saving modules are supplied in containers and comprise ten or twelve server racks which are ready to use immediately, complete with power distribution, climate control and software for monitoring and IT infrastructure management. This allows the flexible use of IT systems for everything from colocation and private clouds, to ITaaS (IT as a service) and DCaaS (data centre as a service).

The climate control solution is from Rittal's Liquid Cooling Package (LCP) range. The LCP draws in waste air from the servers, cools it down to the required inlet temperature of 15°C using a special heat exchanger linked to the cold fjord water circuit at 7°C, and returns it to the system. The overall result is a PUE (power usage effectiveness) of less than 1.1, ensuring a high degree of energy efficiency. As well as being inexpensive, the electricity used is also very sustainable, since 97 percent of it is from renewable energy sources.

The underground data centre also has another inestimable benefit: Security! There is only one optimum entry point to the facility, while the rock formation provides natural protection from electromagnetic waves. Specially trained security staff patrol the entire installation around the clock, 365 days a year. A threestage authentication process and intelligent camera systems provide additional security.

**100** per cent renewable energy

chambers with up to three levels



#### Preconfigured modules are delivered in containers and can be operated straight away.

5 levels underground

#### Your benefits at a glance:

- Cost-efficient and environmentally friendly
- Container and building solution
- Maximum security
- Flexibly adaptable





Building an equivalent to the underground facilities above the surface would require enormous plots of land and involve huge construction costs.



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### Rittal – The System.

#### Faster – better – everywhere.

- Enclosures
- Power Distribution
- Climate Control
- IT Infrastructure
- Software & Services



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