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Modular data centres in containers

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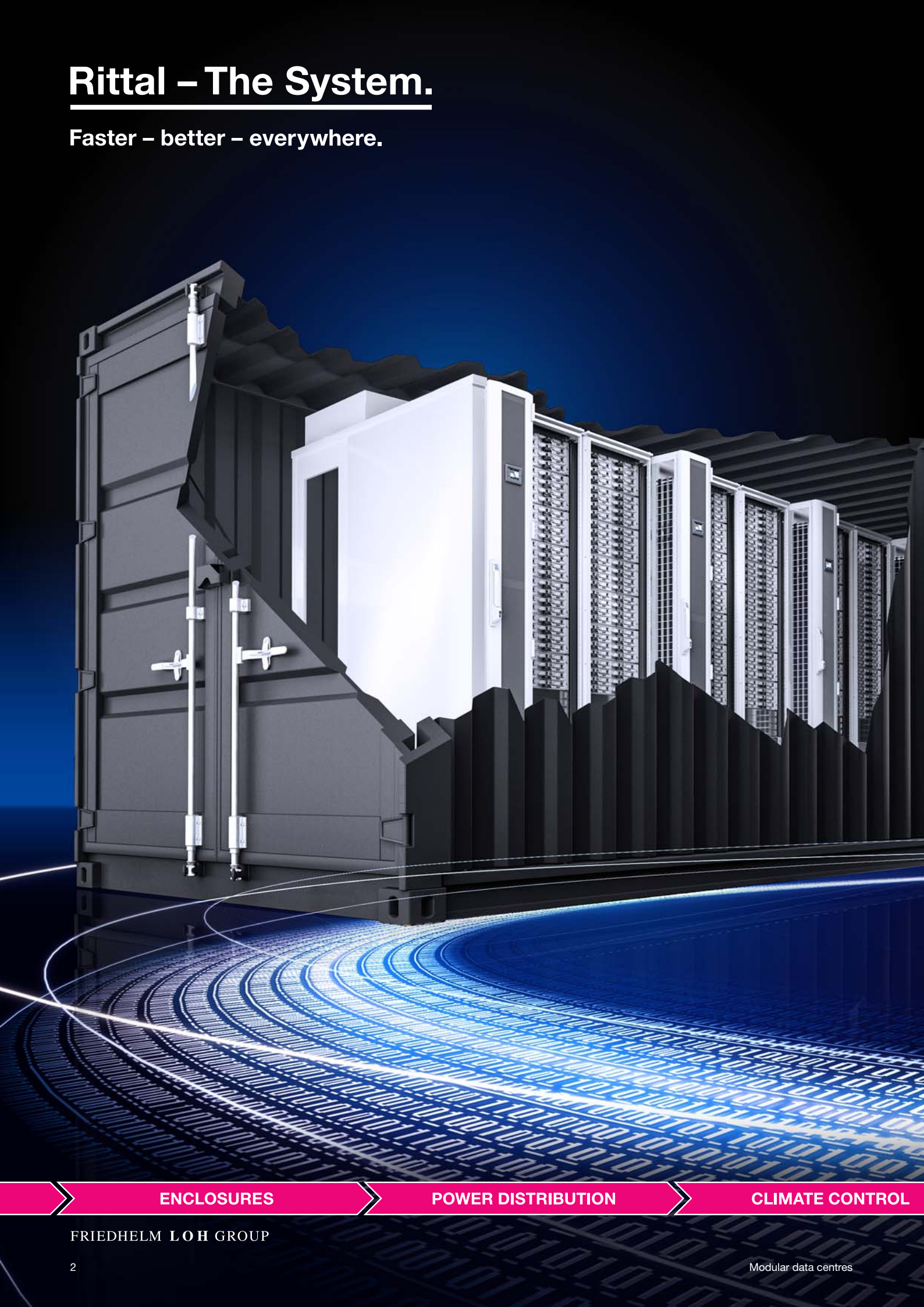

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RiMatrix Cooling Container:
Efficient recooling systems in the container frame, ready to connect and system-tested with redundant chillers, free-cooling mode or additional free cooler and network functions

RiMatrix Data Center Container:
Ready-to-connect IT infrastructure in a robust container shell, as standardised IT modules in a range of output categories for SME, Cloud and Edge applications

Network racks:
Pre-configured type TS IT for installing network technology and structured cabling, with two PDUs for redundant power supply

Server racks:
Pre-configured type TS IT for server installation, with cable guide rails and two PDUs for redundant power supply in the server exhaust air zone

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IT containers based on the modular principle

Growing data volumes and escalating requirements are a common cause of problems in existing IT environments. Container solutions for outdoor siting are one possible answer to this problem. For the conventional components of rack, power, cooling and monitoring, Rittal and its strategic partners Innovo Cloud and Lefdal also offer “IT as a Service”, together with a location – the Lefdal Mine Datacenter in Norway – which can save up to 40 percent energy costs compared with a data centre in Germany.

RiMatrix Power Container:
Modular UPS systems with redundancy to supply one or more IT modules

Low-voltage distributor:
Complete distributor system with connection point for the main supply and the outgoing feeders from all PDUs

IT cooling:
Cold water or coolant-based systems for energy-efficient cooling of the entire server inlet air zone, speed-controlled and with n+1 or n+n redundancy

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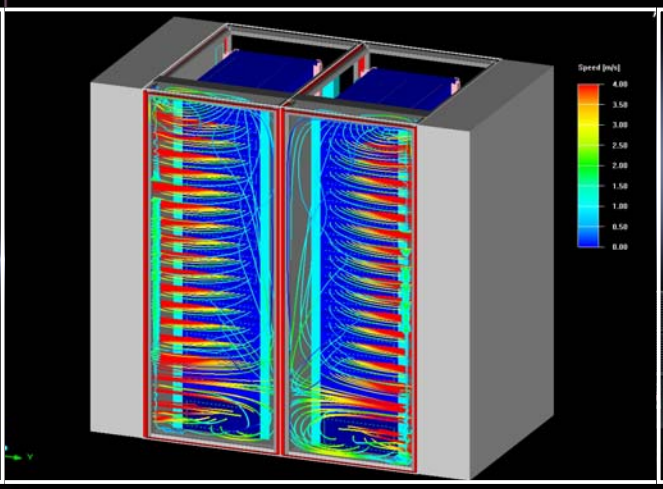
Edge Data Center – modular and scalable

The digital transformation means a radical shake-up. New technologies such as smart cities, connected cars, streaming services, Industry 4.0 and mobile data offer new opportunities, but also necessitate the storage and rapid processing of huge volumes of data. This creates a demand for ever more flexible and modular IT solutions. Ideally, these should be located where the data is produced, i.e. locally and close to the user. This is where Edge Data Centers come into their own, combining short latency times with exceptional computing power and optimum reliability. Rittal Edge Data Center solutions are available with 2, 4 or 6 racks, incorporating predefined components for energy supply, cooling, IT security and monitoring. Of course, the data centre may be installed in a container for flexible siting.



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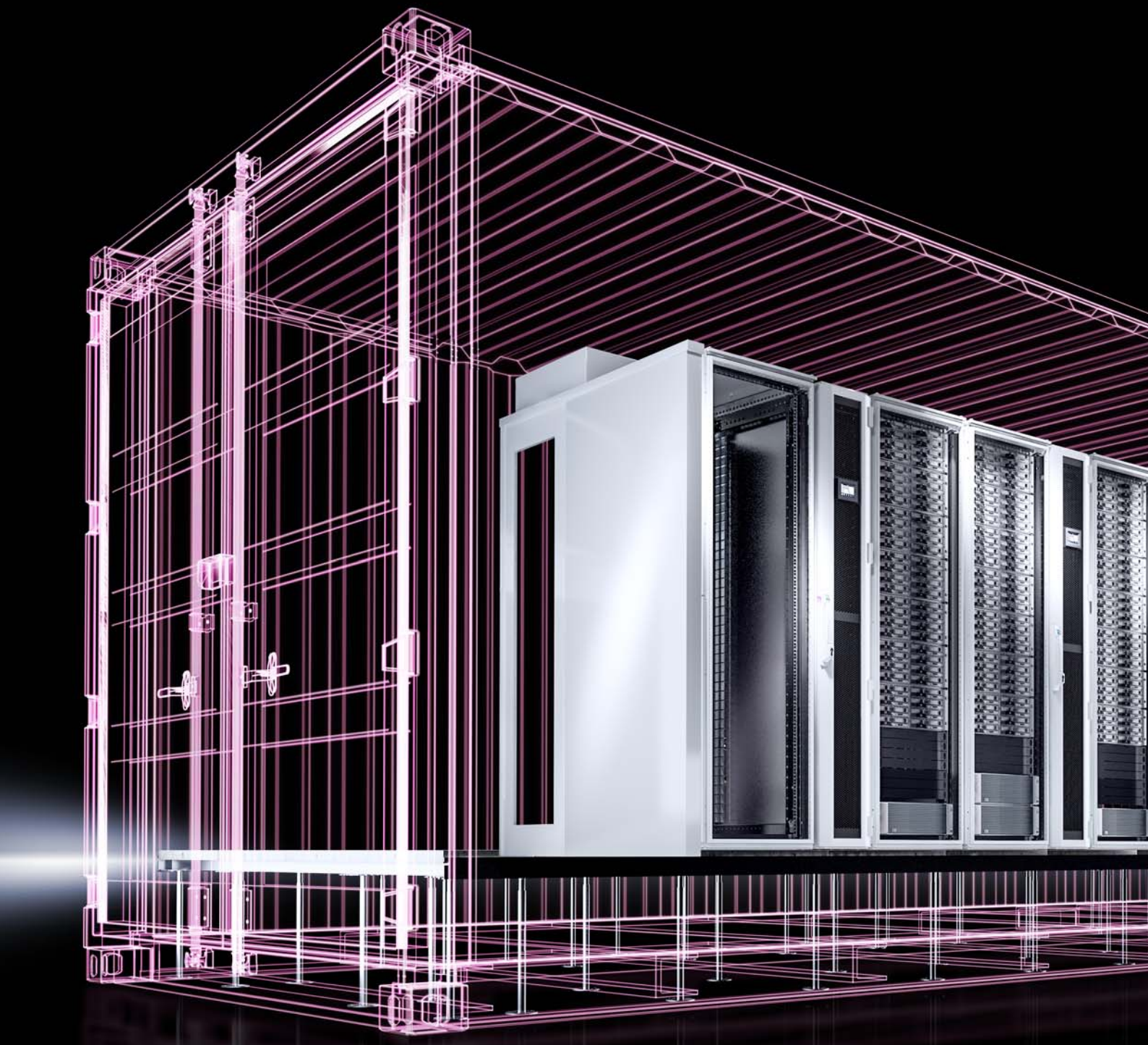

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RiMatrix Data Center Container

For SME, Cloud and Edge applications

Container solutions from Rittal are delivered pre-assembled, and can be up and running in next to no time. The spectrum ranges from simple IT containers to complete all-in-one systems incorporating the entire physical IT infrastructure, from the rack, to climate control, a power supply with a powerful UPS system, through to complete monitoring and, at the customer's request, an effective fire extinguisher system. The product spectrum comprises multiple graduations and output categories, allowing you to select the most suitable solution for your requirements. ISO High Cube dimensions are also supported. Extensive standardisation within the product family not only shortens the delivery time, it also enhances product reliability and quality. The field-tested solutions are delivered complete with comprehensive documentation.

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RiMatrix Data Center IT Container

Version			**RDC-IT 50/10-L-III**	**RDC-IT 60/12-L-II**	
Maximum total IT output in kW			50	60	
Maximum IT output per rack in kW			5	5	
Redundancy of cooling system			2n	n+1	
Redundancy of power supply			2n	2n	
Cooling concept			LCP systems are positioned between the racks, and depending on the variant, are either flush with or set forward from the enclosure suite. These systems cool the entire cold aisle in front of the servers and have a redundant design in the container variants. The variants with a second set of cold water pipelines also support n+n redundancies.		
Power concept			The container main power supply is split among individual outgoing feeders to the PDUs in the individual enclosures via a low-voltage distributor. Each enclosure has an A supply and a B supply, thereby achieving n+1 redundancy. The main distributor offers separate connections for the A and B supply to which one or two UPS-buffered supply lines may be connected. A RiMatrix Data Center Power Container with integral UPS may also be used to supply the containers. The container peripherals are supplied via an additional C-line.		
Racks	Server rack W x H x D mm	600 x 2000 x 1200	10	12	
	Network rack W x H x D mm	800 x 2000 x 1200	1	1	
	Technical rack W x H x D mm	600 x 2000 x 600	–	–	
		600 x 2000 x 1200	1	1	
Current	Low-voltage distributor		1	1	
	UPS, modular		–	–	
	PDU		11 x 2	13 x 2	
Cooling	Quantity		6 x LCP CW	4 x LCP CW	
	Pipe systems		2 set(s)	1 set(s)	
Container size L x W x H mm (external dimensions)			12192 (40 ft.) x 3000 x 3000	12192 (40 ft.) x 3000 x 3000	

SME, Cloud and Edge applications

	RDC-IT 90/8-M-I	RDC-IT 100/10-L-II	RDC-IT 100/10-L-III	
	90	100	100	
	10	10	10	
	n+1	n+1	2n	
	2n	2n	2n	
	Use of the Zero-U-space cooling system (ZUCS) optimises use of the interior space by positioning the cooling units underneath the racks in the raised floor. Efficient EC fans ensure a constant server inlet air temperature in the shielded cold aisle. This system provides a redundancy of n+1.	LCP systems are positioned between the racks, and depending on the variant, are either flush with or set forward from the enclosure suite. These systems cool the entire cold aisle in front of the servers and have a redundant design in the container variants. The variants with a second set of cold water pipelines also support n+n redundancies.		
	The container main power supply is split among individual outgoing feeders to the PDUs in the individual enclosures via a low-voltage distributor. Each enclosure has an A supply and a B supply, thereby achieving n+1 redundancy. The main distributor offers separate connections for the A and B supply to which one or two UPS-buffered supply lines may be connected. A RiMatrix Data Center Power Container with integral UPS may also be used to supply the containers.	The container main power supply is split among individual outgoing feeders to the PDUs in the individual enclosures via a low-voltage distributor. Each enclosure has an A supply and a B supply, thereby achieving n+1 redundancy. The main distributor offers separate connections for the A and B supply to which one or two UPS-buffered supply lines may be connected. A RiMatrix Data Center Power Container with integral UPS may also be used to supply the containers. The container peripherals are supplied via an additional C-line.		
	8	10	10	
	1	1	1	
	1	–	–	
	–	1	1	
	1	1	1	
	–	–	–	
	9 x 2	11 x 2	11 x 2	
	9 x ZUCS	6 x LCP CW	6 x LCP CW	
	1 set(s)	1 set(s)	2 set(s)	
	7250 x 3000 x 3000	12192 (40 ft.) x 3000 x 3000	12192 (40 ft.) x 3000 x 3000	

RiMatrix Data Center IT Container

Version			**RDC-IT 200/10-L-II**	
Maximum total IT output in kW			200	
Maximum IT output per rack in kW			20	
Redundancy of cooling system			n+1	
Redundancy of power supply			2n	
Blob arrangement			–	
Cooling concept			Energy-efficient LCP systems with a cold water supply are used as cooling systems, and can each produce a cooling output of up to 55 kW. These systems are positioned in the row between the server enclosures and can easily be set forward into the cold aisle. This brings the cold air directly in front of the servers for cooling without deflection losses.	
Power concept			The container main power supply is split among individual outgoing feeders to the PDUs in the individual enclosures via a low-voltage distributor. Each enclosure has an A supply and a B supply, thereby achieving n+1 redundancy. The main distributor offers separate connections for the A and B supply to which one or two UPS-buffered supply lines may be connected. A RiMatrix Data Center Power Container with integral UPS may optionally be used to supply the high-performance containers. The container peripherals are supplied via an additional C-line.	
Racks	Server rack W x H x D mm	600 x 2000 x 800	–	
		600 x 2000 x 1200	10	
	Network rack W x H x D mm	800 x 2000 x 800	–	
		800 x 2000 x 1200	1	
	Technical rack W x H x D mm	600 x 2000 x 1200	1	
Current	Low-voltage distributor		1	
	UPS, modular		–	
	PDU		11 x 2	
Cooling	Quantity		6 x LCP CW	
	Pipe systems		1 set(s)	
Container size L x W x H mm (external dimensions)			12192 (40 ft.) x 3000 x 3000	

	RDC-IT 200/10-L-I	RDC-IT 200/10-ISO L-I	
	200	200	
	20	20	
	n+1	n+1	
	2n	2n	
	The racks and cooling systems are arranged so that two racks form a unit with one LCP. This unit is described as a “blob” and represents an independent functional module in software terms with built-in IT hardware.		
	Energy-efficient LCP systems with a cold water supply are used as cooling systems, and can each produce a cooling output of up to 55 kW. These systems are positioned in the row between the server enclosures and can easily be set forward into the cold aisle. This brings the cold air directly in front of the servers for cooling without deflection losses.		
	The container main power supply is split among individual outgoing feeders to the PDUs in the individual enclosures via a low-voltage distributor. Each enclosure has an A supply and a B supply, thereby achieving n+1 redundancy. The main distributor offers separate connections for the A and B supply to which one or two UPS-buffered supply lines may be connected. A RiMatrix Data Center Power Container with integral UPS may optionally be used to supply the high-performance containers. The container peripherals are supplied via an additional C-line.		
	–	10	
	10	–	
	–	1	
	1	–	
	–	–	
	1	1	
	–	–	
	11 x 2	11 x 2	
	7 x LCP CW	7 x LCP CW	
	1 set(s)	1 set(s)	
	12192 (40 ft.) x 3000 x 3000	12192 (40 ft.) x 2438 x 2896 (ISO High Cube)	

RiMatrix Data Center All-in-One Container

Version			RDC-AIO 35/3-M-II	RDC-AIO 45/8-L-II	
Maximum total IT output in kW			35	45	
Maximum IT output per rack in kW		Server rack	10	5	
		Network rack	5	5	
Redundancy of cooling system			n+1	n+1	
Redundancy of power supply			2n	2n	
Cooling concept			LCP systems are positioned between the racks, and depending on the variant, are either flush with or set forward from the enclosure suite. These systems cool the entire cold aisle in front of the servers and have a redundant design in the container variants. Coolant-based DX systems may also be used in the AIO variants, which are linked to the relevant external unit. These may also be optionally secured directly to the outer container sleeve.		
Power concept			The container main power supply is split among individual outgoing feeders to the PDUs in the individual enclosures via a low-voltage distributor. Each enclosure has an A supply and a B supply, thereby achieving n+1 redundancy. The main distributor offers separate connections for the A and B supply; the integral modular UPS is positioned directly at the infeed to the B-line. The container peripherals are supplied via an additional C-line.		
Racks	Server rack W x H x D mm	600 x 2000 x 1200	3	8	
	Network rack W x H x D mm	800 x 2000 x 1200	1	1	
	Technical rack W x H x D mm	600 x 2000 x 600	–	–	
		600 x 2000 x 1200	–	–	
Current	Low-voltage distributor		1	1	
	UPS, modular		40 + 20 kW	60 + 20 kW	
	PDU		4 x 2	9 x 2	
Cooling	Quantity		5 x LCP DX	6 x LCP DX	
	Pipe systems		Single	Single	
Container size L x W x H mm (external dimensions)			7250 x 3000 x 3000	12192 (40 ft.) x 3000 x 3000	

SME, Cloud and Edge applications

	RDC-AIO 60/6-M-I	RDC-AIO 90/8-L-II	RDC-AIO 180/16-L-II	RDC-AIO 180/16-L-III	
	60	90	180	180	
	10	10	10	10	
	–	5	5	5	
	n+1	n+1	n+1	2n	
	2n	2n	2n	2n	
	Use of the Zero-U-space cooling system (ZUCS) optimises use of the interior space by positioning the cooling units underneath the racks in the raised floor. Efficient EC fans ensure a constant server inlet air temperature in the shielded cold aisle. This system provides a redundancy of n+1.	LCP systems are positioned between the racks, and depending on the variant, are either flush with or set forward from the enclosure suite. These systems cool the entire cold aisle in front of the servers and have a redundant design in the container variants. The variants with a second set of cold water pipelines also support n+n redundancies.			
	The container main power supply is split among individual outgoing feeders to the PDUs in the individual enclosures via a low-voltage distributor. Each enclosure has an A supply and a B supply, thereby achieving n+1 redundancy. A UPS is already integrated into the RDC-AIO 60/6-M-II.	The container main power supply is split among individual outgoing feeders to the PDUs in the individual enclosures via a low-voltage distributor. Each enclosure has an A supply and a B supply, thereby achieving n+1 redundancy. The main distributor offers separate connections for the A and B supply; the integral modular UPS is positioned directly at the infeed to the B-line. The container peripherals are supplied via an additional C-line.			
	6	8	2 x 8	2 x 8	
	1	1	2 x 1	2 x 1	
	1	–	–	–	
	–	–	–	–	
	1	1	2 x 1	2 x 1	
	60 + 20 kW	100 + 20 kW	2 x (100 + 20 kW)	2 x (100 + 20 kW)	
	7 x 2	9 x 2	2 x (9 x 2)	2 x (9 x 2)	
	6 x ZUCS for server zone 1 x ZUCS for UPS zone	6 x LCP CW	2 x (6 x LCP CW)	2 x (6 x LCP CW)	
	1 set(s)	1 set(s)	2 x 1 set(s)	2 x 2 set(s)	
	7250 x 3000 x 3000	12192 (40 ft.) x 3000 x 3000	12192 (40 ft.) x 3000 x 3000	12192 (40 ft.) x 3000 x 3000	

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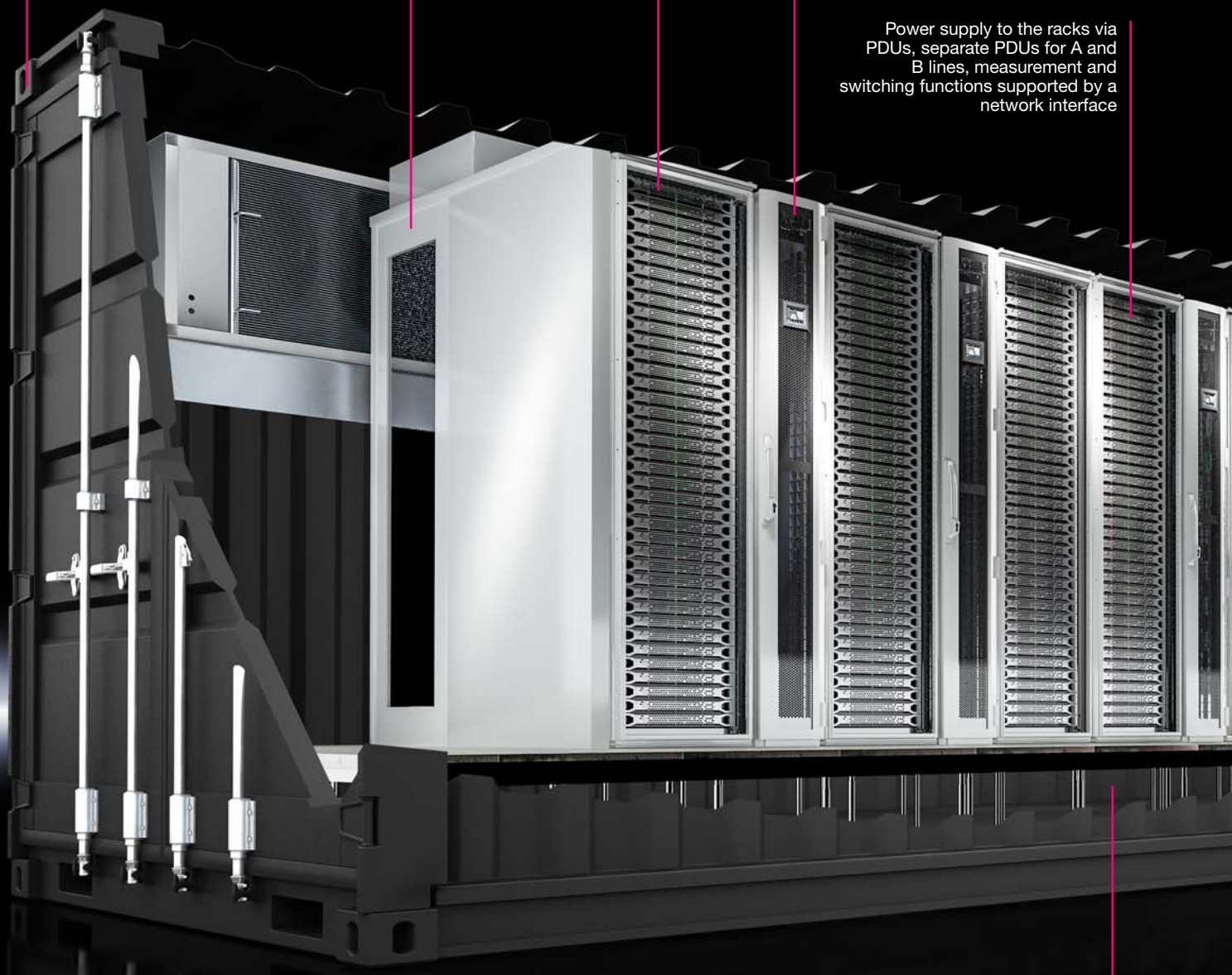
Container sleeves in a variety of sizes and levels, from S to L, also available as ISO High Cube variants, with flexible doors and openings

Integrated partitions and container peripherals, individual solutions for container configuration

Pre-configured racks of the type TS IT, as a server rack with 600 mm width or as a network rack with 800 mm widths, depths variable at 800 mm, 1000 mm or 1200 mm

Cooling solutions in various stages adapted to the required server output, redundant versions available, depending on the container and output variant

Power supply to the racks via PDUs, separate PDUs for A and B lines, measurement and switching functions supported by a network interface



Modular raised floor, height depending on cooling solution and installed racks

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RiMatrix Data Center Container Customized

Container solutions for individual requirements

Of course, we can also build you an individually planned data centre solution in a container to meet your specific requirements. There are no limits to the construction of individual data centre containers, from small main data centres, to Edge and Fog installations, through to large modular cloud data centres. Individually planned containers are also supplied pre-assembled. They are more complex than a standardised solution, and above all, entail more intensive planning, not only in terms of infrastructure design, but also with the complete documentation and consideration of errors in the designed solution. With maximum heat losses of between 30 and 200 kW, a RiMatrix Data Center Container can incorporate unlimited intermediate procedures and applicable technologies from the IT portfolio. As well as offering advice, Rittal itself can also provide complete conceptualisation and planning of a container data centre.

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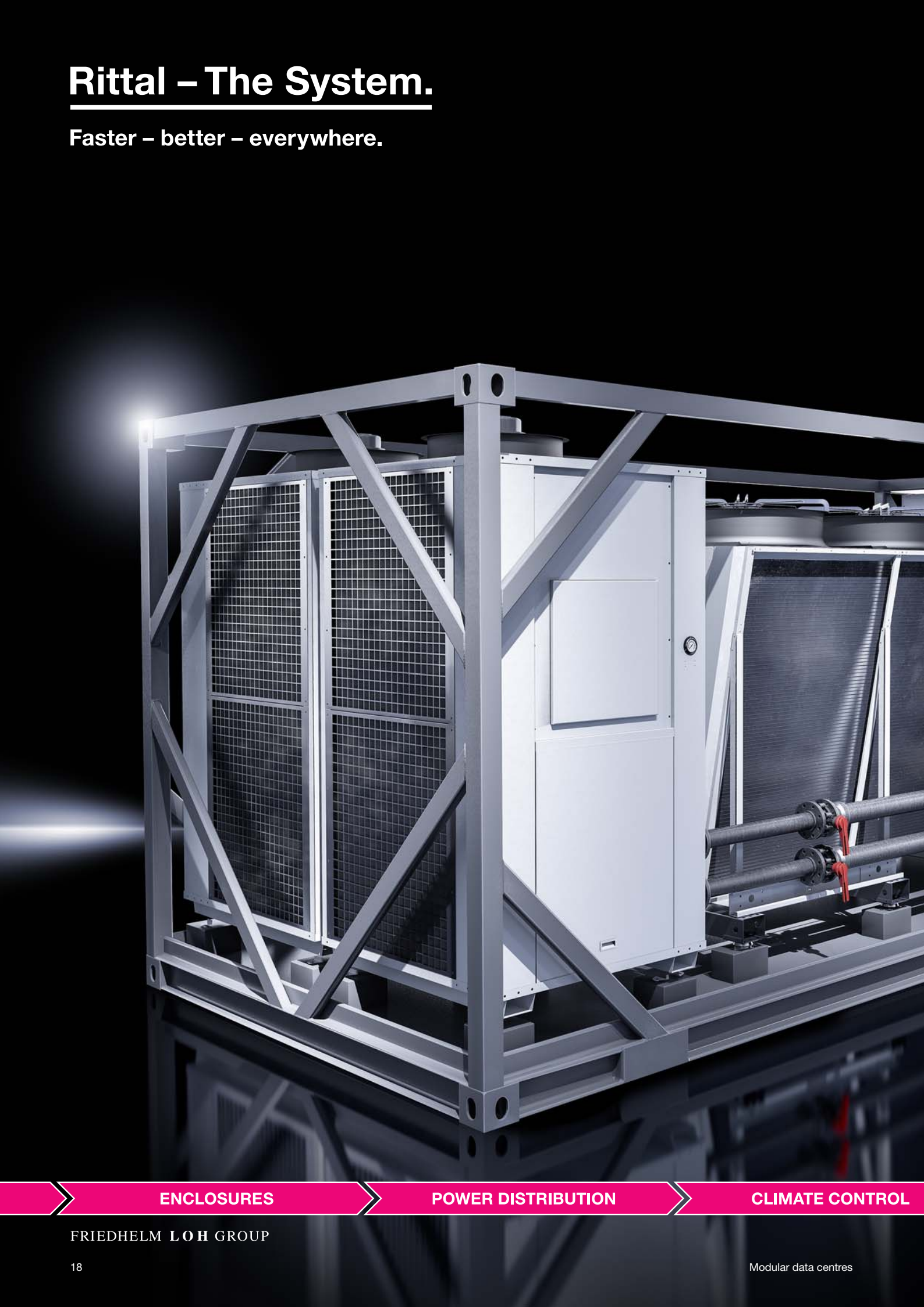

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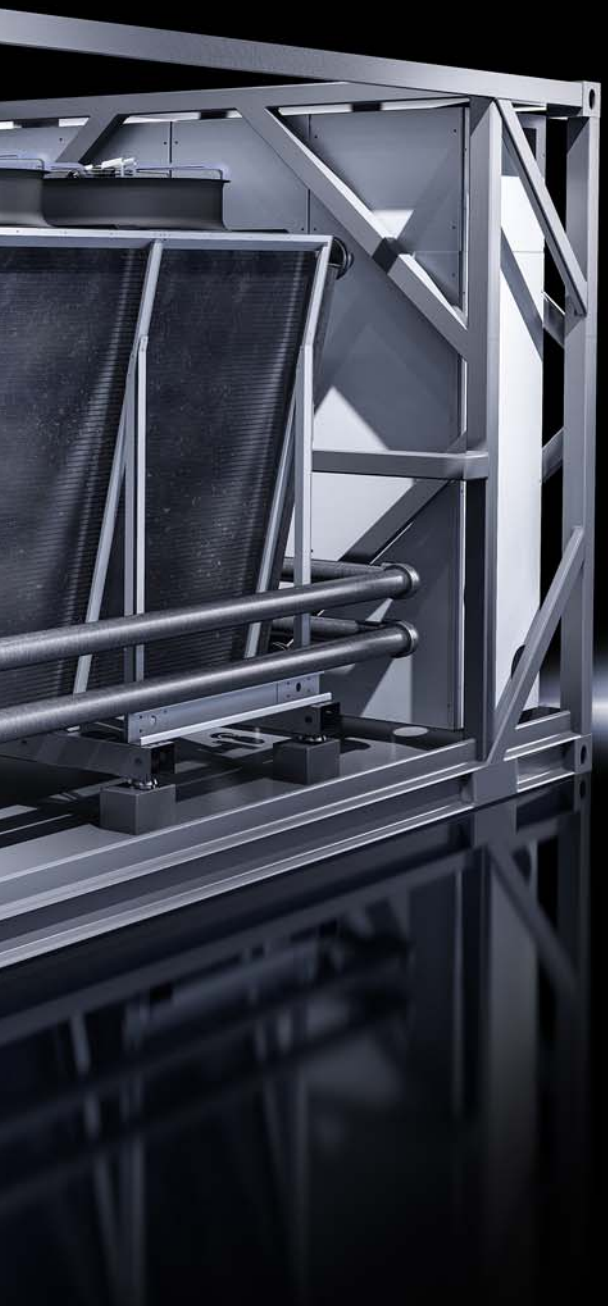
Cooling and power supply to suit all output classes

Complete plug & play cooling and power supply solutions are available to match the container portfolio.

Benefits of plug & play solutions:

- Co-ordinated systems for fast and simple commissioning
- System-tested software to control all components, including emergency mechanisms
- Individual control and monitoring via an integral TCP/IP interface



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Containers for cooling

Version	**RDC-C 200/2-ISO L-II**	**RDC-C 70/2-M-II**	**RDC-C 100/2-M-II**	
Total output in kW	60 to 200 kW[1)]	70	100	
Equipment	■ 2 x chillers (redundant) with integral free coolers ■ Pipework	■ Free cooler ■ 2 x chillers (redundant) ■ Control and hydraulic station ■ PLC controller with network		
Characteristics	Separate chiller systems with independent regulation and control, mounted on a container frame.	Energy-efficient cooling with superordinate control of all components. The integral controller regulates a constant water inlet temperature depending on the external temperature and the status messages from the components.		
Redundancy	Chillers: 2n	Chillers: 2n	Chillers: 2n	
To fit	RDC-IT 50/10-L-III RDC-IT 60/12-L-II RDC-IT 100/10-L-II RDC-IT 100/10-L-III RDC-IT 200/10-L-II RDC-IT 200/10-L-I RDC-IT 200/10-ISO L-I RDC-AIO 90/8-L-II RDC-AIO 180/16-L-II RDC-AIO 180/16-L-III	RDC-IT 50/10-L-III RDC-IT 60/12-L-II RDC-AIO 60/6-M-II	RDC-IT 90/8-M-II RDC-AIO 90/8-L-II RDC-AIO 180/16-L-II RDC-AIO 180/16-L-III	
Container size L x W x H mm (external dimensions)	12192 (40 ft.) x 2438 x 2896 (ISO High Cube)	7250 x 3000 x 3000	7250 x 3000 x 3000	

[1)] Higher outputs available on request.

Container for the uninterruptible power supply

	RDC-P 200/8-ISO S-II	RDC-P 1000/8-M-II	
	2 parallel paths, 2 x 60 to 200[1)]	2 parallel paths, 2 x 1 MW	
	■ ABB DPA UPScale with batteries and low-voltage distributor ■ Modular layout ■ LCP DX cooling	■ ABB DPA 500 with batteries and low-voltage distributor ■ Modular layout (500 kW modules) ■ LCP CW cooling ■ Batteries separate	
	Separate connections for A and B supply lines. Both paths are completely separate, with redundant UPS modules, batteries and the corresponding low-voltage power distributor.	Separate connections for A and B supply lines. Both paths are completely separate, with redundant UPS modules, connections for batteries and the corresponding low-voltage power distributor.	
	Modules: n+1	Modules: n+1	
	RDC-IT (all variants)	RDC-IT (all variants)	
	6058 (20 ft.) x 2438 x 2896	7250 x 3000 x 3000	

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IT as a service – simple, and from any location

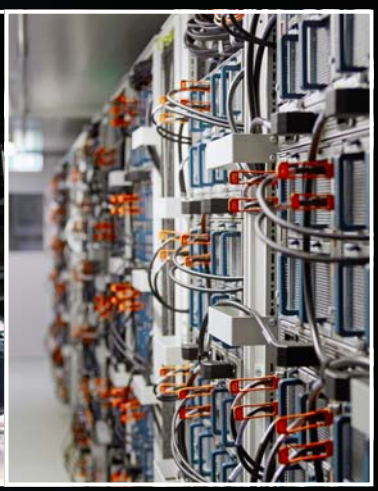
Rittal and Innovo Cloud have joined forces in a strategic partnership to market innovative infrastructure and cloud solutions based on the flexible “IT as a service” model (ITaaS). Customers get a turnkey cloud data centre in which components such as racks, climate control and power supply are available as predefined modules. The scope of supply optionally includes the IT components (such as server, network and storage). In addition, the established open source “OpenStack” framework is used as the cloud management software.

The result is a standardised, “virtual private” cloud data centre (BCC – Balanced Cloud Center), which is equally well-suited to standard applications in the ITaaS mode as to highly demanding application scenarios, such as high-performance computing (HPC), SAP Hana or Big Data applications. Depending on the customer solution, these innovative ITaaS models may be implemented on matching, previously presented container modules.

For example, the BCC concept (RDCS 200-L-II-B) features in the Lefdal Mine Datacenter project currently being installed on the west coast of Norway. The five-storey tunnel system with 75 chambers provides 120,000 square metres of space for an infrastructure with a potential total capacity of 200 MW.

The project partners have set themselves the ambitious target of making the LMD the number one in Europe, with unsurpassed levels of cost-efficiency, security, flexibility and sustainability. When the Total Costs of Ownership (TCO) are taken into account, what is more, the LMD is 40 percent cheaper than other data centres in Europe.

This is due in large part to the cooling solution, which cools waste air from the servers via high-performance heat exchangers with a cooling circuit linked to the seawater. The entire system is connected to the 565 metre deep fjord, which guarantees unlimited supplies of cold water and reduces energy consumption to a minimum.



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