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VX IT – the smart IT rack for modular data centres

White Paper IT 03

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Digitisation means that companies will need ever more computing power, in all departments and at every location. Research, production, marketing and sales, customer service and administrative departments are using ever increasing amounts of data in their work and must be able to make business-critical decisions quickly and accurately. This is only possible if there is an efficient and fail-safe IT landscape. IT has become a central factor for economic success in the modern economy. The challenge for IT managers is this: nowadays, data centres have to be available both faster and in some very different performance classes in order to be able to meet an organisation's diverse requirements. This includes single-rack installation, as well as cloud, edge, enterprise, colocation and hyperscale data centres.

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1 Executive summary

IT racks form the basis of digitisation

In today's networked world, companies, organisations and public administrations need an enclosure platform with which they can quickly and efficiently implement a future-proof IT infrastructure.

Statistics from the US market analysts "451 Research" show just how important modern IT infrastructures have become for the global economy. They forecast a two percent global annual growth in data centres by 2024, measured in terms of the kilowatts of installed capacity. At the same time, around 2.5 million new IT racks are predicted to be delivered worldwide during this period.

The challenge for IT managers is this: nowadays, data centres have to be available in very different performance classes in order to meet an organisation's diverse needs. These include single-rack installation, as well as cloud, edge, enterprise, colocation and hyperscale data centres. The basis here is an enclosure platform that is expandable and that can be adapted to meet any challenge and speed of the IT world. A platform of this kind has to impress with a sophisticated architecture, maximum security standards and extremely simple configuration, ordering and operability – the basis of Rittal's IT new rack, the VX IT.

The Rittal Configuration System (RiCS) makes the wide range of options and the high flexibility of the VX IT platform available to users. This online configurator leads users step-by-step through the configuration of the required IT rack and includes a plausibility check. All the VX IT variants created with the configurator have been tested and certified for product safety in accordance with international standards. Subsequently, IT managers save valuable time in planning and procurement. Simultaneously, they are assured that all the components work in perfect harmony.

Only those IT managers who rely on a smart modular system that supports the rapid implementation of new data centres will be able to actively drive the digital transformation of their organisation and position themselves as digital pioneers.

Read more about VX IT in our White Paper.

2 Introduction

These are the challenges that IT managers face

Digitisation means that companies are going to need ever more computing power, in every department and location. Research, production, marketing and sales, customer service and administrative departments are using ever increasing amounts of data in their work and have to be able to make business-critical decisions quickly and accurately. This is only possible if an efficient and fail-safe IT landscape exists. IT has become a central factor for economic success in the modern economy. Consequently, IT managers are faced with the challenge of satisfying the ever increasing demand for more and more IT resources quickly and efficiently.

Nowadays, one to two years is too much time to set up a data centre. IT managers need a future-proof solution more quickly.

Time plays an important role in developing new data centres. Projects that call for one or two years to set up a data centre can no longer be accepted. IT managers therefore need a solution that allows them to implement new IT capacities at any location, quickly and without any risks.

Against this background, Rittal has developed the VX IT rack platform. The IT rack is universally applicable, flexibly configurable and available with a comprehensive range of accessories. Another very important point: The VX IT offers full compatibility with Rittal's established RiMatrix systems. This way, it is possible to replace individual components in existing data centres, as well as to expand data centres as desired. For example, companies can expand existing RiMatrix installations using the new VX IT and also utilise VX IT-specific components for cooling, UPS or monitoring. This provides investment security for data centres equipped with Rittal components.

Figure 1: The brand new IT enclosure VX IT is a universally applicable rack solution in modular format for even more freedom in the rapid construction of data centres.

Reaching the goal faster

Regardless of the speed at which IT systems are planned: IT managers can achieve their goals faster and easier with the VX IT. This is guaranteed by the process as a whole, ranging from selection, configuration and ordering to delivery, which runs via the RiCS online configurator. The IT rack variant configured there is manufactured in the highest quality in a state-of-the-art production facility and then delivered quickly and on time via an optimised logistics system.

Another important aspect is the certification of the IT rack and all the accessories installed. Should a company need differently configured IT racks for different locations, this would lead to a huge amount of work and time being needed for certification and documentation, which could mean a considerable delay in providing new IT resources. Every IT rack defined by the RiCS is fully certified, as are its accessories. This freedom in constructing data centres is unique.

Every IT rack defined by the RiCS is fully certified, including its accessories.

The Rittal VX IT has thus become an ideal platform for all requirements in modern IT infrastructures, regardless of whether these are for the network rack of a floor distributor, server racks in an edge, a cloud or hyperscale data centre.

3 Enclosure platform VX IT

How to find the suitable individual variant

Years of international experience from many customer projects have gone into the development of the VX IT. The aim has been to create a universal modular variant system to cover both current and future requirements of IT systems in every performance class. This has resulted in one single platform for all application scenarios. At the same time, VX IT forms the basis of the RiMatrix Next Generation, a new, open modular system for modular data centres, which IT managers can use to successfully design their entire IT landscape.

IT racks represent an important element in a data centre security concept.

Anyone faced with an investment decision concerning an enclosure platform can base their choice on such points as the planned place of installation and the data centre's purpose. This tells us the IT security requirements, as well as the size of the IT rack and the accessories needed. The following chapters provide further details.

Data security starts with the IT rack

IT racks represent an important element in a data centre security concept. For example, an IT rack protects against unauthorised physical access to IT components. Depending on the location, however, an enclosure with a specific protection class is required, which is expressed in the global IP ("International Protection") standard. If the IT rack is in an office environment, access protection in accordance with IP 20 (with a lockable door) will suffice. This will also be enough in other lockable rooms or in a computer centre that is secured in any case.

Anyone operating an IT system in a harsh production environment will need extra protection: For example, fine flour dust accumulates in industrial-scale bakeries; this would damage any unprotected IT system in a very short time. If a jet of water hits an IT enclosure that is only protected simply during cleaning work in a workshop, the moisture will quickly cause the IT systems to fail. In such environments, protection class IP 55 is recommended in order to ensure reliable protection against dust and jets of water.

In addition, specific security solutions are available that offer an even higher level of protection by providing an additional enclosure around a conventional VX IT rack, including added defence against EMC radiation, vibrations or vandalism. One example is the Rittal Micro data centre (MDC), which, as a security safe, offers the highest physical protection. The VX IT is an integral part of the MDC and - as a complete solution – offers protection against such hazards as corrosive gases, fire and water.

Accessories and interior installation

A wide range of accessories is available for the VX IT in order to configure it individually. These include options for the doors and side panels, as well as for the floor and roof. Further accessories include pull-outs and cable management tools, as well as solutions for monitoring, power supply and asset management in the IT rack. Such components as PDUs, UPS systems, IT cooling systems and monitoring solutions are also available for interior installation, as are modules for early fire detection and extinguishing.

Due to its modular design and the wide range of possibilities it offers, the VX IT can be configured in numerous ways. To this end, the IT rack is fully certified without the need for any additional test procedures when Rittal accessories and the Rittal Configuration System are used. This saves valuable time when commissioning new IT infrastructures.

The VX IT is fully certified without any additional test procedures being needed when Rittal accessories and the Rittal Configuration System (RiCS) are used.

4 The components of the VX IT in detail

Mechanics and standard dimensions

The VX IT is suitable for mounting server, storage and network components. Assembly is performed largely without tools, using time-saving “snap-in” technology. The height units and pitch patterns are marked, which makes it easier to set the 19-inch distance between levels. The internal dimensions are not limited to 19 inches, alternative installation dimensions can easily be achieved by means of lateral offset.

The standardised basic equipment comprises a flexible 19" mounting level, divided side panels with quick-release fastener, and optimised cable entry features with brush strips; standard IT racks, which only have servers installed, call for a width of 600 mm and a depth of 1,000 to 1,200 mm. As a rule, power and network cables are installed at the rear. In the case of network components, ventilation is often also provided from the side, as the front is reserved for network ports. A network enclosure therefore often uses a width of 800 mm and a depth of up to 1,000 mm.

In the case of a mixed configuration with server and network technology, most space is needed to comfortably install the network distributors, patch panels and PDUs for power supply, as well as the large numbers of cables. The suitable heights are determined from the height units (Us) required in each case. A 42-U rack is around two metres high, which represents the most common height employed these days. However, the VX IT does allow for an expansion of up to 52U to make the best use of the space available.

High load capacity

Load-bearing capacity information is also important for integrators or system suppliers. Certification creates certainty.

Thanks to the improved frame design, the VX IT has more vertical-section stability than its predecessor models. The load capacity has been verified both by internal tests at Rittal and through external certification by the Underwriters Laboratories (UL).

The VX IT offers a load capacity that is certified in accordance with the UL 2416 directive. Depending on the requirements, two versions are available: The VX IT Standard variant permits a static load of 1,500 kg (in accordance with the Rittal test procedure), or 1,200 kg as per UL certification. The VX IT Dynamic version permits a load of 1,800 kg in accordance with Rittal test procedures, or 1,500 kg (UL).

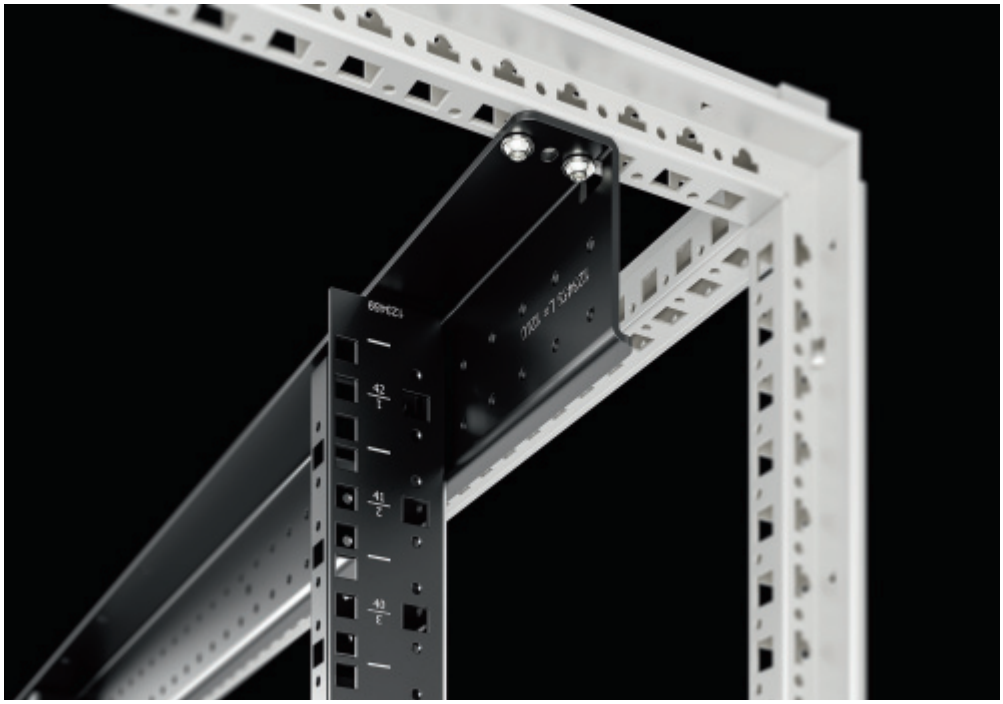

Figure 2: Thanks to an improved frame construction, the VX IT enclosure achieves maximum stability in the vertical profile of up to 1,800 kg depending on the model.

These loads are important for integrators or system suppliers. The latter completely configure the IT racks with all the necessary components on behalf of their customers and then deliver the ready-to-connect solution directly to the chosen installation site. Certification gives the providers the certainty that they can populate the IT racks up to the respective weight.

Base assembly and roof

Rittal has developed a modular concept for the base assembly, which can be adapted to customer requirements. The new system combines existing solutions such as the Flex-Block, or the PS and TS base/plinth systems. A stable welded base frame is available for direct mounting or for fixing to the floor. The components for the roof plate and base configuration have also been designed for optimised cable routing, which ideally supports individual requirements.

With a base/plinth system, users gain an additional functional or cabling space below the enclosure.

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Users can also implement cable clamping in the base or plinth for strain relief if, for example, large numbers of cables are routed under a raised floor. When working in a raised floor, the strain relief feature protects sensitive ports or connectors. This is particularly beneficial for trunk cables, which have a large diameter and a high bending radius.

Another benefit of the base/plinth system is that technicians can very easily attach load-bearing corner pieces from the outside or inside. These are affixed with simple clip fastenings or with screws. All in all, the base/plinth system and additional cable routing elements and support rail systems provide a large range of options for interior installation.

A roof concept for the IT rack has been developed that meets the requirements and the protection category and allows a wide range of individual solutions. When selecting the roof solution, customers can orient themselves to the cable entry type planned or the protection category required. A one-piece, closed solution supports a protection category of up to IP 55. Brush strips for cable entry are available either over the entire depth of the enclosure or at the rear across the width of the enclosure. Another variant supports cable entry in the corner areas via brush strips.

Figure 3: Freedom of choice, also for the protection class-compliant roof concept

Doors and rear panels

One important aspect in the development of the VX IT was to further simplify installation for technicians. All the flat parts such as side panels or roofs are attached quickly and easily using snap-in fasteners and positioning aids. The new vertically split side panels, available as optional accessories, provide users with improved access in order to speed up installation work. The vertically divided side panels are fitted with simple hinges, which means that they can be opened like doors and are yet still easy to remove. Horizontally divided side panels are also available. Here too, the technicians have rapid access to all the installed parts in the rack. Unauthorised persons are unable to open the side panels from the outside, as they have an internal locking system.

When designing the VX IT, the developers also placed great emphasis on flexible installation options. One further example of the new accessibility is that the outer mounting level of the frame section can also be configured from the outside. This saves a great deal of time over conventional assembly from the inside. The continuous 25 mm pitch pattern is available both horizontally and vertically, which also makes installation work easier. Counting the holes also makes it even simpler for technicians to position components such as sensors, cable holders or air routing components. Moreover, the interior has been designed to optimise space and it offers enough room to install PDUs in the zero-U-space and for laying cables. The space

below the 19-inch level and the side panel of an IT rack is referred to as the zero-U-space. With the VX IT, it is possible to install a Rittal PDU there.

Figure 4: Slim fit: The compact and slim design of Rittal PDUs is unique on the market. This allows Rittal PDUs to be mounted in the space between the side panel and the 19-inch mounting frame.

There are a number of different mounting solutions for the 19-inch mounting angles, depending on the enclosure dimensions. While 600-mm wide racks are mounted directly on the enclosure frame, the 19-inch levels of 800-mm wide racks are mounted on depth stays or cross beams.

Zero-U-space made usable by the VX IT: a Rittal PDU can be mounted.

This means that different mounting dimensions of 21, 23 or 24 inches and an asymmetrical arrangement of the 19-inch mounting level can also be implemented with 800-mm wide enclosures. The “standard” configuration variant with cross members is used for rack depths of up to 800 mm and is ideally suited for use as a network distributor, as it enables quick and easy cable management across the entire enclosure width in any height unit.

Additional space is gained on one side with an asymmetrical arrangement of the 19-inch level, which can be used for optimised cable routing or for the integration of a Liquid Cooling Unit (LCU) for IT cooling.

The VX IT is also compatible with existing IT infrastructure solutions constructed with the TS IT and DK TS systems. This means that the VX IT can be further populated and bayed.

Locking system: Doors and security

No tools are needed to mount doors. An optional 180-degree door opening angle is available for bayed enclosures in order to support customer security requirements. It is often desired that racks within an aisle containment have 180-degree opening to ensure that escape routes are not blocked in the event of danger. An automatic door opening solution is also available as an option, with a radio-controlled handle for remote monitoring.

Doors with 180-degree opening within aisle containments ensure that escape routes remain free.

Divided rear doors are used as default on all server and network racks with a height of 1,800 mm or more that do not require any special IP protection category. A three-point locking system is used here, so that adjacent door locking is no longer required. This makes it easier to close the rear doors while, at the same time, cables can no longer become trapped in the side door locking mechanism. The complete operation is performed from outside.

Door handles with intelligence and security functions

The VX IT has been given a simplified system for installing hinges and handles in rapid assembly technology. The hinges and handles can be easily removed and installed in the desired new position when changing the door opening from left to right (or vice versa).

The security measures at IT rack level include logging which persons have had access to the IT systems and at what time. These are particularly significant in large data centres that process sensitive data. It is also important in factory buildings because many people have access to the machinery and the IT racks installed there. The VX IT supports these security requirements with smart door handles. For this purpose, the IT rack can optionally feature a wireless access monitoring capability.

Smart door handles support the logging of accesses to the IT systems.

Automatic door opening

Businesses can increase operational security in the data centre with an optionally available automatic door opening feature. Such an automatic system is needed in a variety of situations. For example, the IT cooling for the rack may fail. If the rack door were closed, the temperature within the IT rack would rise very quickly and cause the active IT components to fail. An open door prevents the build-up of heat and allows the warm air to escape, so giving IT administrators time to shut down the systems in an orderly manner. Another example is

where a fire has broken out in the IT rack and it needs to be extinguished from the outside. The extinguisher medium can only penetrate the rack if the doors of the IT rack open automatically in the event of fire or smoke.

The VX IT also offers a clever optional variant. In this case, two narrow areas are recessed within the front door, which can be opened quickly and easily without the need for an extra motor. The locking mechanism uses door magnets that are controlled by the Rittal Computer Multi Control (CMC) III monitoring solution.

With this solution, the physical security of the IT rack is maintained, even after the door surfaces have been opened, as no components such as servers can be stolen. Besides this, the door surfaces do not create a blockage in narrow spaces or in an aisle containment.

Paying attention to appearance

A little LED, a big effect: Coloured light strips can indicate the status of racks from the outside.

It is often the little things that increase the benefits of a solution. For example, the VX IT may feature an optional LED light strip that allows the IT rack to display its status to the outside world in colour. The light strip is affixed magnetically on the left or right of the enclosure frame.

The advantage for IT managers: In large installations, they can quickly and reliably visually detect when a component in an IT rack is reporting an error. The LEDs can, for example, signal a normal state by being lit up green or blue. Yellow indicates a warning while red signals a malfunction. The LED glows white when the door to the IT rack is opened, providing additional lighting for the service technician.

In addition, companies can reduce the energy required for lighting by using white racks in the data centre. This is because black enclosures absorb more light than IT racks that have a white paint finish. In large installations especially, operators can noticeably cut energy costs. The VX IT can optionally be supplied in “white” (RAL 9003).

IT cooling for all scenarios

Very different requirements are placed on the IT cooling system, depending on how the IT rack is configured. Heat dissipation by fan via the roof plate is sufficient for low performance requirements. At higher power outputs, roof-mounted units are needed to blow cold air into the rack. The warm air is then released into the surrounding space, so that additional room cooling is recommended. Perforated doors with a high air permeability are useful for a room air-conditioned environment. In order to form closed air circuits, tightly closing doors are necessary. In contrast, cooling with cold water or with another coolant is used for higher loads. The required heat exchangers can be mounted directly on the rear door or on the side of the IT rack.

The entire range of Rittal's IT cooling solutions is available for the VX IT. Rittal distinguishes between four scenarios which commonly occur in practice:

Four common scenarios for IT cooling.

1. The IT rack releases the heat to the surroundings. This is where the Blue e+ IT solution comes into play as a roof-mounted or rear door unit. Blue e+ IT cooling units are highly energy-saving and are available with an output of up to 3 kW.
2. The IT rack dissipates heat to the outside and a cooling unit is installed in the rack: For this purpose, Rittal offers the LCU solution, a split cooling unit based on refrigerant with an indoor unit (evaporator) and an outdoor unit with an integrated compressor of up to 6.5 kW.
3. The IT rack emits heat to the outside and a cooling unit is attached in series or installed as a rear door: To this end, Rittal offers a wide range of LCP (Liquid Cooling Package) cooling units with an output of up to 55 kW. The units operate on a water or coolant basis.
4. The IT rack emits heat to the outside; cooling is provided by a separate solution. This is where concepts and solutions such as Air Handling Units (AHUs) or Computer Room Air Conditioning (CRAC) are used, which Rittal implements in conjunction with its partners in order to meet specific customer requirements.

These variants can also be deployed flexibly within the RiMatrix Next Generation data centre solution. Cooling solutions include the following Rittal products:

- LCP CW from 30 kW to 55 kW (water-based rack and series cooling)
- LCP Rear Door CW with 10 kW and 20 kW (water-based rear door cooler)
- LCP DX 12 kW, 20 kW and 35 kW as well as the LCP DX/FC 35 kW (coolant-based)
- The LCU DX 3 kW and 6.5 kW are integrated in the VX IT (coolant-based)
- Integrated Blue e+ roof and side cooling (hybrid technology)
- Cold aisle containment – suitable for the RiMatrix NG and VX IT

Monitoring and surveillance

Rittal offers a number of suitable solutions for monitoring, including the CMC III monitoring system. This way, users can have an eye on all the vital functions of the data centre infrastructure. The CMC system is equipped with interfaces that enable simple and comfortable connection to higher-level management systems, such as a DCIM. This concept means that even distributed edge data centres or IoT systems in large production environments can be monitored efficiently and transparently.

Accessories for every occasion

The VX IT rack has been designed as a flexibly configurable platform. That is why a wide range of components are available as accessories. These include shelves, pull outs and aids for cable management or air routing. However, many additional products are available in the

areas of monitoring, power supply and asset management so that the IT rack can be ideally adapted to individual requirement. The Rittal Configuration System guide the purchaser step-by-step and systematically through the selection process.

Figure 5: The wide variety of accessories makes the VX IT a platform for all application scenarios, from network enclosures to solutions for hyperscale data centres.

Quick and easy online configuration

The Rittal Configuration System (www.rittal.com/vx-it) is an online solution for constructing application-specific variants of the VX IT. Configuration is based on a modular system: Users begin by selecting the enclosure housing and choosing the components for the interior installation and the accessories needed. The configurator permits a large number of configurable enclosure variants that go far beyond the standard product range. The user is supported by an automatic plausibility check, so that all the components really do harmonise perfectly. In addition, recommended accessories are shown directly to the user through a quick selection feature. No matter which solution the user defines, the VX IT created this way, including all its components, is tested and certified for product safety.

No matter which solution the user defines, the VX IT, including all its components, is tested and certified for product safety.

The configurator also provides information at any time on when delivery can be expected. Every rack ordered via the configurator is delivered in a fully assembled state. The delivery

time will vary, depending on the degree of customisation of the rack. The accessories can be delivered separately and enclosed loose with the order, or they can be provided already mounted.

Figure 6: Every VX IT you create using the Rittal Configuration System (RiCS) is fully certified. Testing covers accessories, as well.

Complete modular system certified

One of the special features of the VX IT modular system is the complete certification of all optional components via test procedures like UL 2416, IEC 60950 and IEC 62368, as well as a CB report. Consequently, no additional test is needed when a customer-specific solution is drawn up with the configurator. Country-specific certificates can even be generated from the CB report without any further testing.

5 Application scenarios for the VX IT

The following examples show the applications in which the VX IT can be used. Of course, the high level of flexibility also supports use of the VX IT in many other cases

IT racks as floor distributors

IT floor distributors call for good cable management and flexibility.

IT managers and technicians are often faced with the challenge of fitting buildings or individual offices with IT floor distributors. The IT rack takes on the task of connecting all the local IT components such as telephones, printers or PCs with one central data centre.

Important points here are cable management for orderly cable routing and fastening, the accommodation of a number of different network components such as patch panels or switches, the optimum distribution of mechanical stress and a structured cable routing system.

The VX IT supports these requirements with the greatest possible flexibility. Different enclosure widths are available, depending on the amount of cabling involved. Variable depth or combination rails support interior installation, e.g. for cable routing using cable ties or for cable support using cable clamps in a product.

In this scenario, a glazed door enables fast and flexible administration, when checking free ports or active components for example. Vertically divided side panels provide ideal access from the side to the front and rear, as well as to the components and cabling. Snap fasteners with integrated internal latches on the side panels protect against unauthorised access.

The IT components only have a low power consumption, so that only a small amount of heat is dissipated. Under certain circumstances, it may only be possible to provide IT climate control by using a fan. It is better if a cooling unit is used, especially if the floor distributor is located in a small, unventilated room. Rittal offers solutions for IT cooling, such as the Blue e+ IT roof-mounted unit or the LCU coolant-based mounted solution.

IT racks in industrial environments

Robust for industry:
IT racks have to be able to withstand dust, water and physical stress.

Anyone wanting to operate IT systems in an industrial environment, such as in warehouses or production buildings will have to protect the IT racks from external influences. Consequently, a defence against dust and water is an important requirement for an IT rack. Protection against physical damage by vehicles such as forklift trucks must also be ensured. Here, the IT rack takes on the job of guaranteeing the connectivity of all the IT components in these environments – from the production building to distributed edge data centres and to a cloud data centre.

A VX IT with the following components would be used in such an environment: a closed base assembly, a one-piece closed roof panel, a closed glazed door at the front and a sheet steel door at the rear. A closed sheet steel door is recommended in all environments where heavy loads are transported by industrial trucks.

Equipped in this way, the VX IT supports protection category IP 55 and so offers ideal protection against environmental and ambient conditions. Climate control can be provided by Rittal's LCU (Liquid Cooling Unit) solution, which also offers the necessary security as per IP 55 thanks to its closed circuit. Moreover, one-piece bolted side panels protect against unauthorised access. The additional side panel internal latching also ensures improved access security – a features that sets the VX IT apart from its TS IT predecessor model.

This way, the VX IT has every prerequisite for use in smart scenarios: from smart cities to Industry 4.0 applications. The VX IT is also ideally suited for use in edge infrastructures or for setting up new mobile telecom networks, as its access protection, monitoring and protection category are of the highest quality.

IT racks in data centres

In this scenario, IT racks take on the function of network and server racks where the active components such as servers, storage or switches are located. It is vital to be able to dissipate the waste heat safely from the IT systems in the data centre, even in the most confined spaces. Protection against overheating is also needed. If there is only a little space available for the IT systems, room climate control is usually not possible and rack climate control is then employed.

IT racks in data centres require efficient climate control

The VX IT permits rack climate control through a closed sheet steel and glazed door. Generally speaking, rack-based cooling offers the best possible energy efficiency, as minimal volumes of air are moved. With this solution, the IT rack and cooling unit form a sealed unit. This means that even very high HPC loads of more than 50 kW per rack can be cooled. The procurement costs are comparatively high, as a separate cooling unit is needed for each rack.

Bayed suite cooling, which is based on the principle of containing enclosure suites, promises greater cost efficiency. Here, the areas in front of and behind the racks are divided into a hot and a cold aisle. This helps increase energy efficiency, as the cold and hot air masses are kept well apart.

The VX IT is also available with an optional automatic door opening system. In the event of failure of the cooling system or fire, the new door-in-door concept allows two integrated door inserts to open automatically. This lets either the cooler room air or the extinguisher gas to flow in. With room and row climate control, ventilated doors at the front and rear may be the right strategy for IT climate control.

If the room height permits, the VX IT can be mounted with up to 52 height units (U). This results in a very high packing density and thus the most efficient use of space and footprint.

If the data centre is already very cramped, doors with a 180-degree opening angle help if the racks are bayed. The new 180-degree baying hinge also offers greater comfort and safety in such cases and makes it easier for technicians to access the IT components installed. At the same time, reduced aisle widths are possible because the 180-degree doors meet the safety standards for escape routes.

IT racks for electronic installations and in limited space

In some scenarios, the installation site of the IT rack no longer lets technicians open the side panels or the rear of the IT rack. This may be the case, for example, with IT racks that are mounted on the wall in production buildings directly next to machinery and power distribution systems. Other examples are a network enclosure or a distribution enclosure for telecommunication systems. In many cases, only a small footprint is available here.
The main function of the IT rack is to make access to the cabling and IT components as easy as possible. A swing frame is used to reach the rear of the installed IT components as easily as possible.

The VX IT provides a solution for this with a swing frame that includes a rear panel instead of a rear door. The swing frame allows optimum access from the front to the interior, to the rear of the 19-inch installations and to the mounted components. Depending on the version, opening angles of 130 or 180 degrees for the swing frame are available – servers can thus only be installed to a limited extent. It significantly cuts the time and effort required for maintenance and repair work. Modifications can thus be carried out quickly and easily at any time. But this also establishes investment security in the enclosure platform.

6 Appendix

Definitions of terms; abbreviations

CB procedure The CB procedure is an international system for the mutual recognition of test results and certificates on the basis of a multilateral agreement between the countries and certification organisations that participate.

CE marking: The CE mark (**C**onformité **E**uropéenne) indicates that the product to which it is affixed meets the requirements of all the EU directives applicable to this product. However: In the case of CE marking, only in exceptional cases has an independent testing and certification body has actually tested the product.

CEE standard: The "**C**ommission on the Rules for the Approval of the **E**lectrical **E**quipment" is an international commission that regulates the approval of electrical equipment and, for example, standardises connectors.

CMC: The CMC (**C**omputer **M**ulti **C**ontrol) product range is an alarm system from Rittal for network and server racks, enclosures, containers or technical rooms.

DCIM: A software solution for **D**ata **C**entre **I**nfrastructure **M**anagement that offers a range of function blocks that are needed for the ongoing operation and capacity planning of IT infrastructures.

Edge data centres: These data centres are found close to the place where data is generated. This location may be at a remote production site, in retail outlets or in an 5G transmitter station – in other words "out on the edge". The aim is to process the data directly things are happening and in real time.

EMC: EMC (**E**lectro**m**agnetic **C**ompatibility) refers to the ability of a technical device not to interfere with other devices by electrically or electromagnetically affecting them or to cause damage to itself.

HPC: High-**P**erformance **C**omputing is a generic term for the high-performance computers used in research or in simulations such as crash tests or weather forecasts.

IEC: The **I**nternational **E**lectrotechnical **C**ommission (IEC) is a Geneva-based international standardisation committee that drafts standards in the electrical and electronic engineering fields.

IP: The **I**nternational **P**rotection Code indicates the degree of protection of an enclosure against contact, foreign objects or water.

LCU: The **L**iquid **C**ooling **U**nit is a split IT cooling unit from Rittal for mounting in an IT rack.

LCP: The **L**iquid **C**ooling **P**ackage is a high-performance Rittal IT cooling unit which is also used in the HPC sector.

LED: The **L**ight **E**mitting **D**iode is a light source based on optoelectronic semiconductors.

PDU: A **P**ower **D**istribution **U**nit is a high-quality socket strip manufactured according to safety standards and used for power distribution in IT racks.

RiCS: The **Ri**ttal **C**onfiguration **S**ystem is an online configurator that i. e. navigates the user step-by-step through the configuration of an IT rack and then carries out a plausibility check.

UL: The US **U**nderwriters **L**aboratories, Inc. is one of the largest independent testing organisations allowed to award a seal for certified products as a qualified testing laboratory.

UPS: An **U**ninterruptible **P**ower **S**upply filters the mains voltage and secures the energy supply of the IT components in the event of power grid fluctuations or outages.

Zero-U-space: Describes the space between an IT rack's side panel and the 19-inch mounting frame.

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