VERTIV™

Infrastructure Solutions Catalog

Vertiv

Nearly all aspects of our lives involve the use of technology. It is how we work and play and do anything in between. This connectivity or use of data is built into the very fabric of our society. It is vital to human progress. Vertiv believes there is a better way to meet this accelerating demand for data — one driven by passion and innovation.

As industry experts, we collaborate with our customers to envision and build future-ready infrastructures. We leverage our portfolio of hardware, software, analytics, and services, to ensure our customers' vital applications run continuously, perform optimally, and scale with business needs.

Unlocking Efficiency and Agility with Prefabricated Solutions

Over the past decade, a notable shift has occurred in data center construction methods. In the past, traditional "brick and mortar" approaches involved piecing together system components and constructing the building, followed by equipment installation and commissioning. However, in contrast, modern modular data centers are conceived, produced, and tested off-site concurrently with site preparation, yielding over 40% time savings compared to conventional builds. Prefabricated modules prioritize seamless integration, curtailing onsite labor demands and logistical intricacies.

This transition offers rapid and efficient design, augmented risk management, and cost predictability through factory integration. Modular data centers assure scalability for future expansions, embody repeatable designs, and exhibit superior quality via factory control. This simplified assembly enables swift transportation by road, rail, or sea, contributing to enhanced deployment agility.

Our Brands

Vertiv™ SmartMod™ | **Vertiv™ Power Module** | **Vertiv™ TimberMod™**

Vertiv™ MegaMod™ | **Vertiv™ HydroMod™**

Our Production Facilities

Headquarters:

- Oreškovićeva 6n/2, Zagreb, 10 000, Croatia
- 505 N Cleveland Ave, Westerville, 43082, USA

Production facilities:

Rugvica, Croatia | Ras Al Khaimah, UAE | Donegal, Ireland | Columbus, Ohio

Anderson, South Carolina | Tijuana, Mexico

Key Benefits

Rapidly Deploy. Standardize. Repeat

- Speed data center builds with pre-integration, prefabrication, and flexible designs when you can't wait

Reduce Risks

- Control budget, improve safety, and mitigate risk for stakeholders without compromising quality

Energy Efficient Design

- Lower site PUE and reduce environmental impact while controlling costs

Zero Floor Space Waste

- Recover precious white space and scale as you grow

Here you can learn more about

▶ **VERTIV INFRASTRUCTURE SOLUTIONS**

Prefabricated Modular Data Centers

Benefits of using a Prefabricated modular data center

Prefabricated modular data centers offer a host of compelling advantages that are transforming the landscape of data center design and deployment. Their inherent modularity ensures scalability, allowing organizations to easily expand their infrastructure as demand grows. The standardized nature of these modules streamlines maintenance and operation, promoting efficiency and reducing costs. Additionally, the sustainability aspect cannot be overlooked, as the use of recyclable materials, like steel, in the manufacturing process reduces environmental impact. By integrating assembly within controlled factory environments, these data centers not only save time but also minimize onsite disruptions, resulting in faster deployment and optimized performance. Overall, prefabricated modular data centers stand as a testament to innovation, offering adaptable, cost-effective, and environmentally responsible solutions for the everevolving demands of the digital age.

0 - 100 kW

Vertiv™ SmartMod™

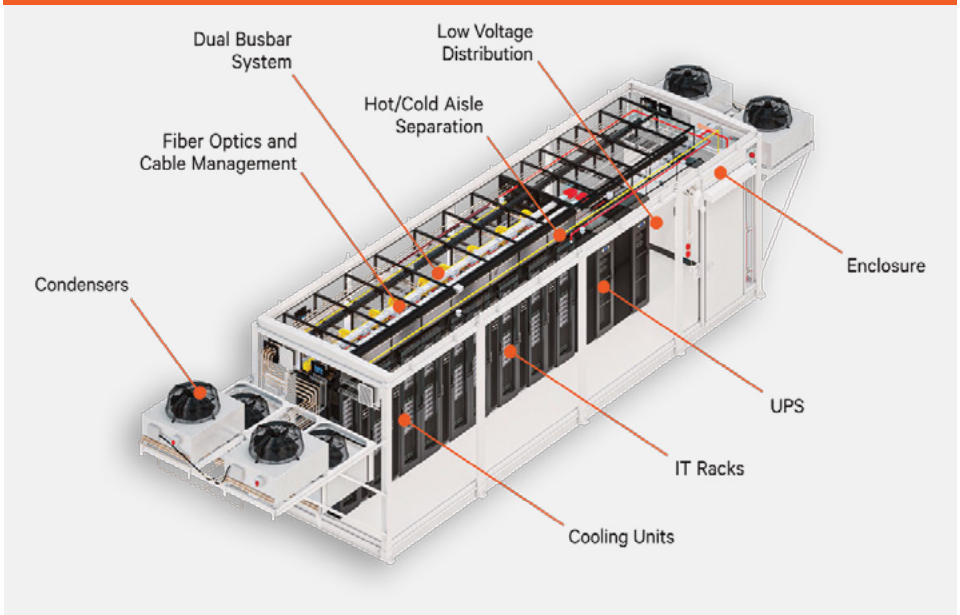
Prefabricated Modular Data Centers up to 100kW normally fall under all-in-one modular data centers, where all the equipment necessary for normal data center functionality is placed within a single transportable module.
Vertiv can support this range with its Vertiv™ SmartMod™ that is a perfect fit for IT deployments between 2 and 14 racks or 100 kW or less.

SmartMod™ Features

- Modular and scalable Vertiv™ Liebert® UPS power protection
- Close-coupled in-row Vertiv™ Liebert® CRD thermal management units with intelligent Vertiv™ iCOM™ Edge controls
- Classic and cost-effective Vertiv™ racks
- Vertiv rack PDUs
- Thermal containment to isolate hot aisle and cold aisle airflows for optimum thermal performance
- Automatic Transfer Switch (ATS) to reliably select normal or emergency power sources
- Overhead infrastructure, including piping, electrical distribution, and fiber ducts
- Clean agent fire suppression and aspiration smoke detection (as optional item)
- Vertiv™ Environet™ Alert real-time monitoring and visualization for critical infrastructure (as optional item)

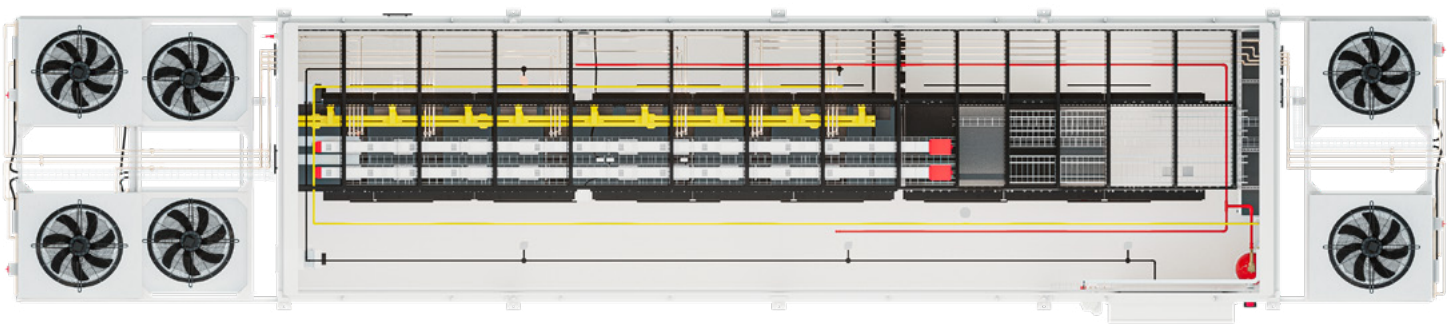
SmartMod offers a simple way to install capacity in a fraction of the time, providing at the same time enhanced levels of availability, efficiency, and control in self-contained enclosures that can be deployed securely, virtually anywhere.

Components overview of Vertiv™ SmartMod™



Enclosure Cut-Out view of Vertiv™ SmartMod™

SmartMod is not a one size fits all system. It is designed to be configurable to right-size to your rack footprint, IT load, desired redundancy, location, and other additional options so you can achieve the optimal solution based on a specific need. All subsystems are factory installed into a secure, weatherproof and transportable enclosure – simplifying and drastically shortening the on-site time required to install and startup, and reducing the potential for risk, quality, or schedule delays.



Top view of SmartMod

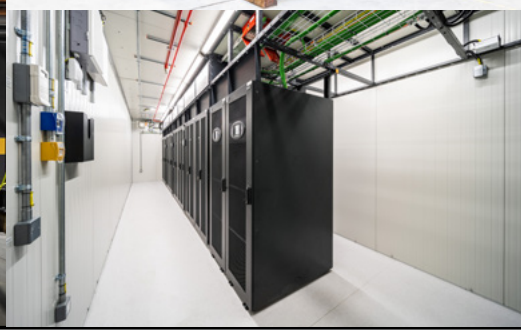
Vertiv™ SmartMod™ Specifications

Standard Design Specifications	SmartMod	
Enclosure External Dimensions		
Enclosure Length (mm)	6426, 8010, 9594, 11178 or 11970	
Enclosure Width (mm)	3400	
Enclosure Height (mm)	3260	
Module Overall Length[1]	6426-12045 mm (@ 6426 mm) 8010-13630 mm (@ 8010 mm) 9594-15215 mm (@ 9594 mm) 11178-16795 mm (@ 11178 mm) 11970-17590 mm (@ 11970 mm)	
Lifting Weight[2]	Up to 18000 kg per module	
Input AC Parameters		
Region	EMEA	NAM
Voltage/Frequency	400 VAC, 50 Hz	Input: 480 or 208V 60Hz, Rack: 208/120V 60 Hz
IT Racks		
Rack Height	42U (2000 mm) 47U (2200 mm) 48U (2265 mm)	42U (2000 mm) 47U (2200 mm) 48U (2265 mm)
Rack Depth	1100 mm	1100 mm
Rack Width	600 mm and/or 800 mm	600 mm and/or 800 mm
Rack Load	8 kN	8 kN
Electrical		
Electrical Distribution Board	1 or 2	1 or 2
Automatic Transfer Switch	1 or 2	1 or 2
UPS Model	APM150	EXM20 - EXM200
UPS Cabinet	1 or 2	1 or 2
UPS Module Redundancy	N or N+1	N or N+1
UPS Rating	Up to 150 kVA (@APM150)	Up to 200 kVA (@EXM200)
Battery Backup Time[3]	Up to 13 min @ 100 kW Up to 30 min @ 50 kW	Up to 5 min @ 100 kW Up to 10 min @ 50 kW
Busbar System	2 per row	2 per row
Rack Load	Up to 17 kW	Up to 17 kW
PDU	2 per rack	2 per rack
PDU Capacity (max)	3x32 A @ 230/400 V-3ph	2x60 A @ 120/208 V-3ph
PDU Type	Basic, Monitored (unit level) or Switched (unit level)	Basic, Monitored (unit level) or Switched (unit level)
Mechanical (HVAC)		
Air Conditioning Type	In-row, direct expansion	In-row, direct expansion
Air Conditioning Redundancy	N or N+1	N or N+1
Air Conditioning Units	up to 6x CRD25 with up to 6x CCD25 externally mounted condensers	up to 8x CRV019 with 8x MCL040 Condensers up to 5x CR035 with 5x MCL055 Condensers
Cooling Capacity for IT Load (35°C)	up to 100 kW	up to 100 kW
Exterior Ambient Operating Range	-30°C to +52°C	-22°F to 125°F

[1] Length presented is the maximum transport length. It includes an enclosure with attached condenser units.
[2] Weight presented is the estimated weight of shipping/lifting the unit with empty IT racks and empty UPS battery cabinets.
[3] Battery backup time at beginning of life (BOL). Maximum available backup time may vary based on solution input parameters (presented here 2 options for different IT Load requirements).

Vertiv™ SmartMod™ 30 kW

CASE STUDY



30 kW **IT Load**

Customer Need

- Two smaller, portable data centers to support airport operations
- Special color and coating due to site conditions
- Strict delivery schedule

Solution

- Standard Vertiv™ SmartMod™
- IT rack quantity: 8 (800mm x 1100mm x 42U)
- 2N UPS electrical topology with ATS
- N+1 redundancy on UPS and cooling
- 10 min battery back up time
- Fire detection& suppression, VESDA
- Intrusion detection

Result

- Customer impressed with speed of response and speed of delivery
- Vertiv technical know-how employed to delivery turn-key data center infrastructure

Vertiv™ SmartMod™ 34 kW

CASE STUDY

34 kW **IT Load**

Customer Need

- DX as Thermal Solution, 10 kW/Rack
- N+1 Electrical redundancy, N+1 Cooling redundancy, and Entrance Vestibule
- Special color and coating due to site conditions

Solution

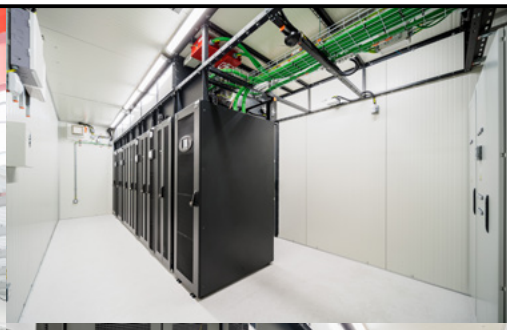
- Standard Vertiv™ SmartMod™
- IT rack quantity: 10, 3-4 kW per rack density
- N+1 redundancy on UPS and cooling
- Cooling through an In-Row cooling system with our CRV units (019/020)

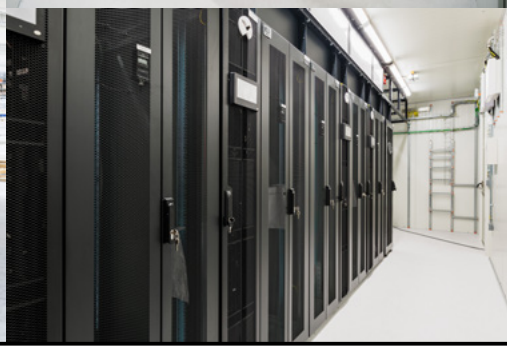
Result

- Reclaimed space
- Better capital planning
- Quick delivery

Vertiv™ SmartMod™ 70 kW

CASE STUDY





70 kW **IT Load**

Customer Need

- Smaller data center that can be deployed quickly

Solution

- Standard Vertiv™ SmartMod™
- IT rack quantity: 4 (800 mm x 1100 mm x 42U) & 4 (600 mm x 1100 mm x 42U)
- 2N UPS electrical topology with ATS
- N+1 redundancy on cooling
- 10 min battery back up time
- Fire detection& suppression, VESDA
- Intrusion detection

Result

- Early engagement with the customer helped drive solution according to their needs
- Fast time to respond - solution from the configurator

100 - 200 kW

Vertiv™ SmartMod™ Max

Vertiv™ SmartMod™ Max is a simple, configurable system that extends the capability of the SmartMod™ platform to larger deployments. For IT deployments up to 210 kW and up to 26 IT racks, SmartMod™ Max offers a simple way to install capacity in a fraction of the time a typical IT build might take.

Based on preffered cooling option, SmartMod Max is available in two versions:

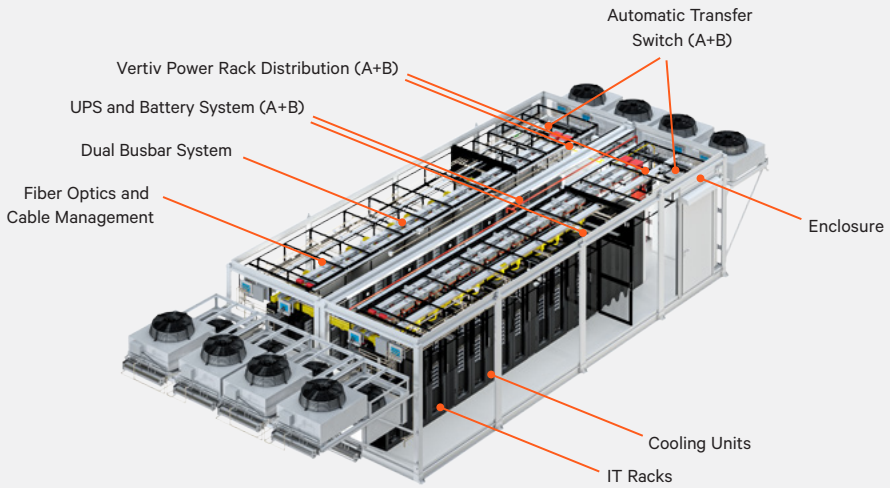
- SmartMod Max DX - featuring direct expansion based cooling units
- SmartMod Max CW - featuring chilled water based thermal management units

SmartMod™ Max incorporates:

- Vertiv™ Liebert® UPS power protection options based on your needs - using either the modular and scalable Vertiv™ Liebert® APM / Vertiv™ Liebert® APM Plus, or the space-saving Vertiv™ Liebert® EXM2
- In-row Liebert® thermal management units with intelligent controls
- Classic and cost-effective Vertiv racks
- Vertiv™ rack PDUs
- Thermal containment to isolate hot aisle and cold aisle airflows for optimum thermal performance
- Automatic Transfer Switch (ATS) to reliably select normal or emergency power sources
- Overhead infrastructure, including piping, electrical distribution, and fiber ducts
- Clean agent fire suppression and aspiration smoke detection (as optional items)
- Vertiv™ Critical Insight real-time monitoring and visualization for critical infrastructure (as optional item)

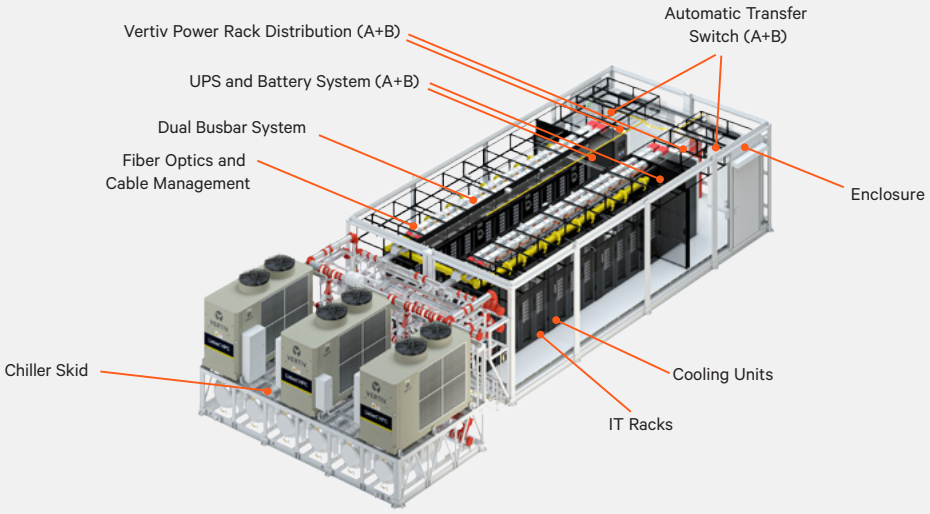
Again, all subsystems are factory installed into a secure, weatherproof and transportable enclosure – simplifying and drastically shortening the on-site time required to install and startup, and reducing the potential for risk, quality, or schedule delays.

Components overview of Vertiv™ SmartMod™ Max DX



Enclosure Cut-Out view of Vertiv™ SmartMod™ Max DX

Components overview of Vertiv™ SmartMod™ Max CW



Enclosure Cut-Out view of Vertiv™ SmartMod™ Max CW

Vertiv™ SmartMod™ Max Specifications EMEA

Standard Design Specifications	SmartMod™ Max DX	SmartMod™ Max CW
Enclosure Length		
Enclosure Length (mm)	8010, 9594, 11178 or 11970	
Single Module Width (mm)[1]	2900	
Enclosure Width (mm)	5810	
Enclosure Height (mm)	3333	
Module Overall Length (mm)[2]	8010 - 13670 (@ 8010) 9594 - 15254 (@ 9594) 11178 - 16838 (@ 11178) 11970 - 17630 (@ 11970)	8830 (@ 8010) 10415 (@ 9594) 12100 (@ 11178) 12790 (@ 11970)
Chiller Skid Dimensions (WxL) (mm)	-	3440 x 6865
Lifting Weight[3]	Up to 17000 kg per module	Up to 17000 kg per module Up to 8000 kg per chiller skid[4]
Input AC Parameters		
Region	EMEA	
Voltage/Frequency	400 VAC, 50 Hz	
IT Racks		
Rack Height	42U (2000 mm) 47U (2200 mm) 48U (2265 mm)	42U (2000 mm)
Rack Depth	1100 mm	
Rack Width	600 mm and/or 800 mm	
Rack Load	8 kN	
Electrical		
Electrical Distribution Board	2	
Automatic Transfer Switch	1 or 2	
UPS Model	APM150, APM Plus or EXM2	
UPS Cabinet	2	
UPS Module Redundancy	N/N+1 for APM or N for EXM2	
UPS Rating	Up to 150kVA (@ APM150) or 250kVA (@ APM Plus or EXM2)	
Battery Backup Time	1-10 min	1-15 min
Busbar System	Two per row	
Rack Load	Up to 17 kW	
PDU	Two per rack	
PDU Capacity (max)	3x32 A @ 230/400 V - 3ph	
PDU Type	Basic, Monitored (unit level) or Switched (unit level)	
Mechanical (HVAC)		
Air Conditioning Type	In-Row, Direct Expansion	In-Row, Chilled Water
Air Conditioning Redundancy	N+1	
Air Conditioning Units	Up to 12x CRD25	Up to 8x CRC60
Cooling Capacity for IT Load (35°C)	Up to 200 kW	Up to 210 kW
Exterior Ambient Operating Range	-30°C to +52°C	

[1] SmartMod™ Max enclosure consists of two (2) modules.

[2] Length presented is the maximum transport length. For SmartMod Max DX it includes an enclosure with attached condenser units. For SmartMod Max CW it includes the piping extension attached to enclosure, while chiller skid is transported separately.

[3] Weight presented is the estimated weight of shipping/lifting the unit with empty IT racks and empty UPS battery cabinets.

[4] The lifting weight of chiller skid includes 3 chillers, 6 tanks and piping (water or glycol excluded).

Vertiv™ SmartMod™ Max Specifications NAM

Standard Design Specifications	SmartMod™ Max DX	SmartMod™ Max CW
Enclosure Length		
Enclosure Length (mm)	9754, 1128, 12192, 12802, 14326, 15850	
Single Module Width[1]	9' 6" (2900 mm)	
Enclosure Width	19' (5810 mm)	
Enclosure Height (mm)	3402	
Module Overall Length[2]	32' (9754 mm) 37' (11278 mm) 40' (12192 mm) 42' (12802 mm) 47' (14326 mm) 52' (15850 mm)	
Chiller Skid Dimensions (WxL)	Chiller Selection Dependent	
Lifting Weight[3]	Project Dependent	
Input AC Parameters		
Region	NAM	
Voltage/Frequency	400 VAC, 50 Hz	
IT Racks		
Rack Height	42U (2000 mm) 47U (2200 mm) 48U (2265 mm)	42U - 78" (2000 mm)
Rack Depth	43" (1100 mm)	
Rack Width	23" (600 mm) / 31" (800 mm)	
Rack Load	8 kN	
Electrical		
Electrical Distribution Board	2	
Automatic Transfer Switch	1 or 2	
UPS Model	EXM	
UPS Cabinet	2	
UPS Module Redundancy	N, N+1, 2N	
UPS Rating	100, 150, 200 kW	
Battery Backup Time	5 min	
Busbar System	Two per row	
Rack Load	Up to 17 kW	
PDU	Two per rack	
PDU Capacity (max)	30A / 60A @ 120 / 208 V	
PDU Type	Basic / Monitored (unit level) / Switched (unit level)	
Mechanical (HVAC)		
Air Conditioning Type	In-Row, Direct Expansion	In-Row, Chilled Water
Air Conditioning Redundancy	N+1	
Air Conditioning Units	Up to 8x CRV019 with 8x Condensers per row Up to 5x CR035 with 5x MCL055 Condensers per row	Based on IT load (2-8 CRC60) tied to piping space
Cooling Capacity for IT Load (35°C)	Up to 200 kW	
Exterior Ambient Operating Range	-30°C to +50°C	

[1] SmartMod Max enclosure consists of two (2) modules.

[2] Length presented is the maximum transport length. For SmartMod Max DX it includes an enclosure with attached condenser units. For SmartMod Max CW it includes the piping extension attached to enclosure, while chiller skid is transported separately.

[3] Weight presented is the estimated weight of shipping/lifting the unit with empty IT racks and empty UPS battery cabinets.

Vertiv™ SmartMod™ Max 36 kW

CASE STUDY

36 kW **IT Load**

Customer Need

- Telecommunications support in deserted area with limited infrastructure
- DC Rack power with N+1 UPS backup
- 20 racks & 36 kW of Total IT load
- Preparation for future increase in IT load

Solution

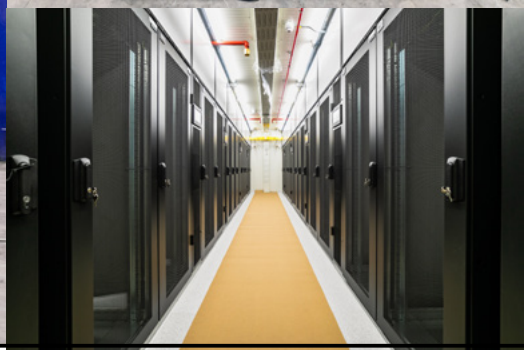
- Dual Module Data Center solution
- 20 DC powered racks installed
- 48 VDC Powered by Netsure 7100 with 63 kW UPS capacity
- VRLA Battery Technology
- N+1 wall mounted air cooling up to 84 kW
- Vesda Fire detection with NOVEC1230 fire extinguishing system

Result

- Standard product solution
- Successful and clean dual module deployment
- Exceeding customer expectations of quality

Vertiv™ SmartMod™ Max 90 kW

CASE STUDY



90 kW **IT Load**

Customer Need

- 24 racks, up to 100 kW, TIER III availability level
- Quick delivery time

Solution

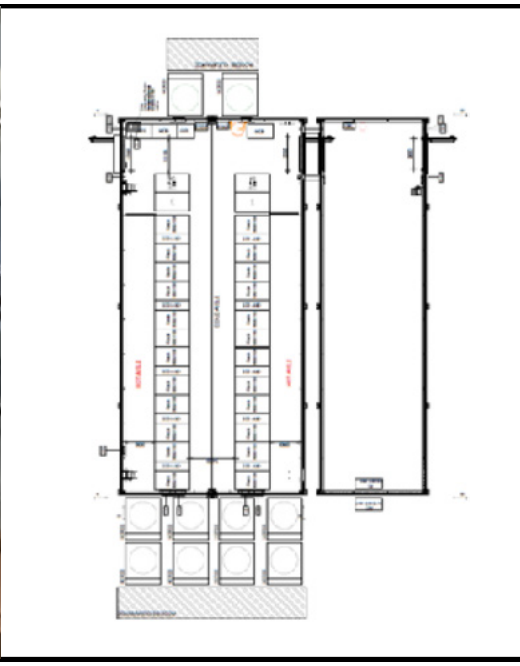
- Off-the-shelf Vertiv™ SmartMod™ Max product – 24 racks, 90 kW IT – with country-specific modifications (60 Hz power supply, SASO-certified cooling solution)
- 2N power supply topology with Vertiv™ Liebert® APM row-based UPS and built-in batteries
- N+1 cooling per rack row with Vertiv™ Liebert® CR019 units (airfreighted from the US)
- VESDA fire detection and NOVEC1230 fire extinguishing system
- CCTV and access control integrated in the factory
- Externally-mounted condensers sized for +52°C ambient

Result

- Standard product exceeding customer expectations
- 14 weeks EXW availability
- KSA Partner responsible for on-site turnkey works
- Future expansion projects already in the pipeline

Vertiv™ SmartMod™ Max 150 kW

CASE STUDY



150 kW **IT Load**

Customer Need

- 150 kW IT Load, 2N power, N+1 cooling, additional office space to the Data Center area

Solution

- Vertiv™ SmartMod™ Max DX including:
  - Dual module enclosure, 11970 mm x 5810 mm x 3330 mm (LxWxH)
  - Cooling: 10x Liebert® CR025 (n+1 redundancy per row) + 10 Liebert HCR33 condensers
  - UPS: Vertiv™ Liebert® APM 150kVA
  - Racks: 24x Knürr™ Miracel2 server racks
  - PDUs: 2 per rack, Vertiv™ Geist™, metered
  - Fire suppression system: NOVEC

Result

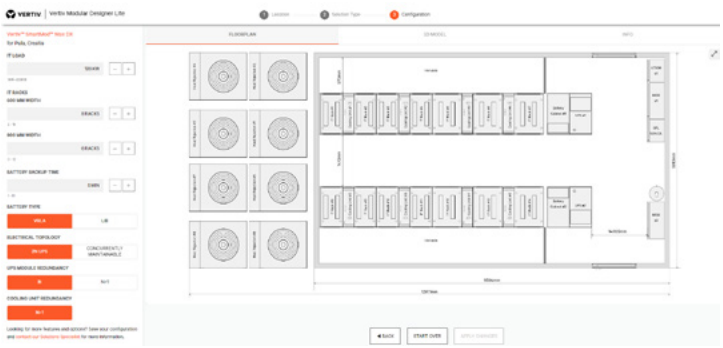
- Standard configuration allowing quick delivery (20 weeks EXW)
- Factory construction quality allowing quick deployment and commissioning
- Office space based on SmartMod-type module

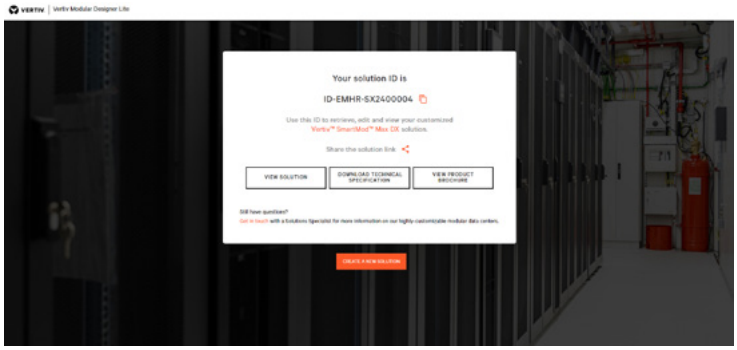
Vertiv™ Modular Designer Lite

Vertiv™ Modular Designer Lite is a web-based solution tailored for configuring Vertiv™ SmartMod™ and Vertiv™ SmartMod™ Max all-in-one modular data centers.

- Easy and intuitive platform for designing an all-in-one data center, ensuring accessibility for users of any technical expertise
- No need for logins or software downloads: you can start building your data center immediately

- Access to essential technical documentation about the configured data center, including technical descriptions and product brochures
- Direct communication with Vertiv Solution Experts about the configured solution
- Configurations can be saved for future reference and modification.
- 2D and 3D visualizations of the data center configuration up to 200kW.





Here you can learn more about

▶ VERTIV MODULAR DESIGNER LITE

200 - 600 kW

Vertiv™ SmartMod™ Combo

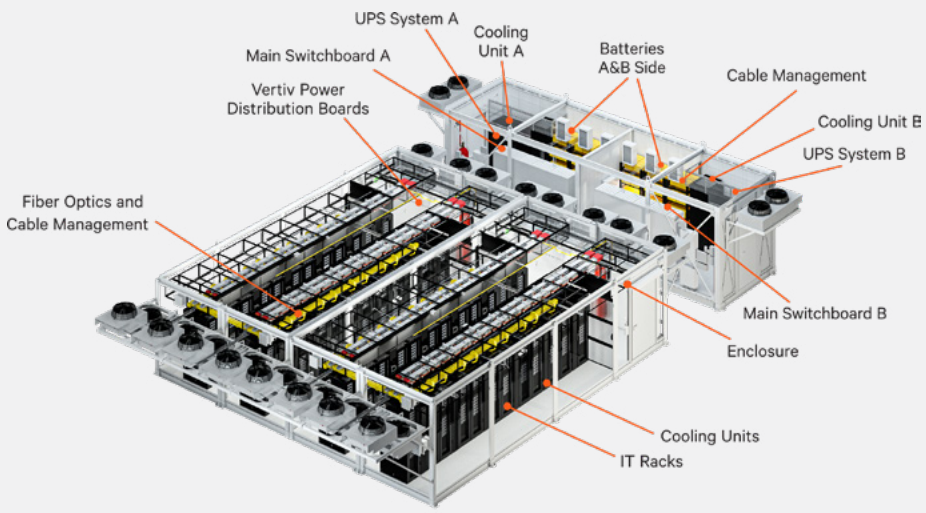
Standardized prefabricated data center offerings for IT deployments from 200 kW to 600 kW and up to 104 IT racks in total can be addressed with the Vertiv™ SmartMod™ Combo. The modules are shipped in prefabricated sections, then connected and sealed at your site by experienced Vertiv personnel to create a fully functional data center with dedicated White Space and external Vertiv™ Power Module. SmartMod Combo leverages core Vertiv™ Critical Power, Thermal Management, and Monitoring & Control Technologies.

SmartMod™ Combo incorporates:

Vertiv™ Power Module unit:

- Monolithic Vertiv™ Liebert® EXL S1 UPS with leading power per square foot and operating efficiency, robust electrical protection, intelligent paralleling that optimizes performance and Dynamic Grid Support for enhanced grid interactive capabilities
- VRLA batteries in open battery stands or lithium-ion batteries in racks, providing battery back-up
- Floor mounted Vertiv™ Liebert® PDX PI Air Conditioning and preinstalled condensers
- Thermal containment to isolate hot zone and cold zone airflows for optimum thermal performance
- Automatic Transfer Switch (ATS) functionality to reliably select normal or emergency power sources
- Overhead infrastructure, including piping, electrical distribution, and fiber ducts
- Clean agent fire suppression and aspiration smoke detection (as optional items)

Components overview of Vertiv™ SmartMod™ Combo



Enclosure Cut-Out view of Vertiv™ SmartMod™Combo

Vertiv™ SmartMod™ Max (White Space) unit:

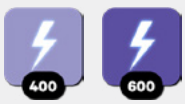
- Classic and cost-effective Vertiv™ racks
- Vertiv™ rack PDU's
- In-row Liebert thermal management units with intelligent controls - direct expansion cooling and chilled watter cooling options are available
- Thermal containment to isolate hot aisle and cold aisle airflows for optimum thermal performance
- Overhead infrastructure, including piping, electrical distribution, and fiber ducts
- Clean agent fire suppression and aspiration smoke detection (as optional items)

Based on preferred cooling option, SmartMod Combo is available with both direct expansion cooling units or chilled water based cooling units.

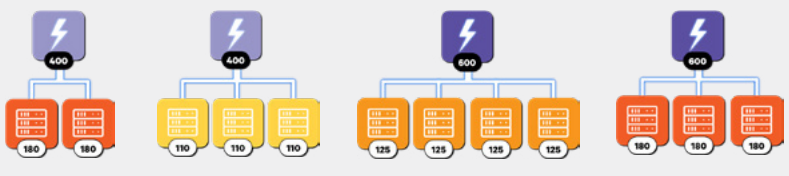
Vertiv™ SmartMod™ Combo Building Blocks

Vertiv™ SmartMod™ Max White Space (kW)

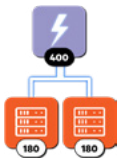
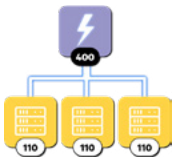
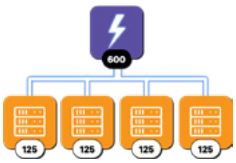
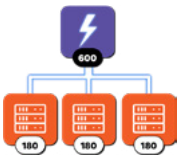
Power Modules (kVA)



Predefined Vertiv™ SmartMod™ Combo Configurations

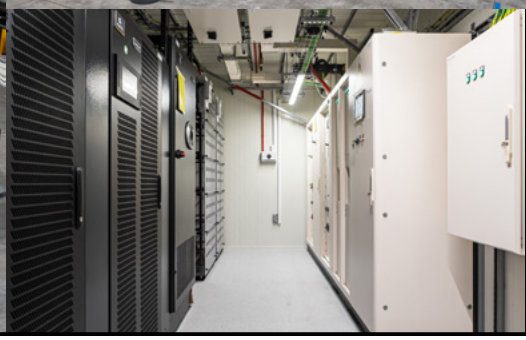


Vertiv™ SmartMod™ Combo Specifications

Vertiv™ SmartMod™ Combo configuration	PMSMM04021-182-000	PMSMM04021-113-000	PMSMM06021-124-000	PMSMM06021-183-000
Layout				
Vertiv™ Power Module				
No of Power Modules	1			
External Dimensions per Module				
Enclosure Length (m)	11970	11970	13800	13800
Enclosure Width (m)	3400			
Enclosure Height (m)	3500			
Overall Lenght (mm)	14400	14400	16200	16200
Weight (kg)	32000	32000	37000	37000
Input AC Parameters				
Region	EMEA / NAM			
Voltage/Frequency	400VAC/50Hz or 480VAC/60Hz			
Electrical				
Power module topology	2N			
Electrical Distribution Board	2			
Automatic Transfer Switch	2			
UPS Model	EXL S1			
UPS Cabinet	2			
UPS Module Redundancy	N			
UPS Rating	400 kVA	400 kVA	600 kVA	600 kVA
Battery Backup Time	9 min BOL @360 kW	10 min BOL @330 kW	8 min BOL @500 kW	6 min BOL @540 kW
Mechanical (HVAC)				
Air Conditioning Type	Floor Mounted Air Conditioning			
Air Conditioning Redundancy	N per side			
Air Conditioning Units	Liebert® PDX PI041 + HCR059 condensers			
Cooling Capacity for IT Load @35°C (kW)	40.6			
Exterior Ambient Operating Range	-30°C to +52°C			
Vertiv™ SmartMod™ Max				
No of SmartMod Max Modules	2	3	4	3
External Dimensions per Module				
Enclosure Length (mm)	11970			
Single Enclosure Width (mm)	2900			
Total Enclosure Width (mm)	5810			
Enclosure Height (mm)	3300			
Overall Length (mm)	17500	15400	15400	17500
Weight (kg)	2 x 15700	2 x 15200	2 x 15200	2 x 15700
IT Racks				
No of Racks	52	78	104	78
Rack Height (U)	42	42	42	42
Rack Depth (mm)	1100	1100	1100	1100
Rack Width (mm)	600	600	600	600
Rack Load (N)	8000			
Electrical				
Rack Load (kW)	6.9	4.2	4.8	6.9
Busbar System	2 per row			
PDU	2 per rack			
PDU nominal Capacity	3x16A @ 230/400V-3ph or 30A/60A @ 120/208V			
PDU Type	Monitored (unit level)			
Mechanical (HVAC)				
Air Conditioning Type	Air Cooled In-Row Based Cooling Unit			
Air Conditioning Redundancy	N+1 per row			
Air Conditioning Units	Liebert® CRV CRD25 + CCD25 Condenser or Liebert® CRV 035 + MCL055 Condenser			
Cooling Capacity for IT Load @35°C (kW)	360	330	480	540
Exterior Ambient Operating Range	-30°C to +52°C			

Vertiv™ SmartMod™ Combo 300 kW

CASE STUDY



300 kW **IT Load**

Customer Need

- The customer was new to the data centre colocation business and required a solution that allowed modular growth as they developed their market
- The initial design was based on traditional build methodology but required significantly more space with a large dependency on local build activities
- This approach introduced additional time and risk that the client wanted to mitigate

Solution

- Based on Vertiv™ SmartMod™ Combo solution with 2 x SmartMod Max and 1 x Vertiv™ Power Module 400 2N
- Phased deployment with 52 racks in Phase 1 and 52 racks in Phase 2
- Total IT load of 3 kW per rack, 156 kW total for phase 1
- In-row DX based cooling with N+1 redundancy per row
- 2N electrical architecture, 2 x EXL S1 200 kVA UPS with 10 min @312kW VRLA backup per side
- ACC, CCTV, Fire system within each room

Result

- Optimized Power Module footprint
- Significantly reduced lead time to deliver data centre to site
- Client selling space for future deployments before the first phase was delivered

0.5 MW and more

Vertiv™ MegaMod™

Vertiv™ MegaMod™ Provides a High-Quality Prefabricated Modular Data Center Solution that can be deployed in expandable units of 0.5 or 1 MW for IT Loads up to 2 MW or more. Choose between the MegaMod and MegaMod Plus solution, that offers additional racks and cooling capacity with a dedicated IT and Cooling Modules.

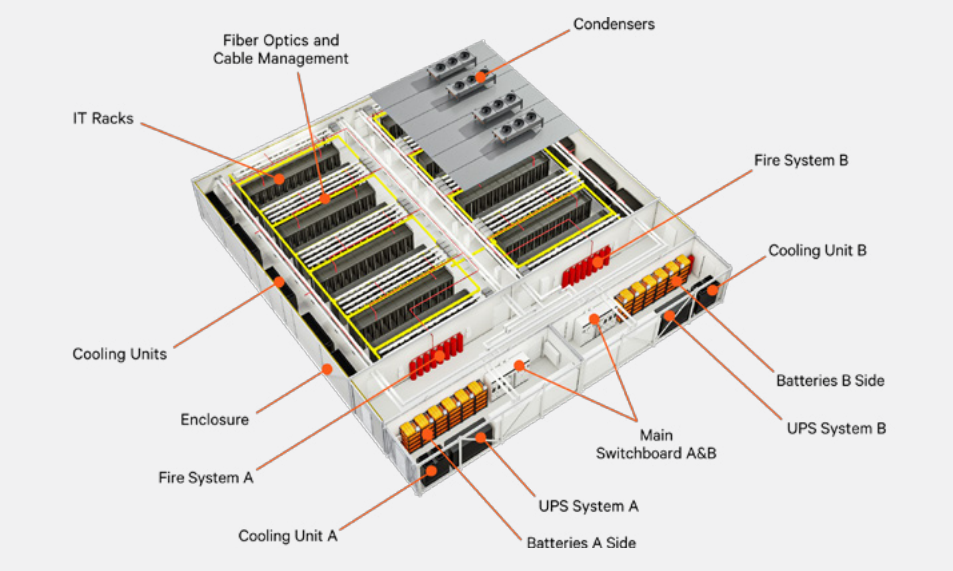
Vertiv™ MegaMod™ Makes IT Easy to Deploy New Capacity at Speed

MegaMod™ provides everything you need to get started with a fully equipped modular data center, from external power rooms, to cooling, racks, monitoring and fire protection. In addition, Vertiv also can provide end-to-end services for a worry-free startup and ongoing operations, including deployment, commissioning, ongoing maintenance, spare parts, and ongoing training.

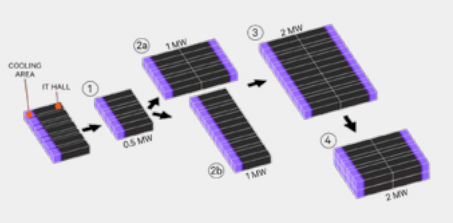
MegaMod includes:

- **UPS power protection** – Rely on the monolithic, transformer- free Vertiv™Liebert® EXL S1 UPS, which provides leading power per square foot and operating efficiency, robust electrical protection, intelligent paralleling that optimizes performance and Dynamic Grid Support for enhanced grid interactive capabilities.
- **Batteries** – Gain reliable battery backup with Valve-regulated lead acid (VRLA batteries), or choose lithium-ion as an upgrade, to gain longer lifespans, better performance in rugged conditions, and a lower total cost of ownership.
- **Floor-mounted Vertiv™Liebert® PDX Air Conditioning** – Benefit from cooling that provides the industry's highest efficiency, protection, and capacity per footprint for smaller space. Other cooling type options on request.
- **Thermal containment** – Isolate hot containment, ensure aisle and cold containment, and maintain aisle airflows for optimum thermal performance.
- **Classic and cost-effective Vertiv™ racks** – Store all equipment securely and efficiently, while easily accessing equipment for servicing.
- **Vertiv™ rack power distribution units (rPDUs)** – Ensure reliable power distribution, with monitored and switched rPDUs.

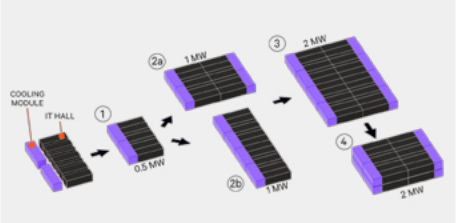
Components overview of Vertiv™ MegaMod™



Enclosure Cut-Out view of Vertiv™ MegaMod™



Various building block layouts for Vertiv™ MegaMod™



Various building block layouts for Vertiv™ MegaMod™ Plus

- **Automatic Transfer switching functionality** – Easily navigate outages with automatic switching to secondary power sources.
- **Overhead infrastructure** – Contains suspended piping, electrical distribution, and fiber ducts, away from electronics.
- **Clean agent fire suppression and aspiration smoke detection** – Protect your assets in the event of a fire with fast-acting detection and suppression systems.
- **SCADA-based Building Monitoring System (BMS) with a SQL database** – Teams can use the BMS for real-time onsite or remote monitoring and visualization of critical infrastructure, with graphics, alarms, trending, user management, and database recording of sessions, keeping system performance high.

Vertiv™ MegaMod™ Specifications

MegaMod™ Platform Design Feasibilities

MegaMod™ Reference Designs

		MegaMod™ 0.5 MW	MegaMod™ Plus 0.5 MW	MegaMod™ 1 MW	MegaMod™ Plus 1 MW
General					
Voltage/Frequency	400VAC, 50Hz	400VAC, 50Hz			
Ambient Operating Range	-30°C to +52°C	-30°C to +40°C			
External Dimensions					
Enclosure Height (m)	4 / 5[1]	4			
Enclosure Length (m)	Depending on final layout	26.5			
Enclosure Width (m)	Depending on final layout	14	15.5	24	31
Stackability	Yes, as option	Not featured in Reference Design			
IT Hall					
IT Racks					
No. Of Racks : Width - 600 mm	up to 128 per 0.5 MW IT Hall block	96	120	192	240
No. Of Racks : Width - 800 mm	up to 96 per 0.5 MW IT Hall block	Not featured in Reference Design			
Rack Height	42U / 47U / 48U	42U			
Rack Depth	1100 mm / 1200 mm	1100 mm			
Rack Load	8 kN	8 kN			
Electrical					
Max IT Load [2]	up to 2 MW	500 kW	500 kW	1000 kW	1000 kW
Average Rack Density	4 - 8 kW	5.2 kW	4.4 kW	5.2 kW	4.4 kW
Busbar System	A+B side	A+B side			
PDU	Two per rack	Two per rack			
PDU Capacity (max)	3x16A @ 230 / 400V - 3 phase	3x16A @ 230 / 400V - 3 phase			
PDU Type	Basic, Monitored (unit level) or Switched (unit level)	Monitored (unit level)			
Mechanical (HVAC)					
Air Conditioning Type	Perimeter cooling, direct expansion	Perimeter cooling, direct expansion			
Air Conditioning Redundancy	N+1	N+1			
Air Conditioning Units	Liebert PDX PI/PX82-120 + HCR59 - 99 or MCM/L 55-100 with Econophase	Liebert PDX PI120 + HCR88 condensers (2 condensers per unit)			
Ventilation type	Roof mounted Air Handling Unit, with humidifier, DX dehumidification	Roof mounted Air Handling Unit, 1000 m3/h, with humidifier, DX dehumidification			
Power Module					
Electrical					
Power module topology	N / 2N	2N within single module		N within single module / two modules	
Main Switch Board w/ UPS Bypass	Depending on final Power Module specification	3p1600A, TP&N+E, 400V/50HZ PSCC = 36kA @ 1sec FORM 4 Type 2; IP 31		3p3200A, TP&N+E, 400V/50HZ PSCC = 50kA @ 1sec FORM 4 Type 2; IP 31	
Automatic Transfer Switch	Breaker Based	Breaker Based			
UPS Model	EXL S1	EXL S1			
UPS Rating	600 / 1000 / 1200 kVA	600 kVA		1000 kVA	
Battery Backup Time	+5 min	5 min @ 500 kW EOL		5 min @ 1000 kW EOL	
Battery Type	VRLA / Li-ion (optional)	VRLA			
Mechanical (HVAC)					
Air Conditioning Type	Perimeter cooling, direct expansion	Perimeter cooling, direct expansion			
Air Conditioning Redundancy	N	N			
Air Conditioning Units	Liebert PDX	Liebert PDX PI041 + HCR59		2 x Liebert PDX PI041 + HCR59	

[1] Actual module height may vary due to roof mounted condensers. 5m height includes roof support beam installed on site.
[2] Maximum IT load at dT=15°C for MegaMod and dT= 12°C for MegaMod Plus.

Vertiv™ MegaMod™ 1.1 MW

CASE STUDY

1.1 MW **IT Load**

Customer Need

- 1.1 MW IT Load, rapid schedule, easy shipping and site construction, Tier III certificate,

Solution

- The integrated data center solution delivered by Vertiv contained:
  - Modular, hot/cold aisle configuration, and power, IT, and battery modules
  - 156 DCM racks; 2 x PDU per each rack
  - PCW cooling units with Vertiv™ SmartAisle™ technology
  - 4 x 500KVA N+1 UPS configuration
  - Busbar distribution power system and high energy efficiency
  - Tier III compliant power and cooling architecture

Result

- Delivered project and met customers expectations on quality and requested reliability

Vertiv™ MegaMod™ 1.1 MW

CASE STUDY

1.1 MW **IT Load**

Customer Need

- Looking to rapidly expand their available colocation white space
- Highly reliable, world-class facility offering future flexibility and enhanced performance

Solution

- Prefabricated modular data center consisting of 120 racks with expansion to up to 286 racks, and including Vertiv power and thermal management technologies, as well as advanced Lithium Ion batteries for reduced operational expenses
- Solution was prefabricated, integrated and tested in Vertiv facility, then disassembled into 12 shippable units and packed for transport

Result

- Solution was shipped, reassembled on-site and ready for testing in under 6 weeks
- Reliable, low-risk partner ensuring projects remain on-time and on-budget
- Ongoing local support for operations

0.5 MW and more

Vertiv™ SmartMod™ HDX

Latest developments in AI, IoT, cryptocurrencies, AR/VR reality and the exponential growth in data, means that today businesses need access to computers capable of performing complex workloads. This in turn has resulted in a need for data centers where a single IT rack can support densities of 20 kW and higher.

For such applications, where air-cooling can cover the increased heat loads, Vertiv has developed a standardized prefabricated data center offering - the Vertiv™ SmartMod™ HDX.

This simple, scalable data center design uses pre-engineered Vertiv™ building blocks to create a full solution – the Power Module, IT Hall and Chiller Skid. This next generation High Power Density data center utilizes the Vertiv™ Liebert® DCL or active Vertiv™ Liebert® DCD cooling solutions to support rack density up to 50 kW/rack.

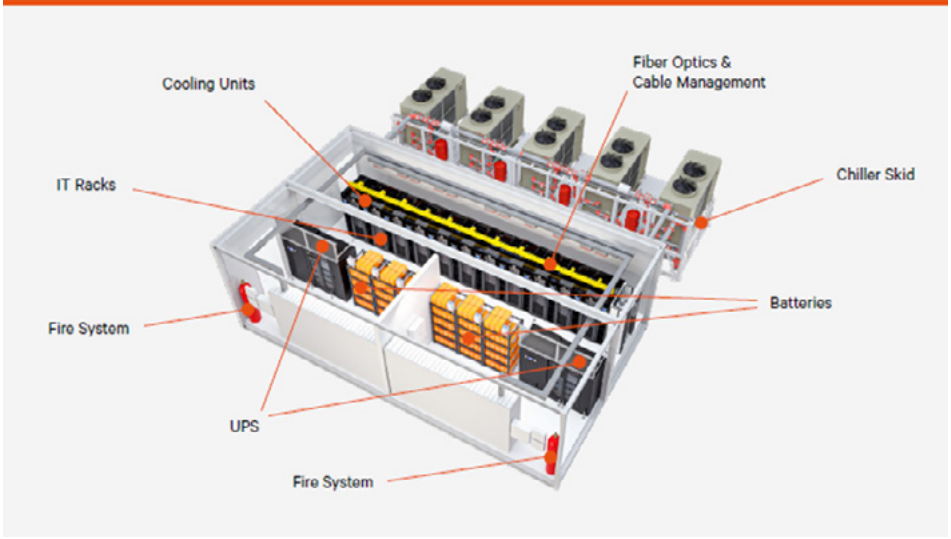
Based on preferred cooling option, SmartMod Combo is available with both direct expansion cooling units or chilled water based cooling units.

To showcase the capabilities of this high power density datacenter platform, take a closer look at our two Vertiv™ SmartMod™ HDX Reference Designs

- **Vertiv™ SmartMod™ HDX DCL**
  – DCL cooling-based solution
- **Vertiv™ SmartMod™ HDX DCD**
  – DCD cooling-based solution

The SmartMod™ HDX solution can further adapt to your specific rack quantity and rack density.

Component Overview of Vertiv™ SmartMod™ HDX DCL

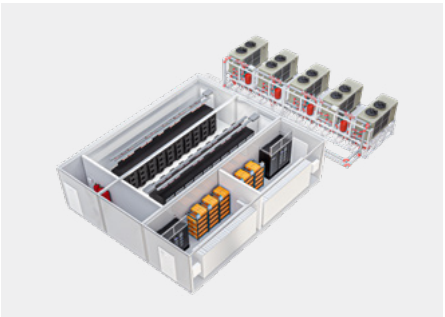


Cut off view of the Vertiv™ SmartMod™ HDX DCL

SmartMod HDX data center solution includes:

- **UPS power** –Monolithic Vertiv™ Liebert® EXL S1 UPS, with Dynamic Grid Support for enhanced grid interactive capabilities
- **Batteries** - Reliable battery backup with Valve-regulated lead acid (VRLA), or lithium-ion batteries
- **Liebert® DCL Modular Rack Cooling**, Closed Loop Cooling Architecture (up to 35 kW/rack)

  or
- **Liebert® DCD rear-door heat exchangers** (passive or active, up to 50 kW/rack)
- **Vertiv™ Liebert® HPC-S chillers** with free-cooling option
- **Vertiv™ racks**
- **Vertiv™ rack power distribution units (rPDUs)**
- **Automatic Transfer switching functionality** – Automatic switching between primary and secondary power sources.
- **Overhead infrastructure** - Including chilled water piping, fiber ducts and mesh cable trays
- **Clean agent fire suppression and aspiration smoke detection** (as optional item)
- **Ancillary systems** – CCTV, Access Control and Intrusion Detection (as optional items)
- **SCADA-based Building Monitoring System (BMS) with a SQL database** (as optional item)



Cut off view of the Vertiv™ SmartMod™ HDX DCD

Vertiv™ SmartMod™ HDX Design Specifications

	SmartMod™ HDX DCD	SmartMod™ HDX DCL
General		
Voltage/Frequency	400VAC, 50Hz	
Ambient Operating Range[1]	-25°C to +45°C [1]	-25 °C to +43°C [1]
IT Hall		
IT Racks		
No. Of Racks: Width - 600 mm	-	11
No. Of Racks: Width - 800 mm	26	-
Rack Height	42U	
Rack Depth	1200 mm	
Rack Load	12 kN	
Electrical		
Max IT Load	600 kW	385 kW
Rack Density	up to 50 kW	up to 35 kW
Busbar System	A+B side	
PDU	Two per rack	
PDU Capacity (max)	3x63A @ 230/400V - 3phase	
PDU Type	Basic, Monitored (unit level) or Switched (unit level)	
Mechanical (HVAC)		
Cooling Technology	Air-water heat exchanger mounted on rack cabinets rear-door	Air-water cooling unit for lateral attachment to server cabinets
Cooling Redundancy	N+1	
Cooling Units	Vertiv™ Liebert® DCD Active + Vertiv™ Liebert® HPC-S Freecooling Chiller	Vertiv™ Liebert® DCL Hybrid + Vertiv™ Liebert® HPC-S Freecooling Chiller
Power Module		
Electrical		
Power module topology	N or 2N	
Main Distribution Board section	400V, 50Hz, Form 4 Type 2, IP31, 36kA @ 1sec	
Automatic Transfer Switch	Breaker Based	
UPS Model	Monolithic or Modular	
UPS Rating	up to 800 kVA	up to 500 kVA
Battery Backup Time	up to 10 min	
Battery Type	VRLA / Li-ion (optional)	
Mechanical (HVAC)		
Cooling Technology	Chilled Water Floor-Mounted Cooling Unit	
Cooling Redundancy	N	
Cooling Units	PCW	

[1] Maximum altitude 500 m and maximum glycole content 45%. Operating Temperature Range can be extended to reach down to -30 or up to +52 °C

0.5 MW and more

Vertiv™ Custom

In addition to its standardized offerings, Vertiv also designs, manufactures and deploys Custom data centers. Here, we are able to build, in close cooperation with the customer, a full prefabricated Data center according to their specific requirements.

Typically, these data centers are for deployments of IT loads up to 20 MW or more.

Hyperscale Cloud Colocation

CASE STUDY

4.9 MW **IT Load**

Customer Need

- 4.9 MW of computing power within 14 months
- Hyperscale cloud tenant-specific requirements and limited site footprint - two-story deployment

Solution

- Dividing computing infrastructure among two locations — a 900-kilowatt (kW) expansion within existing M-VAULT and a greenfield site, which is the newest M-VAULT hosted at QSTP and designed for 8 MW

Result

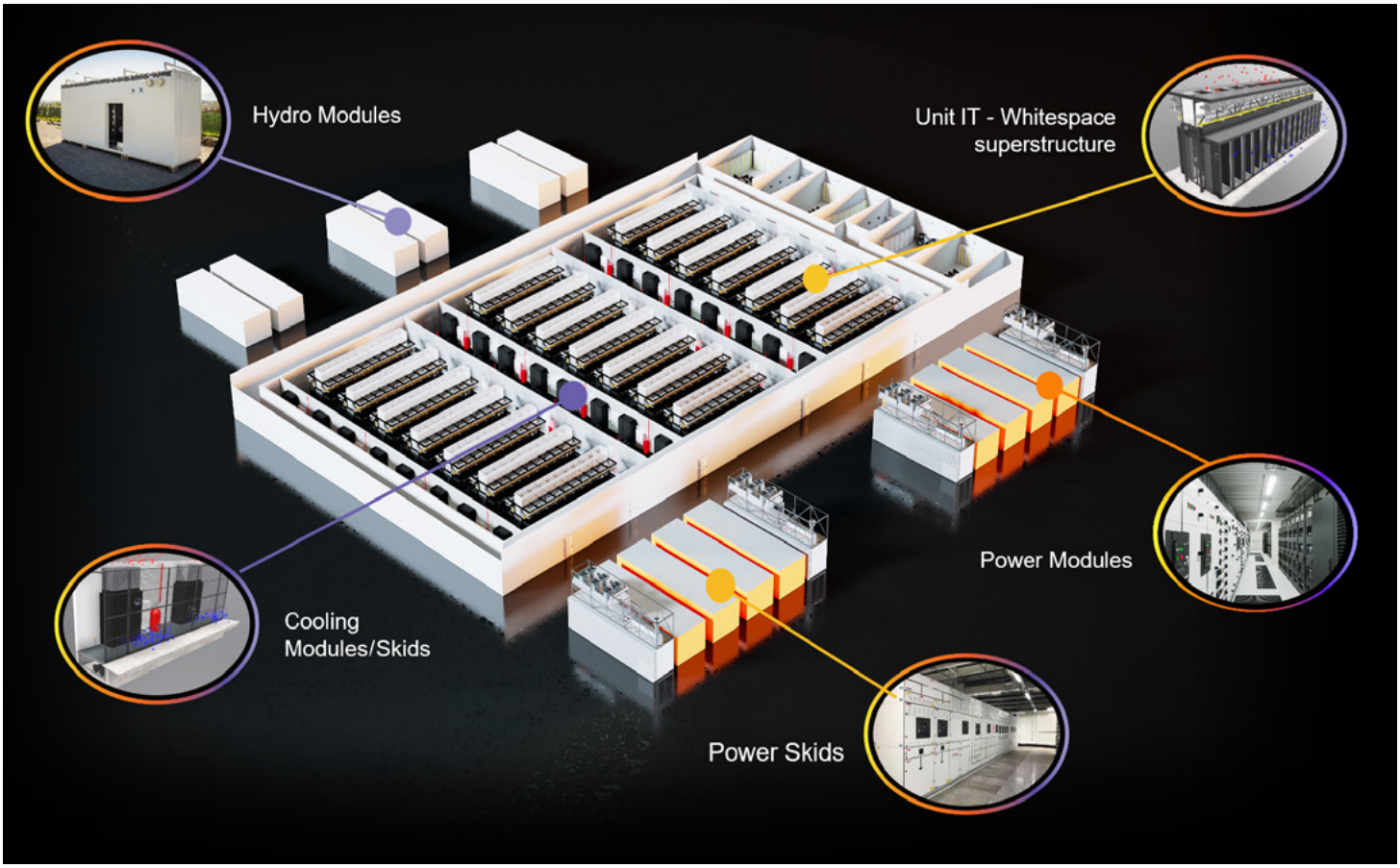
- Vertiv™ Liebert® EXL S1 UPS provided MEEZA up to 99% energy efficiency in Dynamic Online mode. With its intelligent paralleling feature, the UPS can even optimise efficiency at partial loads, which achieves cost savings by minimising energy losses.
- Largest PFM data center campus in MEA region
- 14 months turnkey schedule with Local Partner delivering the turnkey works

Hybrid Data Center Design

What is hybrid?

The hybrid modular data center approach incorporates off-site prefabrication of complex building blocks (power modules/skids, cooling and hydro modules/skids, and whitespace superstructure) into or next to traditionally constructed buildings with seamless on-site integration to speed up the fitting out of a traditional build or existing data center.

These are scalable, flexible designs for larger deployments up to 40 MW IT, with 450 to 1500 racks. Deployment time on hybrid modular solutions is usually 9 to 16 months, depending on complexity, with a possibility of inventory stock for rapid rollout of expansion.



Here you can read more about

▶ HYBRID MODULAR DATA CENTER WHITE PAPER

Vertiv™ Power Module & Skid

Vertiv™ Power Module is critical power infrastructure in prefabricated, easily expandable modular blocks primarily for data center applications allowing customer and designer to focus on the sensitive areas of the facility that require the most attention and management.

Power Module sizes are typically up to 2500+ kVA and they leverage core Vertiv™ Critical Power and Thermal Management technologies to deliver a simple, yet robust design that grows with data center needs at the most critical locations.

All subsystems are factory installed into a secure, weatherproof, and transportable enclosure. The enclosure simplifies and drastically shortens the on-site time required to install and startup, and reduces the potential for risk, quality, or schedule delays. The entire Vertiv Power Module and its sub-systems are designed to minimize additional work required at the site – from arrival on site to startup and commissioning in days instead of months.

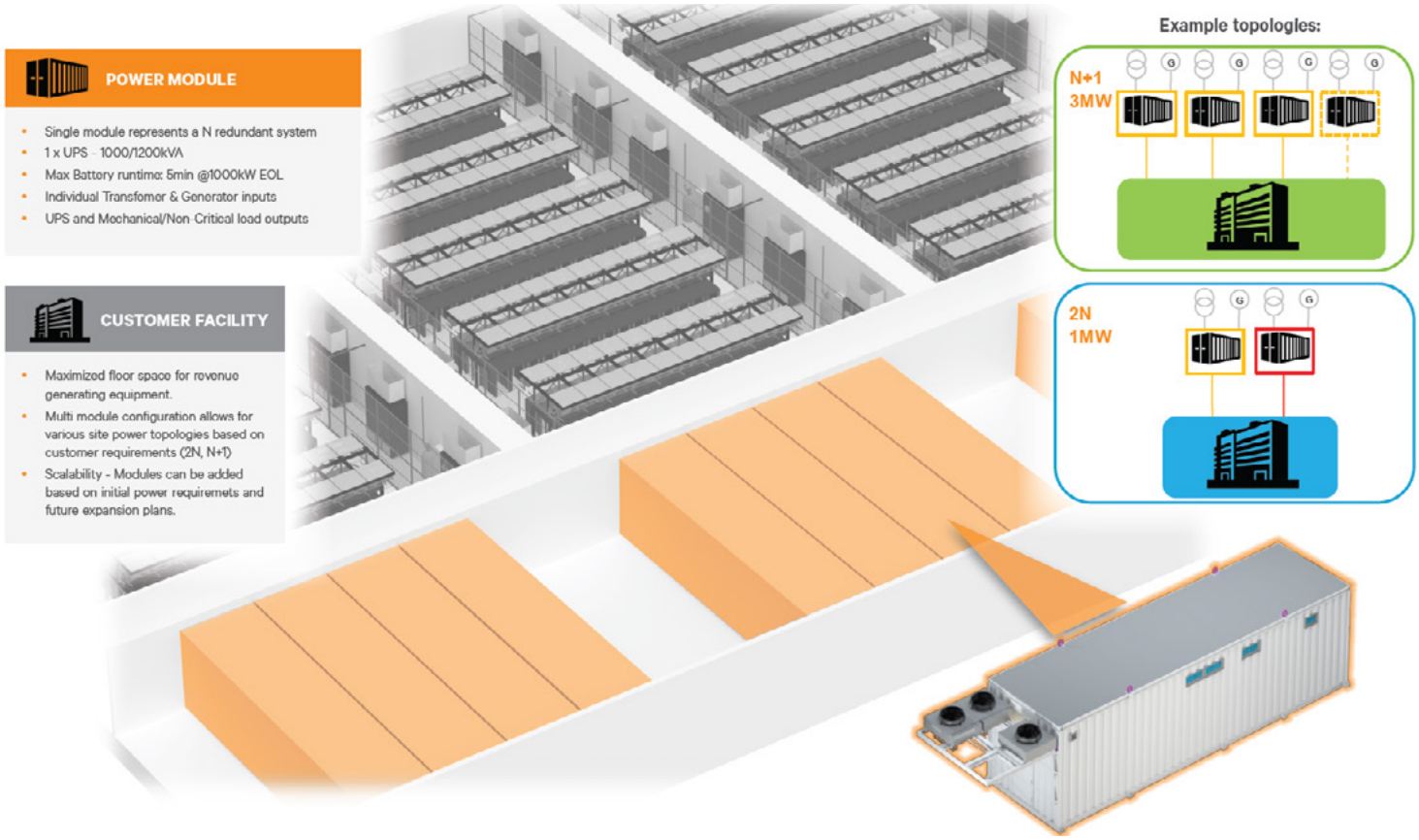
Vertiv™ Power Module incorporates:

- Vertiv™ Liebert® UPS offers industry leading power density and proven reliability
- Multiple switchboard configurations offer distribution options for both critical (UPS-protected) and non-critical downstream loads
- Flexible incoming and outgoing power connections, wall or floor, that can match the needed site architecture
- Breaker-based normal to emergency power automated transfer
- Integral energy storage with VRLA or Li-ion batteries
- Redundant Vertiv™ Liebert® Thermal Management units with air containment – ensuring optimal operating conditions for all subsystems, even in the event of utility power loss
- Clean agent fire suppression to reliably protect assets in the event of a fire
- SCADA-based Building Monitoring System (BMS) with a SQL database – Teams can use the BMS for real-time onsite or remote monitoring and visualization of critical infrastructure, with graphics, alarms, trending, user management, and database recording of sessions, keeping system performance high

Highlights

- High power density built around market-leading Vertiv™ Liebert© UPS technology
- Energy efficient operation with airflow containment to ensure optimal equipment conditions
- Rapid deployment with limited site work enabling nearly "plug and play" functionality
- Simple, hot scalability of your site's power capacity by simply adding more Vertiv™ Power Modules
- System efficiency up to 95%

Capacity & Installation Flexibility



Vertiv™ Power Module Technical Specifications

	Power Module	
Enclosure External Dimensions		
Enclosure Length	Up to 17m	52’
Enclosure Width	Up to 4m	12’
Enclosure Height	Up to 4m	12’
Estimated Transportation Weight	Up to 45t	
Enclosure Type	Steel Frame and Walls	
Electrical		
Region	EMEA	NAM
Voltage / Frequency	230/400V-3ph / 50Hz	480-3ph / 60Hz
Recommended Transformer Size	Up to 3150 kVA	
UPS Type	Liebert® EXL S1, Trinergy™	
UPS Rating	up to 2500 kVA	
Main Switch Board Rating	up to 5000A	
Rated Short-Time Withstand Current (Icw@1s)	up to 100kAIC @ 600V	
Form of Separation	up to Form Type 4b	
Automatic Transfer Switch	Open/Closed Transition	
Load Bank	Prepared with Camlock Connections	
Battery		
Battery Type	VRLA or Li-ion	
Estimated Battery Backup	5 min @ Full Load, EOL	
Cooling		
Cooling Type	Air cooling; Direct Expansion with Optional Free Cooling	
Cooling Unit Model	Liebert® PDX	
Cooling Unit Redundancy	N or N+1	
Exterior Ambient Operating Range	-20°C to +50°C	-35°C to 40°C
Fire Detection and Suppression		
Fire Detection System	Smoke/Heat detection	Conventional
Fire Suppresion System	FK 5-1-12	HFC-227A (FM-200)
Very Early Smoke Detection System	Optional	
Monitoring		
EPMS	HMI with PLC; Single Customer Interface Based on OPC UA/MQTT Protocol	
Optional	Video Surrveilance, Access Control, Intrusion Detection	

Here you can learn more about

▶ VERTIV POWER MODULES

Vertiv™ Power Module 1.2 MW

CASE STUDY

1.2 MW **Power Output**

Customer Need

- Our Key Account needed 1.2 MW prefabricated power rooms for the next phases of their Large Colocation Datacenter in Ireland
- We managed to secure business by leveraging on our experience on Power modules and optimizing solution footprint while meeting project requirement

Solution

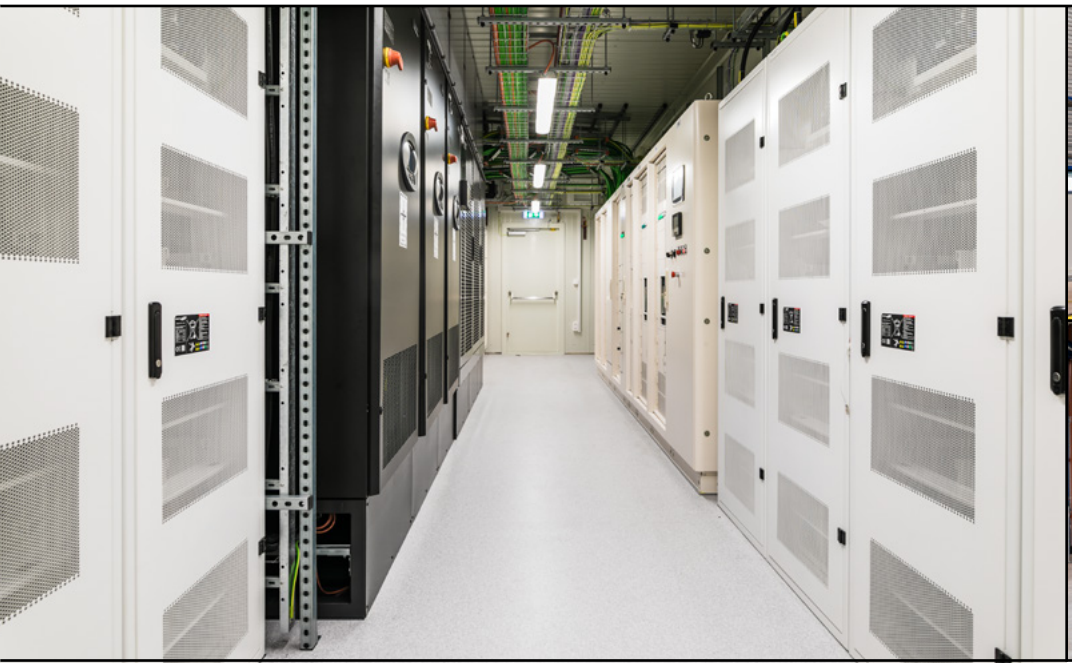
- Vertiv worked with the client to develop a 1.2 MW Power module that is fully compliant to local regulations, meets project requirements and supports project delivery dates
- Full BIM Model developed, integrating into the overall site BIM
- Delivered solution fully meeting client performance and resiliency requirements

Result

- Delivered, deployed and commissioned 12 x 1.2 MW Power modules, successfully meeting project schedule and performance requirements
- Delivered solution successfully met and passed stringent end client commissioning

Vertiv™ Power Module 1.2 MW

CASE STUDY



1.2 MW **Power Output**

Customer Need

- Large Colocation Datacenter constructed using modular power rooms to speed up delivery and optimize cost
- Meet client specific requirements and create a resilient power architecture by using 1,2MW prefabricated power rooms
- Utilize New Li-Ion battery technology to optimize footprint

Solution

- Power Module with 1200kW UPS
- N+1 redundancy on air-conditioning system
- Li-Ion batteries for 5min battery backup
- Roof top mounted condenser units
- Designed in accordance with local regulations
- All material used certified as per EAC

Result

- Delivered, deployed and commissioned 8 x 1.2 MW Power modules, successfuly meeting project schedule and performance requirements
- Delivered solution successfuly met and passed stringent end client commissioning

Hyperscale Data Center Power Skid

CASE STUDY

1.6 MW **Power Output**

Customer Need

- Power Skidded Electrical Rooms
- Large Scale capacity/throughput production
- Expertise in Electrical Integration

Solution

- 1.6 MW Power Output Skidded Electrical Rooms
- 150+ skids delivered to over 10 program sites
- Integrated Equipment includes:
  - 156 DCM racks; 2 x PDU per each rack
  - PCW cooling units with Vertiv™ SmartAisle™ technology
  - 4 x 500KVA N+1 UPS configuration
  - Busbar distribution power system and high energy efficiency
  - Tier III compliant power and cooling architecture

Result

- Solution was held in factory for extra weeks for early completion
- Satisfied customer and delivery
- Growing pipeline with client

Vertiv™ Power Module 1.7 MW

CASE STUDY

1.7 MW **Power Output**

Customer Need

- Large Colocation Datacenter in Amsterdam constructed using modular power rooms to speed up delivery and optimize cost
- Meet client specific requirements and create a resilient power architecture by using 1.7 MW prefabricated power rooms

Solution

- Vertiv worked with the client to develop a 1.7 MW Power module (2 MW UPS capacity) that meets project requirements and supports project delivery dates
- Full BIM Model developed, integrating into the overall site BIM
- Delivered solution fully meeting client performance and resiliency requirements

Result

- Delivered, deployed and commissioned 34 x 1.7 MW Power modules, successfully meeting project schedule and performance requirements
- Delivered solution successfully met and passed stringent end client commissioning

Vertiv™ Unit IT

Vertiv™ Unit IT is a prefabricated infrastructure intended for data center white space. It consists of air containment, busbars and tap-off boxes, cable trays, fiber runners, lights and, optionally, fire detection and suppression. Vertiv Unit IT is installed over the IT racks, either self-supported or suspended.

Vertiv Unit IT simplifies designing IT space with Vertiv configured infrastructure blocks. The unit is fully prefabricated and tested in Vertiv integration facility. Subsequent installation on site takes hours compared to days with traditional white space furnishing.

The configuration of the Vertiv Unit IT itself is configurable, with dimensions depending on various Whitespace site specific design requirements.

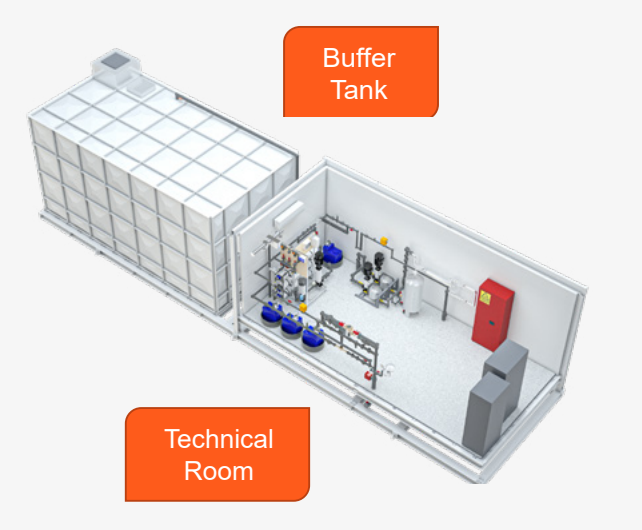
Vertiv™ HydroMod™

Vertiv™ HydroMod™ prefabricated cooling systems can offer a convenient and cost-effective solution for data center cooling applications. Prefabricated cooling system is a modular unit that is designed, built, and tested off-site, and then delivered and installed on-site with minimal disruption.

Vertiv provides a variety of HydroMod solutions:

1. Prefabricated Water Treatment System

- System sizing data centers from **0.5 to 2.5 MW** IT load
- Support for adiabatic and evaporative cooling systems
- Scalable depending on site water quality
- Skidded single-transport solution



2. Prefabricated Chilled Water System

- System sizing data centers from **0.5 to 2.5 MW** IT load
- Support for primary and secondary cooling systems
- Scalable depending on site sizing requirements
- Skidded single-transport solution
- Requires only connection to CHW system and power supply
- Can be connected in parallel to achieve redundancy

When Innovation meets Sustainabilty

Vertiv™ TimberMod™

Data center owners and operators want to improve their ability to meet evolving sustainability requirements. One approach is to reduce the embodied carbon of the new capacity they deploy.

Embodied carbon includes non-operational emissions, including the extraction, manufacturing, transportation, and installation of materials and components used to build and deploy new facilities.[1] Data centers are typically constructed of concrete (up to 40%), fuel (around 25%), and steel (around 10%).[2] Across industries, steel contributes 10% of global carbon emissions, while concrete contributes 6% to 11%.[3]

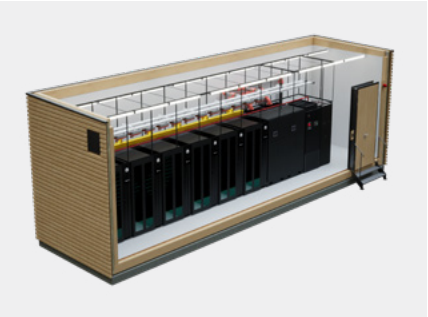
Data center owners and operators can reduce embodied carbon by choosing different materials and manufacturing methods to deploy new capacity. Mass timber can be considered a more environmentally sustainable building material than concrete or steel because it can be renewable if harvested using sustainable processes. Mass timber also stores carbon captured from the environment.[4] As a result, "mass timber construction can function as a form of carbon removal when combined with sustainable timber production and building demolition practices."[5]

Vertiv prefabricated modular data centers (PFM) offer new IT and power capacity in modular building blocks, supporting business growth while avoiding carbon emissions due to unused capacity. Now, data center owners and operators have fresh options with Vertiv™ TimberMod™, a PFM structure made of mass timber that can be applied to **Vertiv™ Power Module** and **Vertiv™ SmartMod™** infrastructure.

[1] Joseph Hawkins, "The embodied carbon challenge for truly net-zero data centers," article, DatacenterDynamics, September 21, 2023, https://www.datacenterdynamics.com/en/marketwatch/the-embodied-carbon-challenge-for-truly-net-zero-data-centers/
[2] Dan Swinhoe, "Sustainable data centers require sustainable construction," article, DatacenterDynamics, article, May 12, 2021, https://www.datacenterdynamics.com/en/analysis/sustainable-data-centers-require-sustainable-construction/#
[3] Gideon Fink Shapiro, "Concrete, Steel, or Wood: Searching for Zero-Net-Carbon Structural Materials," Architect Magazine, January 15, 2020, https://www.architectmagazine.com/technology/concrete-steel-or-wood-searching-for-zero-net-carbon-structural-materials_o
[4] "What Is Mass Timber Construction," fact sheet, American University, updated June 24, 2020, https://www.american.edu/sis/centers/carbon-removal/fact-sheet-mass-timber.cfm#
[5] Ibid.

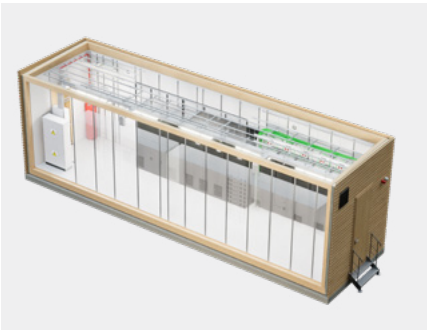
Solutions with Vertiv™ TimberMod™ structure

Vertiv™ SmartMod™



SmartMod™ is an all-in-one modular data center featuring all equipment necessary for normal data center functionality. All subsystems are factory installed into a secure, weatherproof and transportable enclosure – simplifying and shortening the on-site time required to install and startup.

Vertiv™ Power Module



With Vertiv™ Power Module you can rapidly construct redundant blocks of critical power infrastructure for your new or existing facility, allowing you to focus on the sensitive areas of the facility that require the most attention and management.

Deploy Vertiv™ TimberMod™ to Accomplish Key Business Goals

With TimberMod, data center owners and operators gain a solution that meets their business, technical, operational, and sustainability objectives.

Deployable in modular building blocks of IT and power capacity, TimberMod has an appealing architectural design that transcends data center applications and blends into any environment. Vertiv provides end-to-end services to ensure a straightforward startup and smooth ongoing operations. These services include deployment, commissioning, ongoing maintenance, remote monitoring, and training. Use TimberMod to meet business and performance objectives while reducing carbon emissions.

One Click LCA

Global Warming Potential*

Timber 1 : 3 Steel

** Calculations were performed using One click LCA software and Level(s) framework, both compliant with EU taxonomy–Calculation method (EN 15978:2011). Sources for the material Environmental Product Declaration (EPD) are taken for the design phase. Data used in calculations comes from equivalent design phases of two Vertiv™ Power Modules. The calculation was carried out for the cradle (A1) to gate A3 and the transport of materials and structure elements to the assembly site (A4) - in this case our factory site in Rugvica, Croatia. The equipment was excluded from the calculation since it represents the common denominator for both buildings.*

Here you can read more about

▶ VERTIV TIMBERMOD

Accomplish More Sustainability Goals with Vertiv™ TimberMod™

Vertiv TimberMod addresses data center owners' and operators' desires to use more sustainable processes – without compromising performance or speed to market TimberMod™:

- **Leverages mass timber as a structural element:** Built with mass timber, TimberMod offers the same level of reliability as steel, ensuring robust performance when encountering seismic activity, wind forces, and structural demands.
- **Uses natural materials:** Mass timber can be a renewable construction material based on how it is produced, harvested, and used. Organizations that deploy TimberMod can minimize resource depletion and reduce carbon dioxide emissions.

  The European Commission is developing a roadmap to reduce the whole-life carbon of the building sector by 2050 by focusing on operational and embodied emissions. This regulation could spur data center owners to adopt mass timber as a construction material for new capacity in the European Union.[6]
- **Can be flexibly and rapidly deployed:** Offering prefabricated critical power and IT infrastructure, TimberMod is ideal for small and medium-sized data centers that want to deploy new capacity at pace.

[6] "MEPs back plans for a climate neutral building sector by 2050," press release, European Parliament, March 14, 2023, https://www.europarl.europa.eu/news/en/press-room/20230310IPR77228/meps-back-plans-for-a-climate-neutral-building-sector-by-2050

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