

Vertiv™ Integrated Modular Solutions

Building at scale with Prefabricated Modular Data Centers

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Integrated Modular Solutions

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Change in building methodology

Conventional “Brick and mortar”

Design

Construct

Install

- Select and size system components and engineer to work together
- Construct the building on site
- When building is completed, installation and commissioning starts



Modular Constructed Building

Design

*Manufacture
off-site*

Deliver

Install

- Fabricate and assemble all components of the building in the factory
- Prepare the site for installation
- Transport Modules to site and make final connections



Prefabricated / Modular Solutions Value Offering

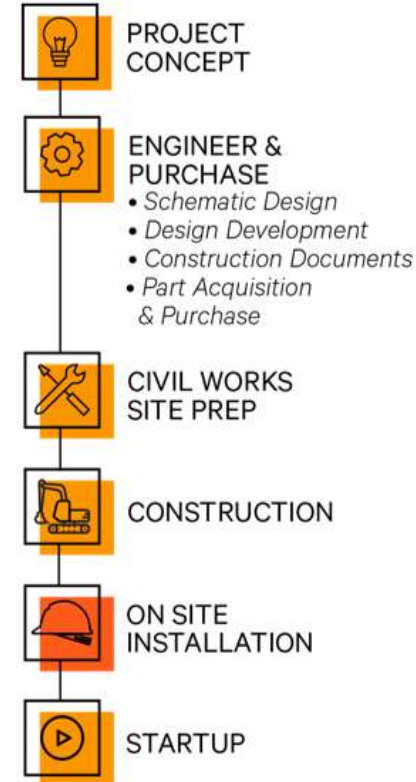
CORE VALUES:

- Rapid Design
- Speed of Deployment
- Facility Integration
- Simplistic Assembly

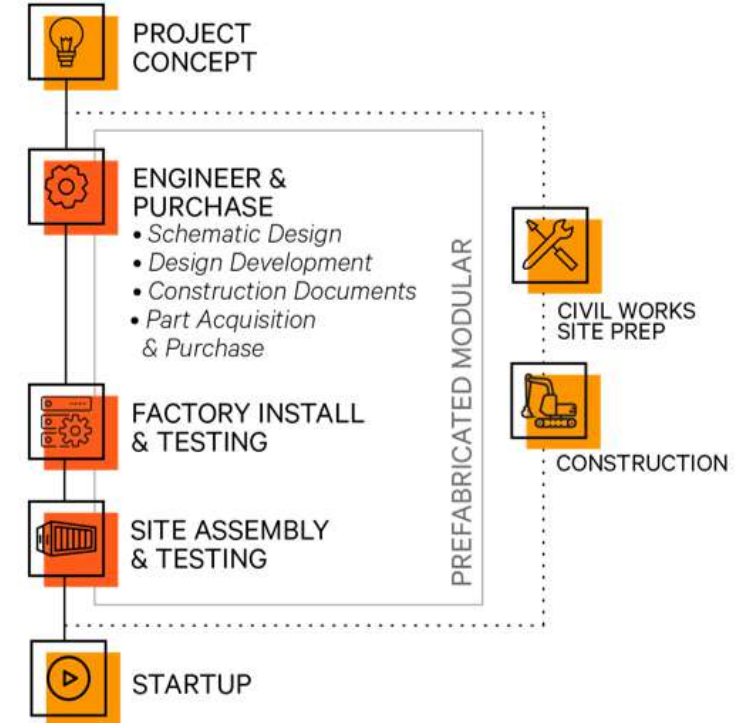
- Efficient design*
- Low Risk due to factory integration*
- Cost Certainty*
- Scalable for future extensions*
- Repeatable*
- High quality control through factory*
- Geographic reach*

- More stringent Quality Control
 - factory environment integration and testing
- Site preliminaries reduction
- Onsite labor reduction
- Onsite Logistics complexity reduction
- Live onsite redesign reductions
- Faster Speed of Deployment

Traditional New Build



Prefabricated Modular New Build



Time Saving vs. Traditional New Build
up to 30 - 40%!

Vertiv and Omdia research



228 companies were surveyed from many diverse industries across the globe who operate their own Data Center. More than half have already deployed Prefabricated Modular Data Center solutions. Nearly all companies indicated they would consider utilizing the technology in their future Data Center strategy. Also, 9/10 respondents reported that they would use a Prefabricated Modular Data Center solution as their construction strategy.

Deploying PMDC technology 52%



48%

PMDC is a part of future DC strategy



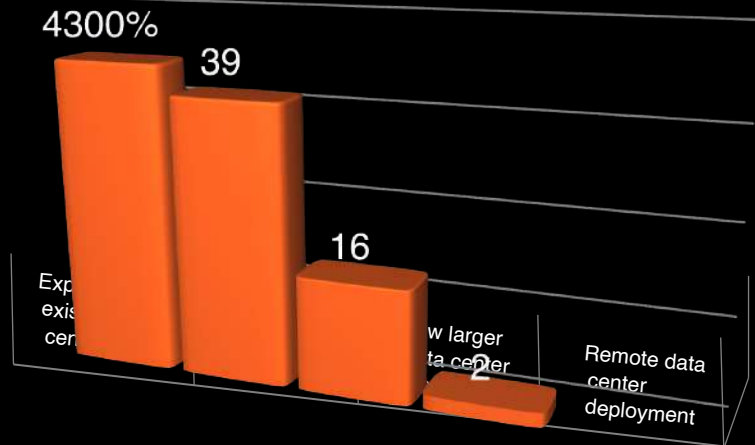
99%

Using PMDC as default DC construction strategy



93%

Prefabricated Modular Data Centers are best suited for:



Main reasons to deploy PMDC:

- Modularity
- Standardization
- Sustainability environmentally friendly
- Attractive pricing
- Easy to deploy
- Product customization
- Lead time



Scalability
29%



Service & Support
29%



Follow hyperscale DC operator innovation
25%

What are Vertiv™ Integrated Modular Solutions?

Solutions engineered with preassembled, integrated and tested systems in factory environment to shorten deployment time and improve predictability of performance:

- Standalone prefabricated modular-constructed buildings
- High flexibility in designing the solution
- Internal look and feel of an actual building
- External facade to meet esthetic needs (optional)
- Modular part can be connected to standard building



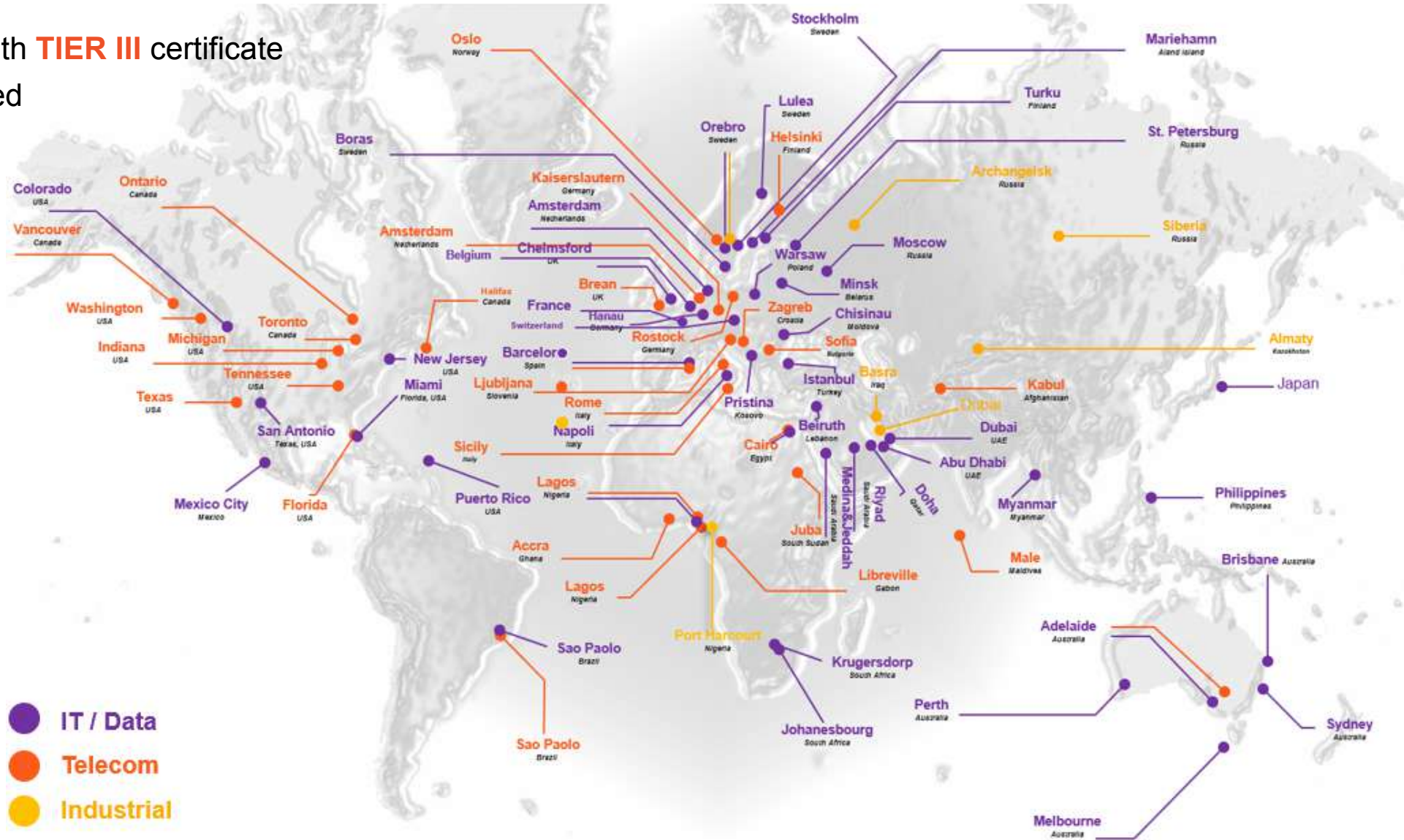
Integrated Modular Solutions EMEA



90.000m2 of manufacturing space

Vertiv Modular history - Global deployments

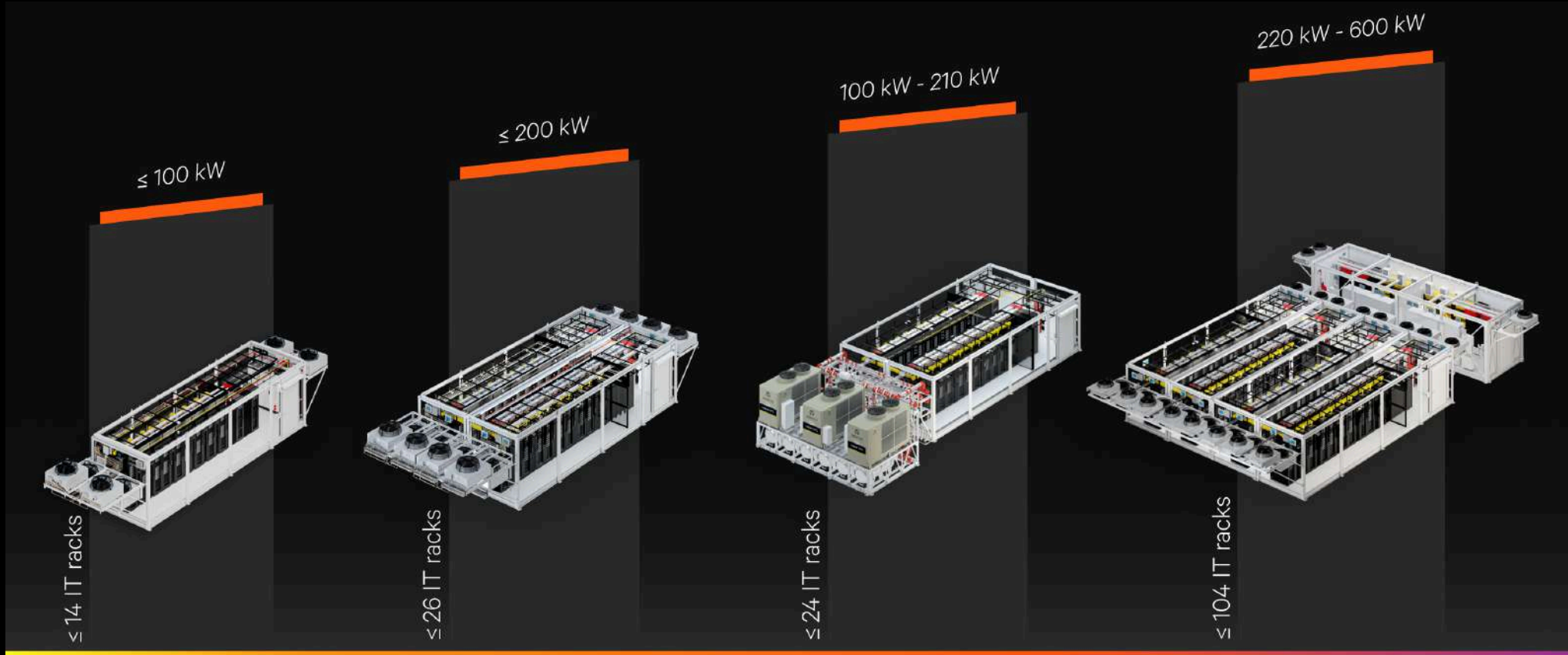
- Multiple global sites with **TIER III** certificate
- **1500+** Modules shipped
- **800+** Sites worldwide
- **250+** MW IT load
- **23000+** m2
- **5000+** Racks



Portfolio and success stories



Standard solutions (SmartMod family) - Small EDGE

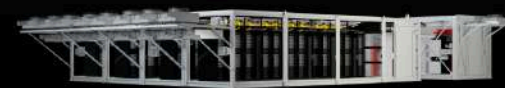
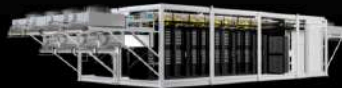


SmartMod™

SmartMod™ Max DX

SmartMod™ Max CW

SmartMod™ Combo



Standard solutions (SmartMod family) - Success stories

SmartMod project in Croatia:

- 5 pieces of racks, 20kW of IT load
- Concurrently maintainable solution
- Diesel generators as part of the solution



SmartMod project in Italy:

- 9 pieces of racks, 100kW of IT load
- Additional space for 2 custom racks
- Concurrently maintainable solution



SmartMod Max project in Japan:

- 20 pieces of racks, 80kW of IT load
- Structure for highly seismic environment
- Facade on Skid module
- Concurrently maintainable solution
- Full compliance to local standards



SmartMod Max project in Ivory Coast:

- CLS + Data Center
- 10 pieces of racks, 30kW of IT AC load
- 20 pieces of racks, 15kW of IT DC load
- Concurrently maintainable solution



SmartMod Max project in Saudi Arabia:

- 24 pieces of racks, 100kW of IT load
- Concurrently maintainable solution



Prefabricated Modular solutions - ENTERPRISE / COLOCATION

Prefabricated Modular Data Centers:

- Custom-built solutions for Data Centers
- Design & Build approach:
 - Vertiv LV equipment
 - Vertiv Power
 - Vertiv Thermal
 - Vertiv IRS
 - 3rd party subsystems
- Scalable design up to 2MW IT blocks
- 200 - 300 racks



Vertiv™ MegaMod™:

- Standardized prefabricated Modular Data Centers
- Design & Build approach:
 - Vertiv LV equipment
 - Vertiv Power
 - Vertiv Thermal
 - Vertiv IRS
 - 3rd party subsystems
- Scalable Data Centers up to 2MW (500kW IT blocks)
- 96 to 128 racks per 500kW block



Prefabricated Data Centers - Success stories

T-Systems, Spain:

- Prefabricated Data Center on 2 floors
- 38 pieces of Modules, 1200m²
- Vertiv Racks: 290 pieces
- Vertiv PDU's: 580 pieces
- Vertiv Thermal (CW cooling technology)
- TOTAL IT load: 1100kW



Minsk, Belarus:

- Prefabricated Data Center
- 12 pieces of Modules, 540m²
- Vertiv Racks: 156 pieces
- Vertiv PDU's: 312 pieces
- Vertiv Thermal (CW cooling technology)
- TOTAL IT load: 1300kW



Doha, Qatar:

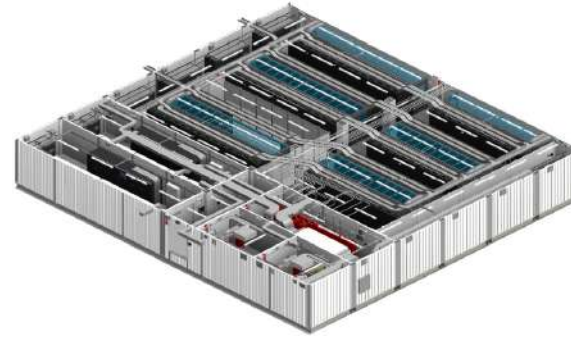
- Prefabricated Data Centers, TIER II / TIER III compliant
- 80 pieces of Modules, 1800m²
- Vertiv Racks: 260 pieces
- Vertiv PDU's: 520
- Vertiv Thermal (DX cooling technology)
- TOTAL IT load: 2300kW



Prefabricated Data Centers - Success stories

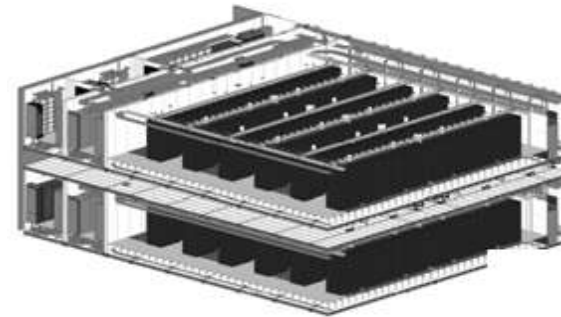
Johannesburg, South Africa:

- Prefabricated Data Center
- 12 pieces of Modules, 480m²
- Vertiv Racks: 120 pieces (expandable to 286 pieces)
- Vertiv PDU's: 240 pieces
- Vertiv Thermal (DX cooling technology)
- TOTAL IT load: 0.5MW (expandable to 2.2MW)



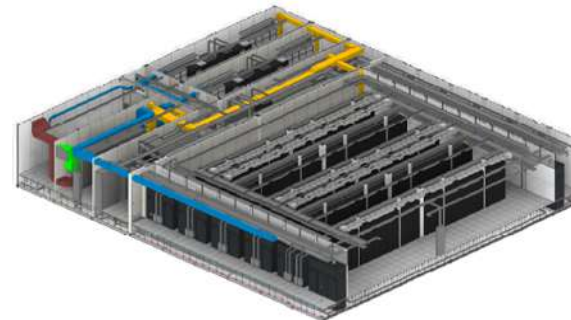
Doha, Qatar:

- Hyperscale cloud colocation
- 80 pieces of Modules, 2920m²
- Hyperscale cloud tenant-specific rack layout
- Limited site footprint (two-story deployment)
- Distributed redundant topology (A/B/C) for each 2MW block
- TOTAL IT load: 4.0MW with future expansion to 8.0MW



Doha, Qatar:

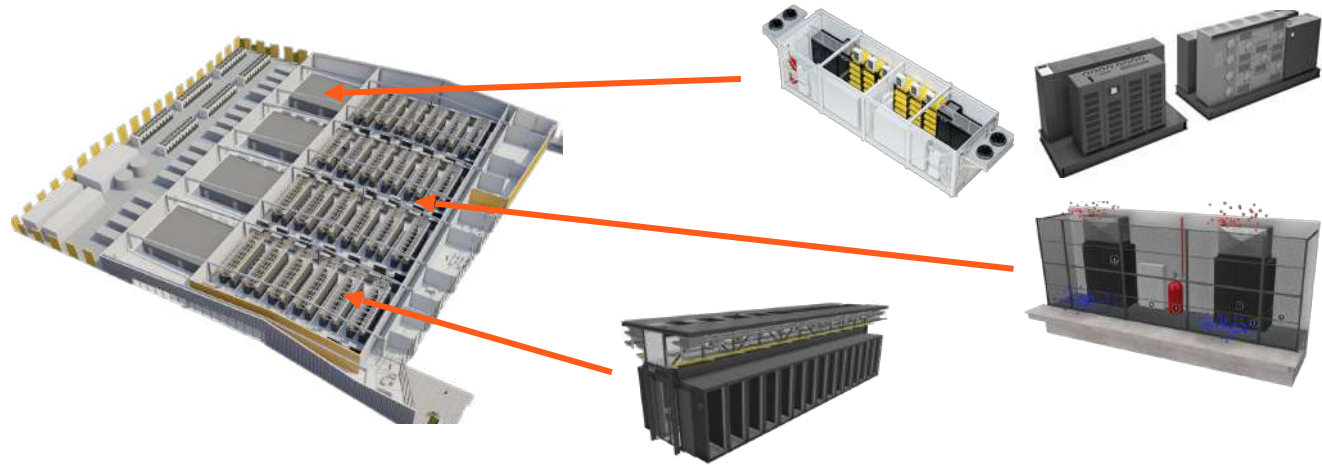
- Hyperscale cloud colocation expansion
- 18 pieces of Modules, 700m²
- Hyperscale cloud tenant-specific rack layout
- Limited site footprint
- Building covered with external cladding
- TOTAL IT load: 900kW



Hybrid approach - HYPERSCALE / COLOCATION

Hybrid solution:

- Custom-built solutions
- Traditionally constructed building on site
- Prefabricated components:
 - Power Modules / Skids
 - Cooling Modules / Skids
 - Unit IT Modules
- Scalable design up to 40 MW of IT load
- 450 - 1500 racks



Power Modules / Power Skids:

- Optimizing Data Center footprint
- Optimizing speed of deployment
- In EMEA region: 200+ pcs / 250MW+
- Redundancy levels: N, N+1, 2N
 - Vertiv LV equipment (up to 5000A)
 - Vertiv Power
 - Vertiv Thermal
 - 3rd party subsystems



Hybrid approach - Success story (10,8MW Data Center)

Customer Region: Saudi Arabia



Power Modules - Success stories



Country	Number of sites	Module size	Installed IT capacity	Year
Netherlands	3	1.0 MW, 1.6 MW, 1.7 MW	149.0 MW	2018 - 2023
KSA	4	0.6 MW, 1.2 MW	40.2 MW	2018 - 2022
Poland	4	1.2 MW	30.0 MW	2020 - 2022
Russia	2	1.2 MW	28.8 MW	2020 - 2021
Ireland	2	1.2 MW	14.4 MW	2021
UAE	1	1.6 MW	6.4 MW	2021
Germany	1	1.0 MW	3.0 MW	2018 - 2019
Malawi	1	0.6 MW	0.6 MW	2021
Italy	1	0.6 MW	0.6 MW	2021
Croatia	1	0.6 MW	0.6 MW	2022
TOTAL:			273.6 MW	



and counting...

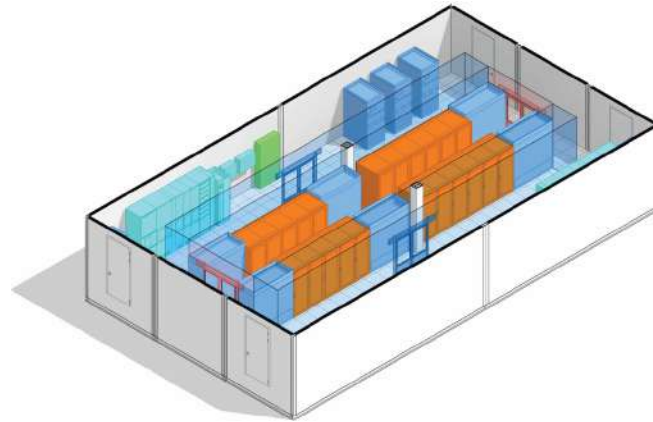
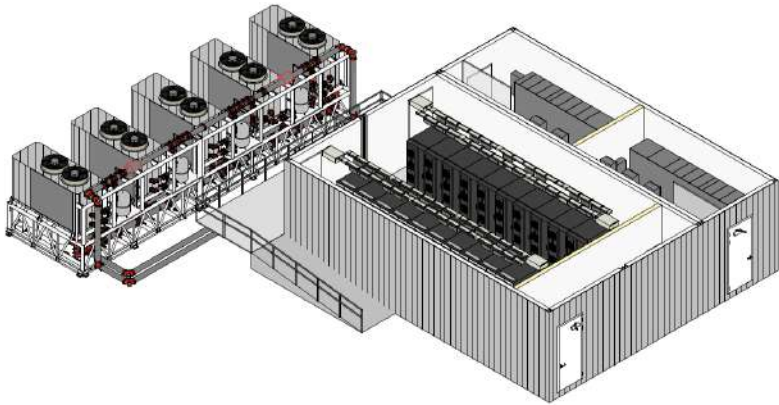
High Density and High-Power Computing Data Centers

Market:

- Machine Learning (ML)
- Artificial Intelligence (AI)
- Research activities

Market requirements:

- Pushing the limits on rack density - up to 200kW per rack
- Pushing the limits of IT load inside small space - up to 4MW
- Pushing the limits on PUE - down to 1.06



Dammam, Saudi Arabia:

- HPC Data Center
- 16 pieces of Modules, 780m²
- Racks: 20 pieces
- UL-standard power supply (480V, 3-wire, 60Hz)
- Vendor-specific rack layout and liquid cooling solution
- TOTAL IT load: 3.6MW (180kW/rack)



THANK YOU!

