



VERTIV™

SMARTMOD™

Intelligent, Integrated Infrastructure
for the Data Center



Deploy a High-Capacity, Efficient and Secure Infrastructure in Just Months

Building a new data center in a short timeframe is nearly impossible.

The SmartMod™ infrastructure from Vertiv™ provides enhanced levels of availability, efficiency and control in self-contained enclosures that can be deployed securely, virtually anywhere.

With the SmartMod solution, you get an effective alternative to traditional data centers, which gives you cost-savings, operational efficiency and the highest levels of availability—implemented in just months.

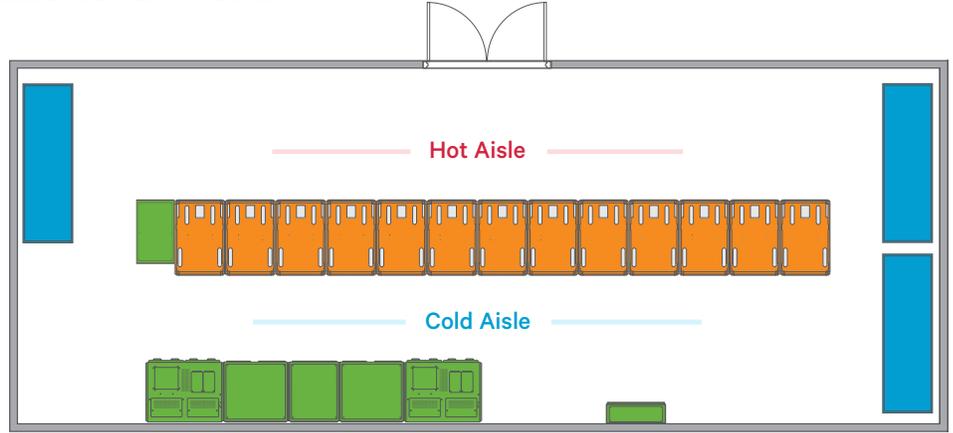
The SmartMod infrastructure is ideally suited for:

- Supplemental data center capacity
- Disaster recovery
- Remote data centers

With the SmartMod solution, Vertiv has demonstrated CAPEX savings of about 8 percent AND OPEX savings of about 29 percent, as well as:

- Tested as a system, minimizing commissioning and deployment time. Full testing reports are provided

Compare the Costs of a Conventional Data Center Design Versus the SmartMod Infrastructure Solution



Conventional

Number of Racks	13
Density	5.77
Total IT Load	75 kW
Cooling units	3 x 20 ton Precision Cooling systems units
Power	2 100kVA UPS systems with Battery Modules Distribution panel
Heat Rejection Equipment	External Condensers

● Fire suppression canister	■ AC Power
■ Transfer switches	■ Racks and Integrated Cabinets
■ Precision Cooling (DX configurations shown. Chilled Water configurations also available)	■ Condensing Units

	CONVENTIONAL DATA CENTER DESIGN	SMARTMOD 8-RACK, 75KW, N+1	COST SAVINGS	ADVANTAGE SMARTMOD
Room Costs	\$579,000	\$84,000	\$495,000	85%
Infrastructure Costs	\$315,000	\$772,000	-\$457,000	-145%
Total Capital Expense	\$894,000	\$856,000	\$38,000	4%
Energy Consumption	\$31,000	\$22,000	\$9,000	29%
5 Year OpEx	\$155,000	\$110,000	\$45,000	29%
5 Year TCO	\$1,049,000	\$966,000	\$83,000	8%

Room Savings: Pre-engineered, integrated enclosure eliminates need for new facility and reduces planning and on-site costs.
Equipment Savings: SmartMod enclosure cost includes data center space and infrastructure; cost more than offset by other savings.
Energy Savings: Airflow management, EC fans, digital scroll, intelligent cooling controls, no chilled water.

What Makes the SmartMod™ Offering Unique?

Imagine the advantages of a rapidly deployable, standalone data center with all the capabilities you need to achieve your IT objectives.

The SmartMod infrastructure utilizes the following data center and technology best practices to deliver results in efficiency, availability and capacity:

- Maximizes the return temperature at the cooling units to improve capacity and efficiency
- Matches cooling capacity with IT load
- Utilizes cooling design that reduces energy consumption
- Uses power management systems that optimize availability and efficiency
- Features a design that enhances flexibility using scalable architectures that minimize footprint
- Utilizes real-time infrastructure optimization to provision resources faster, increase efficiency and reduce stranded capacity
- Leverages the availability of in-market data center design expertise and technical assistance

EFFICIENT	ECONOMICAL	SIMPLIFIED	CONTROLLABLE
<ul style="list-style-type: none"> • Reduce power consumption by up to 28% compared to conventional data center design • Reduce maintenance costs through an efficient design that reduces wear and tear and requires less servicing • Install and service components without disrupting the main data center or integrated systems • Easily access for servicing with the 11.5-foot width which provides more work space 	<ul style="list-style-type: none"> • Reduce time and cost of deployment due to pre-engineered design; order, install and implement within just months • Avoid the costs and hassles of data center expansion and construction by adding stand-alone capacity and space as needed • Deploy without burdening your existing power and cooling infrastructure 	<ul style="list-style-type: none"> • Rapidly deploy through a pre-engineered, integrated infrastructure • Ensure continuity of business operations with single system startup, warranty, preventive maintenance and repair • Utilize industry-leading service and support provided by local data center design experts who can help implement the solution as a standalone data center or integrated with existing facilities 	<ul style="list-style-type: none"> • Comprehensively monitor and manage each connected device to ensure efficiency and availability, and evaluate how potential adjustments might affect performance • Ensure efficiency and availability with Liebert® iCOM® controls — manage cooling to optimize IT equipment performance and life • Enhance performance and anticipate potential problems before they occur with Avocent® infrastructure monitoring and management appliances and software • Increase physical security and equipment protection with lockable cabinets, mounted video cameras and access alerts; incoming power is not exposed

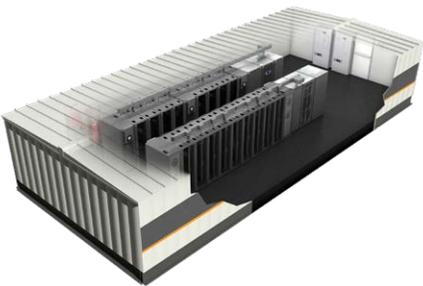
SmartMod™ Enclosure: Efficient Technologies Provide a Reliable, Innovative Solution

Get the industry's leading physical infrastructure in a rapid-deployment enclosure.

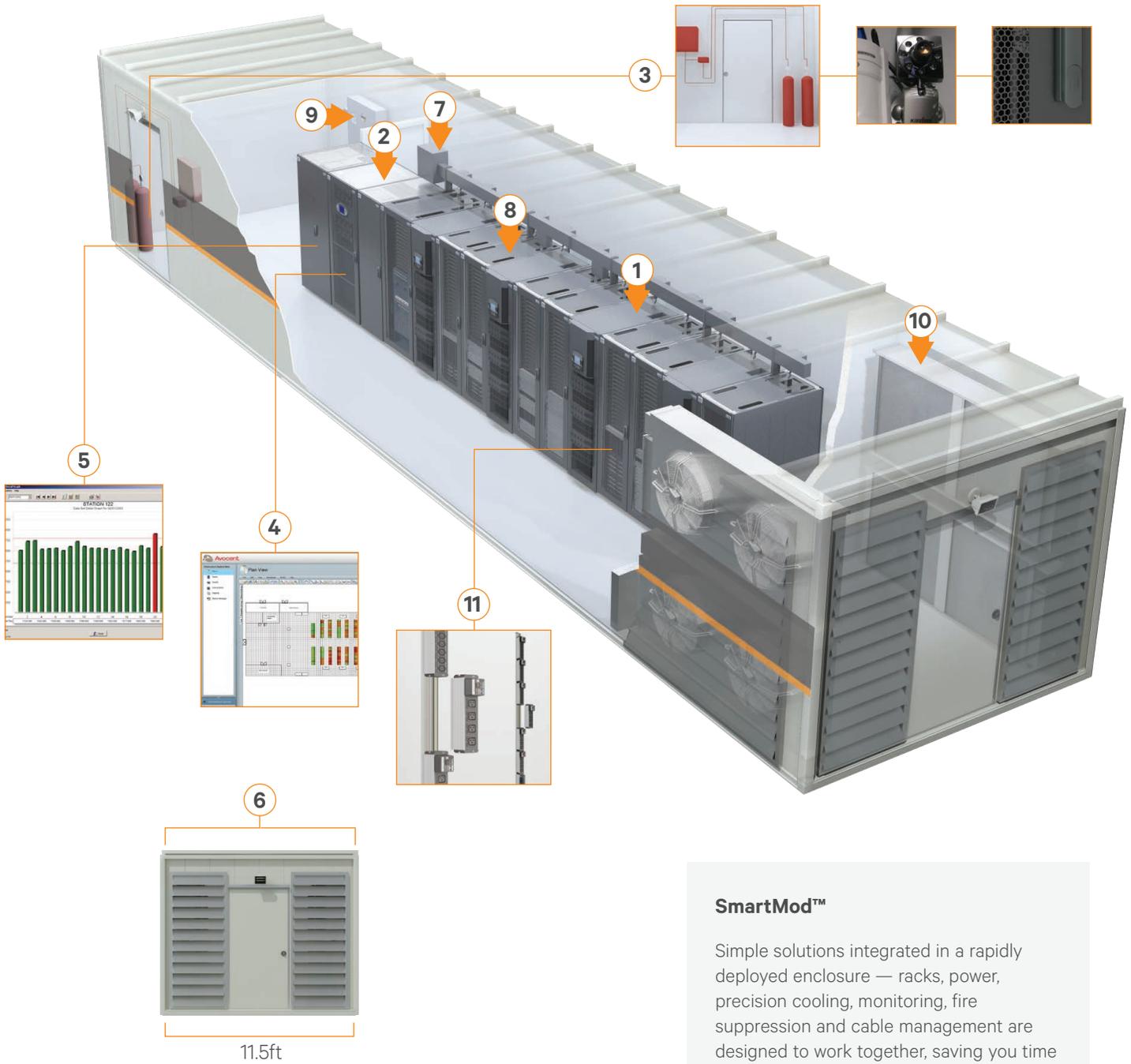
The SmartMod enclosure comes in configurations to support a range of capacity needs. Multiple power and precision cooling options within each configuration let you customize it for redundancy levels, types of heat rejection and other requirements.

To accommodate larger IT loads, power and IT equipment can be separated into matching enclosures configured to function together.

The SmartMod infrastructure can be used to supplement existing data center capacity, to act as a quickly deployable remote data center, or to serve as a disaster recovery site.



1. **High-efficiency cooling technologies support higher density** — Liebert® CRV™ precision cooling system with Liebert iCOM® controls match cooling to rack load, and reduce cooling system energy consumption and cooling system cost
2. **Modular, scalable high-efficiency and high-reliability UPS** — Liebert APM™ provides transformer-free, on-line, uninterrupted power, and KIRK™ key interlock system for safety
3. **Safe and secure** —
 - Remotely monitor physical security and access through video cameras and access-triggered alarms
 - Integrated fire suppression enhances safety and physical security
4. **Comprehensive, remote data center infrastructure management** — Avocent® appliances and software provide comprehensive, remote monitoring and control
5. **Proactive battery monitoring and management** — Alber® BDSi® in external battery cabinet constantly monitors each battery to ensure availability and reliability
6. **Easy access and service** — Unique 11.5-foot internal width provides wider aisles for easy movement and equipment maintenance
7. **Flexible power distribution** — Liebert MB® Modular Busway is a flexible and economical way to deliver power to the rack without the cost or hassle of power cable whips. Connects directly to rack PDUs
8. **Flexible platform for easy configuration** — Full-depth DCM™ racks maximize space utilization and allow you to add any type of IT or networking equipment and simplify cable management with tool-less accessories
9. **Integrated heat rejection** — Quiet, high-efficiency condensers are matched to cooling units for greater operating efficiency. Liebert MC™ condensers require less refrigerant, run more efficiently and run more quietly than other options
10. **Flexible rack PDUs** — MPX™ adaptive rack PDU or MPH2™ managed rack PDU provide flexibility and power control at the receptacle level, and faster implementation of IT equipment



SmartMod™

Simple solutions integrated in a rapidly deployed enclosure — racks, power, precision cooling, monitoring, fire suppression and cable management are designed to work together, saving you time and money on installation and operation.

Sampling of Reference Design Configurations

The SmartMod™ infrastructure solution saves on design and installation costs with fully integrated power, cooling and monitoring in a pre-configured enclosure.

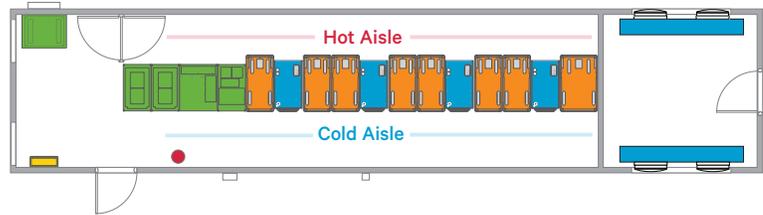
Because of its rapid deployment, favorable energy and space efficiencies, the SmartMod enclosure is the simple answer to your infrastructure needs.

IT Enclosure, 90kW or 75kW

Input voltage	480 or 208 VAC 3-Phase
Rack Space	336 U
Density	90kW: 11.25 per rack 75kW: 9.37kW per rack
Total IT Load	90kW / 75kW
Power Redundancy	90kW: N / 75kW: N or N+1
Cooling Redundancy	90kW: N or N+1 / 75kW: N or N+1
Footprint	11.5'W x 53'L
Heat Rejection Equipment	Integrated Condensers

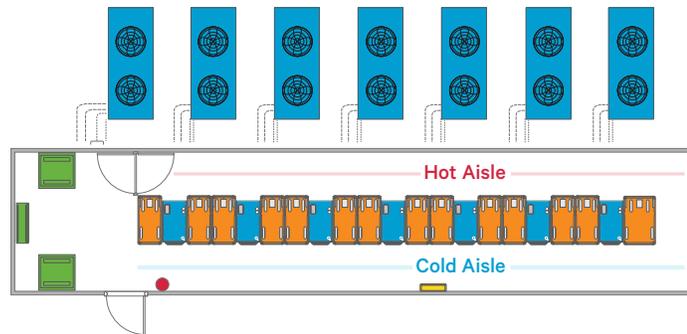
Primary Applications

- Remote/off-site deployment, disaster recovery.
- Racks, Liebert® UPS, Liebert MB, Liebert CRV based Precision Cooling
- High Density Designs



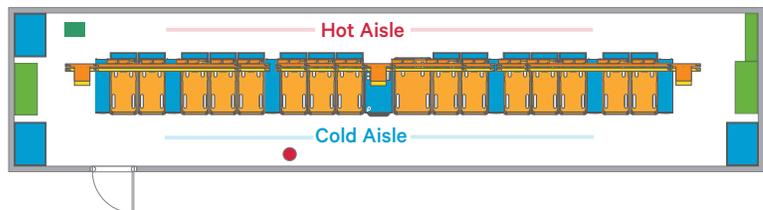
IT Enclosure, 200kW

Input voltage	480 VAC 3-Phase
Rack Space	14 racks, 588U
Density	14 kW / rack
Total IT Load	200 kW
Power Redundancy	N or 2N
Cooling Redundancy	N+1
Footprint	11.5'W x 53'L
Heat Rejection Equipment	Chilled Water or External for DX



High Density Enclosure, 330kW

Input voltage	480 or 208 VAC
Rack Space	16 racks, 672U
Density	20.6 kW / rack
Total IT Load	330 kW
Power Redundancy	2N
Cooling Redundancy	2N
Footprint	11.5'W x 53'L
Heat Rejection Equipment	Chilled Water

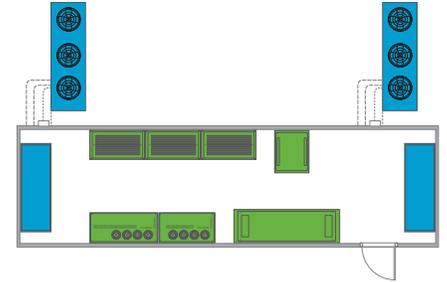


AC Power Enclosure, 675 kW

In/out Voltage	480 VAC 3-Phase
Total IT Load	675 kW
Power Redundancy	N
Cooling Redundancy	2N
Footprint	11.5'W x 40'L
Heat Rejection Equipment	External Condensers

Primary Applications

- Existing Data Center and IT Enclosures
- Liebert® UPS, Liebert Battery Cabinets, Liebert Precision Cooling, ATS, Switchboard

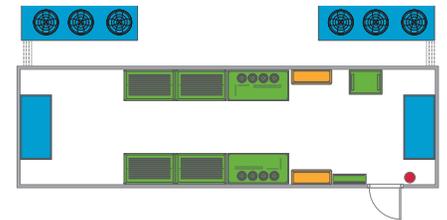


AC Power Enclosure - 200kW

In/out voltage	480 VAC 3-Phase
Total IT Load	200 kW
Power Redundancy	N or 2N
Cooling Redundancy	2N
Footprint	11.5'W x 40'L
Heat Rejection Equipment	External Condensers

Primary Applications

- SMB-Primary Data Centers
- Enterprise- Supplemental
- Increase flexibility, scalability and operational efficiency
- IT and/or Power Enclosures integrated together on-site

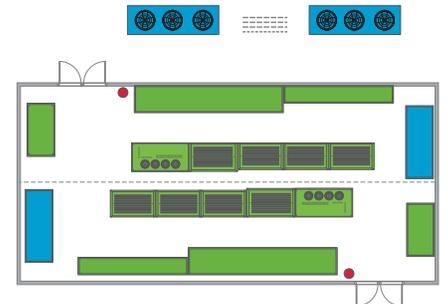


Multiple Integrated Enclosures - AC Power

Components	Cooling, ATS, Switchboards, UPS, Batt, Fire & Monitoring
Input Voltage	480 VAC 3-Phase
Power Redundancy	N, 2N, N+1
Cooling Redundancy	N, N+1, 2N
Footprint	(2) 11.5'W x 48'L
Heat Rejection Equipment	External Condensers

Primary Applications

- Existing Data Center and IT Enclosures
- Liebert UPS, Liebert Battery Cabinets, Liebert Precision Cooling, ATS, Switchboard

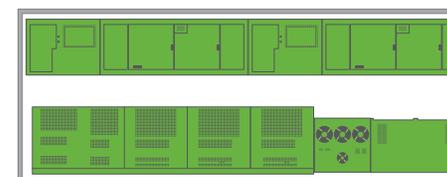
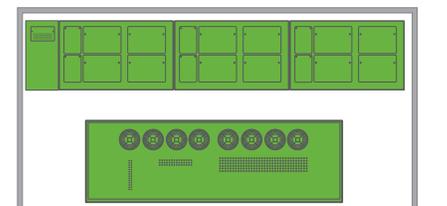


AC Power Platform

Components	Liebert NXL 750kVA UPS (3) Battery Cabinets 1200A SwitchGear 1200A STS2 w/Optimize Transfer Liebert PPC 750kW Transformers, 480v - 415v/240 Liebert EXC Output Distribution
Voltage	480V Input / 240V Output
Power Redundancy	N, 2N, N+1
Footprint	8'W x 16'L + 8'W x 21.5'L

Primary Applications

- Co-Location and Hosting Data Centers
- Assembled on an open skid platform
- Liebert UPS, Liebert Battery Cabinets, Liebert Distribution, ATS, Switchboard





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