



VERTIV[™]

SMARTAISLE[™]

Intelligent, Integrated Infrastructure
for the Data Center



Deploy an Efficient and Flexible Row-Based Infrastructure

Efficiency. Capacity. Availability. Control.

The SmartAisle™ infrastructure from Vertiv™ offers considerable savings in CAPEX and OPEX via an intelligent, integrated row-based system. The infrastructure integrates racks, power, cooling and infrastructure management into a holistic data center solution.

With this solution, Vertiv has demonstrated CAPEX savings of 10 percent AND OPEX savings of 27%, as well as:

- Simplified, rapid deployment that means that installation doesn't hinder productivity or break budgets
- Enhanced cooling efficiency with the Liebert® CRV™ row-based precision cooling system, Liebert iCOM® Controls and cold aisle containment – combining to deliver PUEs 15-25% lower on average than that of a conventionally designed data center with the same capacity
- Industry's highest efficiency UPS and power management systems with modular designs for easier scalability
- Comprehensive visibility, insight and control via data center infrastructure management technologies ensure availability and efficiency when you need them most

1. High-efficiency precision cooling technologies and environmental controls –

Liebert CRV precision cooling system with Liebert iCOM controls matches cooling to rack load, and reduces cooling system energy consumption through:

- Digital scroll compressor
- EC plug fans
- Teamwork control modes

2. Modular, scalable high-efficiency power –

Liebert APM™ UPS provides reliable, transformer-free, on-line, uninterrupted power, and KIRK® key interlock system for safety

3. Flexible power distribution

– Liebert MB™ Modular Busway is a flexible and more economical way to deliver power to the rack without the cost and hassle of power cable whips. It connects directly to rack PDUs

4. Cold Aisle Containment –

inexpensively supports capacity increases by separating hot and cold air for increased efficiency

5. Flexible platform for easy configuration –

Full-depth DCF™ racks maximize space utilization and allow you add any type of IT or networking equipment and simplify cable management with tool-less accessories

6. Flexible rack PDUs –

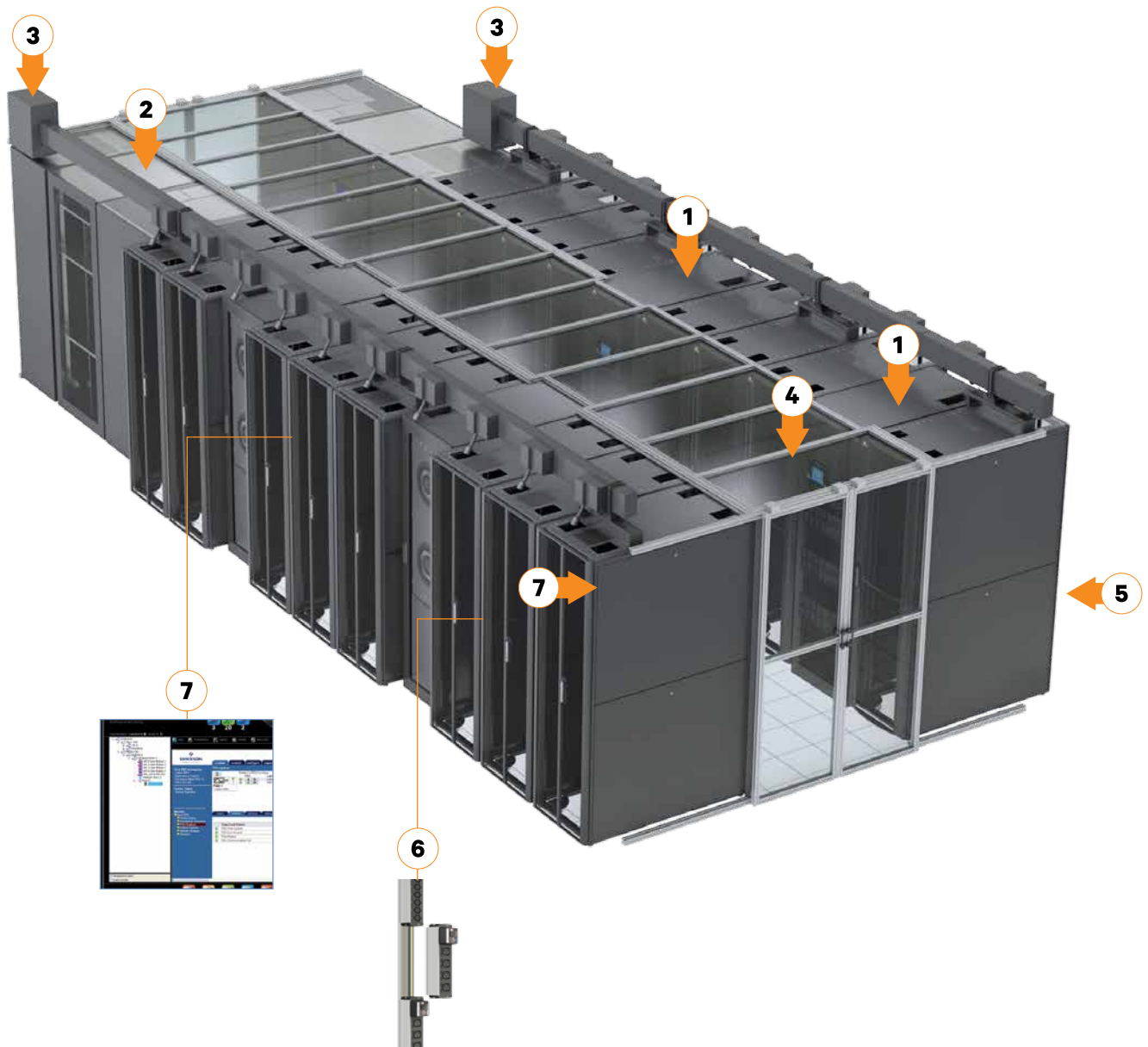
MPX™ adaptive rack PDU or MPH2™ managed rack PDU provide flexibility and power control at the receptacle level, and faster implementation of IT equipment

7. Comprehensive, remote data center infrastructure management –

Avocent® appliances and software and Liebert Nform™ and Liebert SiteScan™ softwares provide comprehensive, remote monitoring and control

SmartAisle™

Simple, fully integrated infrastructure – racks, precision cooling, monitoring, cable management and power systems are designed to work together, saving you time and money on installation and operation.



What Makes the SmartAisle™ Offering Unique?

Imagine the advantages of an intelligent, integrated infrastructure with all the capabilities you need to achieve your IT objectives.

The SmartAisle infrastructure utilizes these data center design and technology best practices to deliver the following results:

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

EFFICIENT	ECONOMICAL	SIMPLIFIED	CONTROLLABLE
<ul style="list-style-type: none"> • Reduce energy consumption up to 27% compared to conventional data center design through the use of Cold Aisle Containment, Liebert® precision cooling systems, and Liebert iCOM® controls • Increase availability by using high-efficiency power systems, such as Liebert APM™ UPS or Liebert GXT3™ • Improve productivity and standardize equipment moves, adds and changes with monitoring and management technologies • Flexibly and cost-effectively distribute power to the rack using Liebert MB™ Modular Busway, compared to using a distribution cabinet. 	<ul style="list-style-type: none"> • Achieve equipment cost savings and extend your existing infrastructure investment by using more efficient designs and technologies • Save up to 10% in capital expenditures using technologies that help you avoid expensive room upgrades to cooling systems, flooring and power management 	<ul style="list-style-type: none"> • Simplify design, implementation and reconfiguration using standardized, integrated systems • 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 	<ul style="list-style-type: none"> • Free up stranded capacity and gain efficiencies using Avocent® Data Center Planner™ and Liebert SiteScan™ software • Maintain cooling equipment operating levels to ensure efficiency and availability, using Liebert iCOM controls • Monitor and manage power capacity within the rack, by using Liebert UPS systems and rack PDUs

Where to Use SmartAisle™ Infrastructure Solutions

No Other Solution Offers the Industry’s Leading Infrastructure Systems for Such a Wide Array of Applications and Environments

SmartAisle configurations can be scaled to fit any size IT environment from a row of racks to large enterprise data centers. The SmartAisle offering brings together the widest range of innovative infrastructure technologies such as modular row-based UPS, configurable PDUs, modular busway, data center infrastructure management software and the industry’s leading precision cooling technologies.

The SmartAisle approach can be used as a standalone solution to scale from just a few racks up to an entire data center

(most cost effective up to 400kW total load), with integrated row-based power, precision cooling and infrastructure management. Or within a larger data center, it can be applied to meet capacity growth objectives, providing the infrastructure support needed to increase density without increasing footprint.

This highly efficient, flexible and easily implemented solution can be deployed in either raised floor or non-raised floor environments.



A. James Clark School of Engineering at the University of Maryland



A. JAMES CLARK
SCHOOL OF ENGINEERING

Location: College Park, Maryland, USA.

Critical Need: Optimize an existing data center infrastructure for efficiency, availability and space-utilization to promote availability and accommodate future IT growth.

Products/Services:

- Comprehensive Thermal Assessment with Computational Fluid Dynamics (CFD) Modeling
- SmartAisle technologies, including Liebert CRV™ Row-Based Precision Cooling Solution with Liebert iCOM® Controls and remote monitoring facilitated by Liebert’s Virtual Ntegrity Gateway (VNG)

Results

- Doubled cooling capacity and physical capacity of data center
- Optimized server configuration and airflow for maximum efficiency and IT availability
- Improved Power Usage Effectiveness (PUE) by 5.5 percent

“Vertiv was able to help the University of Maryland achieve Efficiency Without Compromise in revamping a 25-year-old data center into a modern infrastructure that is very efficient and will meet our growing capacity needs for the future.”

—Jim Zahniser, Executive Director of Information Technology, A. James Clark School of Engineering at the University of Maryland

¹A. James Clark School of Engineering at the University of Maryland Case Study. CH-00022 (05/11).




Economy and Efficiency

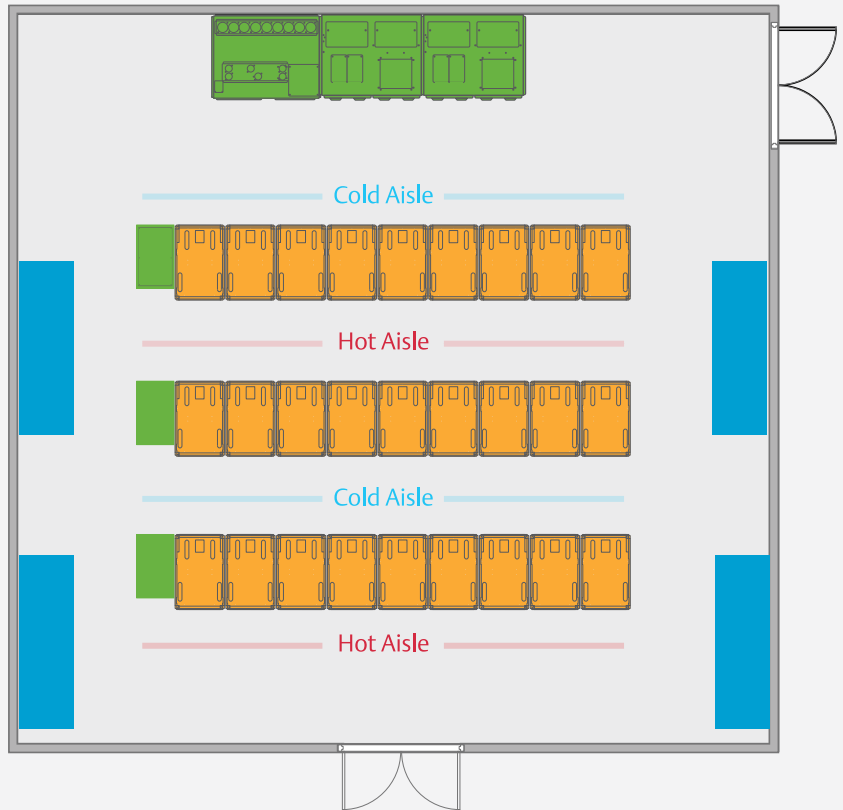
Compare the Costs of a Conventional Data Center Design Versus the SmartAisle™ Infrastructure Solution

	CONVENTIONAL DATA CENTER DESIGN	SMARTAISLE DESIGN	COST SAVINGS	ADVANTAGE SMARTAISLE
Room Costs	\$515,000	\$459,000	\$56,000	11%
Infrastructure Costs	\$415,000	\$391,000	\$24,000	6%
Total Capital Expense	\$930,000	\$850,000	\$80,000	9%
Energy Consumption	\$63,600	\$46,500	\$17,000	27%
5 Year OpEx	\$318,000	\$233,000	\$85,000	27%
5 Year TCO	\$1,248,000	\$1,083,000	\$165,000	13%

CONVENTIONAL

- Racks** 27
- Density** 5.9 kW per rack
- Total IT Load** 160 kW
- Cooling Units** 4 x 20 ton Precision Cooling systems Units
- Power** 2 x 100 kVA room-level UPS systems and power distribution

-  Precision Cooling
-  AC Power
-  Racks and Integrated Cabinets



Liebert® CRV™ Row-based Cooling, 20-40kW



Ideally suited and designed for cooling server rack cabinets in small and medium data centers. Features Liebert iCOM® controls, variable speed EC fans and a digital scroll compressor, for high reliability and energy efficiency.

Liebert APM™ On-line UPS, 15-90kW



This row-based, transformer-free, on-line UPS allows quick and easy capacity increases with FlexPower™ hardware assemblies - no additional floorspace required. The UPS operates with the industry's highest efficiency - up to 94% at loads of 50-100%.

Aisle Containment Systems



Separates hot and cold air streams for better cooling operation and higher efficiency. Doors and ceilings in Modular, Vertical and Retractable systems contain data center racks and IT equipment.

DCF™ Optimized Racks



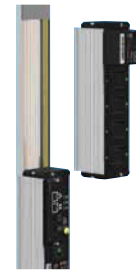
19" data center rack system from Vertiv Network Power integrates computing hardware, power management technologies and peripherals. It provides superior design flexibility, with optimized thermal and cable management features, and tool-less accessories.

Liebert MB™ Modular Busway



Provides high density power distribution to the rack while eliminating cable clutter that can reduce airflow. This modular system is easy to install, and is easily expanded with a variety components in configurations to meet unique site needs.

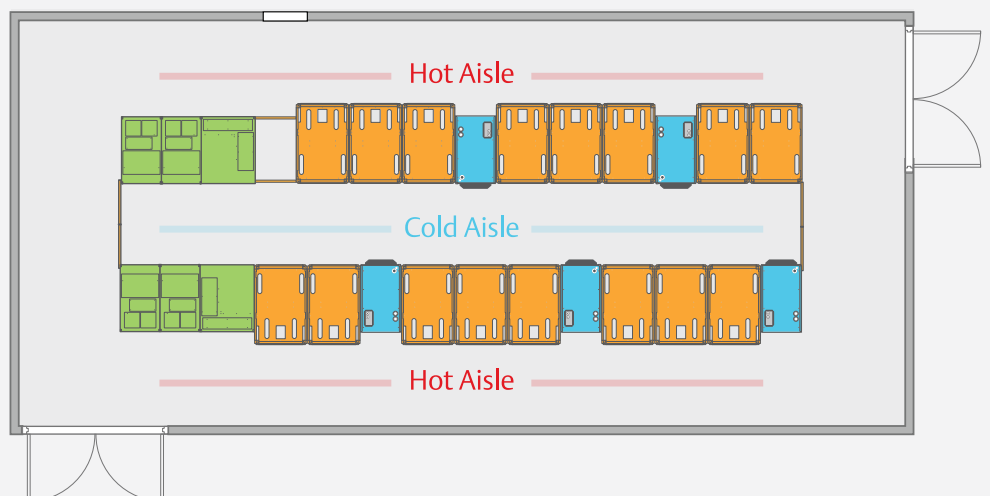
MPX™ and MPH2™ Rack PDUs



Adaptive and managed rack power distribution units allow remote monitoring and control at the receptacle level, as well as monitoring of environmental input options such as rack temperature and humidity. Rugged construction and industry's leading operating temperatures.

SMARTAISLE

Racks	16
Density	10kW per rack
Total IT Load	160 kW
Cooling Units	6 row-based precision cooling units Cold Aisle Containment
Power	2 row-based UPS systems Modular power busway





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