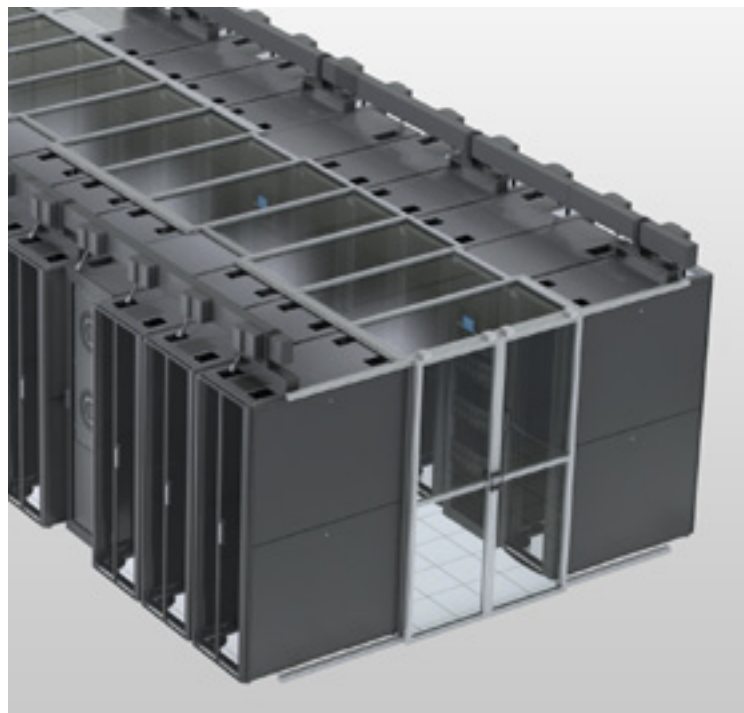


## Aisle Containment Systems

Flexible Containment Systems To Increase Efficiency



## Offerings Increase Energy Efficiency With Emerson Network Power Aisle Containment Systems

Reduce energy consumption while supporting higher density IT and networking equipment — without compromising your requirement for availability.

Aisle Containment Systems from Emerson Network Power are designed to optimize the efficiency, design and operation of your data center infrastructure. A comprehensive selection makes it easy to support both standard and non-uniform hot/cold aisle applications.

### Ideally Suited For:

- Hot aisle/cold aisle applications
- Raised floor data centers with perimeter cooling (Liebert DS or Liebert CW)
- Non-raised floor data centers using row-based precision cooling systems such as Liebert® CRV™ or Liebert XD™
- Retrofit to existing racks, or DCF™ & DCM™ racks
- Emerson Network Power SmartAisle™ Solutions with Liebert precision cooling and Liebert iCOM® controls

### Configurations to fit any site needs:

- Modular roof and door system for DCF & DCM racks
- Vertical system for non-uniform rows and rack heights
- Retractable roof
- Variable standard components interchangeable to create custom solutions



*Raised floor data center with perimeter precision cooling (Liebert DS or Liebert CW)*



*Slab floor data center with Liebert CRV row-based precision cooling and Modular System*

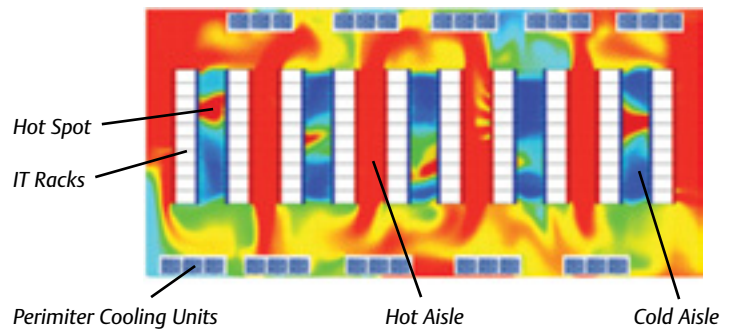


*Aisle Containment Systems from Emerson Network Power may be installed at any location in the data center, with options to fit most rack configurations. Shown with Vertical System.*

## Problem:

In the thermographic view of a typical data center, the problem with the traditional approach in high density data centers is highlighted by the numerous hot spots and wide variation in inlet temperatures to the IT equipment.

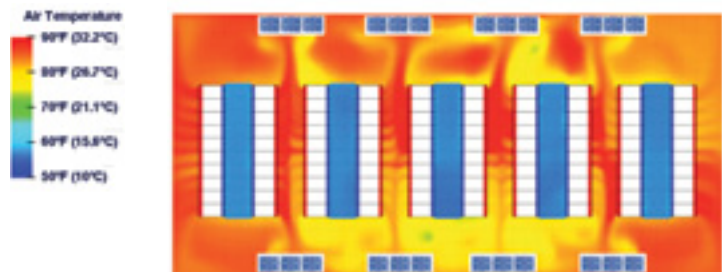
### Typical Data Center (top view)



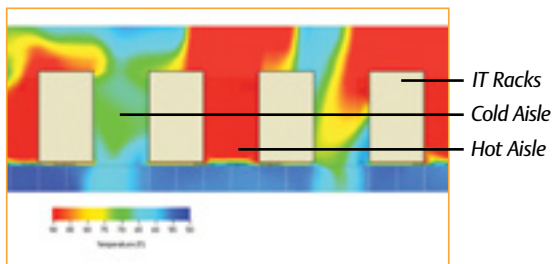
## Solution:

Liebert® Precision Cooling systems with Liebert iCOM® control are enhanced by Aisle Containment from Emerson Network Power, enabling dynamic optimization of the cooling environment, and lower energy usage.

### Liebert Aisle Containment in Data Center (top view)

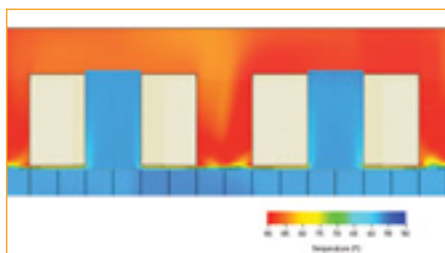


### Typical Data Center (end of row view)



Without aisle containment, hot and cold air mix in both the hot and cold aisles, making the cooling system less effective and less energy efficient.

### Data Center with Aisle Containment System / Liebert iCOM controls (end of row view)



Aisle Containment combined with Liebert precision cooling with iCOM controls enables uniform temperature effective cooling, and consistently hot return air for more effective precision cooling system performance.

### Aisle Containment Systems Are Designed to:

#### Optimize Cooling System Efficiency

- 30+% efficiency increase
- Continuous dynamic adaptation to load
- Less fan power per kW cooling

#### Eliminate Hot/Cold Air Mixing

- Uniform and predictable temperature to all IT equipment
- Integrate the cooling unit air flow delivery with the IT equipment requirements

#### Increase Space Efficiency

- 30+% increase in IT equipment density
- Up to 12kW/rack with perimeter cooling
- Up to 30kW/rack with localized cooling

#### Increase Capacity

- 25+% increase in available cooling capacity
- Extend capacity of existing precision cooling system

#### Allow Easy Retrofit

- In many cases, no requirement to replace existing raised floor cooling infrastructure
- Components fit through standard doorways
- Fits existing DCF™ and DCM™ racks

#### Leverage Redundancy/Availability

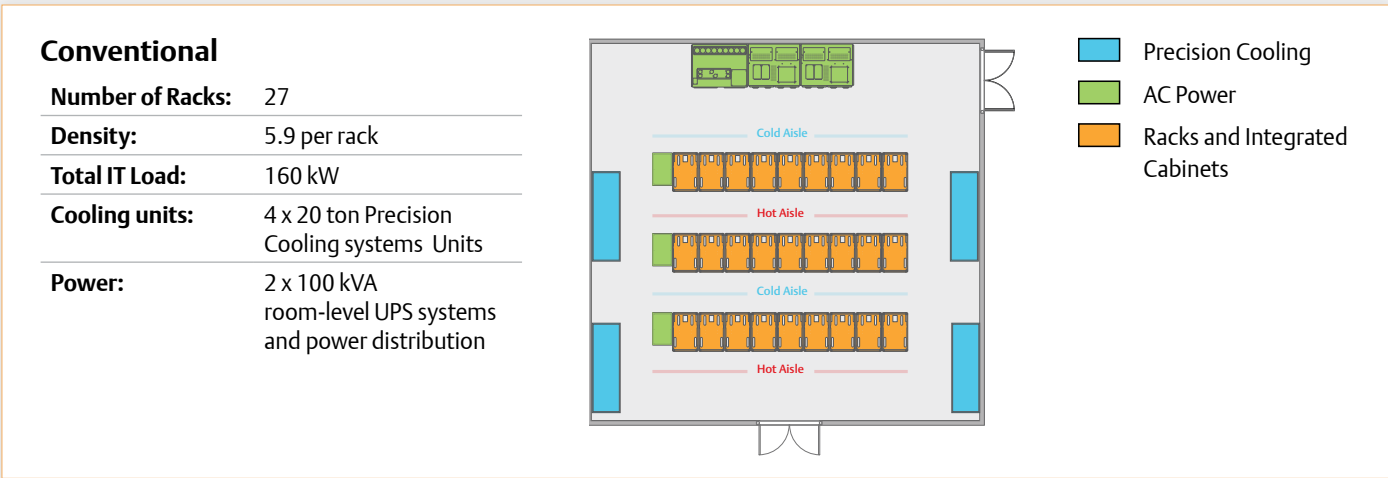
- Utilize existing cooling redundancy of raised floor air distribution and high availability cooling infrastructure
- Retrofit existing racks with Liebert Aisle Containment

#### Provide Fast Return on Investment (ROI)

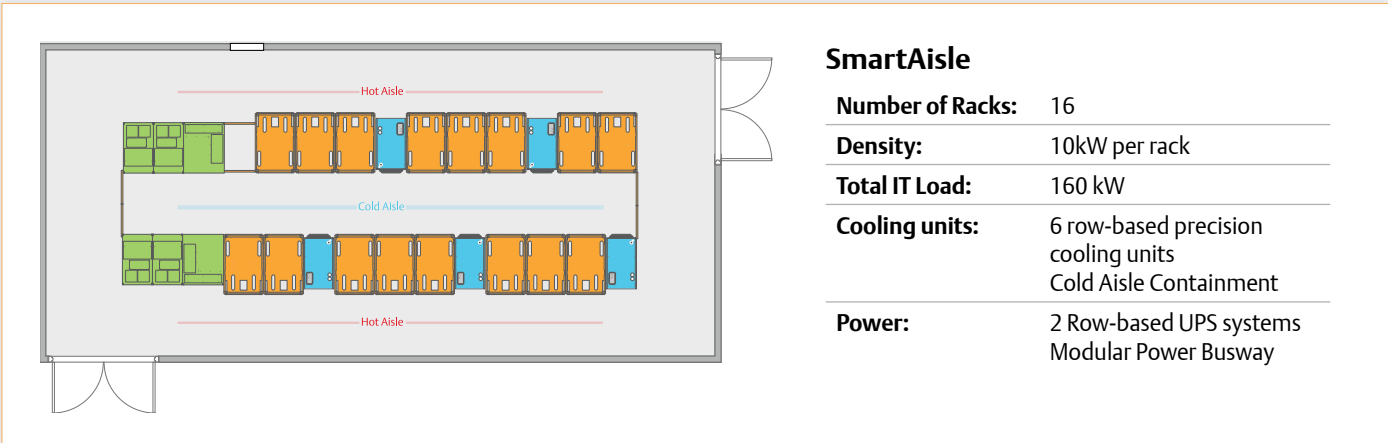
- Payback within a few months to less than 2 years
- Low initial investment

# Compare the Costs of a Conventional Data Center Design Versus the SmartAisle™ Solution with Aisle Containment

SmartAisle from Emerson Network Power is an intelligent, integrated infrastructure using row-based building blocks. Aisle Containment optimizes efficiency and lowers energy expenses in the SmartAisle solution.

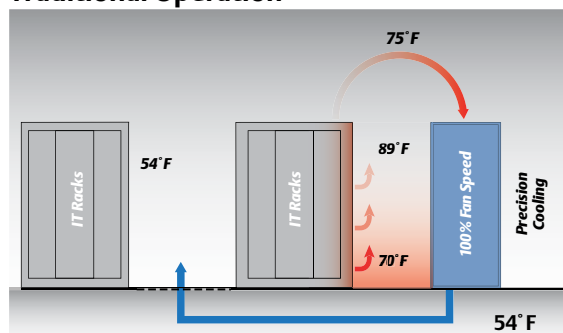


|                       | Conventional Data Center Design | SmartAisle Design | Cost Savings | % Advantage SmartAisle™ |
|-----------------------|---------------------------------|-------------------|--------------|-------------------------|
| Room Costs            | \$515,000                       | \$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    | \$63,500                        | \$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%                     |

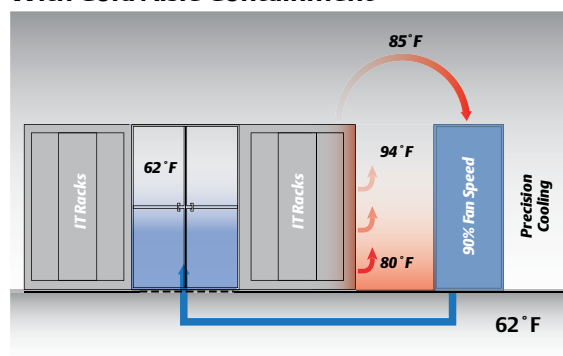


## Measurable Energy Efficiency

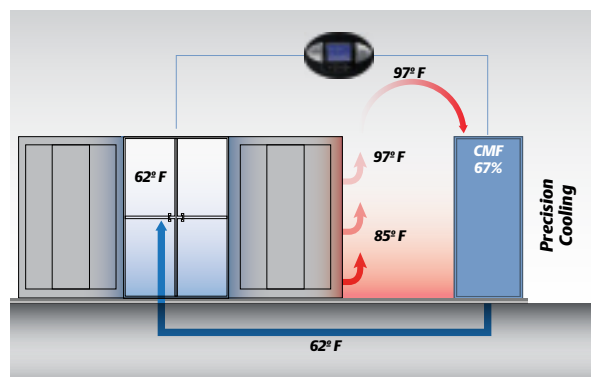
### Traditional Operation



### With Cold Aisle Containment



### Liebert® Precision Cooling with Liebert iCOM® control and Aisle Containment



- Requires less fan power per kW of cooling
- Leverages variable fan speed control
- Operates with digital scroll technology for variable capacity control
- Provides continuous dynamic adaptation to cooling load
- Allows you to easily take advantage of free cooling designs

### Savings - Direct Expansion System

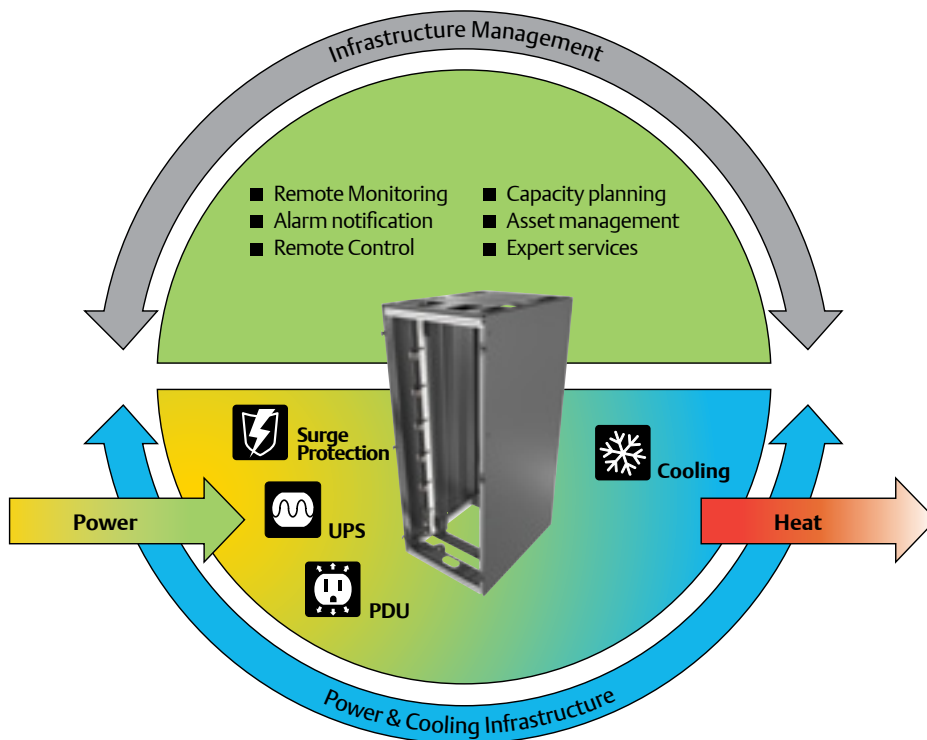
|                       | Traditional Approach | With Cold Aisle Containment | With Liebert iCOM and Containment |
|-----------------------|----------------------|-----------------------------|-----------------------------------|
| <b>Compressor</b>     | 69.7%                | 50.9%                       | 50.4%                             |
| <b>Condensor</b>      | 9.3%                 | 9.3%                        | 9.3%                              |
| <b>Evaporator Fan</b> | 21.0%                | 18.5%                       | 7.2%                              |
| <b>Total</b>          | 100%                 | 78.7%                       | 66.9%                             |
| <b>Savings</b>        |                      | <b>21%</b>                  | <b>33%</b>                        |

### Savings - Chilled Water System

|                        | Traditional Approach | With Cold Aisle Containment | With Liebert iCOM and Containment |
|------------------------|----------------------|-----------------------------|-----------------------------------|
| <b>Chiller*</b>        | 71.3%                | 64.9%                       | 60%                               |
| <b>Pumps*</b>          | 10.0%                | 5.4%                        | 5.2%                              |
| <b>Air Handler Fan</b> | 18.7%                | 14.3%                       | 7.2%                              |
| <b>Total</b>           | 100%                 | 84.6%                       | 72.4%                             |
| <b>Savings</b>         |                      | <b>15%</b>                  | <b>28%</b>                        |

\* Estimated savings based on dedicated data center chiller

## Enhanced Performance and Management of Dynamic IT Spaces



Today's successful businesses depend on adaptable technologies to help them respond quickly to market demands. Your data center must be built on a support infrastructure designed to match the power and cooling needs of rapidly changing IT initiatives such as virtualization and consolidation. Each IT change, move or addition will affect the entire support infrastructure—you need products and support that ensure your IT systems will operate reliably in these environments.

Emerson Network Power leads the industry in infrastructure support, with a comprehensive offering that provides efficient operation without compromising availability. These solutions are backed by the industry's largest service organization, ensuring continued support by factory-trained experts.

## IT Racks and Accessories



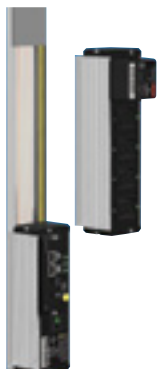
### DCFTM & DCM IT Rack

- Industry leading 83% perforation for high density IT equipment
- Dozens of simple tool-less accessories
- Significant zero-U mounting space
- Roof designed for optional high density cooling



### Aisle Containment from Emerson Network Power

- Flexible design independent from rack width
- Sliding or vertical doors
- Modular, vertical or retractable overhead containment
- Integrated adaptive control reduces fan energy cost



### Liebert® and Knurr Rack PDUs

- Basic, controlled or adaptive designs
- Local and remote monitoring
- Additional in-rack sensors available
- Available in low and high density
- 2-year no-hassle replacement warranty



### Liebert MBTM Modular Busway

- Tool-less mounting to Knurr racks
- Plug-n-play bus plug / rack PDU connections
- Replaces multiple power cables
- Available in dual bus design



## Power and UPS



### Liebert® FDC™/ Liebert FPC™

- Rack-size power conditioning and distribution
- Requires only front and back service access
- Offers top or bottom cable entry



### Liebert APM™ UPS

- Scalable capacity growth without increasing footprint: 15-90kW
- Operates with up to 94% energy efficiency
- Row-based installation



### Liebert NX™ UPS

- Scalable capacity growth without increasing footprint: 40-200kVA
- Parallel configurations for capacity or redundancy
- Operates with up to 97% energy efficiency
- Row-based installation

## Precision Cooling



### Liebert CRV™ Row-Based Cooling

- 20kW to 40kW precision cooling with horizontal airflow design for both non-raised and raised floors
- Digital scroll compressor and variable speed fans for highly efficient operation
- Air, water, glycol and chilled water designs
- Liebert iCOM® for intelligent control, communications and monitoring



### Liebert DS™ Perimeter Cooling

- Industry standard in floor mount precision cooling.
- Available in single units from 28kW to 105kW
- Flexibility of design with air, water, glycol and GLYCOOL cooling
- Liebert iCOM for intelligent control, communications and monitoring
- Digital scroll technology for variable capacity control
- Widest variety of air supply configurations



### Liebert XD™ Row-based Cooling

- High heat density cooling system that requires little to no data center footprint
- Additional energy savings with pumped refrigerant technology
- Intelligent fan control in each module and Liebert iCOM for intelligent control, communications and monitoring



### Liebert CW™ Perimeter Cooling

- Chilled Water cooling
- Available in single units from 26kW to 181kW
- Optional EC Plug Fans maximize energy efficient operation
- Liebert iCOM for intelligent control, communications and monitoring
- Widest variety of air supply configurations

## Infrastructure Management



### Liebert Nform™

- Software solution providing centralized monitoring of a wide range of data center infrastructure equipment
- Leverages existing network communications
- Triggers event actions or notifications



### Liebert SiteScan™ Web

- Software solution providing centralized monitoring of a wide range of data center infrastructure equipment
- Leverages existing network communications
- Triggers event actions or notifications

## Ensuring The High Availability Of Mission-Critical Data And Applications.

Emerson Network Power, a business of Emerson (NYSE:EMR), is the global leader in enabling Business-Critical Continuity™ from grid to chip for telecommunication networks, data centers, health care and industrial facilities. Emerson Network Power provides innovative solutions and expertise in areas including AC and DC power and precision cooling systems, embedded computing and power, integrated racks and enclosures, power switching and controls, infrastructure management, and connectivity. All solutions are supported globally by local Emerson Network Power service technicians. Liebert AC power, precision cooling and monitoring products and services from Emerson Network Power deliver Efficiency Without Compromise™ by helping customers optimize their data center infrastructure to reduce costs and deliver high availability.

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SL-11421 (R09/12) Printed in USA

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**Racks & Integrated Cabinets**

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