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White Space Datacenter Solutions

Craig Watkins – Global Product Line Manager

Ivo Petrov - Solutions Architect, Datacenter Solutions

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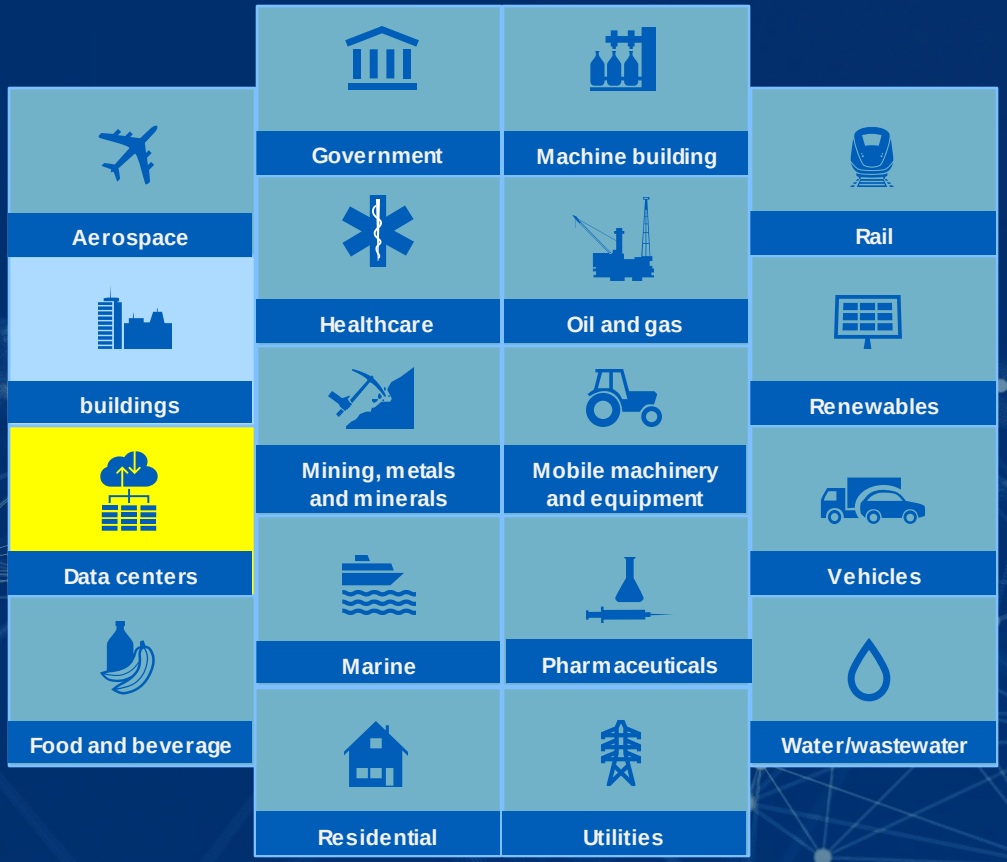
Solving industry's toughest power management challenges around the world



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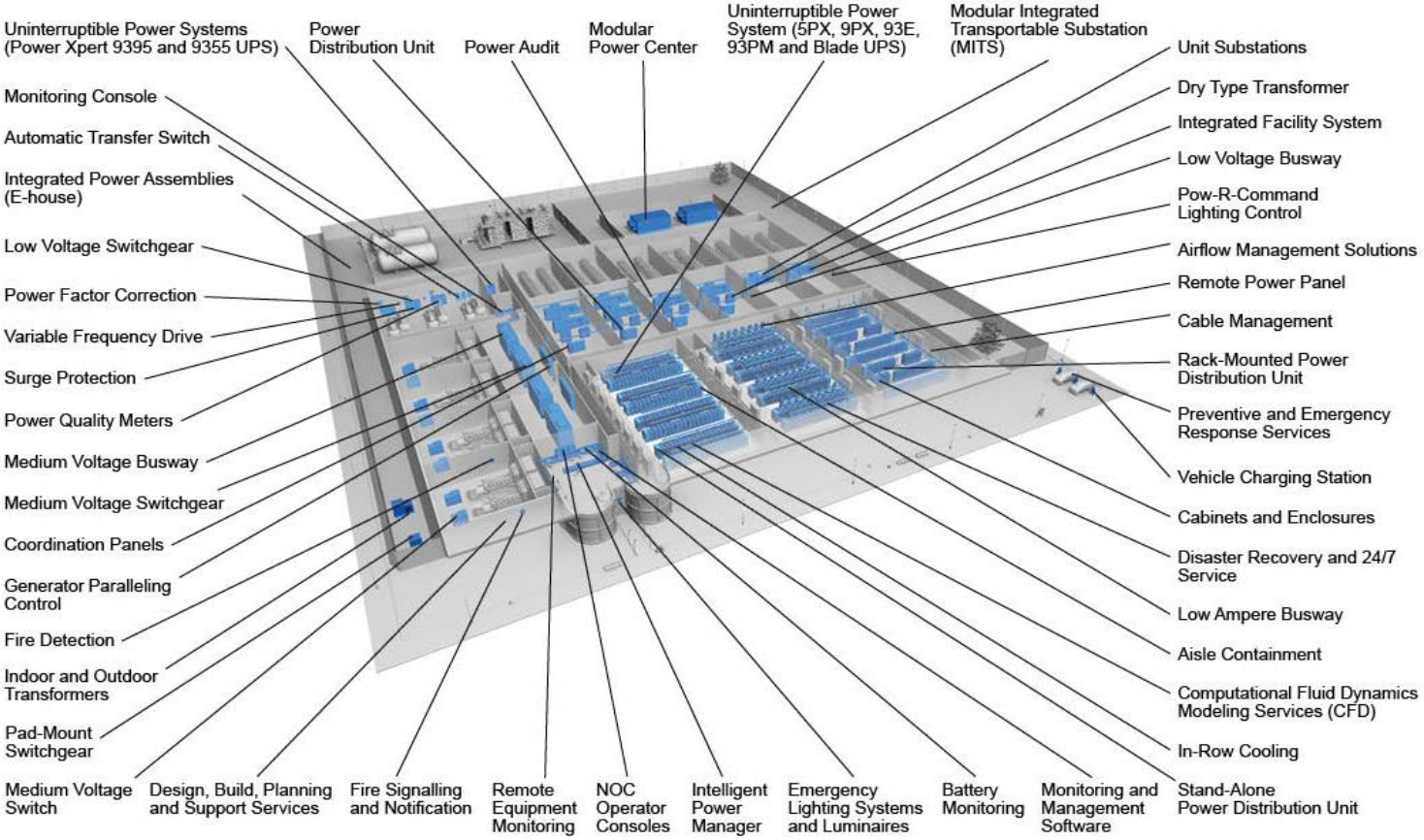

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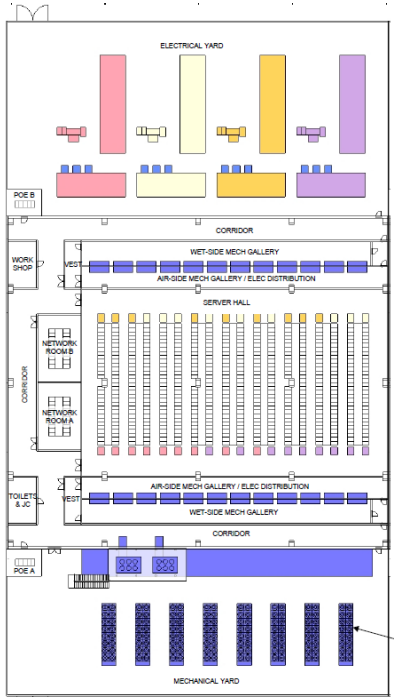


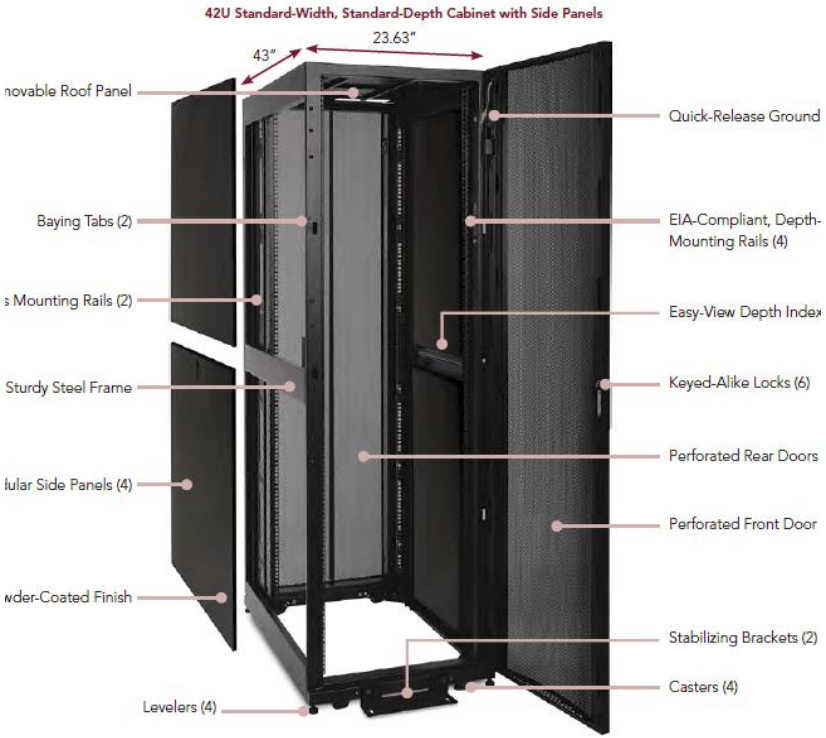
Electrical Yard

White Space

Mechanical Yard

Eaton's products for the White Space – high level overview

- How to house the equipment:
  - Racks
- How to power the equipment:
  - UPS, Busway, in-rack PDUs, Modular Datacenter Pods
- How to cool the equipment:
  - DX In-row Cooling options
- How to optimize the airflow:
  - Containment AMS
- How to connect the equipment:
  - Fiber, Copper, Power cables;
  - Break-out and connectivity cassettes solutions,
  - Spine/Leaf solutions, TAP boxes
  - Robotic Automation of Physical connectivity – Robotic Fiber Panel System



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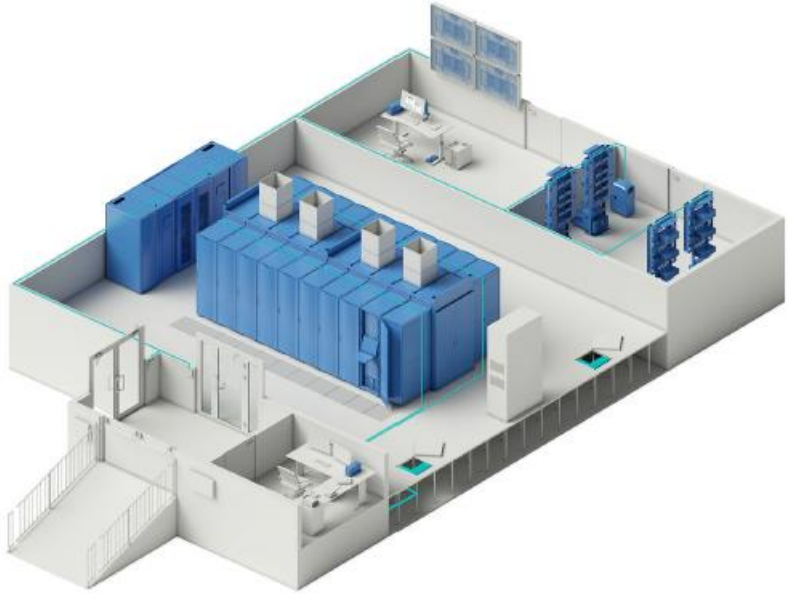

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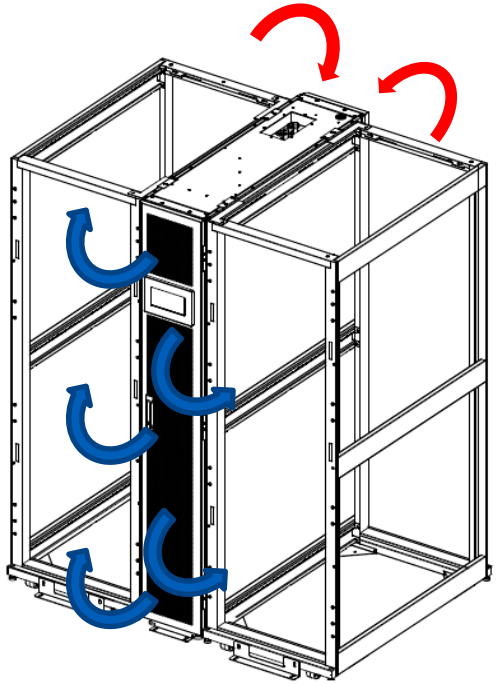

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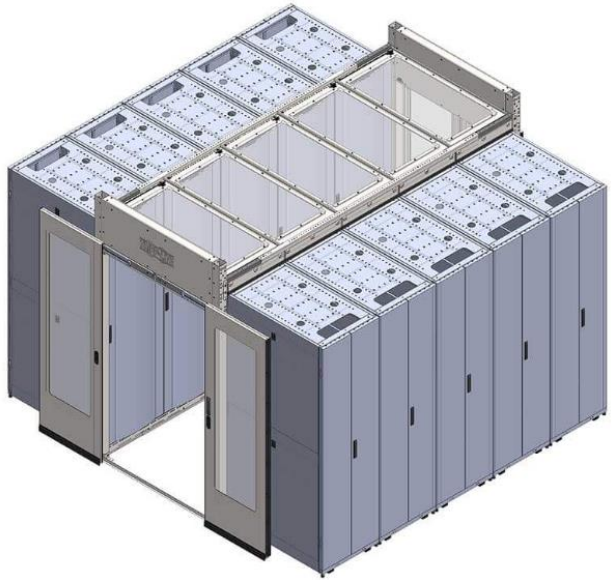

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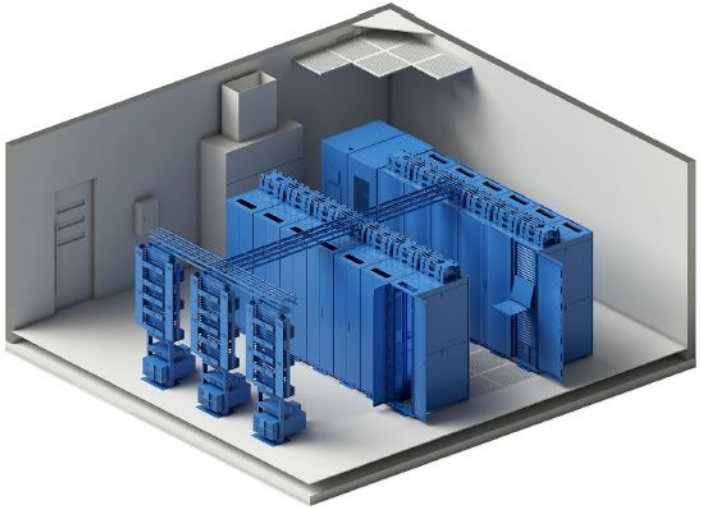

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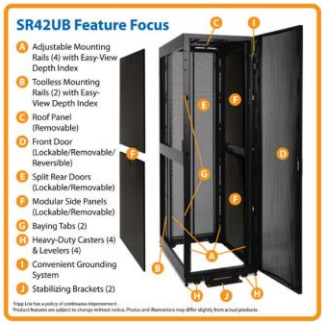
Racks / Server Enclosures

- Legacy Eaton/Wright Line Racks
  - TAA - built in Worcester, MA
  - Tailored, custom, fits special needs, higher price

- Tripp Lite SmartRack® (SR) series - 5000+ racks in stock in Chicago, IL
  - Customizable, component stock, channel oriented, many SKU options
  - Configured-to-order, BTO and specialty racks



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Racks - Paramount

- Configured to order product
- Fully welded frame solution
- One-piece design includes cable pass-through holes
- Tool-less adjustable mounting rails as well as half-height mounting rails
- 42U, 44U, 48U, 51U; 24” & 30” widths; 42” & 48” depths
- Toolless adjustment of rails
- TAA/BAA Compliant

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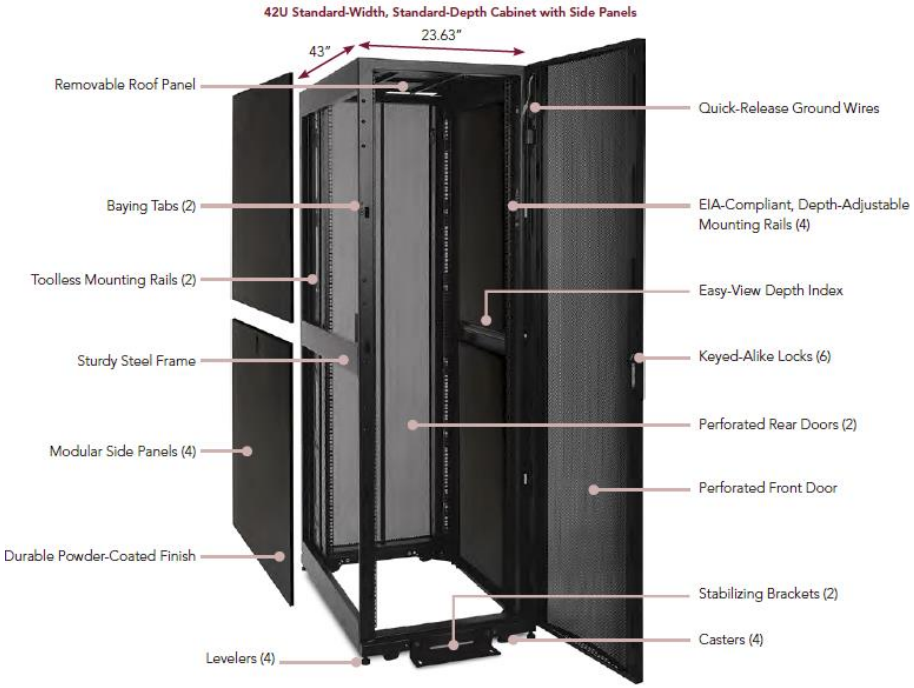
Racks - SmartRack series



Extra-Wide

Extra-Deep

Deep & Wide

Mid-Depth

Shallow-Depth

Floor standing Enclosure	Max Device Depth (in.)	Rack depth (in.)	Ideal for...
Shallow	27	32	A/V equipment, limited space
Mid-depth	31	36	Limited space
Standard	37	42	Servers
Deep	42, 48	46, 48, 54	Extra cables, improved airflow

'Welded' front and rear frame options, Heavy duty….

White Finish

Without Side Panels

Colocation

Shock Pallet (Ships with 1,250 lb.)

Seismic-Certified

NEMA-Rated

Clear Acrylic "Glass" Door

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Physical Housing Space- Rack

SRH Rack Line

- Increased weight capacities (5k static, 3.5k dynamic)
- Increased depth to accommodate AI server sizes (42”, 48” and 54”)
- Multiple widths (600mm and 800mm)
- Still through a modular build program for flexible variations and ease of stocking

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Racks & Cabinets for IT Infrastructure

Rack Enclosures

- 12U to 55U in a variety of widths and depths
- EIA-standard mounting rails
- Up to 3,000 lb. weight capacity
- Toolless mounting for PDUs
- 60+ models with 80+ accessories

Open Frame Racks

- 12U to 45U 2-post racks
- 12U to 58U 4-post racks
- EIA-standard mounting rails
- Up to 3,000 lb. weight capacity
- Toolless mounting for PDUs
- 20+ models

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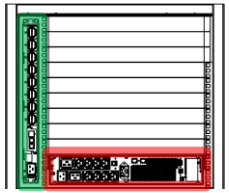
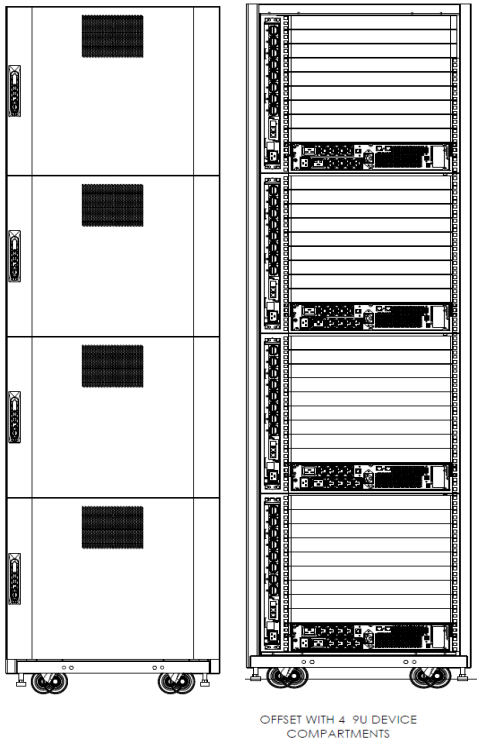
Build-to-Order (BTO) Solutions

- Modular/Edge Data Centers
- Micro Data Centers
- Hyperscale Solutions
- Specialty Racks

Managed
PDU



Online UPS



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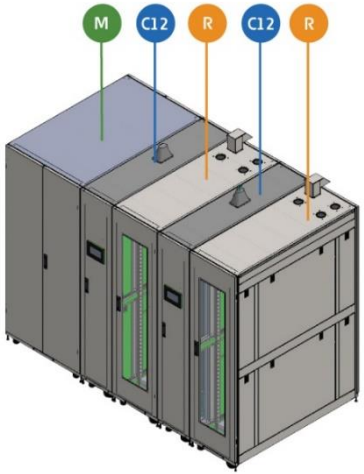
SmartRack® Modular Data Centers

Will start with 13 std models, custom configurations and offer buy as you grow

- **Web Configurable:** Customer provides number of racks, load per rack and web generates BOM and drawing with required in-Row coolers and capacity

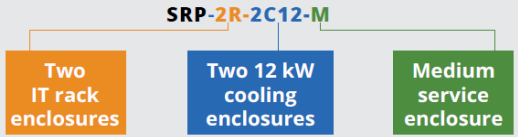
SRP-2R-C12 - or-
SRP-2R-C25

SRP-3R-2C12 -or-
SRP-3R-2C25



Understanding catalog numbers

The enclosure type and quantity of each type are represented in the catalog number.
R = IT rack enclosure; **C12** = 12 kW cooling enclosure;
C25 = 25 kW cooling enclosure; **S** = Small service enclosure;
M = Medium service enclosure; **L** = Large service enclosure



- **Service enclosures in three widths**
  - For 3-Phase UPS
  - Power distribution panels
  - Fire suppression systems or
  - Non-IT equipment that does not need to be in the environmental area of the rack

Small service enclosure (S)	Medium service enclosure (M)
87.52 x 27.6 x 65 in. (2223 x 700 x 1650 mm)	87.52 x 31.5 x 65 in. (2223 x 800 x 1650 mm)

Large service enclosure (L)
87.52 x 39.4 x 65 in. (2223 x 1000 x 1650 mm)

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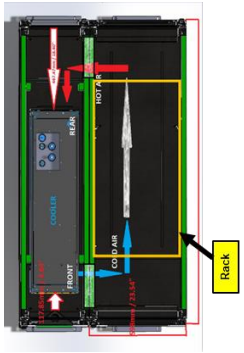
Physical Housing Space/Cooling- Pods

Modular Pods

- Precision thermal management
- Ease to configure and distribute power between racks
- Complete network management via a suite of Eaton's Brightlayer solutions
- Utility (UPS or as required) modules separate from the IT rack cooling.
- Unlimited configurations via our SmartRack Modular data centers
- Rapid deployment leveraging innovative modular and scalable design



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Power Quality – UPS, transformers, RPP

- Eaton provides complete power solutions from the mid-voltage transformers to building UPS, ATS and downstream power distribution

	Rack UPS	9155	9PXM	9355	9355	93E	93PM
Power Range	5-12kW	8-15kVA	4-20kVA	10-15kVA	20-30kVA	20-60kVA	10-400kW
Design/Form	Modular/ Monolithic	Monolithic	Modular	Monolithic	Monolithic	Monolithic	Modular
Native Voltage	208V, 400V	208V – 240V	208V - 240V	208V	208V	208V	208V, 400V & 480V
Electrical Type	3PH	1PH	1PH	3PH	3PH	3PH	3PH

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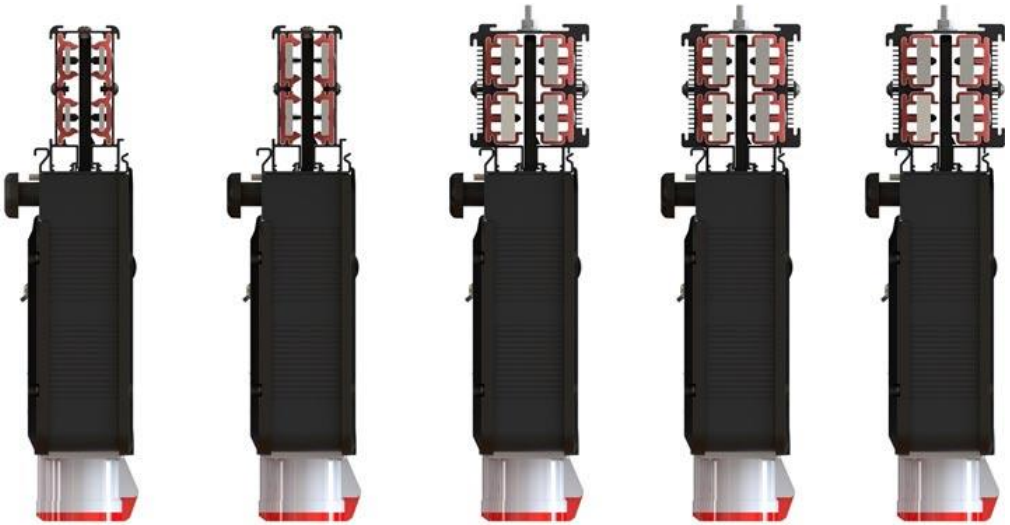
Overhead Busway

The PowerWave 2 Busway System can be deployed in 250A, 400A, 600A, 800A or 1000A systems - up to 600 VAC to fit all ranges of mission-critical power loads.

250A 400A 600A 800A 1000A



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Rack PDUs

			Distribution	Local Meter	Network	Section Meter	Outlet Meter	Outlet Switching
$	Basic (BA)	X	X	X				
	Local Meter (ME)		X	X	X			
	Metered or Monitored (MI)	X	X	X	X	X	X		
	Metered Outlet (MO)	X		X	X	X	X	X	
	Switched (SW)		X	X	X	X	X		X
$$$	Managed (MA)	X	X	X	X	X	X	X	X
	Automatic Transfer Switch (ATS)	X	X	Provides dual input redundancy to single corded devices					
	Maintenance Bypass (MBP)	X	X	Distributes power and bypasses UPS for maintenance					

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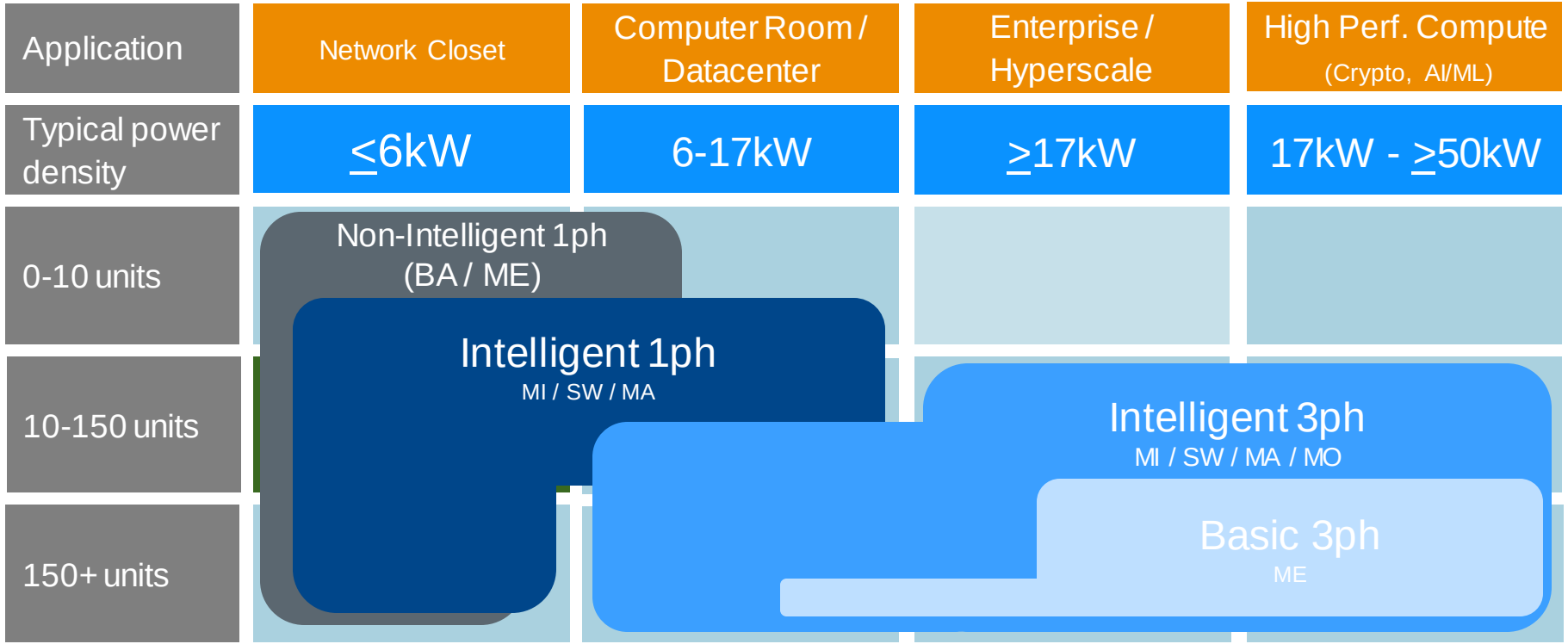
Drive spec based on customer needs



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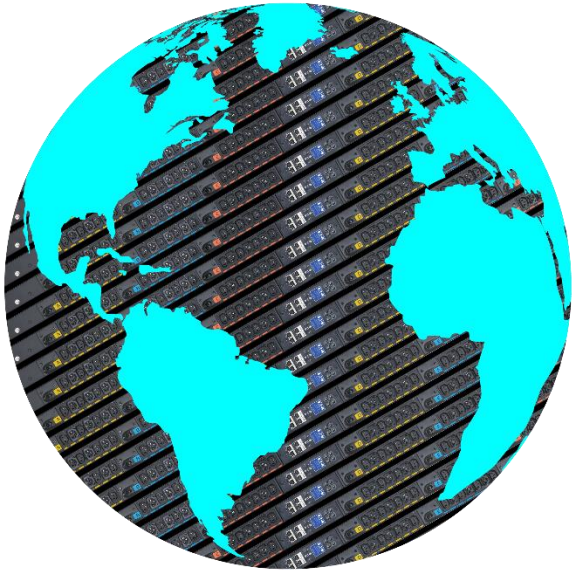
G4 PDU – Built for Enterprise

- High-density
- Enterprise-quality
- Simplicity in design
- 30 new models - "EVMxxxxxx"



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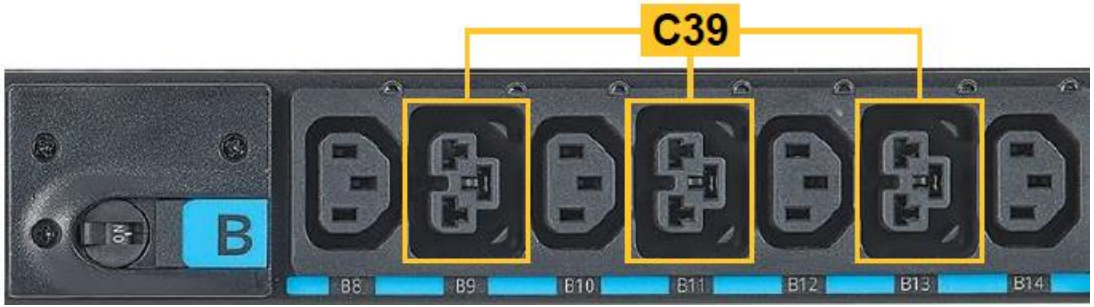
C39 Combo Outlet

- Dual capability to act as C13 or C19
- Flexibility reduces total outlets needed
- High contact retention so plugs won't fall out
- P-lock cable compatibility for full locking
- Alternating phase sections



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One PDU to rule them all.

The Eaton universal input rack PDU is designed with a single chassis that can be deployed worldwide!

More information available on the G4 PDU webpage!

Universal Input G4 - The most flexible PDU

- Universal power input – buy one PDU and stock different cords for each power rating
- Detachable cord options for 5 to 23 kVA, single-phase or three-phase Delta, or three-phase Wye
- Standardize global business on one PDU

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Universal input cables

- Input connector determines single- or three-phase wiring
- UL 817 approved cord sets tested and rated for disconnect under load
- Twelve plug options from 5 to 23 kVA with 10 ft. cable

L6-30P cable CBL350-10

360P6W cable CBL362-10

460P9W cable CBL356-10

532P6W cable CBL358-10

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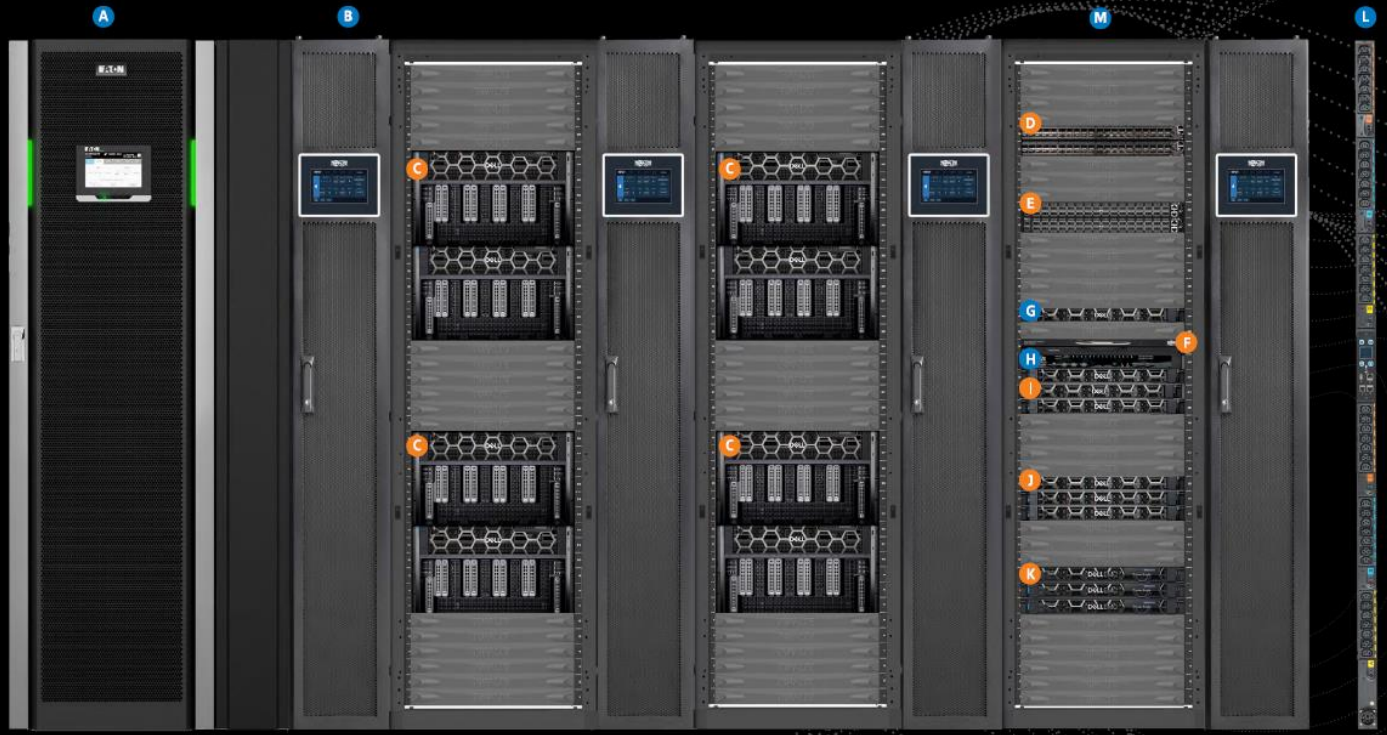
Reference architecture : Large Model Training - Minimum Unit



- A 93PM 208V UPS scalable to 120kW w/ lithium-ion external batteries
- B 25kW In-row cooling system
- C Training module - PowerEdge XE9680 server
- D IB Module - QM9700 InfiniBand switches
- E Ethernet Module - Z9432F - ON Switches
- F Bright/Omnia Head R660 Server
- G Console with 19" LCD
- H 16-Port Cat5 KVM over IP Switch
- I Management Module - R660 Servers
- J MLOPs/Data Prep Module - R660 Servers
- K Data Module - F600 PowerScale Storage
- L UPDU- 23kW universal PDU
- M 42U rack or self-contained deployment

Remote monitoring Service - PredictPulse

Intelligent power management - Brightlayer Data Centers suite

Reference architecture: Large Model Inferencing - Minimum Unit

- A 93PM 208V UPS scalable to 60kW w/lithium-ion external batteries
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Let your solution speak for you, as with this alliance you will achieve:

Grow	Expand	Develop
Sustainability High Efficiency	Availability Scalability	Security Resilience
To learn more, click here	To learn more, click here	To learn more, click here

- Remote monitoring Service - PredictPulse
- Intelligent power management - Brightlayer Data Centers suite

Physical Housing Space- Aisle Containment

Free Standing (TLS)

Self-supporting frame structure

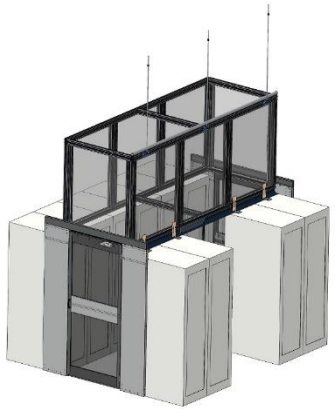
- Channel-oriented
- Simple to quote (12 part numbers)

Ceiling Mounted (EB)

RapidPod

Suspended from ceiling

- Hot or cold aisle compatible
- Extruded design
- Customizable design

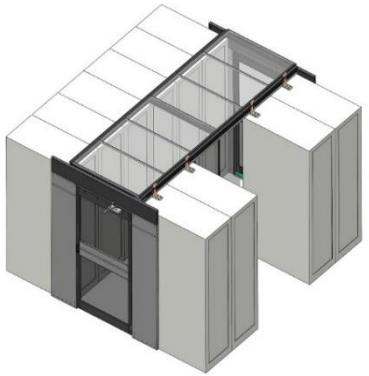


Rack Supported (EB)

RapidPod

Bridges across aisle rack-to-rack

- Hot or cold aisle compatible
- Extruded design
- Often used with In-Row cooling solutions



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SmartRack Aisle Containment

- Self-supporting
- Channel-oriented
- Easy to configure
- Cold aisle or hot aisle

https://www.tripplite.com/products/smartrack-aisle-containment-system

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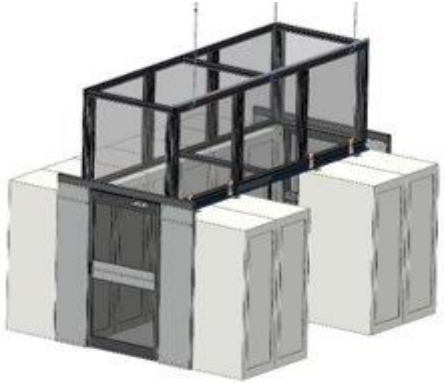
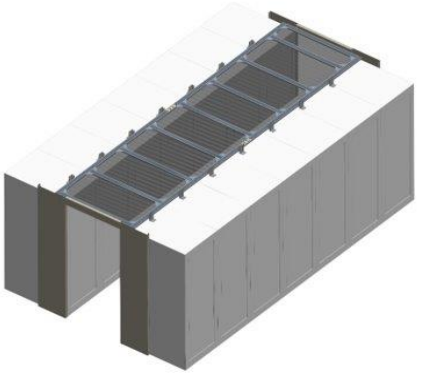
RapidPod - Systems Architecture



Vertical (Hot Aisle)

Extrusion Design



Horizontal (Cold Aisle)

- Extruded aluminum framing system creates a scalable, field configurable system
- Standard sized pod kits in stock for rapid deployment or prebuilt panel options for custom configurations
- Flexible mounting options - ceiling hung or rack supported
- Installable with standard hand tools
- Toolless removable window panels for maintenance access
- Low-profile framing system can fit in tight area applications

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RapidPod® - Configurable with End of Row Doors

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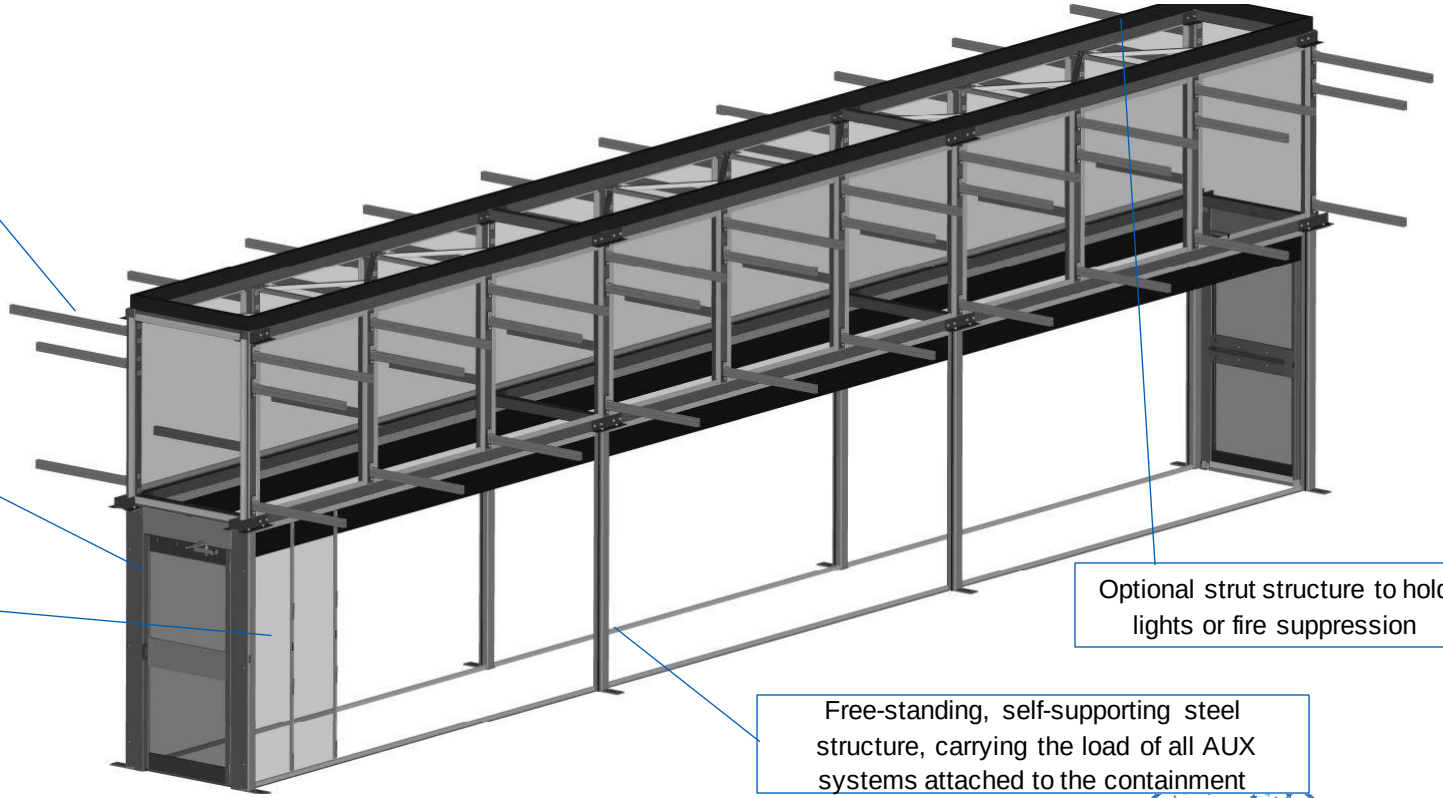
Hyperscale Containment Systems



Cantilever support structure for cable trays, busways and more. Can be different length, height or different number of support bars.

End of row doors

Rack blanking panels

Optional strut structure to hold lights or fire suppression

Free-standing, self-supporting steel structure, carrying the load of all AUX systems attached to the containment

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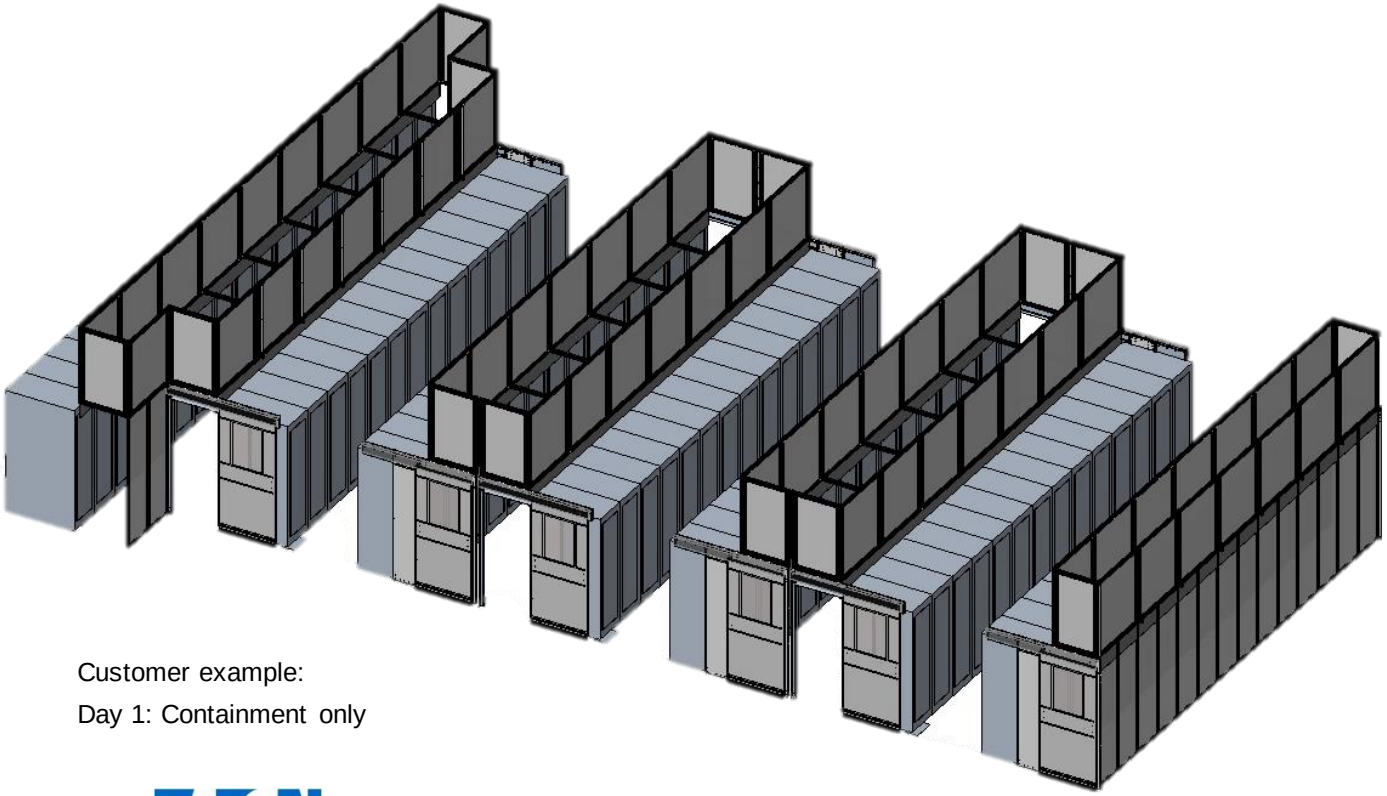
RapidPod® - Customized Design Layouts



Customer example:

Day 1: Containment only

SPLIT LENGTH POD

- Uses “Inside” Corners
- Sliding Doors

CAGE-SPLIT POD

- Provisions for security cages bisecting containment
- Custom Sliding Doors

SPECIAL DESIGNS

- Very specific customer requirements
- Fit to complex features in room

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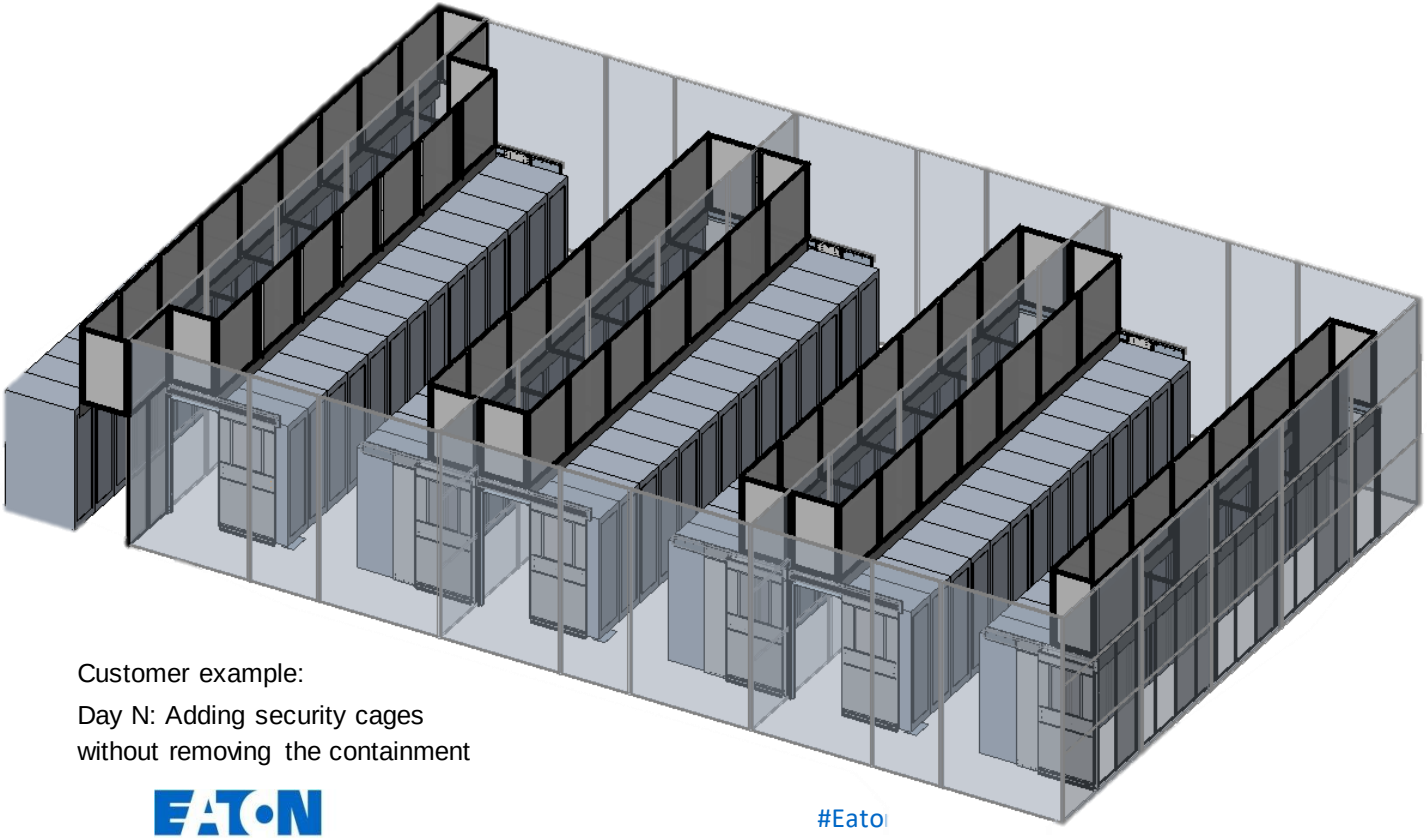
RapidPod® - Customized Design Layouts



Customer example:

Day N: Adding security cages without removing the containment

SPLIT LENGTH POD

- Uses “Inside” Corners
- Sliding Doors

CAGE-SPLIT POD

- Provisions for security cages bisecting containment
- Custom Sliding Doors

SPECIAL DESIGNS

- Very specific customer requirements
- Fit to complex features in room

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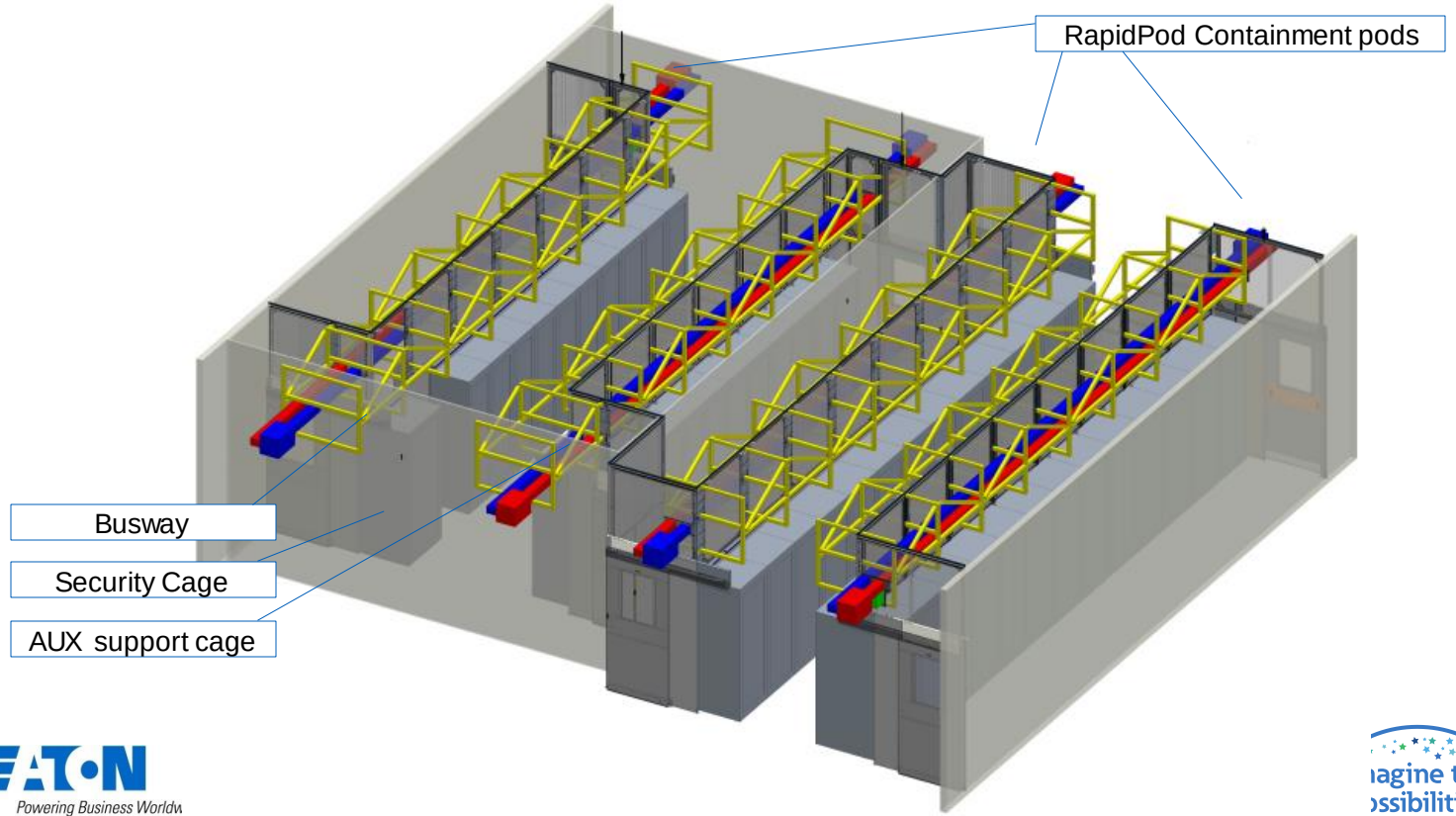
RapidPod - Customized Design Layouts



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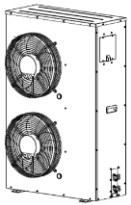
Precision Cooling

In-row cooling – DX Split System 12KW or 25KW units



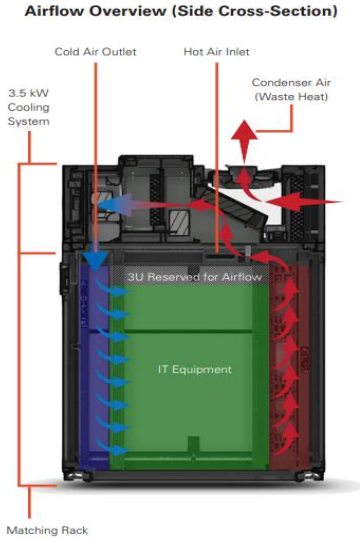
In-Row Cooling

12kW & 25kW 60hz In-Row precision cooling for small to medium size data centers

Proven offerings backed by national field service organization

Single-rack cooling

for server rooms, IT closets, micro data centers and edge computing applications – 3.5KW



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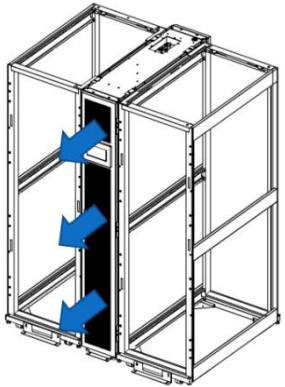
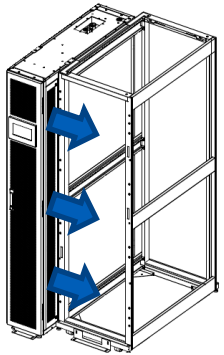
Precision Cooling Overview

Installation Configurations

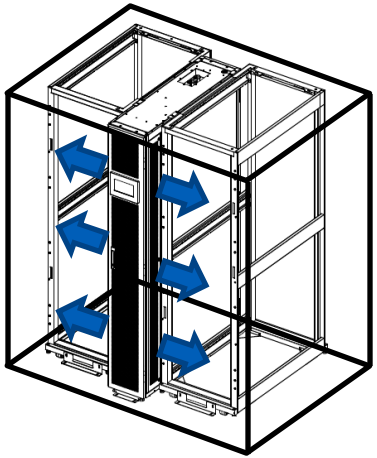
Front air discharge

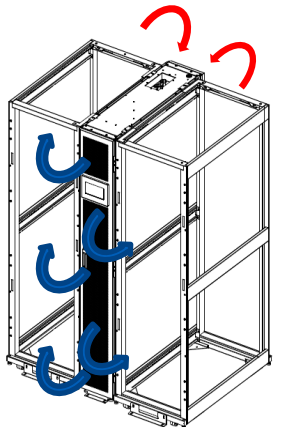


Side air discharge end of row



Side air discharge in container





Front air discharge

Side air discharge – end of row

Side air discharge – enclosed container

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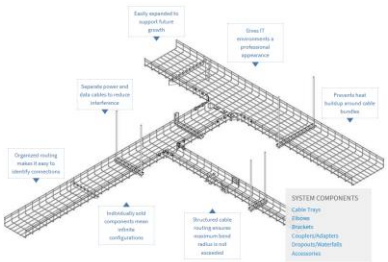
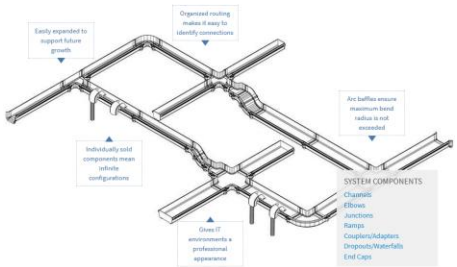
Cable Management





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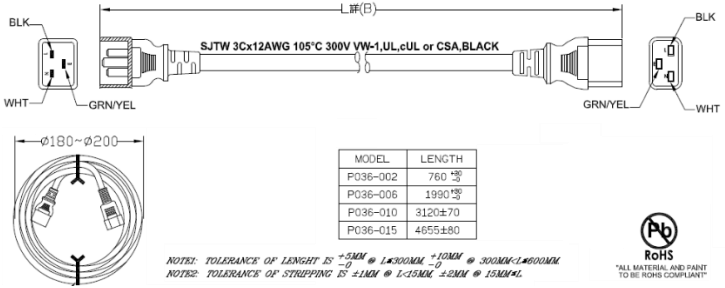
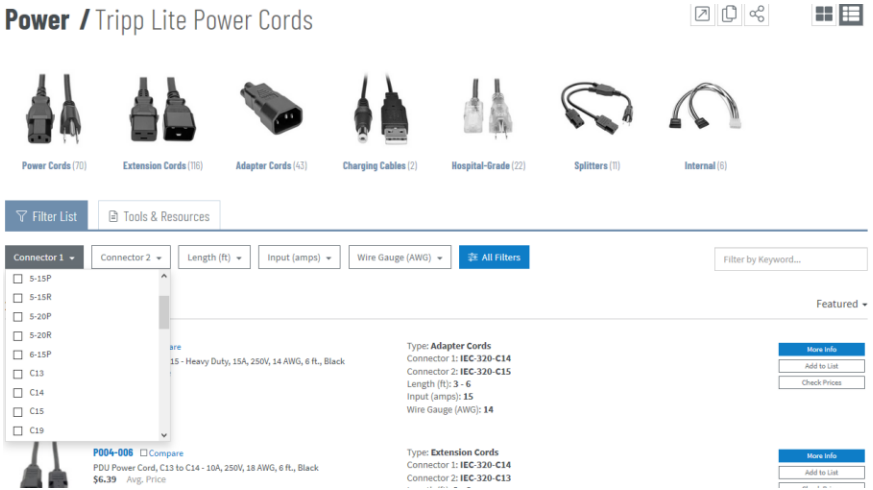
Power Cords

- IT power cords
  - Domestic 120V – NEMA to IEC Cxx
  - 100-250V – IEC Cxx to IEC Cxx (C13, C14, C15, C19, C20)
  - Country-specific cords, internal power cords
  - Locking power cords
- Medical-grade power cords
- Internal PC cords





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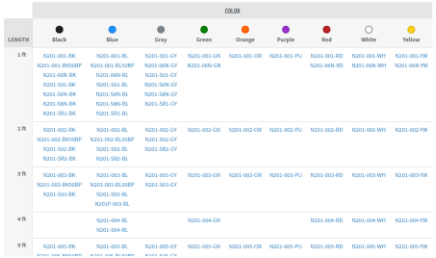
Copper Cables

- Bulk cable,
- Wide assortment of pre-made patch cables
- Custom cables
- Specialty CAT cables – outdoor, industrial
- Patch panels, couplers,

Copper Cable Matrix



Custom Cable Made to Order

cable finder
FIND YOUR CABLE IN TWO EASY STEPS

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Fiber Solutions

- Singlemode
  - 8.3/125
- Multimode
  - 62.5/125 (OM1)
  - 50/125 (OM2 / OM3 / OM4 / OM5)
- Mode Conditioning
- MTP/MPO
- Trunk Cables
- Fiber Breakout Cassettes
- Distribution Enclosures
- Media Converters

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Stack the Rack – One-Stop Shop

- KVM consoles and switches
- Console Servers (RS232 remote access)
- Network switches (SMB, distributed IT)
- Fiber infrastructure –
  - Spine Leaf Solutions, Cassette solutions, TAP, Robotic Fiber Switch

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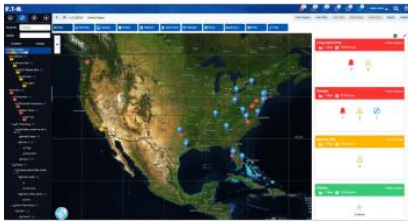
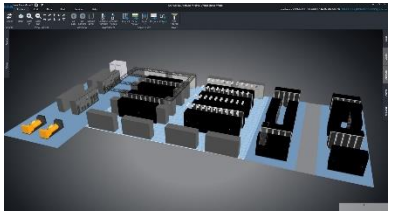
BrightLayer Data Center Suite

Real Time Monitoring of White Space

Monitoring and managing data centers inclusive of power, space, cooling and asset management





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CASE STUDIES

Case Studies

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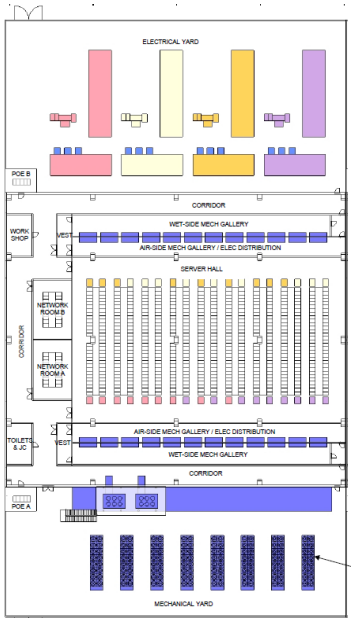
Case Study 1:
Jacobs Cloud Condos



"We are designing a modular 5MW block in a up to 30WM facility.
We want Eaton UPS "kit" …"

Jacobs

MAY 16, 2022

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OVERALL PLAN (NOT TO SCALE)

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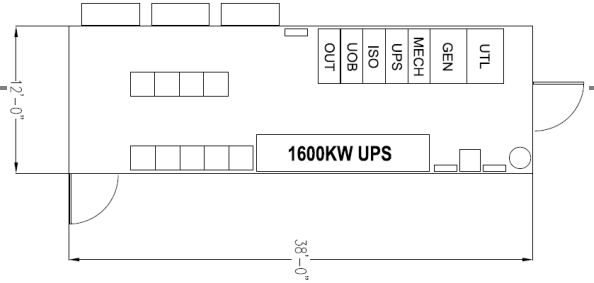

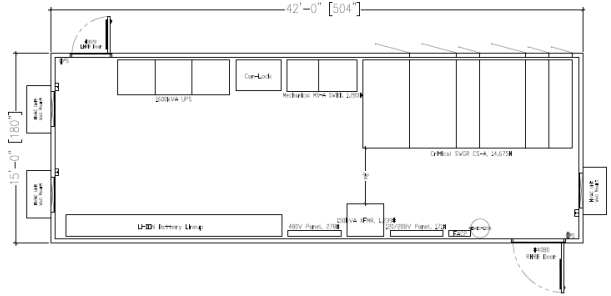

What else?

Eaton Power Center

SST UPS design

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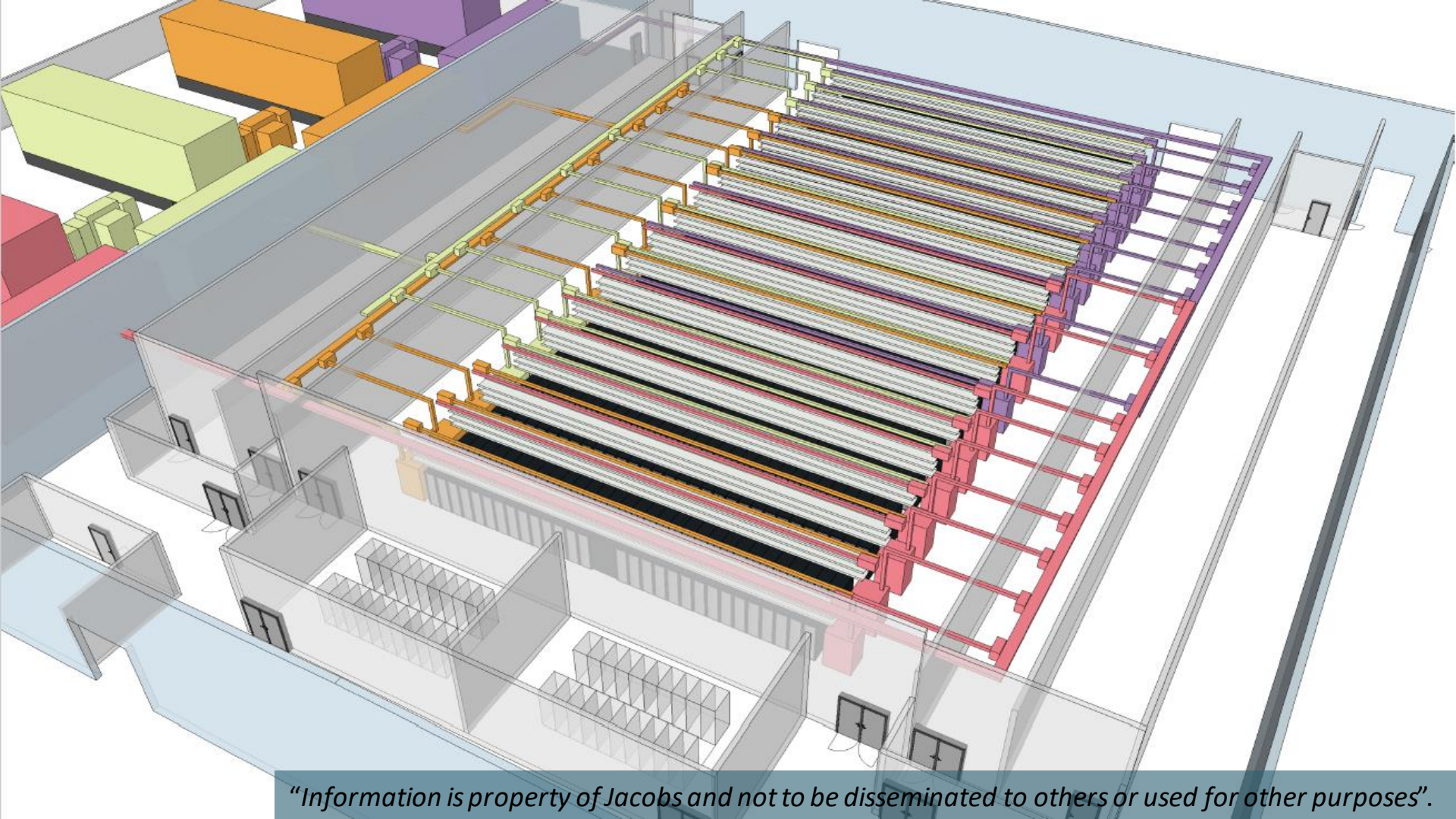

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Eaton Solution

Type	What	Level of need	Details/Lines	Eaton division
Outside Critical Power	4x1.5MW UPS, Eaton Power Center SST UPS option	High	9395XC, SST Mid Voltage Power Center	Critical Power
Power distribution	RPP, Static Switches, Busway	High	4x 2500A, 480V Pow-R-Way III busway, 32x 600A PDI PowerWave 2	Critical Power / PDI
Connectivity – cable routes and management	Cable ladders, raceways, Fiber tray	High	B-line, Tripp Lite	DIT
Connectivity	Cables – copper, fiber, fiber cassettes, Zero-slack enclosures, patch cables, patch panels, network racks, Robotic fiber panel, etc	Ongoing	Tripp Lite	DIT
Racks / Enclosures	Server Racks	540 x SR42UBDP 60x SR48UBDPWD	Tripp Lite SR	DIT
Containment	Air containment option	Hyperscale	Eaton WL	DIT
ePDU	Rack level power distribution	1080 x PDU3XVSR6G20	Eaton / Tripp Lite	DIT

Business opportunity (DIT portion only):

$4M per 5MW reference design block, up to 6 per site ($24M)

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Case Study 2: Enterprise IT customer

"We are designing a new 2000 sq ft DC. ~10KW per rack.

We like the in-row DX cooling.

Pod 1 will be 2 rows

Rest will follow

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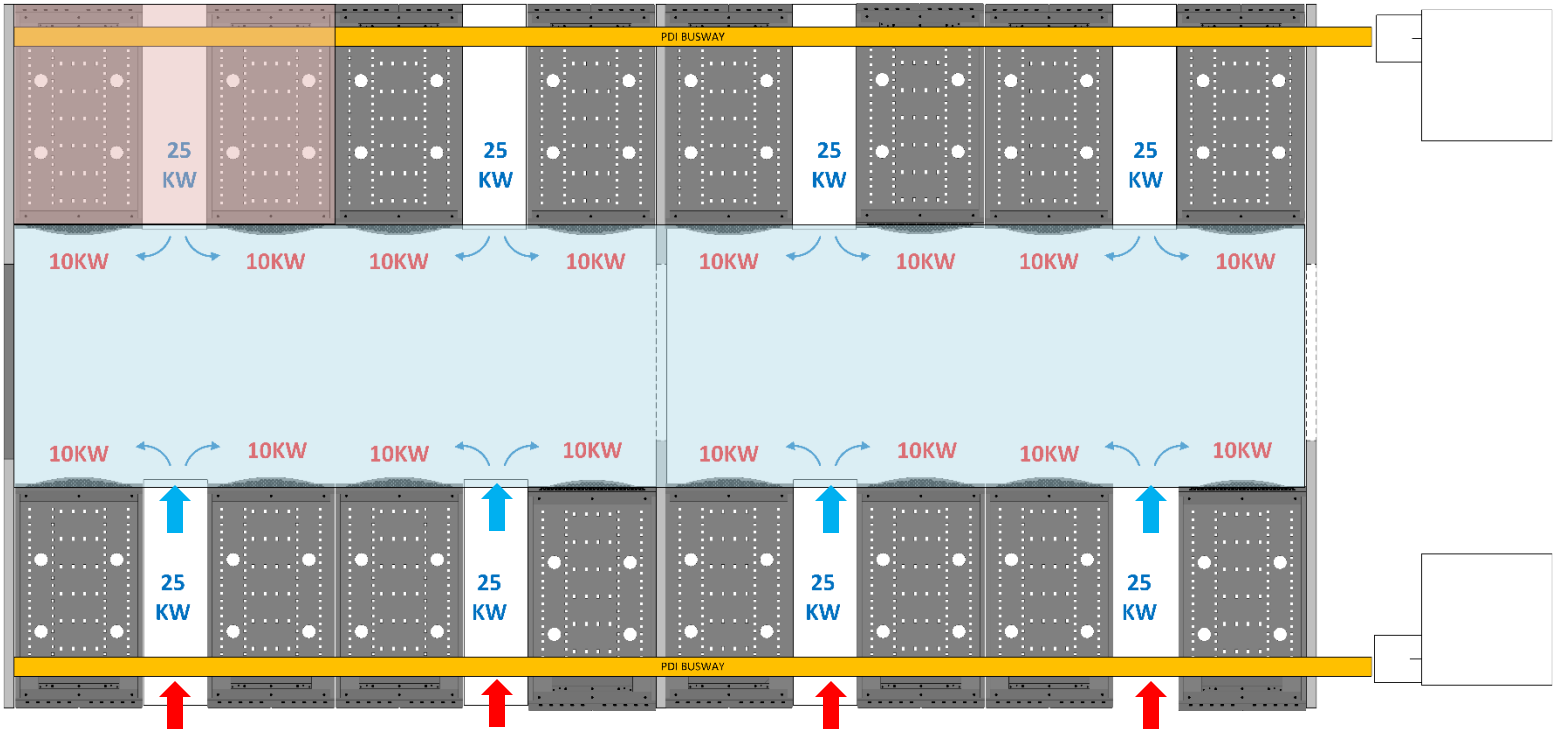
Pod design – technical overview



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Case Study 2: Enterprise IT customer

- Initial request:
  - In-Row Cooling
- Upsell
  - Racks
  - Containment
  - Cable ladders
  - Fiber trays
  - UPS
  - Modular design
  - Connectivity

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