

Open Standards, Infinite Possibilities: The Future of Custom Engineering for Rack & Power Solutions

OCP Educational Webinar Series

August 27, 2026



Community-driven hyperscale innovation for all

The Future of Custom Engineering for Rack & Power Solutions

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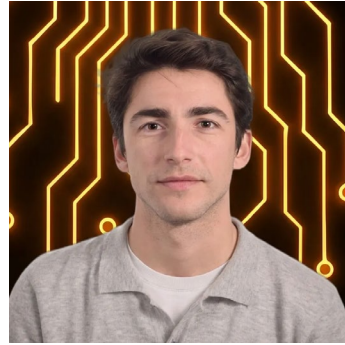
OCP Foundation



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Agenda Overview

Market Overview

Unique Customer Challenges Require Infrastructure Flexibility

Collaborative Physical Architecture

Customer-Based Engineering

Legrand OCP Solutions

Take Aways

Live Q&A

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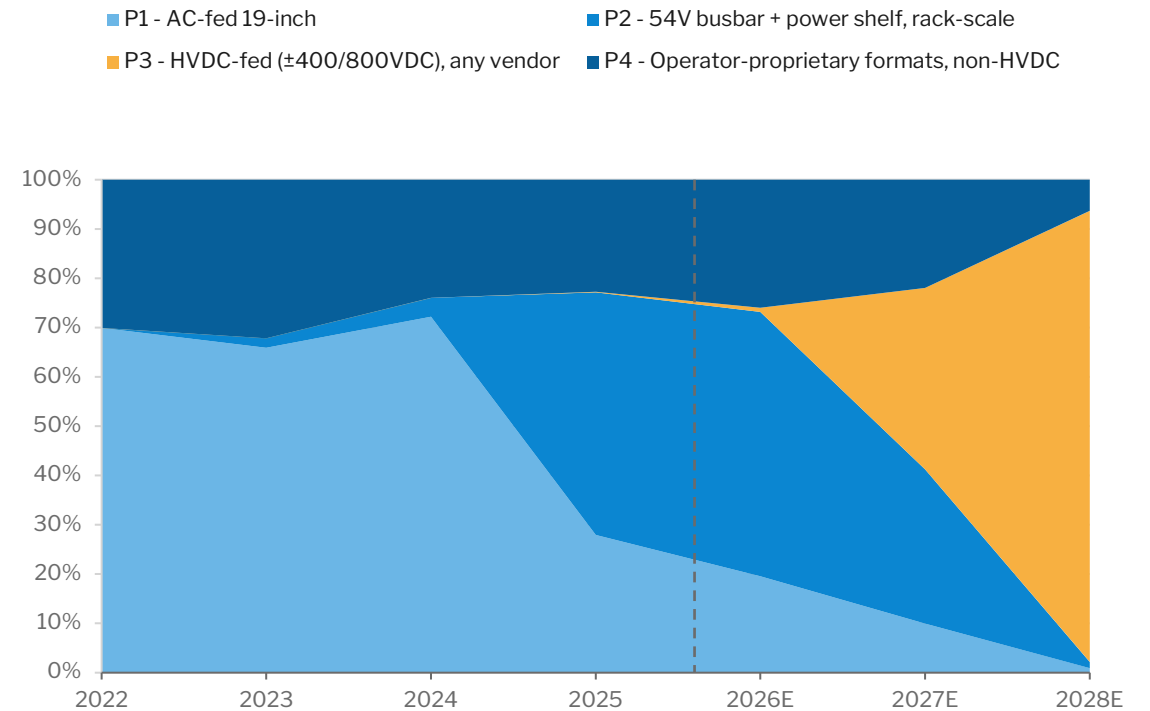
Legrand OCP Solutions

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New MW has fragmented by power architecture

Archetype	Power-delivery interface	kW class	Examples
P1 - AC-fed 19"	In-chassis PSUs, rack PDU	5-40	HGX H100/H200 OEM boxes
P2 - 54V busbar + power shelf, rack-scale	ORv3/HPR and MGX lineage	90-230	Meta Catalina (ORv3 HPR, up to 140kW); GB200/GB300 NVL72; VR200
P3 - HVDC-fed (LVDC)	±400/800VDC disaggregated power rack; 800VDC native	varies; sidecar class 500-1,000+	Mt Diablo spec (100kW to 1MW); Nvidia Kyber NVL576, ~600kW, 2H27; HVDC-fed custom pods from 2027 (TPU-class and peers)
P4 - Operator-proprietary formats, non-HVDC (non-LVDC)	Custom busbar/tray, non-merchant	Varies	Non-HVDC Google TPU pods; AWS Trainium Teton; Maia; MTIA; ORW double-wide



Share of shipped AI system MW by power-delivery architecture, ex-China. Hyperscaler HGX-class allocations per public platform documentation.

Source: SemiAnalysis Industrials Model

No two deployments of the same rack are alike

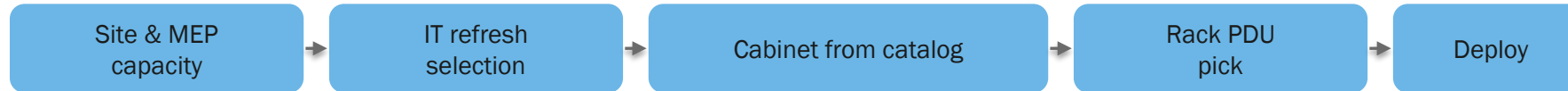
Program	Role	Width/format	Busbar V	Power position	Cooling interface	kW class
ORv3 base spec	Rack standard	21"	48V	In-rack shelf	Air, optional rear manifold [VERIFY: vs OCP spec PDF]	18-36
Meta Catalina	Compute rack	21" ORv3 HPR	48-50V, deepened busbar	In-rack HPR shelf	DLC	up to 140
Nvidia MGX NVL72	Compute rack	MGX rack	54V	In-rack shelf	DLC manifold	120-140
Nvidia Kyber NVL576	Compute rack	Wide, vertical blades	800VDC-fed	Sidecar	DLC	~600
Mt Diablo	Power rack	Sidecar power rack	±400VDC	Disaggregated sidecar	n/a (feeds compute rack)	Scales 100-1,000
Meta ORW	Rack standard	Double-wide, 1200mm (2x ORv3)	per HPR Next	In-rack / hybrid	DLC, liquid-cooled busbar (~700kW test-projected at 30°C rise)	Next-gen

20+ distinct GB200/GB300 NVL72-class deployment configurations across 8+ operators tracked in the SemiAnalysis AI Cloud TCO library. 10+ already for VR200



The decision sequence inverted: Cabinets moved from last to first

Legacy Flow



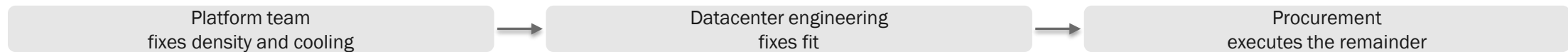
AI-Era Flow



GATES THAT BIND

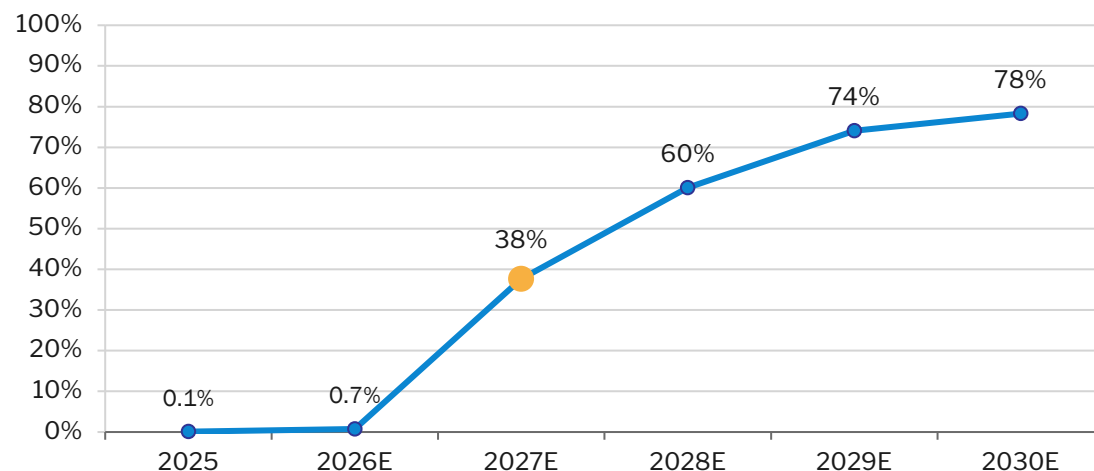
- ◆ Busbar ampacity ceiling
- ◆ Floor load and structure
- ◆ Height/width vs shipping, doorways, freight elevators
- ◆ Cable egress volume
- ◆ Manifold and sidecar space claims
- ◆ Mixed 19"/21" estates
- ◆ Branch-level power visibility once density varies 10x across one hall

OWNERSHIP



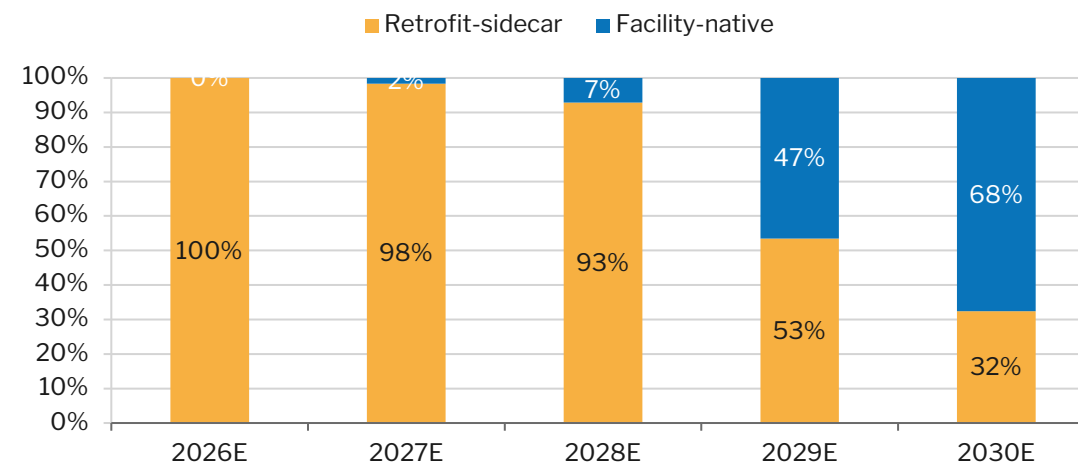
800VDC arrives as a LVDC Power Rack product first

800VDC share of new IT capacity (SA est.)



Source: SemiAnalysis Industrials Model

Retrofit vs facility-native 800VDC



Source: SemiAnalysis Industrials Model

What the 800VDC era does to cabinet and rack engineering:

- ✓ Retrofit-first adoption puts 800VDC into existing halls: sidecar power racks are engineered into live rows, so floor load, adjacency, cable egress, and mixed AC/DC feeds are resolved per site.
- ✓ Compute racks and power racks now fork independently: voltage, width, and cooling interface each vary by program, and the cabinet absorbs the mismatch at every pairing of compute rack, power rack, and hall.
- ✓ Coexistence to 2030 makes adaptable cabinets and rack-level power distribution the stable interface between IT refresh cycles and the building: mixed-voltage, mixed-width estates are the steady state.

Which architecture are you deploying / planning?

- Traditional 19" EIA
- OCP / Open Rack
- A mix of OCP and 19" EIA
- MGX / AI-focused infrastructure
- Not sure / still evaluating

Agenda: Unique Customer Challenges Require Infrastructure Flexibility

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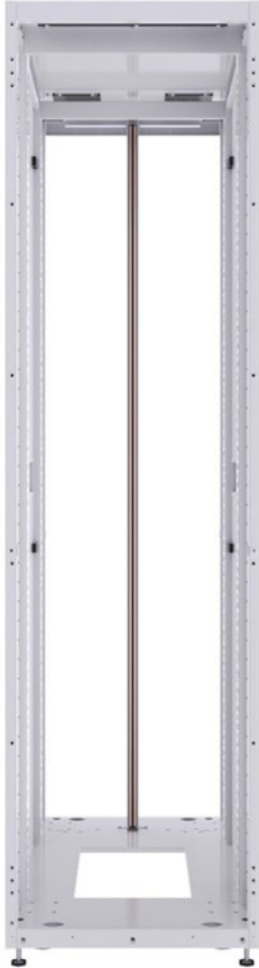
Open Standards
≠
One-Size-Fits-All

Back of Rack
Space Constraints

Data Hall
Environmental Conditions

Gaps in Architecture
Strategies

OCP Open Rack Evolution to ORv3



- OCP $\neq$ typical standards organization
- Open-sourced specifications
- Supports 21-inch OU and 19-inch RU hardware
- Traditional height = 44OU (roughly 48RU)

OCP Open Rack Evolution to ORv3



- NVL = OCP + 19" EIA
- Deeper base cabinet
- High Density Environment – RDHx
- Designed for NVIDIA GPUs
- Features for additional cooling strategies
- Weight load requirements and testing

Agenda: Collaborative Physical Architecture

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Resolving Specialized OCP Challenges through Collaborative Physical Architecture

Working with customers for need-based designs early in the process



Eliminating single-purpose systems in favor of consolidated hardware



Instituting architecture with future reliability and usability in mind

Audience Poll Question

As rack densities increase, which infrastructure challenge is the biggest concern for your organization?

- Power distribution
- Cooling
- Cable routing and management
- Weight / structural capacity
- Other

Audience Poll Results

- Some discussion facilitated by host and analyst of the results with optional comments from sponsors

Agenda: Customer-Based Engineering

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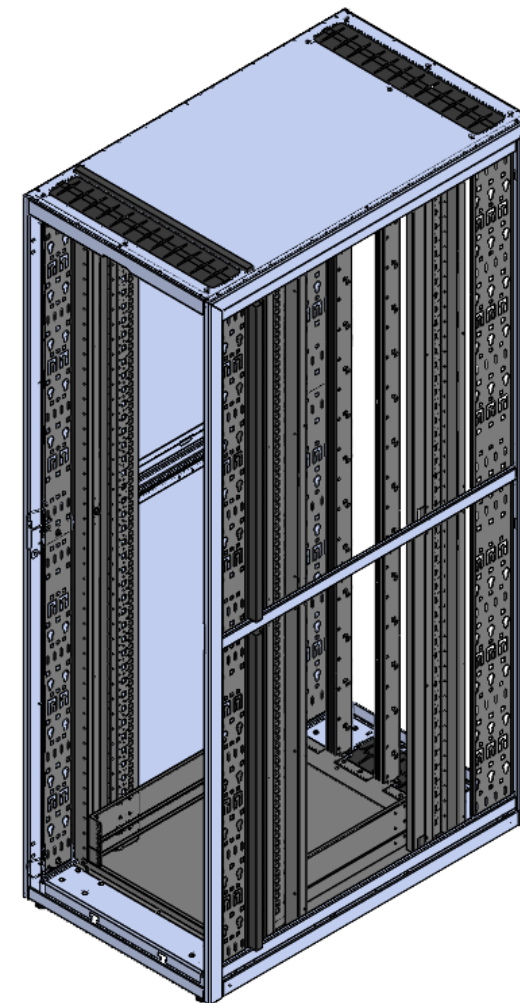
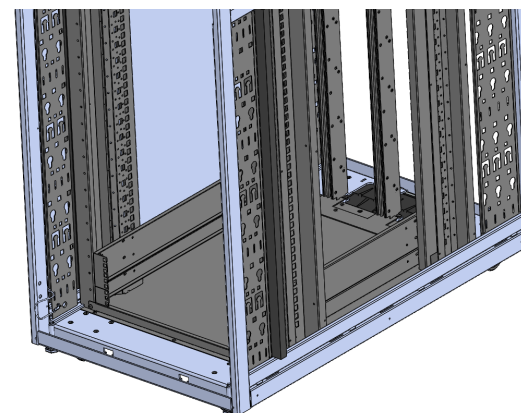
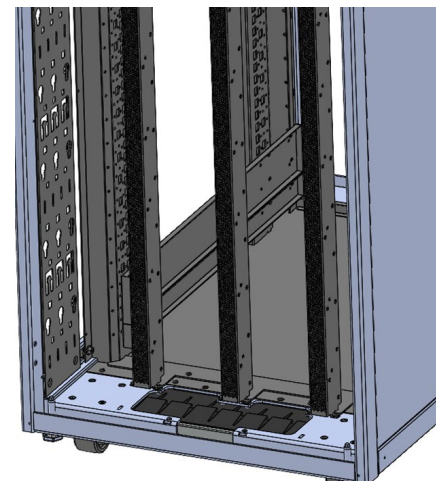
Legrand OCP Solutions

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Simple Cabinets – based on OCP

- 19" EIA or OCP ORv3
- Rear Bottom Passthrough
- One to Three Busbars
- PCMs for PDU or Cable Management
- Various Top Panel Configurations
- Various Side Panel Configurations



In-Rack Environmental Monitoring Solution

- Hyperscale customer requirements:
 - Environmental Sensor monitoring capabilities
 - 1RU, 19" EIA profile for MGX deployment
 - Powered off ORv3 48V DC Busbar, no AC in cabinet
 - Ability to manage up to 16 sensors / cabinet



Monitoring Requirements:

Temperature

Humidity

Differential Air Pressure

Water-based Fluid Leak Detection (PG25)

Cabinet Access (Door Lock)

Agenda: Legrand OCP Solutions

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Complex Cabinet - Based on MGX

Cable Entry/Egress

- Full width brush cutouts on top
- Cable pathway across front
- Using cable fingers
- Brushed passthroughs each side
- Rear hose passthrough in base

Max Dimensions

- Max Width (to Date): 48"
- Max Depth (to Date): 54"
- Max Height: 52RU (480U)



Special Features

- Available RDHx mounting on frame
- Available front/rear doors
- Optional side panels
- Adapt standard height busbar
- Non-OCP locations at top

Other Design Concepts

- Mixed OCP and EIA mounting positions based on equipment
- Dedicated CDU and manifold attachments within frame

Legrand ORv3 DC Busbar

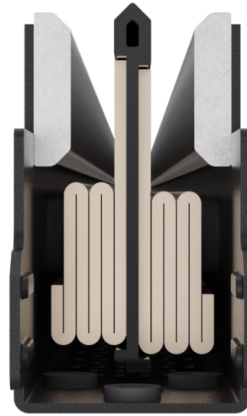
- 48-50VDC Roll-Formed Copper Busbar distributes power along height of cabinet
- Available in 400A / 700A / 1400A versions
- 1400A supports NVIDIA MGX™ architecture
- Standard height is 440U / 48RU
- Customizable design for unique solutions



BUS-44-0400V3-30

400A

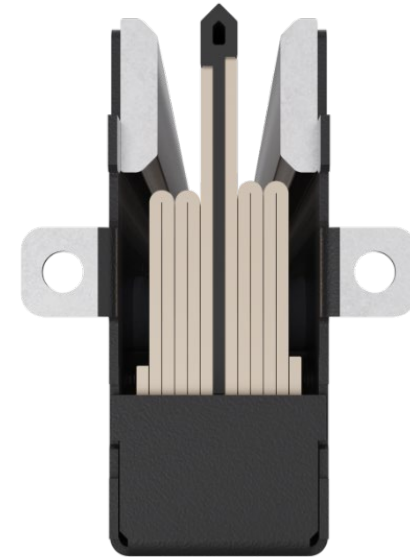
Base Spec Inspired



BUS-44-0700V3-30

700A

HPR Spec Inspired



BUS-44-1400V3-30

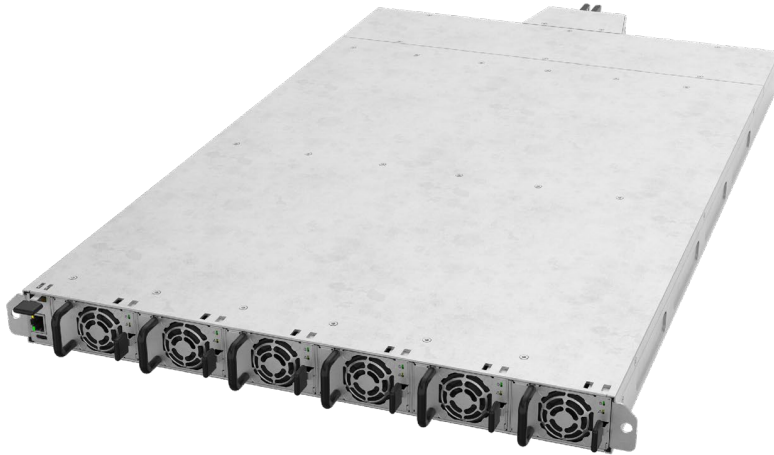
1400A

NVIDIA MGX Inspired

Legrand 33kW Power Shelves

33kW Power Shelf, 1RU, 19"

- HPR architecture
- 19" for use in OCP / MGX cabinets
- 97.0% Peak Efficiency
- Environmental Sensor Capability
- iX12 XERUS network controller (PMC) with Redfish protocol support



33kW Power Shelf, 2RU, 19"

- HPR Architecture
- 6x Auxiliary AC Outlets (Cx) on rear
- 97.0% Peak Efficiency
- Environmental Sensor Capability
- iX12 XERUS network controller (PMC) with Redfish protocol support for Power Shelf and PDU



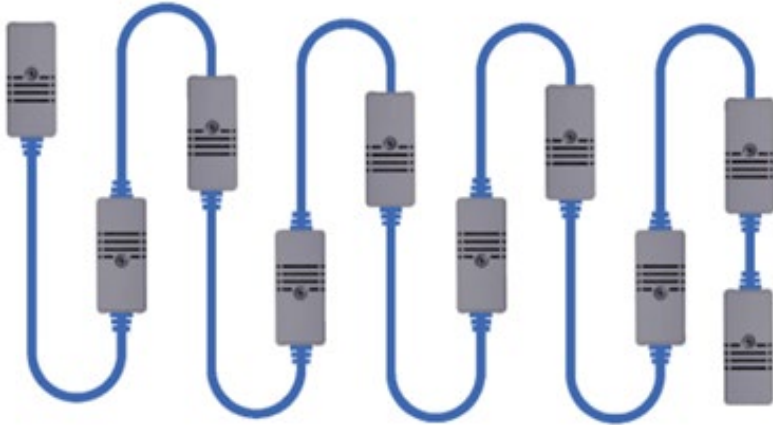
Legrand Smart Rack Controller for OCP | SRC2-0800-ORV3

- Environmental sensor monitoring & cabinet access control
- 1RU, 19" EIA profile for MGX deployment
- Powered off ORv3 48V DC Busbar
- iX12 XERUS Network Controller with Redfish protocol support
- 9x sensor bank provides in-rack monitoring for OCP solutions using the Legrand SmartSensor suite
- Manage up to 720 environmental sensors



SmartSensor Type
Temperature Sensor
Temperature/Humidity Sensor
Airflow Management Sensor
Temperature / Differential Air Pressure Sensor
Water Sensor Floor Sensor Kits
Water Sensor Rope Kit (indicates the position of the leak on the rope)
Particle Sensor (<10 Microns)
Contact Closure Sensor
Dry Contact Sensors
Powered Dry Contact Sensors
Vibration Sensor
Proximity Sensor

SmartSensors: New Sensor Standard



SINGLE BUS/STRING TECHNOLOGY

Cascade up to 32 sensor functions or 12 sensor packages with standard Cat5/6 cables

DUAL RJ45 CONNECTORS

Simplify the installation and servicing of sensor packages without rewiring the rack or daisy chain



LED INDICATORS

Visually indicates when thresholds exceed predetermined levels, improving field response time when addressing critical risks.



HIGH-ACCURACY AND HIGH-RELIABILITY MONITORING

Longer asset lifecycle, better efficiency

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Take Aways

- The standard rack is gone
- Open standards are not one-size-fits-all. Density crowds the rack and forces customization
- Custom cabinets absorb the mismatch. Mixed OCP/EIA mounting, multiple busbars, flexible egress
- Power scales with the platform. ORv3 busbars up to 1400A, 33kW HPR power shelves
- Liquid cooling demands monitoring. Leak, temp, and humidity sensing off the busbar
- Engage early. Design collaboration up front avoids deployment headaches

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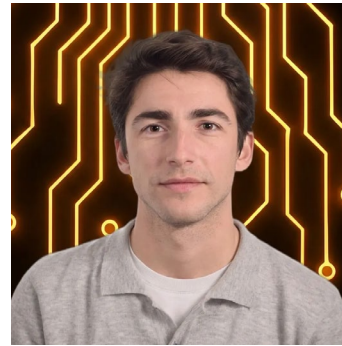
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