WHITE PAPER

ArcTiv iPDU's Provide Greater Control of Your Edge-Series Cabinet

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Abstract

The fastest growing segment of the rack PDU market is the intelligent or 'managed' PDU's which are networked power devices with outlet level control and monitoring. These devices allow Data Center operators to learn more about their server and system performance and make better decisions on allocating power and cooling to their racks.

The emergence of edge-computing has introduced these technologies to the office, retail and manufacturing sectors as IT managers are seeking to gain better control of the servers and security networking devices via a centrally managed, distributed network. These applications are often confined to specialty cabinets with 2-3 servers, requiring the managed PDU's to facilitate a compact design; often in horizontal (1U) or vertical (0U) configurations. The iPDU's can monitor the cabinet environment along with outlet switching to remote reboot devices without affecting the remainder of the network.

Key considerations in selecting the right cabinet and PDU combination include:

- Compact design to meet the application requirements
- Outlet control and environmental management
- Remote management for distributed networks

In this paper, it is shown that incorporating a managed PDU can upgrade your current edge-computing cabinet system to provide the most visibility and control of your network in a compact, economic design. Key markets and applications are shown below:

Offices


High-Rise Buildings


Conference Rooms


Healthcare

Retail


Convenience Stores


Grocery Stores / Big Box


Restaurants

Manufacturing


Factory Automation


Logistics


Airports

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IPDU'S

ArcTiv iPDU's offer greater visibility and control of the power and environment of your edge-computing network. The compact switched and monitored output designs can turn-off unused outlets and provide secure, device reboot. The hot-swap network modules interconnect the cabinet environmental management sensors which allow remote monitoring and user-defined alarms.

The iPDU's are offered in multiple configurations and can be customized to the application. The product line includes:

- Horizontal, 1U PDU's
- Vertical, 0U PDU's
- Environment Management Sensors

iPDU's Support Compact Edge-Computing Cabinet Configurations

Edge-computing applications often require customized cabinet, cooling and power configurations based on the environment and installed equipment ratings. With a range of vertical (0U), and horizontal (1U) configurations, iPDU's are ideal to fit in compact Micro Data Centers and Edge-Series cabinets. Key factors in selecting the right PDU for the application include:

- Rack power consumption (kW)
- Input and outlet styles
- Remote management and alarms
- Environmental monitoring requirements
- Low-profile mounting for easy access to equipment

Table 1. Overview of iPDU's Features

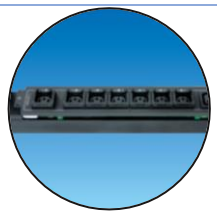
iPDU's			Benefits
 Locking C13 Outlets	 Hot-swap Network Module	 Low-Profile Breakers	• Vertical (0U) and horizontal (1U) configurations • 10A, 16A and 32A options ideal for applications up to 7.4kW • Hot-swap network and outlet modules • Modbus and SNMP communication protocols compatible with 3rd party DCIM systems • 1% accuracy • Low-profile hydraulic circuit breakers • User-defined alarms • Connects to rack sensors for system management • Remote reboot of servers and network equipment • Locking C13 outlet • Tool-less 0U mounting
 Hotswap Outlet Modules	 1% Accurate Meter with Environmental Monitoring	 Tool-less 0U Mounting	
 Horizontal (1U) Configurations			

Table 2. Recommended Managed iPDU Configurations for Edge-Computing Cabinets

Micro Data Center – Split Cooling	Micro Data Center – Integrated Cooling	Smart Cabinet – Fan Cooling
 Cooling: 3.9kW UPS: 6kVA *iPDU* Full Height, 0U (32A) OUT: 20xC13, 4xC19	 Cooling: 3.5kW UPS: 6kVA *iPDU* Full Height, 0U (16A) OUT: 20xC13, 4xC19	 Cooling: 2.0kW UPS: 3kVA *iPDU* Horizontal, 1U (16A) OUT: 8xC13
Floor Standing Cabinet	**Swing Gate Wall Mount Cabinet**	**Vertical Wall Mount Cabinet**
 Cooling: 2.0kW UPS: 3kVA *iPDU* Horizontal, 1U (16A) OUT: 8xC13	 Cooling: 1.5kW UPS: 2kVA *iPDU* Horizontal, 1U (16A) OUT: 8xC13	 Cooling: 1.5kW UPS: 2kVA *iPDU* Horizontal, 1U (16A) OUT: 8xC13
Sound-Proof Cabinet	**Fixed Wall Mount Cabinet**	**Side-Mount Wall Mount Cabinet**
 Cooling: 3.0kW UPS: 5kVA *iPDU* Horizontal, 1U (16A) OUT: 8xC13	 Cooling: 1.5kW UPS: 2kVA *iPDU* Horizontal, 1U (16A) OUT: 8xC13	 Cooling: 2.0kW UPS: 3kVA *iPDU* Horizontal, 1U (16A) OUT: 8xC13

iPDU's Upgrade Edge-Computing Cabinets with Outlet Control & Environment Management

Standard Edge-computing cabinet solutions are often equipped with basic PDU's to power up to 3kW of equipment. As the network closets are quickly being replaced by all-in-one cabinets which can be located in open-office or remote locations, IT managers are seeking remote management of the powered devices along with visibility to the cabinet environment (temperature, humidity, door sensors) in the most economic package. Table 3 shows a comparison of a Micro Data Center, Smart Cabinet and Edge-Series cabinet specifications to determine the best style for the application.

Key Application Considerations:

- IP rating (dust, temperature, humidity)
- Total RMU capacity and equipment size
- Total power consumption
- System Security
- Remote Access

For applications requiring remote management, the managed PDU's can upgrade the system with outlet-level monitoring and control along with environmental management. This level of control can give the IT manager the ability to set system alarms and remotely reboot devices without the direct involvement of a local branch manager.

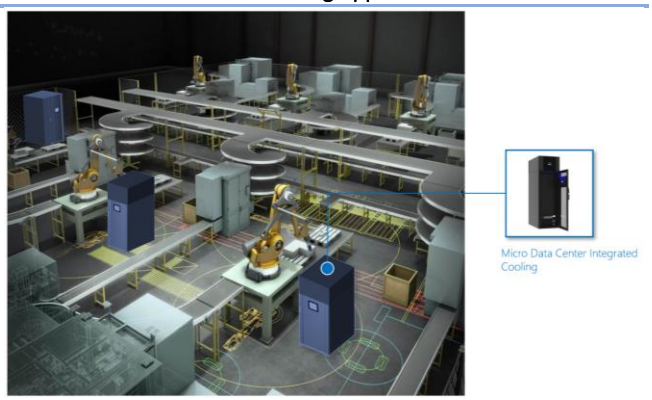
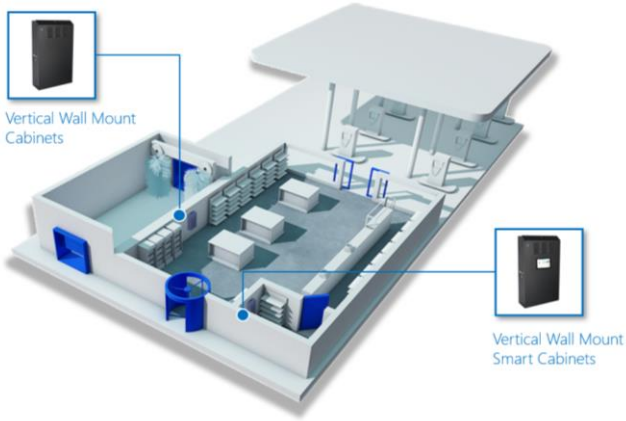
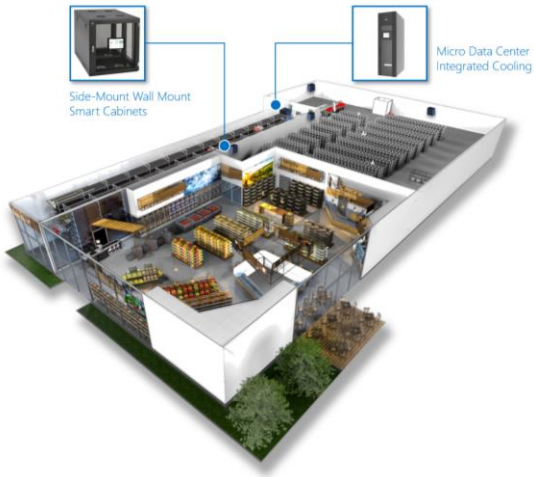
Table 3. Edge-Computing Cabinet System Specifications with iPDU's

Standard System Specification	Micro Data Center (Integrated Cooling)	Smart Cabinet (Fan Cooling)	Edge-Series Cabinet (Fan Cooling)
			
Cabinet RMU (Total)	33U	24U	24U
Cabinet RMU (Available)	27U	18U	21U
IP Rating	IP4X	IP2X	IP2X
Auto door release	Yes	Yes	None
3-in-1 Access Control	Yes	Yes	No (Key only)
Blanking Panels	Yes, 1U	Yes, 1U	Yes, 1U
Cable Management	Yes, 1U	Yes, 1U	Yes, 1U
Environmental Sensors (Temperature, Humidity, Door, Smoke, Water)	Yes	Yes	None
UPS (Max, recommended)	5kVA (External battery)	3kVA (Internal battery)	3kVA (Internal battery)
Power Distribution Module (PDM)	MBP, surge protection	MBP, surge protection	None
Cooling Capacity	3.5kW	2kW	2kW
Cooling Control	Yes, Precision Cooling	Yes (Fan)	No (Fan, Always On)
Communication protocol	Modbus	Modbus	None
HMI	10" (controller)	10" (controller)	None
Alarms	Power, Cooling, Environment, Security	Power, Cooling, Environment, Security	None
Remote Device Reboot	None	None	None
Outlet Monitoring	None	None	None
Add Managed PDU	**Vertical (0U)**	**Horizontal (1U)**	**Horizontal (1U)**
Remote Device Reboot	Yes	Yes	Yes
Remote outlet monitoring	Yes	Yes	Yes
Communication protocol (PDU Only)	Modbus, SNMP	Modbus, SNMP	Modbus, SNMP
Alarms (Added)	Power (Input, Outlet)	Power (Input, Outlet)	Power (Input, Outlet), Temp, Humidity, Doors

iPDU's are Ideal for Distributed Edge-Computing Networks

Common edge-computing applications include branch offices, retail, manufacturing and smart cities, driven by on-site servers to reduce latency and PoE switches for security cameras. Table 4 illustrates the distributed network cabinets which minimize cable lengths and IT room infrastructure costs. Each cabinet configuration can support iPDU's to monitor and control the network power and environment without the need for on-site support.

Table 4. Edge-Computing Common Applications and Benefits

Office Application	Manufacturing Application
	
Benefits	Benefits
• Minimal costs to modifying the office area or building a dedicated IT room • Reduce cabling costs • No additional room cooling requirements • Reduced power loss in PoE cables • Low latency (vs. offsite or cloud)	• Reduced latency by locating the servers and networking devices close to the equipment • Protect against dust, temperature and humidity • Reduced cabling and infrastructure costs • Reduced power loss in PoE cables • Remote re-boot of servers and networking devices
Retail Application – Convenience Store	**Retail Application – Grocery / Big Box Store**
	
Benefits	Benefits
• Remote management of Power, PoE switches, Security and POS equipment • Compact design for back-room storage areas • No need for on-site IT manager	• Greater security by locating the cabinets out of reach of consumers and personnel • Remote management of Power, PoE switches, Security and POS equipment • No need for on-site IT manager

Conclusions

ArcTiv iPDU's provide compact, high-performance solutions which help IT managers control their distributed networks in a wide range of edge-computing applications. The outlet control features allow servers and networking equipment to be remotely rebooted and monitored by a central management system; reducing the need for local IT support staff. In addition, the environmental management functions can upgrade standard edge-series cabinets to include temperature, humidity and door sensors with user-defined alarms. The range of horizontal (1U) and vertical (0U) PDU's allow the user to select the exact configuration for the application while minimizing rack space and system costs.

Using the guidelines and techniques addressed in this white paper, the user can design the best solution based on the room, building and IT equipment requirements. For more information, contact the author or visit our website at www.arctiv-tech.com.

About the Author

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Over 15 years of experience in international business and product development for Fortune 500 companies in the data center, industrial automation and defense industries. MSEE in power systems engineering with extensive product development experience in power electronics and data center infrastructure.

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