Remote Management of Data Center Cabinets

The Importance of Remote Power Control in Multitenant/Colocation, Laboratory and Remote/Edge Sites

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Introduction

With the shift of enterprise-owned Information and Communications Technology (ICT) equipment into multitenant data center (MTDC)/colocation sites and the anticipated growth of remote/edge sites[1,7], basic control of power for remotely located ICT equipment is becoming an important consideration in overall power management strategy. Laboratory environments face a similar challenge with the need to reboot equipment regularly during testing.

Those responsible for remotely located ICT equipment or a laboratory environment stand to benefit from remote power control. Intelligent rack power distribution units (PDUs) with remote power control *(Figure 1)* offer a simple, cost-effective solution, with a generally short return on investment.

This white paper explores the most beneficial applications for intelligent rack PDUs with remote power control, defines the key capabilities to require on intelligent rack PDUs with remote power control, and lists additional monitoring and security capabilities that should be considered when selecting intelligent rack PDUs for use in laboratories, in remote/edge sites or when colocating enterprise-owned equipment into MTDCs.

Definitions in this White Paper

• Cabinet/rack(s) refers to ICT equipment cabinets and racks—any 19" EIA rack-mount support structure for computer servers, data storage or network switches.

• Intelligent rack PDUs include a network connection to provide remote monitoring and/or control and attach into/onto a cabinet/rack.

• Remote power control is the capability to remotely turn on, off and cycle power to each outlet on the intelligent rack PDU and thus individual ICT equipment. This capability is available in CPI Switched and Switched Pro PDUs.

Figure 1: Intelligent rack PDUs are used to distribute power into ICT cabinets and racks. Select models include the capability to turn power on, off or cycle at each outlet.

Fast Fact

If you are already familiar with selection of PDUs and power strips and just need to find a part number quickly, try the CPI Power Selector at selectapdu.com. If you would like help selecting a product or have a technical question, please contact CPI Technical Support at techsupport@chatsworth.com

Beneficial Applications of Intelligent Rack PDUs with Remote Power Control

Remote power control at the outlet level is most useful in remote, unattended sites and laboratories where standard ICT equipment will require occasional or regular physical reboot of equipment, especially when the reboot activity is expensive or time-consuming.

In MTDCs where enterprise-owned equipment is colocated, remote power control functionality can be used to reduce "remote hands" service charges for simple physical reboot activities[8,12]. Generally, the price of the PDU equates to the sum of a few remote hands service charges, and so the return on investment is higher when supporting critical equipment like an interconnect switch, router or server.

Similarly, in remote/edge sites and other unattended sites, use of remote power control functionality may eliminate "truck roll" to sites. In this case, the return on investment may be even higher as downtime can be longer when there are no on site staff or accessible remote hands services, considering that the overall cost-benefit of a truck roll for a simple physical reboot is quite expensive.

In laboratories and test sites, you can use remote power control functionality to reduce the complexity of rebooting equipment when making test changes. Generally, testing involves various configurations with intermittent reboots. The return on investment equals a more efficient use of staff resources and possibly shorter time required for test setup and processing.

An additional application that can apply to all types of sites, but especially unattended multitenant and remote/edge sites is the ability to maintain the "power off" condition on any unused outlets in order to require a formal process that reviews available capacity and failover before deploying and powering new equipment or to secure power when retiring old equipment. This is a form of security, both to restrict access to power and to carefully allocate available capacity.

Required Capabilities for Intelligent Rack PDUs with Remote Power Control

Intelligent rack PDUs are available with a mix of functions for remote power monitoring and control. Most important for remote sites is remote power control at the outlet level. Remote power control at the outlet level includes the ability to turn individual outlets on, off and to cycle power to outlets, which can be used to affect a remote reboot or to ensure power is off on unused outlets *(Figure 2)*.

The following list includes critical firmware and hardware capabilities to require on intelligent PDUs that have the remote power control functionality:

• Naming of the PDU to associate the PDU with a specific site/location and cabinet/rack

• Naming of the individual outlets to associate the PDU with specific rack-mount equipment

• Strong network security including HTTPs support with the ability to upload a custom certificate and support for SNMPv3 for third-party software integration

• Strong user authentication, including integration with enterprise authentication services such as RADIUS and LDAP and separate levels of permission for PDU management versus power/outlet control

• The ability to turn power to outlets on, off or cycle power to outlets

• Use of bistable relays that minimize the power consumption of intelligent PDUs with remote power control during normal operation. They also allow the individual outlets to maintain their state after a power event

• The ability to report status of outlets as on, off or cycling

• The ability to set a cycle time to control the power on sequence and prevent inrush current

• The ability to group outlets, and to monitor and control the status for the entire group of outlets through a single click (on, off, cycle) in order to monitor and control power for a device that has multiple power connections

• The ability to group outlets across multiple PDUs when PDUs are linked using IP consolidation in order to monitor and control power for a device that is powered through multiple (redundant) PDUs

• The ability to turn power off and keep it off on unused outlets in order to prevent the addition of powered equipment to cabinets and racks without a formal review

• Logging of changes in outlet status (on, off, cycle) to keep a historical record of changes and/or to confirm service level agreements (SLAs)

• Support for in-band and out-of-band management through integration with third-party data center infrastructure management (DCIM) and/or simple network management protocol (SNMP) management software or hardware including monitoring, configuration and control of many PDUs across large and/or multiple sites from a single software interface and to add automated responses.

Figure 2: Remote power control allows remote reboot of equipment by cycling power to outlets.

Outlet Status

Outlet Name	Status	Control	Branch	Current	Voltage
1 - Outlet 1	On	☐	CB1	0.00A	121.8V
2 - Outlet 2	On	☐	CB1	0.00A	121.8V
3 - Outlet 3	On	☐	CB1	0.00A	121.8V

Fast Fact

For a simplified explanation of the different levels of functionality (power, monitoring and control) on intelligent rack PDUs, download the companion white paper: The Basics of Selecting Rack-Mount Power Distribution Units (PDUs) and Power Strips at chatsworth.com/white-paper

Additional Capabilities to Consider on Intelligent Rack PDUs with Remote Power Control

In addition to remote power control capabilities previously discussed in the section above, monitoring power use, even when ICT equipment is colocated, provides critical information about power utilization and remaining power capacity *(Figure 3)*. Intelligent PDUs can also integrate environmental monitoring and access control. These capabilities can provide added awareness of operational conditions and security for remote equipment at reduced cost versus separately derived systems.

The following list includes additional capabilities to consider in order to maximize benefits from intelligent PDUs:

- Remote power monitoring at the outlet level with threshold alarms and outlet grouping to monitor power capacity and trends, overall utilization, usage against billing, and/or adherence to SLAs

- Integrated environmental monitoring at the cabinet/rack level with alarms to monitor operation conditions, trends, and/or adherence to SLAs

- Integrated electronic access control and record keeping through integration of electronic locks on the cabinets to remotely control access to equipment and maintain records for regulatory compliance

- IP consolidation that allows multiple PDUs to share a single physical network connection and IP address to reduce networking cost

- Integrated network security to ensure secure access for administration and for the transfer of collected data to third-party DCIM or SNMP management software

- Bulk configuration and firmware upgrade capabilities to allow for easy maintenance and to simplify critical updates across many PDUs and distributed systems

- High operating temperature rating (149°F/65°C) for use in high-density racks and edge sites where higher operating temperatures may be the normal condition

- Integration with third-party DCIM and/or SNMP management software or hardware and/or support for Application Programming Interface (API) or Command Line Interface (CLI) that supports the above capabilities

Fast Fact

For a detailed explanation of these capabilities, download the companion white paper: Additional Considerations When Selecting Rack-Mount Power Distribution Units (PDUs) and Power Strips at chatsworth.com/white-paper
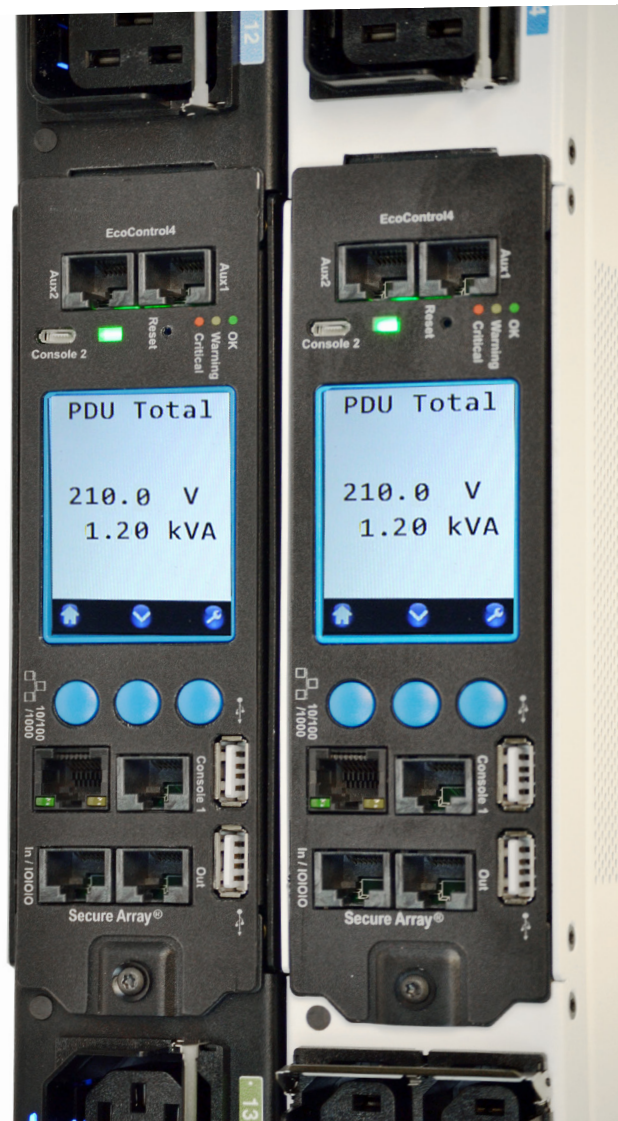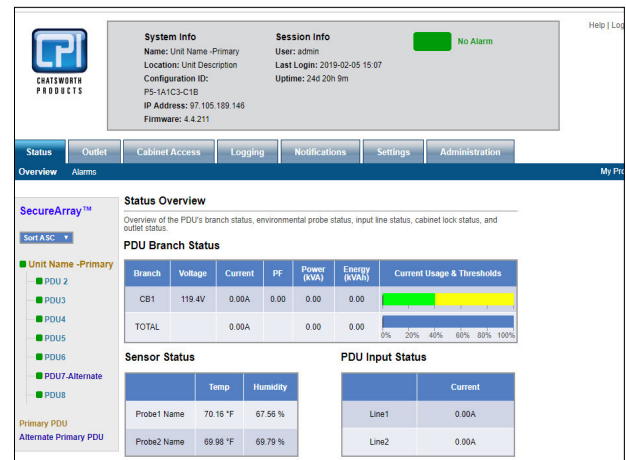

Figure 3: Remote power monitoring captures data that can be used in DCIM to trend power use, estimate remaining capacity, adjust for underutilized equipment and ensure failover.

Conclusion

Those managing remote ICT equipment or a laboratory environment must consider an intelligent rack PDU with remote power control capability as part of an overall power management strategy.

Remote power control simplifies and reduces the cost of basic troubleshooting and helps secure unauthorized access to power. Laboratories also benefit from this capability, allowing efficient, remote reboot as systems are tested through various configurations.

Why Select a CPI PDU?

Managing power at the cabinet/rack level provides the data you need to optimize space, power and cooling utilization at your site. CPI's knowledgeable power sales and application engineering teams will work with you to understand your requirements and help you identify the best solution for your application.

CPI designs and manufactures a complete solution for the cabinet/rack space with more than 300 standard PDU and power strip models encompassing all functionality levels, form factors and electrical configurations, as well as custom configurations for customer-specific requirements.

Additionally, CPI can be your single source for a complete equipment storage solution including PDU, cabinet/rack, cable management, airflow management, environmental monitoring, electronic access control and DCIM software. You can order an ecosystem cabinet with PDUs and all accessories preinstalled or kitted to match your site requirements. The systems are fully compatible, easy to configure and operate.

Fast Fact

If you would like help selecting a product or have a technical question, please contact CPI Technical Support department at techsupport@chatsworth.com

Order locks and PDUs preinstalled to your cabinet. Add power. Make it easy.

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Contributors

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