WHITE PAPER

Top 8 Considerations for Choosing the Right Rack Power Distribution Units to Fit Your Needs

Executive Summary

Power design in data centers is getting substantial attention—particularly by facilities and engineering personnel—as organizations pursue constant improvements in reliability and energy efficiency. At the same time, however, many IT professionals tend to spend little time or energy on the specific products they use to deliver and distribute electrical power. In-rack power is often considered less strategically important than which servers or databases to deploy, and it is often one of the last decisions to be made in the overall design of the data center. But choosing the right in-rack power solutions can save organizations from potentially crippling downtime and deliver significant up-front and ongoing savings through improved IT efficiency and data center infrastructure management.

One of the basic decisions in data center design is which rack power distribution units (PDU) to use and where to use them. The rack PDU is a fundamental building block of any data center, transforming high-capacity raw power feeds to lower-capacity outlets for rack servers, blade chassis, network switches, storage systems and all of the myriad hardware technologies that comprise today's highly diverse and power-hungry MDFs (main distribution frames) and data centers. PDUs come in a variety of flavors, offering varying functionality at varying price points. Paying closer attention to which ones you are using and how you are using them can pay off in a big way.

Choosing the Right PDUs for Your Applications

So how can you determine which rack PDUs are appropriate for your needs and applications? What type of infrastructure challenges are you facing, and what factors do you need to consider in terms of your applications so that you know what questions to ask when evaluating PDUs? Here are the top eight things you need to know about deploying PDUs that will help you choose the right solution for your environment.

1 PDUs address a broad range of power requirements.

It may seem obvious, but defining your power requirements is the first step in choosing the right PDU. Are you powering a major data center with hundreds of server racks running mission-critical applications? Does the environment also include blades—or, as is happening in some cases, are the blades replacing traditional rack servers? In a large-scale data center or blade deployment, for example, you might require PDUs with 3-phase inputs. If you are powering a network wiring closet, branch office or smaller data center, you would typically be looking at PDUs with single-phase inputs. Your needs will change depending upon a variety of factors, and you may be deploying a range of PDUs with different features to address various requirements within your organization.

2 Varied features on PDUs can help you address different power challenges.

If you consider the product offerings of a leading vendor, you will find dozens of different PDU models offering a wide range of features. Fundamentally, however, PDUs are available in four categories: basic, metered, monitored and switched. A basic PDU is what the name implies: a PDU that is used to distribute power without any frills. A metered PDU is a step up from a basic PDU in that it adds a visual current/load meter so you can see when the PDU might be on the verge of overloading. A monitored PDU adds a built-in network interface that will remotely report on the power consumed by the connected equipment. A switched PDU adds the ability to control individual outlets remotely so you can reboot your equipment from any location without having to go to the site in person.

3 To choose the right PDU, you should define goals for your various environments.

Each data center is different, so it is important to determine your goals at the outset. If you have a huge facility with hundreds of server racks, for example, you may be focused on keeping costs down and saving physical space. In those types of data centers, you typically will monitor power consumption at many levels and may not feel the need to monitor the PDU as well. There can be cost savings here by deploying basic or metered PDUs. The opposite may hold true if you are deploying the PDU at a branch location that is not staffed by local IT personnel. Deploying a switched PDU at the site may be more costly up front, but it will provide significant savings over the long term because you won't need to send IT personnel to the site to restore power.

Here are some of the challenges your organization may be facing and which type of PDUs can help you address them.

Feature	Benefit	Basic PDUs	Metered PDUs	Monitored PDUs	Switched PDUs
Multiple Outlets	Provide reliable power distribution from a UPS system, generator or utility source to multiple devices. Models with high-amperage plugs convert a high-amperage outlet into multiple low-amperage outlets.	✓	✓	✓	✓
Current/Load Meter	Displays connected equipment load in amps to prevent overloads and safely balance and optimize load levels.		✓	✓	✓
Network Interface	Provides remote monitoring and alerts to prevent overloads that cause downtime. Supports centralized management through a network management system.			✓	✓
Remote Outlet Control	Eliminates costly service calls by rebooting locked devices from any location. Increases runtime of critical devices by turning off nonessential loads during power failures.				✓

4 Location and staffing requirements will impact your choice of PDU.

As noted, a branch office with no IT staff is a prime location for a switched PDU. With a monitored or switched PDU, you will be able to remotely monitor the power consumption of the equipment at your remote locations. You can monitor how much current the PDU is providing, whether it is nearing its maximum and may be at capacity, or whether you are reaching certain thresholds that may cause you to consider adding capacity. With select switched PDUs, you can break down power consumption at the power outlet level, so you can get details about how much power a single device may be pulling from a specific receptacle. This can help with troubleshooting and isolating potential problems. However, don't overlook the potential benefit of having a switched PDU at your main data center so that you can remotely reboot equipment there as well. It can save you time and resources and ease some of the burden on IT personnel, especially as large, standardized data centers are staffed with fewer and fewer on-site employees.

5 The right PDU will help you to minimize downtime and keep key applications available during power outages.

PDUs are available with a variety of features that can help you to minimize downtime. With a metered PDU, you have real-time local reporting of your power consumption in order to avoid potential overloads. With a switched PDU, you can get systems back up and running quickly from a remote location without having to travel to the site. A switched or monitored PDU will help you keep track of what is happening at a branch location outside of normal business hours. Another advantage of switched PDU is the ability to configure the unit so that it can automatically shed loads during an outage. For example, a switched PDU connected to a UPS system can be programmed to turn off some of the non-critical loads plugged into the PDU during a power failure. This allows you to power off your least-important equipment first while preserving battery backup power for your mission-critical systems.

6 A PDU can deliver more than just information on power consumption.

The network interface on a monitored or switched PDU can be used to communicate information received from standard sensors about a wide variety of functions in addition to power consumption. For example, you can monitor door-closure detectors, smoke alarms, temperature/humidity sensors and other devices through the network interface, receiving alerts and logging operational data automatically.

7 PDUs play a critical role in your overall power management solution.

Every IT organization is under pressure to manage power more efficiently. It's not just a matter of being ecologically responsible. It's also about saving money. In highly virtualized environments, for example, organizations are dramatically reducing the number of servers they are deploying, but they are using more power-hungry servers in their place. Many large organizations are also switching to blade servers and standardizing on data center designs that can be deployed enterprise-wide. As the data center becomes more standardized, it is more likely that power management will be monitored from a central location, so the organization will benefit from deploying networked PDUs across all of its data centers.

8 You can rely upon expert guidance to choose the right PDU.

There are plenty of PDU options available, and there is a strong likelihood that your organization will require different PDUs for different applications. One of the best ways to understand the various options for your organization is to engage directly with a leading PDU manufacturer that offers a wide range of PDUs and features appropriate for the various applications you're likely to encounter. Tripp Lite offers free power audits whereby a Tripp Lite power specialist will estimate your power needs, identify potential problems and recommend cost-effective solutions. This power audit provides:

- A road map, with explanations for design trade-offs
- Detailed project requirements
- Budget-friendly prices for required hardware
- Installation considerations
- Ongoing support options

As you are building, expanding or reassessing your data centers, you don't want to shortchange your power requirements. Power is an area with potential for significant cost savings, and it is extremely important for ensuring continuous uptime and availability of critical systems. Choosing the right PDU may not be the most exciting decision you can make, but it certainly is an important one. Make sure you have the right information at hand to make it a smart choice.

Learn more about how a Tripp Lite power audit can help you define, assess and manage your power and technical requirements by visiting **www.tripplite.com/pages/data-center-power-audit**.

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