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 not deemed as strategic as 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 in 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 feeds for rack servers, blade chassis, network switches, related wiring closets and all of the myriad hardware technologies that comprise today’s highly diverse and power-hungry MDF (Main Distribution Frame) and data centers. PDUs come in a variety of flavors, offering varying functionality at varying price points, and paying closer attention to which ones you are using and how you are using them can pay off in a big way, depending upon the size and scope of your infrastructure.

So how can you determine which type of rack PDU is 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 a 3-phase PDU. If you are powering a related wiring closet or a 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 look at the product offerings of a leading vendor such as Tripp Lite, 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 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 so you can remotely reboot your equipment without having to physically go to the site.

#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 that site will be more costly up front, but it will provide significant savings over the long term because you won’t have to send an IT person to the site to restore power.

#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 of 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 do remote reboots there as well. It can save you time and resources and ease some of the burden on IT personnel.
#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 a switched PDU is the ability to configure the unit so that it can automatically shed power loads. For example, if a switched PDU is configured with a local UPS and there is a power failure, the PDU can be programmed to take power down sequentially. This way you can power off your least critical applications first while preserving battery backup power for your most mission-critical applications.

#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 contact closure sensors about a wide variety of functions in addition to power consumption. For example, you can connect door closure detectors, smoke detectors, a temperature/humidity monitor and other functions through the network interface so that those functions can be monitored remotely.

#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 data centers are also switching to blade servers and standardizing on a data center design 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 and the organization can see cost savings by deploying a single type of PDU 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 capacity 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 roadmap, with explanations for design tradeoffs
- Detailed project requirements
- The lowest acquisition price for any 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. It is an area for potential and significant cost savings, and an area of extreme importance in ensuring uptime and availability of applications. Choosing the right PDU may not be the most compelling decision you may 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/en/solutions/power-audit.cfm.