

PROCESSOR

Cover Focus Articles

 [Click To Print](#)

General Information

June 5, 2009 • Vol.31 Issue 16
Page(s) 26 in print issue

Crucial Elements In Data Center Design

Sticking To Some Best Practices Can Ease Your Design Process

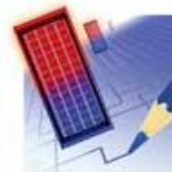
Key Points

- Evaluate your IT load and trends first and design around them.
- Consider modular implementations to maximize your availability, total cost of ownership, and return on investment.
- Outsourcing data center projects may be smarter and cheaper than doing it yourself.

Designing a data center is fraught with stumbling blocks, but there are many best practices that you can follow to ensure that the facility you design is a success. Planning ahead and looking at your enterprise's needs and limitations, for example, are important steps to take, or you may decide to let someone else handle it altogether. Here is a closer look at some best practices to keep in mind as you design your data center.

■ Plan Ahead For Power & Cooling Concerns

Planning an effective cooling system for your facility is imperative as equipment becomes denser and more power-hungry. "As you move to higher-density equipment, cooling is an issue," says

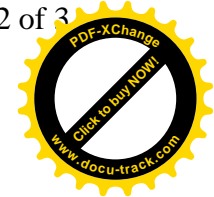
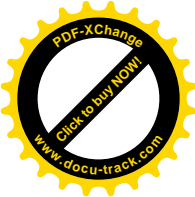


Kenneth Wolverton, vice president of data center operations at colocation company CyrusOne (www.cyrusone.com). "But at certain densities, heat wraps around and affects your cooling side, so cooling must be designed carefully to avoid wraparound." Wolverton recommends calculating cooling parameters by using computational fluid dynamics, which shows how air flows around racks.

Because you must compensate for the heat produced by your IT equipment, it's essential to know that load, according to Chris Crosby, senior vice president of sales and technical services at Digital Realty Trust (www.digitalrealtytrust.com). Whatever else you do, don't simply add up the faceplate ratings of your equipment. Crosby says those numbers can be off by as much as 70%.

Instead, Crosby says to get real data. "You know what [the electrical load] looked like when you put in your new equipment, [and] you know what it looks like now and what it looks like when you refresh the equipment," Crosby says. "You'll also want to know what it looks like in the winter, the summer, and any other time. The more time, the better." Don't use industrial "standards," either, he says; evaluate your own situation across the whole data center by using the electrical meter. Without knowing your IT load and trends, Crosby says, "You'll make bad decisions, no matter what you do."

You also don't want to over-design your data center. Crosby cites a common small-business scenario of a 50-rack data center that draws 100kW: two racks drawing 4kW each, one hard-to-cool rack drawing 8kW, and the other racks all drawing 1kW or 2kW each.



“Look at your total IT load, not just that one 8kW unit,” Crosby says, explaining that you don’t want to design for 150 watts per square foot if you’re only using 100 watts per square foot.

Power and cooling are also critical in considering the trade-offs small enterprises must make in designing data centers because they have a direct impact on reliability and risk. If cooling is insufficient or power fails, then IT equipment can fail, which can shut down a business. “You must plan cooling with risk management in mind,” Wolverton says. “If you can’t ever go down, like a hospital, your data center must have a fairly high degree of redundancy. If you’re running something that’s not mission-critical, you can tolerate more risk.”

■ Implement “Right-Sized” & Modular Solutions

It’s these trade-offs that cause uncertainties for data center designers. “Small and medium-sized businesses are more agile with respect to change than large companies, but they are very budget-restricted,” says Zurica D’Souza, senior product manager for APC by Schneider Electric (www.apc.com). More redundancy in power generation and cooling equipment reduces risk but increases costs. Over-building for power usage and cooling also reduces risk, but it also reduces efficiency and increases lifecycle costs.

“On the power side, we advocate ‘right-sizing’ or utilizing the power you need,” D’Souza says. In fact, she recommends this across the board. In practice, this means using what D’Souza calls “modular scalable solutions,” where you buy the equipment you need today but plan ahead and leave space available for what you’ll need in the future. “Nonmodular implementations are cheaper at first,” she says, “but take longer to bring up if there’s a failure. They cost more to repair and upgrade. Modular scalable solutions have better management. They can tell you the size of your power load [and] if any events are occurring, and you can repair and replace them in real time.”

With modular scalable architectures, D’Souza says availability is more affordable “because you scale up as you need it.” Compromising on availability has consequences. Beyond the time and high costs involved in repairing or replacing a single-power-module data center, it also leaves a business with little flexibility for growth. “The modular scalable approach delivers maximum value for your data center,” she says.

D’Souza says the modular approach also reduces total cost of ownership. “We tend to focus on the now and on ‘What do I have to write a check for today?’” D’Souza says. “I might have to write a small check today, but how many checks will I write? Look at the total cost of ownership, a total lifecycle approach.”

■ Consider The Outsourcing Option

If all of these trade-offs seem too complex and time-consuming, there’s an alternative: Outsource the design and build of your data center to experts. “It takes 18 months from planning through construction to complete and build [a data center],” says Jason Schafer, senior analyst for data centers at Tier1 Research. And capital is expensive: Schafer says every square foot of a 10,000-square-foot data center that consumes 150 watts per square foot costs \$2,000 to build. Bigger data centers in the 65,000- to 75,000-square-foot range cost less, around \$1,200 to \$1,300 per square foot.

“It’s not cost-effective for small and medium-sized businesses to [do it themselves],” Schafer says. “It’s better to go with a wholesale provider. You may not get the customization you want, but [providers] have a process and can drastically reduce delivery time from 18 months to do it yourself to as little as six months.” If you don’t want to go with a wholesale provider, Schafer says you can look at a colocation provider, which are often customers of wholesalers and also frequently work with managed services vendors.

If you choose to go this route, make sure to vet the providers. Don’t believe their claims about availability until you check it out at sites such as the Uptime Institute, which actually certifies tier levels. Crosby recommends talking with a variety of providers, even if you plan to build it yourself. ■

by Bridget Mintz Testa



Biggest Improvement: Consolidate With Virtualization

New technology is great in that you get a lot more computing power per square foot, but it comes with its own problems. With higher rack densities, “there’s a new availability dynamic,” says Zurica D’Souza, senior product manager for APC by Schneider Electric (www.apc.com). “Heat has become a factor.”

How can you deal with that? “Consolidation is the only way to overcome this problem,” says Kenneth Wolverton, vice president of data center operations at CyrusOne (www.cyrusone.com). “Most servers sit idle 70 to 80% of the time. The answer is to virtualize the server. Get it so it’s idle only 15% of the time. That way, you go from 15% productivity to 75% or 85% productivity.”

Virtualization works by loading software on a server so that it emulates multiple servers. “It allocates the resources to do the work of several devices,” Wolverton says. Of course, this does increase the risk of losing that particular box, so it also raises your need for redundancy. “If you take 10 boxes down to two for redundancy, you’re still saving on both equipment and operating costs.”

Copyright © 2010 Sandhills Publishing Company U.S.A. All rights reserved.