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General Information

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Organizing Your Data Center

What To Consider When Getting Your Data Center In Order

The typical SME data center built in 1997 did not look a whole lot different from the data center built in 1987 or even 1977. Dave Leonard, CTO for IT infrastructure provider Infocrossing (www.infocrossing.com), says that until about 1999 or 2000, designers of data centers did not take into consideration new server form factors, such as blade servers, that require significantly more power and cooling resources than old-school servers, let alone storage devices that are so heavy that not only the floor of the data center needs to be reinforced, but the path leading to the data center must be reinforced, as well.

Unfortunately, too many SME data center managers are stuck with whatever physical data center (or in many cases, data room) was engineered in that earlier era, and trying to upgrade these subpar data centers that are already in flight can be difficult or impossible to achieve, Leonard says, adding that many of Infocrossing's customers come from just such a background.

Assuming, however, that you have the means to map out your physical data center, either through adding additional server rooms or by expanding your current one, you can organize its layout so that it serves your needs effectively now and in the future. "Even the smallest server room can benefit from a good floor plan layout," says Steven Harris, director of data center planning and design at consulting firm Forsythe Solutions Group (www.forsythe.com).

■ Global Warming In The Data Center

For Harris' part, heat dissipation is the No. 1 concern when planning the layout of your data center. "The greater the electrical requirements of the IT equipment and the greater the heat output, the higher the concern should be as to how to dissipate the heat from the data center," Harris says.

Leonard concurs. "We design our data center solutions in 10,000 square-foot chunks, [some of which are] designed to handle 8kW per cabinet. If we were to lose cooling in our 8kW room, this room would heat up at 12 degrees per minute, not much slower than your oven heats," he says.

According to Harris, determining your cooling needs is not simply a matter of just how much cooling you have available. "Hot and cold aisles should be a given, and depending upon the kilowatt requirements of the cabinets and other IT footprints within the data center, wider aiseways may also be required," Harris says. "Unfortunately, wider aisles may well limit the quantity of IT equipment you can house within the data center, but better to have less IT equipment properly cooled and powered than more IT equipment in a hotter and less reliable environment."

Harris explains that the location of your CRAC (computer room air conditioning) units in relation to the rows of your IT equipment is also critical. "The key here is to allow the hot air being

discharged from IT equipment to quickly and efficiently reach the CRAC units to be re-cooled,” he says.

Harris adds that ceiling plans are often overlooked when laying out a data center. “Ceilings can oftentimes become very crowded with infrastructure, including lighting fixtures, sprinkler heads, low-voltage ladder systems, return-air ducting, and so forth, [and so] the ceiling and floor plans should work together to ensure efficiency and productivity,” Harris says.

■ Ways To Expand

Infocrossing’s Leonard recommends incorporating expandability into your data center design because building a new data center is more expensive than designing expandability into your existing one. In addition to cooling, Leonard advocates reinforcing the floors to handle heavier devices in a smaller footprint, along with strategies for handling Gigabit Ethernet cabling and UPS plants.

For his part, Harris says that any building systems infrastructure you can eliminate from the floor plan will open the space for IT utilization. You can use ceiling-mounted air conditioning to help with cooling, for example. And consider placing UPS plants in an electrical room close to the server room or data center. “That will free up space within the computing environment and also remove a heat-generating device—which are two positives for the price of one,” Harris says. ■

by Robyn Weisman

The Four Tiers Of Data Center Performance

Infocrossing (www.infocrossing.com) CTO Dave Leonard urges data center managers to check out The Uptime Institute’s four-tiered classification standards for data centers. The standards can help determine at what level your current data center is and what additions you need to make room for to bring it to an acceptable level for your business. The Uptime Institute provides a free whitepaper titled “Tier Classifications Define Site Infrastructure Performance,” which is available for download online at uptimeinstitute.org in the White Paper section of the Resources area.

Tier Performance Standard

Basic Site Infrastructure:

Tier 1 data centers lack redundant capacity components and distribution paths. In other words, any failure or any planned work in the system will cause disruptions. For his part, Leonard describes this tier as “really cruddy. Nobody would ever want that.”

Redundant Capacity Components Site Infrastructure:

Tier 2 data centers have redundant capacity components, which is an improvement over Tier 1. But like Tier 1, Tier 2 data centers provide only one nonredundant distribution path.

“Tier 2 has some degree of redundancy, but it is not maintainable without taking something out of service,” Leonard says.

Concurrently Maintainable Site Infrastructure:

Tier 3 data centers provide redundant capacity components along with multiple distribution paths, typically one primary distribution path and one alternate, only

one of which is used at any time.

“In a Tier 3, you can do preventive maintenance on everything in the data center without losing power or cooling,” says Leonard.

Fault-Tolerant Site Infrastructure:

Tier 4 data centers have redundant capacity systems and multiple distribution paths that work simultaneously. In addition, all IT equipment is dual powered and compartmentalized so that the site will not be disrupted by a single worst-case event, planned work activities, or infrastructure maintenance.

“It’s more highly available than the other tiers,” says Leonard. “If you are going to put all your eggs in one basket, and you really care about those eggs, then you might want to think about [implementing] a Tier 4 data center.”

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