Cisco IT Insights
Do You Know How Much Power Your Data Center Really Uses?

What

Data centers use 1.8 percent of all U.S. electrical consumption.[1] At Cisco, we have 25 data centers around the world. They occupy 242,000 square feet, about the size of four American football fields. They have 28.49 megawatts of managed capacity—enough to power 21,368 average homes. If workloads in a data center exceed available power capacity, power can go out. When that happens, applications fail. To prevent outages, we can either retrofit the data center or move its workloads to other facilities that have spare capacity.

"We don't want to pay for more capacity than we need," says Rob Coster, Cisco IT director of Cisco IT Data Center Facilities. "On the other hand, we want to take advantage of all the capacity we already have. Power is as much an asset as server capacity or network bandwidth."

We monitor, measure, and manage the energy consumption of every Cisco and third-party device in several data centers using Cisco Energy Management Suite and third-party applications for data center infrastructure management (DCIM).

Avoiding a Data Center Retrofit Saved $19.5 Million

As of early 2017, we operated three data centers in Research Triangle Park (RTP), North Carolina. The oldest would need a major retrofit to support cloud computing and Cisco Application-Centric Infrastructure (ACI). But before investing tens of millions of dollars for a retrofit, we decided to see if we could move the data center's workloads to another RTP facility that had already been modernized.

We did the analysis using Cisco Energy Management Suite. The solution measures real-time power consumption from the intelligent power strips that deliver power to all equipment in a cabinet. To view the power measurements, we used a third-party DCIM application that graphically depicts every hall, floor, row, and cabinet in the data center. Clicking the picture of a cabinet shows the equipment in each rack, how much power it's consuming right now, and vacant rack units.

Our analysis showed that the modernized data center had enough space and power capacity for the older data center's workloads as well as its own. In fact, it had enough capacity for seven years of projected IT growth.

We closed the older data center after moving its workloads to the other facility. Not only did we avoid the $19.5 million retrofit investment, we also reduced annual facility costs by $1.14 million.

Monitoring Real-time Power Consumption Prevents Outages

We use Cisco Energy Management in our newer data centers to understand energy use, costs, and carbon emissions by device, location, and time of day. Soon after we started using the solution, an IT admin noticed that a cabinet in one of our San Jose Engineering data centers was approaching capacity. If that happened, the power strip circuit breakers would trip, causing

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[1] [Lawrence Berkeley National Laboratory](#)

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applications to go down. The IT admin used Cisco Energy Management to quickly identify another cabinet with extra space and power capacity. Proactively moving the workloads from the overloaded cabinet to another cabinet prevented application outages.

Why

Why didn't we calculate power consumption by simply adding up each device's published rate? "The power consumption printed on the equipment faceplate is usually overstated by about one-third," says Coster. "Cisco Energy Management is much more accurate because it measures real-time consumption directly from the power strip."

Most of our older data centers currently deliver 4-5 kilowatts for each network cabinet and 8 kilowatts to compute and storage cabinets. To run more workloads in less space, we retrofit data centers to deliver more than 17 kilowatts per cabinet. That should last a long while. "Cisco servers and switches keep getting more powerful and smaller at the same time," says Coster. "That means our space and power requirements aren't growing as fast as they once did." Using less energy is good for the business—and for the planet.

Our next steps? We're rolling out Cisco Energy Manager in our other data centers. We'll analyze the data it collects to identify opportunities to become more efficient. For example, we're planning a pilot to optimize energy consumption by balancing temperature set points, variable-speed motor settings, and equipment runtimes. "In general, keeping equipment always on—or else frequently turning it on and off—consumes more energy and degrades equipment reliability," says Jim Fukuda, global data center services manager. "Analyzing the data from Cisco Energy Manager will help us find the operational sweet spot."

For More Information

Cisco Energy Management Suite

To read additional Cisco IT case studies about a variety of business solutions, visit Cisco on Cisco: Inside Cisco IT.

To view Cisco IT webinars and events about related topics, visit Cisco on Cisco Webinars & Events.

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