Gaining control of electrical use in the data center

It’s not possible to run a data center without worrying about the cost and availability of electricity.

So an important question at any data center is this: “How can we manage capacity to reduce energy consumption and avoid penalties from overages?”

According to Rich Ungar, ABB’s Global Head of R&D for Decathlon, the answer has two parts: IT capacity and everything else.

“First,” he says, “maximize the efficiency of your IT systems by increasing server utilization.”

The result is more transactions per server – and by extension, more transactions per kilowatt. It also reduces cooling requirements, so even a data center with a high PUE is likely to achieve a meaningful reduction in energy consumption by improving IT utilization. Improved server utilization increases overall processing capacity, potentially reducing or delaying capital outlay for new servers and other allied IT assets.

Second, Ungar says, is to seek improvement in five key practices:

1. System availability and performance: This means achieving real-time visibility and performance metering of IT and other facility systems.

Reasons to obtain this level of insight in data centers include the emerging need to manage carbon footprint, and the rising cost of electricity – which is typically a data center's second-largest operating expense after staffing.

This capability includes monitoring status changes in various systems, energy consumption, temperature and humidity, and such physical data as vibration from any location in the data center.

2. Capacity planning and management: A data center can get the most out of its existing power capacity, cooling system, servers and even floor space by optimizing placement of IT assets, managing zoned environments, and providing current- and future-state resource capacity planning – including what-if scenarios and comparisons to other data centers. It allows dynamic management, so systems can be quickly configured as conditions change; for example, bringing more servers online during periods of peak demand rather than operating at peak capacity all the time.

3. Resource forecasting and energy planning: By tapping into real-time intelligence of energy markets and using analytics to create actionable knowledge, a data center can proactively manage its most critical performance metrics, such as transactions per server, PUE, and cost per kWh and MW.

4. Facility & IT automation: Advancing data center technologies make it possible to preserve reliability while achieving higher efficiencies by operating at greater scale and time-sensitivity that exceeds human capabilities. This is accomplished by controlling critical infrastructure – electrical, mechanical and IT – with a system that has decision-making intelligence embedded for such capabilities as holistic optimization, failure handling and energy program participation. This allows optimization of many moment-to-moment tasks that are part of standard operations without the time required for human intervention.

5. Troubleshooting and root cause analysis: Granular performance detail of all data center operations – such as time-stamping and occurrences of unified alerts and alarms – provides accountability and assures contractual compliance as a matter of course. It enables the ongoing analysis necessary to maintain operations at their optimal edge – and to recover quickly when they slip.

Energy rebates programs

In addition to building real-time capabilities to monitor, manage and optimize IT and facilities systems, data centers can take advantage of a number of energy efficiency programs at state and federal levels that offer rebates and other potential savings to data centers.

Here are some resources:
Database for State Incentives for Renewables and Efficiency (http://www.dsireusa.org/)
EnergyStar for Data Centers (http://www.energystar.gov/?c=prod_development.server_efficiency)

Building this set of capabilities allows a data center to improve energy efficiency and avoid penalties from overages while continuing to meet reliability requirements. Ungar adds that this capability is the value proposition of data center infrastructure management (DCIM). But he emphasizes all DCIM systems are not the same.

"Don't underestimate the significance of the monitoring, decision support and centralized control capabilities," he says. "Consider how effectively your systems deliver on these five key practices. It doesn't matter how robust or technically advanced your data center and roadmap are if your DCIM system doesn't support you in optimizing every moment of every day."

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