Manage Data Center Operations with Software

By Bill Clifford

Managing the complex relationship between space, power and cooling in today's data center has become a critical challenge. Using the latest software to monitor the existing infrastructure, data center managers can now analyze whether their current environment can handle the power and cooling requirements of new equipment they are considering. A Fortune 25 bank learned this lesson the hard way. The firm experienced a breaker outage that took three hours to uncover. By the bank's own estimates, the downtime cost $25,000 per minute, resulting in a $5 million loss in productivity.

Power and cooling are the most significant issues facing today's data center managers, according to a number of recent surveys. In fact, nearly 40 percent of data center managers report having run out of power or cooling capacity without sufficient notice.

This is a radical shift from the early days of distributed computing when server power and cooling requirements did not change much. While hardware itself varied in performance and reliability, it was relatively easy to gauge the impact of servers on the data center environment. Managers checked to see that there was enough rack space and square footage to accommodate additions and followed some other basic rules of thumb to ensure the infrastructure could support the new equipment. Power consumption of servers varied little so it was not tracked closely.

The emergence of high-density servers and storage has completely changed the equation. Power consumption has risen exponentially. Data centers designed just a few years ago for one or two kilowatts of power per rack are being filled with racks operating at more than 20 kW—consuming more power in a single rack than a residential house consumes. In fact, many of today's data centers are consuming the equivalent electricity of a small city.

Another major concern for data center management is workload changes. Retail outlets, experience huge workload increases during the holidays and other peak shopping times, running processors harder during those few weeks than at any other time during the year. Running applications twice as hard produces more heat, often putting systems close to their tipping point. These higher workloads must be taken into account when evaluating the health of the data center.

Moreover, the intense heat generated by blade servers necessitates an overhaul of data center cooling techniques. Until recently, most racks were designed for lower levels of cooling. Upgrades in cooling capacity can take upwards of one to two years to plan and deploy, so organizations require considerable advanced notice of new cooling needs to ensure optimum performance.

Space, power and cooling are interdependent variables that now require careful consideration. Managing the complex relationship between these multiple dimensions has become a vexing challenge for businesses today. During the next three years, most CIOs will experience constraints in data center floor space and power that could limit an IT organization's ability to grow as the business grows, according to a Gartner report.

Until recently, most organizations managed data center requirements manually or through Excel spreadsheets. However, businesses can no longer afford to manage only the logical aspect of their IT infrastructure. They need a proactive approach to data center management

that involves making changes within a tightly controlled process that mitigates operational risk. Tackling this challenge requires more accurate modeling of the data center to fully understand infrastructure thresholds and capacities at all levels.

This involves visually managing the data center through impact analysis, variable tracking and asset documentation and configuration. An interactive, three-dimensional representation of the data center affords organizations greater insight into the impact of changes to their IT environment. IT managers can now access granular level of details, drilling down to see an individual rack or server.

Such applications document and aggregate the data center physical infrastructure into a visual repository that maintains the distinct relationships between assets from the physical, logical, and spatial perspectives—identifying problem spots before they occur.

Instead of throwing more technology at a problem and dealing with the fallout later, IT managers can now foresee the impacts—both positive and negative—of additions to their complex infrastructure. For example, before a new purchase is made, IT managers can analyze whether the current environment can handle the concentrated power densities and data center cooling requirements of new equipment. This does not make the data center more rigid. In fact, these tools give stakeholders knowledge that lends credence to their requests for purchasing new technology, and equips them to maximize the efficiency of new equipment.

Gaining a holistic view of the data center and the interrelationship between its many components empowers organizations to keep this lifeblood of the organization humming at peak performance.

Bill Clifford is CEO of Aperture Technologies Inc., Stamford, Conn. Aperture is the leading provider of enterprise software solutions that enable organizations to manage the physical infrastructure of their data centers.