



## **Good Monitors Do More Than Beep**

**By Dave Cole**

Many data center managers struggle to make sense of monitoring. So, what is monitoring? It is a set of technologies that enable data to be collected about the state of devices and resources, to be reported and tracked over time, and to be accessed centrally. Trends can be used to predict potential problems, enabling faulty devices to be identified through their abnormal electricity consumption. Most importantly, monitoring technologies will raise alarms if devices fail or exceed safe values for power and cooling. Rather than beeping and considering the job done, good monitoring systems will manage alarm resolution and escalation to ensure that all alerts are investigated and any problems are resolved.

Monitoring has been confused with data center management by some, but management is more about seeing the big picture of the data center over time. That discipline includes data center design, equipment provisioning, capacity planning, asset management and workflow creation. While data center management plans for the future, monitoring looks at the immediate operational requirements. It is all about putting out today's fires and trying to prevent tomorrow's.

Why are data centers increasingly investing in monitoring equipment? It is not cheap, but it is a good investment. Analysts estimate that hardware is responsible for 15 percent to 20 percent of downtime. If hardware faults could be eliminated, that could immediately cut out one-fifth of the downtime periods that a data center experiences. Outage is expensive. Web-enabled businesses can lose money with every second that the Web site is unavailable.

In addition to helping with day-to-day operations, monitoring can help measure performance against the plan and feed live usage data into the capacity planning process.

How to implement monitoring will depend partly on the make-up of a data center. Before approaching potential vendors, compile a list of the equipment that will be monitored. If hardware from multiple manufacturers is involved, one challenge will be to reduce complexity. Most solutions from equipment vendors are proprietary and running multiple monitoring solutions can be inefficient and expensive. If an attempt is made to integrate equipment from different manufacturers with a proprietary monitoring solution, hardware and software would need to be customized and additional hardware might need to be added to act as a converter. Integrating equipment this way can be expensive. Even if all equipment is bought from a single vendor, there is a risk that the vendor will be acquired by a foreign rival who could conceivably phase out technology critical to some data center operations. Third-party solutions that can monitor all the equipment in a data center is the best solution.

When standardizing communications from devices, the choice needs to be made between using hardware converters or software converters. Hardware converters introduce an additional point of failure and scale gracelessly; complexity and cost increase with the number of monitored devices. A software solution can accept data in the device's native

protocol and convert it for standardized reporting. Software solutions scale readily and can support new devices with new protocols out of the box.

Ensuring scalability will be a key part of the implementation plan. Today, a data center might have 30 racks, a large UPS and two CRAC units. But data center managers should be confident that any monitoring solution they introduce could support 60 more racks, a generator and 120 cabinet distribution units without compromising on performance. Most monitoring systems can only communicate using a single device protocol, but there are solutions that can monitor devices with multiple protocols, such as a UPS talking SNMP and a generator talking Modbus. Even if all your equipment today uses the same protocol, solutions that can handle a wide range of equipment will provide greater flexibility in the future.

Naturally, the where of monitoring should be anywhere there is a data center or likely to be one in the future. It is important that the solution enables a data center manager to pinpoint problems. Look for software that will clear any inactive alarms. Make sure to configure alarm notifications and the associated escalation process. The important thing is that a solution not only helps locate problems but also helps resolve them.

More sophisticated monitoring solutions can be implemented so that they are geographically aware. They can provide a site view, with icons superimposed on an aerial photograph of a campus to indicate the status of data centers. They can show a map of the data center and use colors that can be understood at a glance to reveal which parts of the data center are performing, at risk or down. Zooming in on racks, they can show which resource is suffering a failure (such as a UPS) and the resources (such as servers) that will be affected by it. Some monitoring solutions will overwhelm a data center manager with lists of data that are hard to digest. It can be difficult to understand what impact any outages could be having on the business. Geographic interfaces are much more intuitive for managers and engineers to work with and clearly show the extent of a problem and how it relates to the data center.

When should monitoring be implemented in the data center? There has never been a better time to prepare a business case than now. Downtime is expensive so the cost of the technology quickly delivers a return on investment.

Again, monitoring provides the information needed to respond quickly and smartly to anything that could happen within a facility.

*Dave Cole is president of real-time monitoring, Aperture Technologies, St. Louis, Mo.,*  
[www.aperture.com](http://www.aperture.com).