



# Environmental Protection for Large Data Centers

*The dynamic nature of today's virtualized data centers presents new environmental monitoring challenges*

The combination of today's powerful servers with the wide-scale adoption of virtualization is radically changing the way companies must monitor their data centers.

The consequences when problems arise are very high. While the loss of a single system in a smaller server room is cause for concern, a single data-center blade server failure in a large organization might take down multiple applications running as virtual instances on that piece of hardware.

Besides the higher stakes in the case of a problem, monitoring conditions in a large data center are much more complex than they have ever been before.

In a traditional server room, workloads are fairly predictable, and thus heat generation patterns, while variable throughout a rack, are often understandable. For example, increased workloads in the early morning — when everyone is launching applications — may routinely increase server heat output.

However, in today's large data centers, workloads are much more dynamic. With virtualization, IT managers can easily move instances of an application from one physical server to another. So a server that has been relatively idle for hours might suddenly be running at 90 percent CPU utilization in just a couple of minutes.

Many of today's computing environments virtualize the entire server fleet in the data center, allowing an IT manager to shift workloads not just from server to server in a rack, but also from row to row.

## **A Problem's Impact Multiplies**

As a result of these newer approaches to data-center management, conditions throughout the facility are highly variable. And more is at risk.

Unlike the traditional server room, where the loss of a single server might only take one application offline, equipment failure in a large data center due to environmental problems such as excess heat, water, humidity, smoke, fire, or a power failure can bring business to a halt for an entire department or the whole organization.

What's needed is a sophisticated monitoring and surveillance solution to track environmental changes, identify anomalies, and send alerts when thresholds have been exceeded. The solution must give managers information about their data centers at a very granular level, so a spike in environmental conditions in a single rack can be identified quickly to head off a potential problem.

The bottom line is that in today's data centers, rather than merely reacting to shutdowns when they occur, you need to be proactive in trying to anticipate them *before* they happen. This is an area where ITWatchDogs environmental monitoring solutions can help.

#### **Monitoring Data Center Environmentals**

Several data center environmental factors can contribute to or increase downtime and service disruptions. And as noted earlier, it is becoming harder to monitor these conditions due to the very dynamic nature of today's data centers.

A system that has run cool for months can instantly show a spike in output heat if a manager shifts multiple virtualized workloads onto it all at once. An increase of 18° Fahrenheit (10° Celsius), can double equipment failure rates over time. Since the workload shifts can be very precise (from, say, shelf 1 in rack 2 of row 3 to shelf 5 in rack 4 of row 8), you need separate temperature probes on individual racks and critical devices. That way, problems with a broken fan or air-conditioning failure will show up quickly. Similarly, you might be able to identify a server that is overheating due to its increased workload.

ITWatchDogs takes into account the space limitations in today's densely packed equipment racks. Its environmental monitors are small, ranging in size from compact models only 4 inches long and about the size of a large candy bar, up to full-sized 19" rack-mountable models which, despite all of the features packed into them, only take up a single 1U space in a rack. The devices can run off of existing electrical power outlets, and several models also support Power over Ethernet (POE).

When it comes to other environmental conditions, in addition to temperature, ITWatchDogs' monitors come equipped with various on-board sensors along with digital and analog inputs for external sensors, in-

cluding humidity, water, smoke, and fire. The environmental monitors provide a way to remotely monitor data-center conditions, view historical data to spot trends, and receive alerts when conditions exceed pre-defined thresholds.

With comprehensive monitoring in place, a spike in operating temperature due to a shifted workload, a buildup of condensation in a single rack, or excessive humidity along a row of equipment will be noticed quickly. To make that information available to the appropriate data center staff, ITWatchDogs probes can be monitored via any standard Web browser, without requiring you to install any proprietary software on a host PC to access the monitoring units.

Additionally, ITWatchDogs offers power monitoring. This is accomplished using the Remote Power Manager X2 (RPM X2). The RPM X2 adds remote power monitoring and switching capabilities to any ITWatchDogs environment monitors which have one or more digital sensor ports available. The device enables users to set alarm thresholds for these measurements, and also allow the user to remotely power-cycle a locked-up system to reboot it or to turn equipment off and on via the secure user interface.

#### **ITWatchDogs as your Technology Partner**

To address the highly dynamic nature of today's data centers, organizations need to take a proactive approach to monitoring the environmental conditions that contribute to downtime and disruptions.

ITWatchDogs offers a wide range of environmental monitors providing cost effective ways for data center staff to proactively monitor their IT infrastructure and maintain system uptime. The products provide a quick and easy way to keep an eye on remote conditions from a secure web interface and receive SNMP, E-mail, or text-message alerts when specified alarm thresholds are exceeded. The interface displays live video feeds and environmental measurements including temperature, humidity, air flow, light, sound, power, water detection, and much more. The measurements are logged and graphed for viewing trend patterns. External processes or applications can be automated on trigger of an alarm or remotely through the web interface with units supporting output relay control or with the Remote Power Manager X2.



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ITWatchDogs' climate monitors use standard Web server software to display their measurements and camera feeds. All management and monitoring tools are accessible securely via Ethernet or the Internet; no software installation is required. The monitors have SNMP agent software to integrate with popular networking management tools, and they support SNMP v1, v2c, and v3.

Use of the ITWatchDogs sensors can help IT staff provide superior service by identifying potential problems (such as equipment overheating) before they become severe. Additionally, a remote monitoring capability quickly alerts managers to any problems, and allows them to assess the situation without the need for a trip into the office. This, in turn, helps IT staff work smarter and more efficiently.

For more information about ITWatchDogs, visit:  
[www.ITWatchDogs.com](http://www.ITWatchDogs.com)