



VERTIV WHITEPAPER

Proactive Monitoring for the Dynamic Data Center

Environmental Protection in the Age of Virtualization

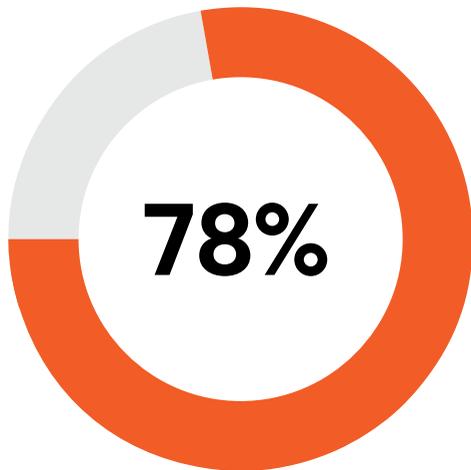
A Cloudy Future

Virtualization is precipitating a sea change in data center infrastructure. Organizations are migrating IT infrastructure from on-premises server rooms to large, dynamic data centers with powerful hardware and significantly more equipment than a run-of-the-mill facility. Over the course of 2017, Gartner projects the cloud services market will grow 18 percent to achieve an estimated aggregate value of \$246.8 billion.

This is particularly true for enterprises, but it does not exclude mid-market businesses and startups that offload data into public clouds.

Forbes estimated that by 2020, 78 percent of small businesses will have adopted cloud computing.

For businesses, virtualization fosters scalability and ease of data access for better corporate collaboration and consolidation of IT infrastructure. Organizations relying on the public cloud no longer have to worry about managing any of this infrastructure. Updates, equipment add-ons and environmental management are out of sight and mostly out of mind.



FORBES ESTIMATED THAT BY 2020, 78 PERCENT OF SMALL BUSINESSES WILL HAVE ADOPTED CLOUD COMPUTING.

Gartner:

www.gartner.com/en/newsroom/press-releases/2017-02-22-gartner-says-worldwide-public-cloud-services-market-to-grow-18-percent-in-2017

The Environmental Ripple Effect

On the data center management side, however, cloud migration introduces staggering complications. Virtualization creates a vastly more dynamic environment with many moving parts. IT managers in an organization may move instances of an application from one physical server to another at a moment's notice. An enterprise might even shift workloads from row to row. For businesses, this ensures high performance of applications.

But in the data center, it means thermal patterns can shift frequently. If a sparsely used row suddenly kicks into action, entire server racks may start running at 90 percent CPU utilization. This generates excess heat that can significantly alter airflow in the facility.

If data center managers do not proactively monitor these types of changes, environmental conditions can become unstable. Equipment can overheat and humidity can accumulate, causing shorts and corroding equipment.

Alternatively, the air could become dry enough to spark static electricity capable of damaging sensitive electronics. Fried equipment could start smoking and possibly even catch fire.

IF DATA CENTER MANAGERS DO NOT PROACTIVELY MONITOR THESE TYPES OF CHANGES, ENVIRONMENTAL CONDITIONS CAN BECOME UNSTABLE.

Forbes:

<https://www.forbes.com/sites/louiscolumbus/2015/05/04/roundup-of-small-medium-business-cloud-computing-forecasts-and-market-estimates-2015/#7d12e6c932b0>

The consequences of these environmental problems are far-reaching. Because servers are more powerful than ever, they might be running multiple applications for an enterprise. If one overheats, the resulting downtime would be more drastic than if a smaller unit went offline in a basic server room. If multiple servers go down for an especially large organization such as a prominent content provider, the result can be service outages for millions of customers.

Worse yet, what if most, or all of the servers in a data center facility go down? It would be difficult to quantify the amount of money lost in a fiasco of this caliber.



Nip Danger in the Bud with Environmental Monitoring

Besides excess heat from servers, external temperature shifts, floods, power failures, break-ins, pollutants from nearby construction sites or manufacturing plants and damaged cooling components can all cause severe environmental problems in the data center.

A sophisticated monitoring and surveillance solution can preempt these issues by tracking environmental changes, identifying anomalies and sending alerts when thresholds have been exceeded. This data can be as granular or as panoramic as data center managers require.

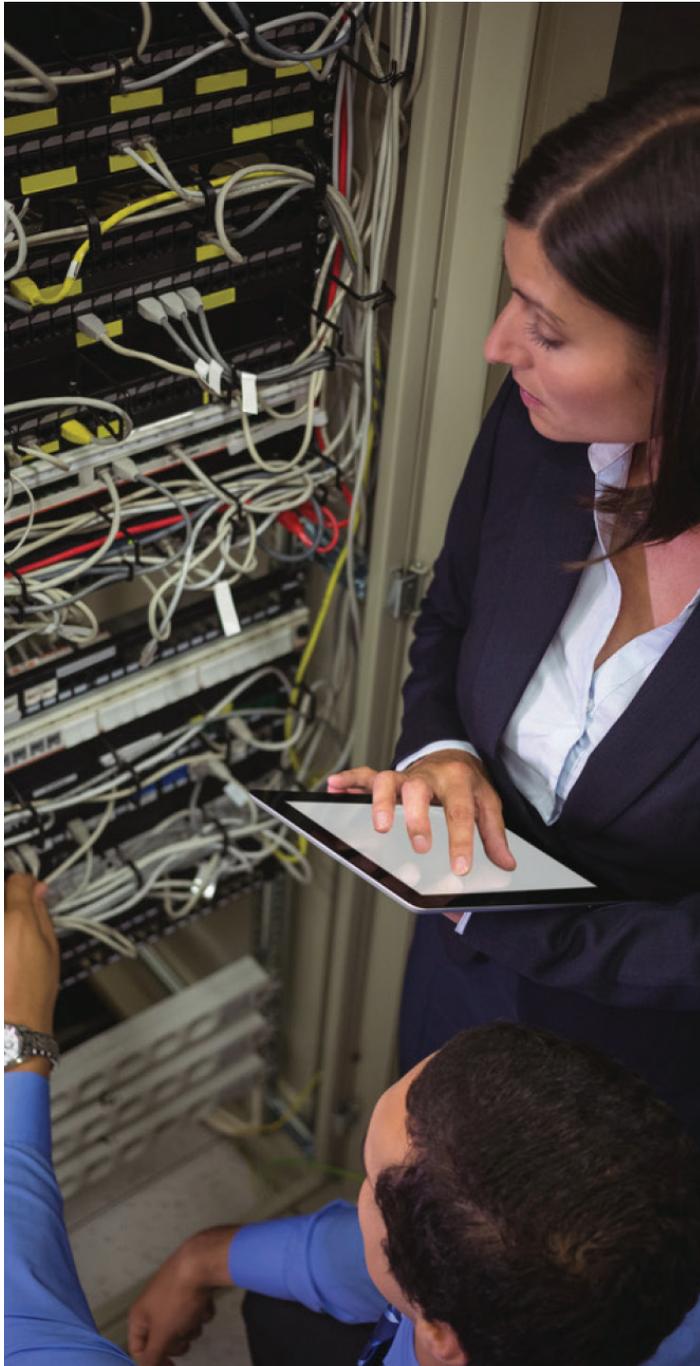
For example, since workload shifts can be very precise (from, say, shelf 1 in rack 2 of row 3 to shelf 5 in rack 4 of row 8), large facilities need separate temperature probes on individual racks and critical devices. Therefore, problems such as a broken fan or an air-conditioning failure will show up quickly.

Similarly, you might be able to identify a server that is overheating due to its increased workload. This detailed level of oversight, complemented by larger-scale visualizations of climate conditions, help data center staff ensure that environmental conditions are maintained at optimal levels.

A SOPHISTICATED MONITORING AND SURVEILLANCE SOLUTION CAN PREEMPT THESE ISSUES BY TRACKING ENVIRONMENTAL CHANGES.

Ideally, this monitoring should be conducted from a single browser-based dashboard so that metrics can be viewed via any standard web browser without requiring installation of proprietary software.

Additionally, environmental monitors help ensure that power problems do not degrade the environment; best-in-class rack power distribution units (rPDUs) have digital sensor ports for external environmental sensors, enabling monitoring directly at the point of rPDU.



Finding the Right Technology Partner is Key

Effective environmental protection of a dynamic data center environment hinges upon staff's ability to be proactive. Prevention is a far more sustainable approach to maintaining a data center environment than recovery, especially considering outages collectively cost enterprises \$700 billion each year. Your data center monitoring partner should therefore be able to all but guarantee that you will not be blindsided by environmental disruptions.

Robust monitors do this by providing a quick and easy way to keep an eye on remote conditions from a secure web interface and by sending SNMP (supports v1, v2c, and v3), email or text-message alerts when specified alarm thresholds are exceeded. The web interface displays environmental measurements including temperature, humidity, airflow, power, water detection and much more.

By strategically placing dry-contact door position sensors, the appropriate staff can even be alerted in cases of unauthorized access to certain zones.

Footprint is another issue that a strong monitoring solution must account for. Densely packed racks in larger facilities may not be able to support cumbersome monitoring equipment. A smart monitoring solution accommodates these needs with environmental sensors that vary in size starting at only 4 inches long – a little less than the length of the average smartphone. Alternatively, management may have space for more robust rack-mountable models with integrated LCD displays and a bevy of features packed into them. Even these should only take up a single 1U space in a rack.

Finally, a strong monitoring device will be able to run on existing electrical power outlets and, ideally, also support Power over Ethernet (POE).

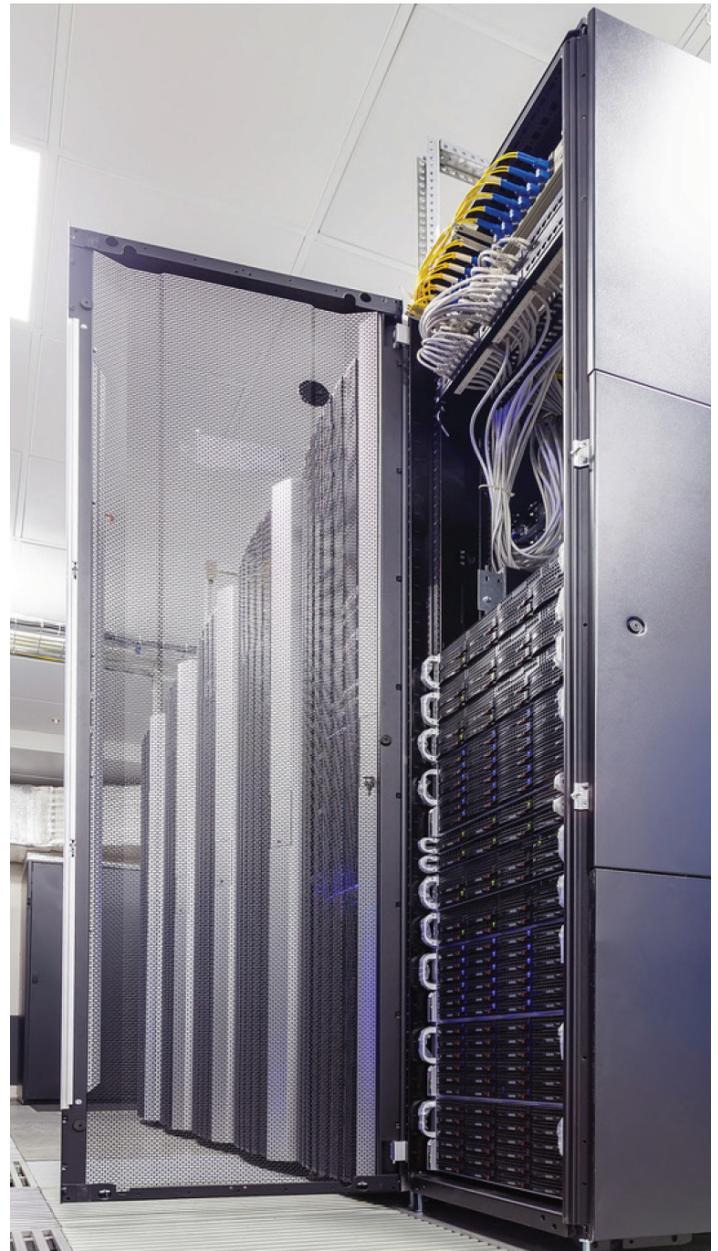
IHS:

<https://technology.ihs.com/572369-businesses-losing-700-billion-a-year-to-it-downtime-says-ihs>

The Result: A Smarter, Safer Data Center

An environmental monitoring solution should strive to achieve one key objective before all others: provide complete visibility of the data center environment and its many variables so as to protect the facility and guarantee great service for organizations. This is exactly what comprehensive data center monitoring accomplishes. It lets management see everything that is happening in a data center from any device, over Ethernet or internet, from inside or outside the office.

The result is a smarter, safer and more manageable facility that is less susceptible to environmentally induced downtime. In the age of virtualization, this is the closest thing there is to uninterruptible business continuity.





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