RF Code™

White Paper

You Can't Manage What You Don't Measure, and You Can't Measure What You Don't Monitor:

Save Money, Save Power and Save Equipment in the Data Center

Executive Overview

Today's data centers are taking the heat both literally and figuratively. With equipment generating enormous amounts of thermal energy, data centers continue to shovel operational funds into cooling as energy costs steadily climb. Environmental optimization is so demanding that Emerson Network Power cites that cooling and energy make up 44% of the average data center's cost of ownership. These shocking levels of energy consumption have led to much rebuttal in the media—particularly, the negative environmental impact of the data center industry's staggering 200% increase in power consumption between 2000 and 2005 in addition to the more modest, but nonetheless concerning, 36% increase between 2005 and 2010[1]. As an April 2013 Scientific American article recently asserted, "To avoid becoming energy hogs and concomitantly adding more greenhouse gases into the atmosphere, these data centers need to smarten up, literally, using new approaches."[2]

Yet as the pressure to increase energy savings and reduce carbon emissions intensifies, operational pressures also compound—from increasing operating speed to balancing growing stores of data with maintaining critical uptime levels. Accomplishing each of these critical objectives leads to an increased thermal output, requiring further energy to cool the environment. This proverbial ripple effect occurs with each attempt to remain competitive within the rapidly evolving data center space.

1 Analytics Press, "Growth in data center electricity use 2005 to 2010"
2 Scientific American, "Cool It: Is the Internet Too Hot for Data Centers to Handle?"

Evidence:

After deploying just $1500 worth of temperature sensors in a single data center, enhanced temperature monitoring enabled IBM to realize over $10,000 in energy savings per year.

Source: Automated Asset Tracking in the Data Center: How IBM Reduced the Time/Cost of Tracking Data Center Assets

The addition of the right intelligent environment monitoring system will replace a seemingly inescapable chain of costs and inefficiencies with savings and smarter management. The right system provides the insight needed to lower energy consumption. Advanced environmental monitoring technology is also able to optimize data center infrastructure, reduce downtime risk, and provide the metrics needed to publically demonstrate that your company has lowered its carbon footprint—all benefits that ensure return-on-investment (ROI) and that the savings will continue to increase.

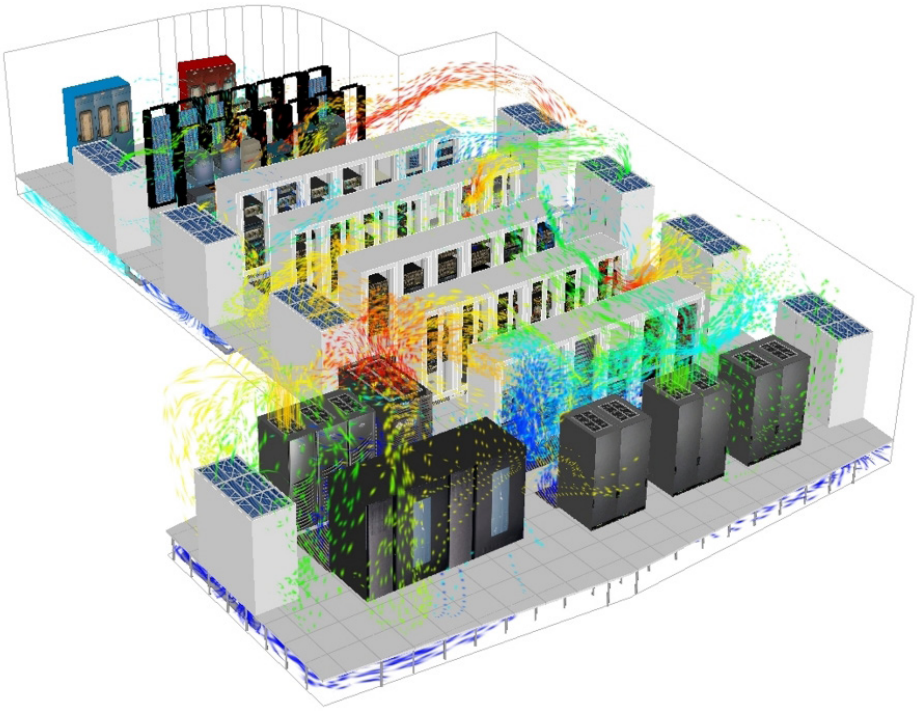
Cost Savings: Lower Energy Expenditure and Beyond

Various methods to lower energy costs in data centers are usually based on one single metric: How much did we lower energy expenditures? While crunching the numbers on energy cost reduction can be a relatively simple exercise and the cost savings are significant, this figure alone does not reflect the total sum of cost savings and benefits gained from installing an intelligent environmental monitoring system that enables a center to easily manage air intake, heat output, and humidity levels. In fact, there are six ways—from installation to metrics to unexpected infrastructure integration—that data centers can employ environmental monitoring technology to lower their bottom line.

Lower Installation Costs

The costs savings of new enterprise technologies rarely start with installation, as this stage typically requires weeks dedicated to coordination, physical installation, and training. Current environmental monitoring systems, particularly wireless models, boast much shorter lead-times. RF Code's latest environmental sensors, featuring an easy-to-deploy "peel and stick" design, are able to integrate fluidly into current software and wireless environments. One RF Code customer, a European-based global financial institution, reported that the hardware was deployed in one working day by its IT staff. Moreover, the

hardware began providing live data feeds in minutes, requiring only one additional working day for software configuration and training, saving data centers hours in manpower and avoiding costs associated with delays and technical issues.



Lower Energy Expenditures

According to a 2007 report by Electronics Cooling, a typical server, priced at $4,000, expends roughly the same price of energy to power and cool itself within its lifecycle. These figures are even more astounding in markets boasting higher energy prices, such as Japan.[3] Furthermore, a 2013 article in Science American went so far as to state that a server's cost may be doubled or tripled by the energy required to power and cool it.[4] The price of cooling as a primary cost-driver has driven data centers to recently develop into one of the leading markets in Oregon, a location companies are attracted to by the mild-climate and lower costs of power.[5]

3 Electronics Cooling, "In the data center, power and cooling costs more than the it equipment it supports"
4 Scientific American, "Cool It: Is the Internet Too Hot for Data Centers to Handle?"
5 Oregon Live, "Data centers in Oregon: High tech meets high desert"

Evidence:

After deploying an environmental monitoring solution, HP's global data center RCI Index improved by 27%, ensuring that 99+% of all of HP's data center assets are consistently and reliably cooled within ASHRAE recommended ranges.

Source: Customer Case Study: HP Cloud Services

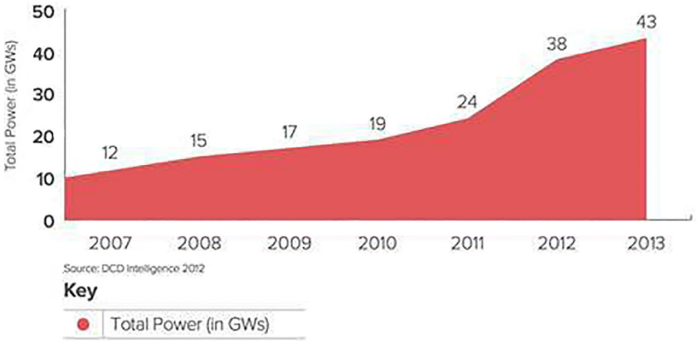
Which brings us to the most obvious and powerful benefit of environmental monitoring—the ability to manage the less costly air-intake temperatures versus the more costly air-cooling temperatures. Even a 1 degree Fahrenheit increase in air-intake can yield an annual savings of 2%, with a positive relationship between savings and the replacement of air-cooling by air-intake. Environmental monitoring metrics and infrastructure provide the critical information data centers need to fine tune these systems, maximizing savings while ensuring temperatures stay within designated guidelines.

When considering the impact of environmental monitoring, data centers can calculate their projected energy costs savings based on the following calculation:

Step 1: Calculate Current Data Center Energy Costs	
Energy Costs per Square Foot	$200
Total Square Footage	10,000
Total Number of Racks	500
Total Number of Rows of Racks	30
Total Number of CRACs (Computer Room Air Conditioners)	4
Annual Energy Cost	$2,000,000
Step 2: Calculate Cost of Environmental Monitoring Installation	
Average Cost for 10,000 sq. ft	$35,000
Step 3: Annual Savings Per 1 Degree F Air Intake Temperature Increase	
Yearly Savings	$40,000

This calculation includes all sensors required to meet ASHRAE guidelines (3 temperature sensors installed in every third rack), readers, software, and labor necessary to deploy the solution.

The model calculation above, demonstrates that by enabling an increase in air-intake temperatures of just 1 degree Fahrenheit the cost savings produced by environmental monitoring more than pays for the addition of the system within the first year following deployment. As a data center continues to familiarize itself with trends in its environment and obstacles, the more it will be able to increase the air intake temperature versus air-cooling, thereby further increasing savings. As discussed in the next section, leveraging monitoring software to refine data center infrastructure can further compound savings.required to perform.



Data center power (energy) requirements continue to rise. According to the 2012 DCD Intelligence Census power usage by data centers grew 63.3% globally to 38 gigawatts (GW) in 2012, with a further 17% increase forecast for 2013.

Infrastructure Management

Too often, minimal infrastructure planning is dedicated to the space where IT equipment is housed, serviced, and maintained. This lack of foresight invariably leads to facility infrastructure mishaps such as thermal "hot spots," lack of uninterruptible power supply rack power, system overloading, and other critical issues. Even in data centers with poor infrastructure planning, the addition of an environmental monitoring system and software with trend reporting capability provides the insight required to proactively configure the layout of data center equipment for maximum efficiency, minimum energy consumption, and optimized power distribution.

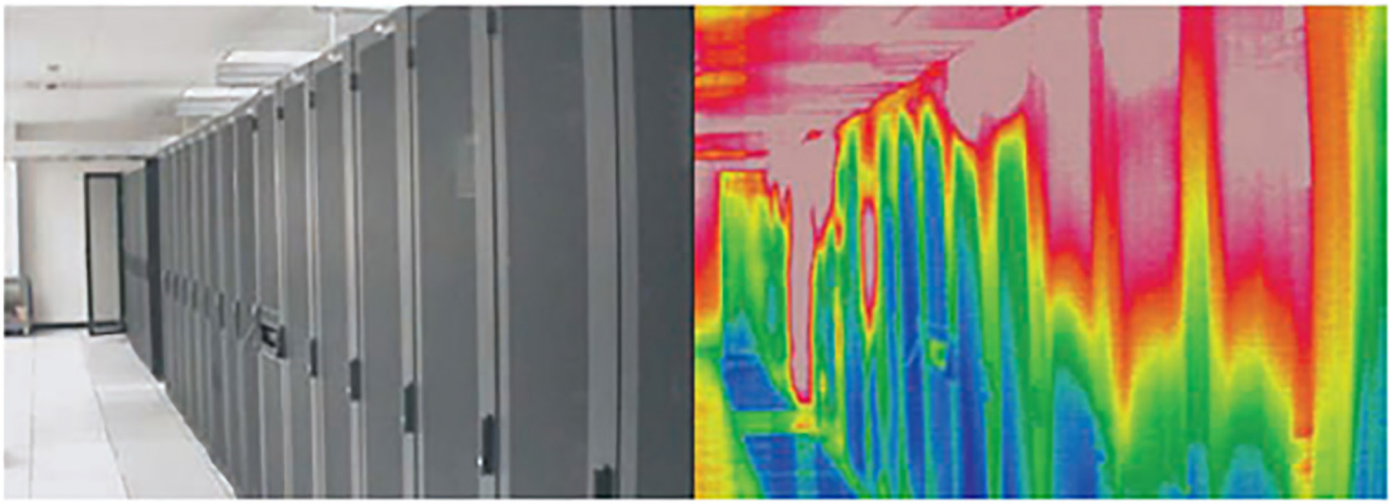
Lower Downtime Risk

The risk for a partial or total systems failure is always present—becoming not a question of if, but

Evidence:

American Greetings' monitoring deployment is preventing costly downtime and lowering operational costs. "It was a lot less expensive than I thought it would be. And it works better than I ever expected."

Source: Customer Case Study: American Greetings



when. The ever-present risk of downtime and how environmental monitoring can be the solution to minimized disruption is illustrated in RF Code's case study of American Greetings' implementation of RF Code monitoring. This case study cites a situation in which the company's CRAC units were brought down by a power outage, causing the enterprise systems management team to power off the server equipment because no monitoring system was in place to accurately report if the internal rack cabinet temperatures were exceeding standard warranty specifications. While the power and servers were quickly restored, this brief scenario costs the company four man-hours to reboot the system in addition to server disruption that might have been entirely avoided if environmental monitoring had been in place.

Downtime incidents have a major impact on a company's bottom line, with every minute of downtime costing thousands of dollars. In 2011, the Ponemon Institute reported that the average costs of a data center outage ranged from a minimum cost of $38,969 to a maximum of $1,017,746 per organization, with an overall average cost of $505,502 per incident.[6] This calculation took into account not only the price of equipment damages and impact to organization productivity, but also intangible damages to the company's brand due to inability to provide services and/or the perception of the brand's reputation amongst consumers. Data centers can proactively prevent downtime risks with intelligent environmental monitoring by monitoring temperatures and receiving immediate notification when any heating issues arise, such as a hotspot.

6 Ponemon Institute, "Calculating the Cost of Data Center Outages "

Smaller Carbon Footprint

Data center carbon emission has been a growing global concern for the past several years. Leading environmental policy organizations, such as the U.S. Environmental Protection Agency, the European Environment Agency, and the European Commission (EC) Code of Conduct on Data Center Energy Efficiency, have each weighed in on the issue, establishing their own minimum guidelines. The U.S. Environmental Protection Agency, for example, established an Energy Star rating in 2010, for which data centers must be in the top quartile of energy efficiency among reported facilities in order to qualify.[7]

7 Energy Star, "Benchmark Your Data Center's Energy Efficiency"

Evidence:

In the two weeks following their environmental monitoring solution deployment, Mitre Corporation was able to raise the set points in their data center 6 degrees. The results? An immediate $4000 return on their investment.

Environmental monitoring provides data centers the power to benchmark their metrics against competitors in the market. Google along with other best-in-class corporations make it a point to publicize their energy metrics in order to gain the public relations benefits of a "green" image. By taking advantage of environmental monitoring metrics, Google is able to publicly claim that Google data centers use a mere 50% of the energy of other data centers.[8] Having the metrics to make such public claims is immensely important, as in recent years, leveraging IT technology to 'green' operations in a company is becoming more and more visible due in large part to public demand that companies strive to decrease energy use and maintain a green image.

Integrated Management Opportunity

The latest environmental monitoring systems have abilities beyond simply measuring temperature and pressure levels in that they are able to integrate into other enterprise services such as asset management. Asset management enables data centers to track their devices throughout the entire lifecycle, from acquisition to end-of-life reconciliation, delivering its own multiple levels of ROI, as outlined in the white paper: "The ROI in IT Asset Management: A Business Case for Utilizing Intelligent Asset Management Technology"."

Conclusion

RF Code's Environmental Monitoring solution was built with a focus on delivering data center efficiency, cost savings, and a fast ROI, expanding its benefits beyond the ordinary. RF Code is even able to bring real-time environmental monitoring to your mobile device with their new mobile management platform, Asset Manager. Asset Manager's sophisticated interactive graphs, maps, and alerting engine ensures that any data center facility is able to detect issues immediately, further proving that you can't change what you can't measure.

8 Google, "Data Centers That Save Energy"

About RF Code

RF Code is the world's fastest growing, leading provider of distributed IT environmental monitoring and asset management solutions. Its patented tracking and sensor technologies are deployed by many of the Fortune 250 and help manage the global data centers of some of the largest IT service providers. RF Code is an essential component of the asset management, risk and compliance assurance and automated control systems in healthcare, IT services, industrial supply chains and natural resources/oil & gas industries. RF Code is a privately held company with investors including QuestMark Partners and Intel Capital. The company is headquartered in Austin, TX, with offices and partners in the UK, EMEA, Australia, Asia and South America.

Large enterprises, such as HP, CME Group, GE, Dell and Bank of America, have already begun experiencing substantial ROI through the deployment of RF Code's automated, accurate real time monitoring systems and are continuing to see positive results through expanded deployments. In addition, global market leading DCIM suppliers, including IBM, CA Technologies, and iTRACS CommScope have eagerly integrated RF Code's real time environmental and asset monitoring technology into the foundation of their systems. The unmatched accuracy of the data RF Code delivers enables these DCIM suppliers to gain a competitive edge in the market surpassing the value of any other systems currently available.

Additional Resources

- Environmental Monitoring Case Study: American Greetings (Link)
- Environmental Monitoring Case Study: PTS Consulting (Link)
- Gartner Research, "Cool Vendors in Data Center Infrastructure Management, Power and Cooling, 2013" (Link)
- On-Demand Webinar: "Point of View on the New ASHRAE Guidelines: A Conversation with Dr. Magnus Herrlin and Bruce Taylor" (Link)

RF Code™
9229 Waterford Centre Blvd. • Suite 500
Austin, TX 78758
Tel: 512.439.2200 • Fax: 512.439.2199
sales@rfcode.com • http://www.rfcode.com