



Data center management lacks unified tools and strategy for infrastructure monitoring

Survey reveals that many data centers are unable to use infrastructure monitoring strategically because of critical gaps in coverage

Real-time infrastructure monitoring tools can help data center management to predict faults, and to respond quickly to any faults that do occur. They can also be used more strategically, by enabling resource use to be accurately measured for the purposes of capacity planning and resource optimization.

There is a difference, though, between being able to monitor the infrastructure and having a holistic view of the data center. If monitoring is spread across multiple systems, it requires additional management work to turn raw data into actionable information.

The Aperture Research Institute surveyed over 100 data center managers, with a collective responsibility for more than 700 data centers, to find out how monitoring technologies are being used in the data center today.

We found that while management understands the benefits of monitoring technology and upwards of 68% aspire to monitor the most significant aspects of their physical infrastructure, only 35% have a single management system for doing so. Although 88% of data center managers do monitor their infrastructure, only 30% monitor more than 90% of their equipment. There is also an over-reliance on building management systems, which risks limiting data center management's ability to monitor infrastructure at the device and rack level.



Introduction

Many businesses are so dependent on their data centers that when the data center goes down, the business does too: companies are unable to sell, buy, produce or manage without reliable access to their applications and business intelligence. Uptime is a priority.

Real-time infrastructure monitoring tools can help data center management to identify potential problems and to respond quickly to any faults that do occur. They can also be used more strategically, by enabling resource use to be accurately recorded for the purposes of capacity planning and resource optimization. Tools vary widely in their sophistication and many vendors provide proprietary tools for their own equipment.

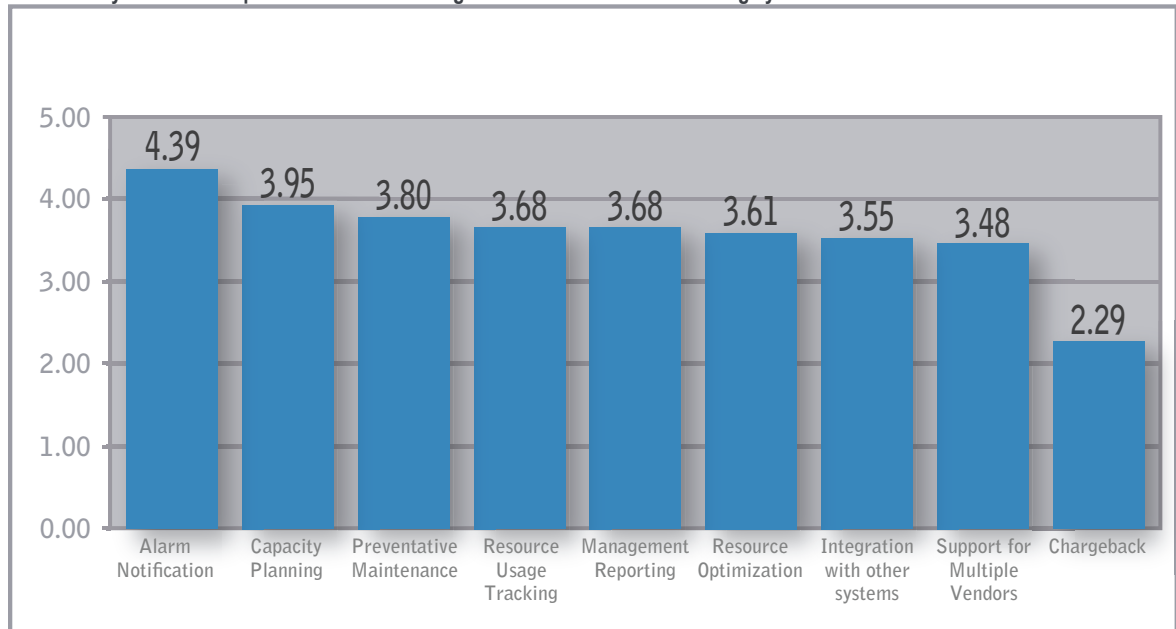
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Important features of real-time monitoring

Our research found that management considered alarm notification to be the most important feature of real-time monitoring solutions, suggesting there is a focus on rapid response to incidents. More strategic activities were also rated highly, though, including capacity planning, preventative maintenance, resource usage tracking and management reporting.

The ability to measure power use so it can be charged back to the business was the only suggested use of monitoring which did not win widespread support. That figure is consistent with our earlier paper 'Data Centers Lack Tools to Measure Efficiency and Support Green Initiatives (May 2008)', which found only 24% of data center managers charge energy use back to the business divisions that commission IT services.

How would you rate the importance of the following features of real-time monitoring systems?



The priorities for monitoring

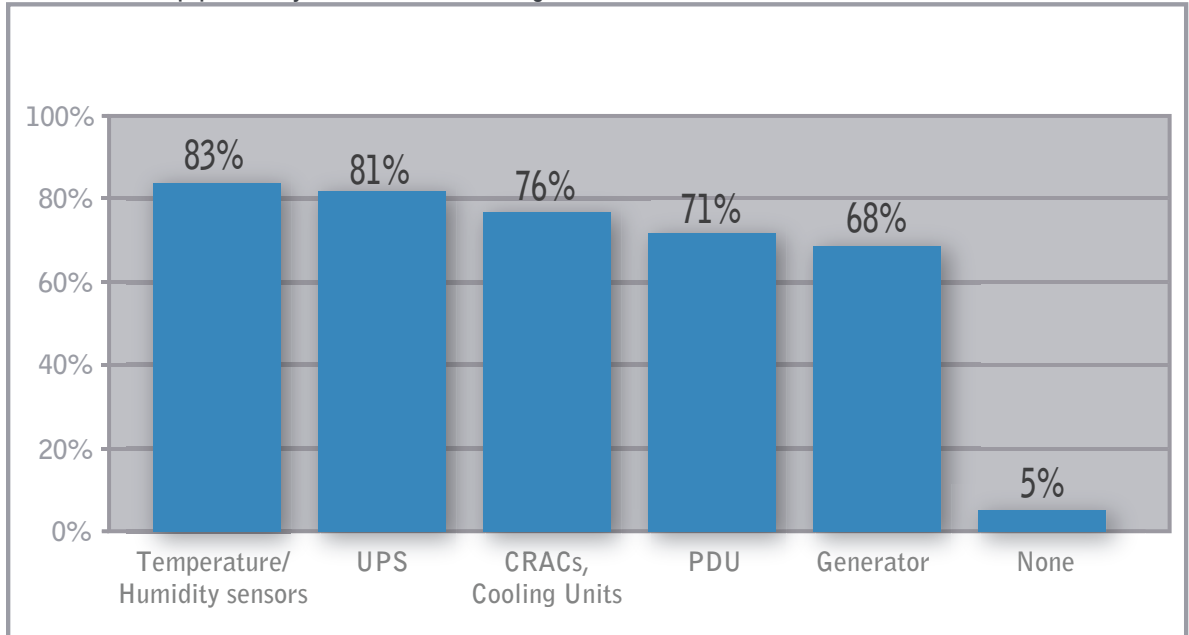
We asked data center managers what infrastructure elements they are interested in monitoring and the results confirmed that there is widespread enthusiasm for monitoring the infrastructure. 68% or more were interested in monitoring generators, PDUs, CRACs and cooling units, UPSs, and temperature and humidity sensors. There was greatest interest in monitoring temperature and humidity, with CRACs and cooling units following closely behind. This is perhaps a reflection of how cooling capacity is becoming a constraint on data center capacity and uptime.

Not surprisingly, 81% of those surveyed expressed an interest in monitoring uninterruptable power supplies to ensure they are indeed living up to their name.



Only 5% of those surveyed said they had no interest in monitoring the infrastructure of their data centers.

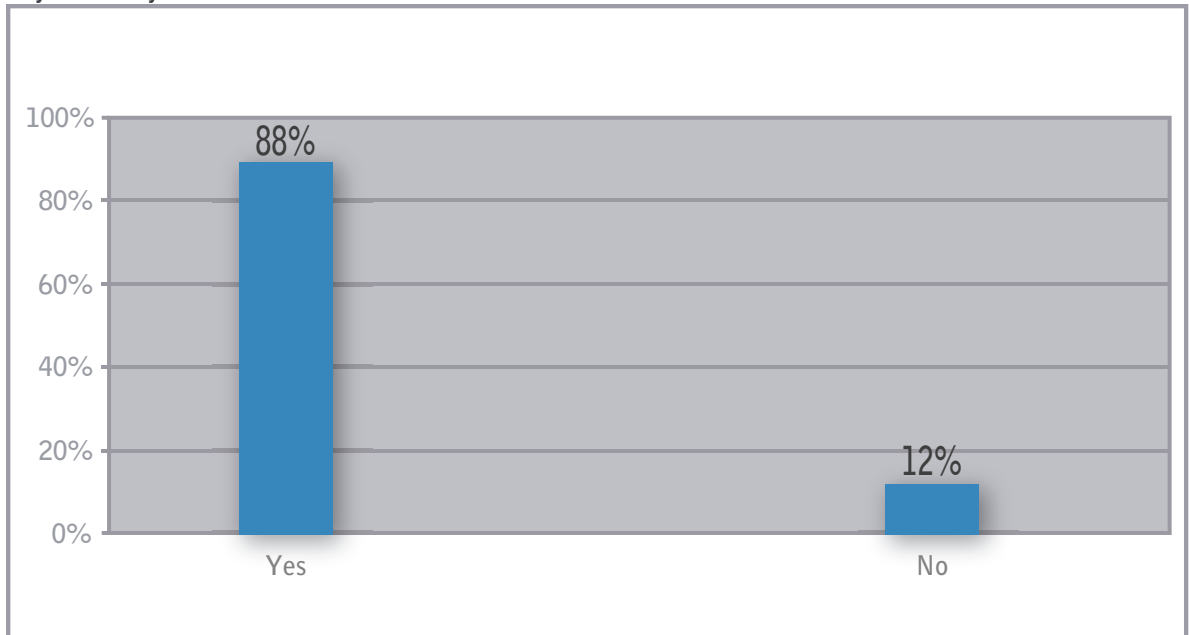
What data center equipment are you interested in monitoring?



How widely used are monitoring technologies?

As the previous figures show, there is broad agreement on the importance of the benefits that real-time monitoring can bring and there is widespread interest in monitoring the infrastructure. That is consistent with our discovery that 88% of data center managers say they monitor their data center infrastructure.

Do you monitor your data center infrastructure?



The shortfall of 12% is surprisingly high – it’s hard to see how data centers can offer the high level of uptime typically required without any ability to monitor the infrastructure that underpins IT services.

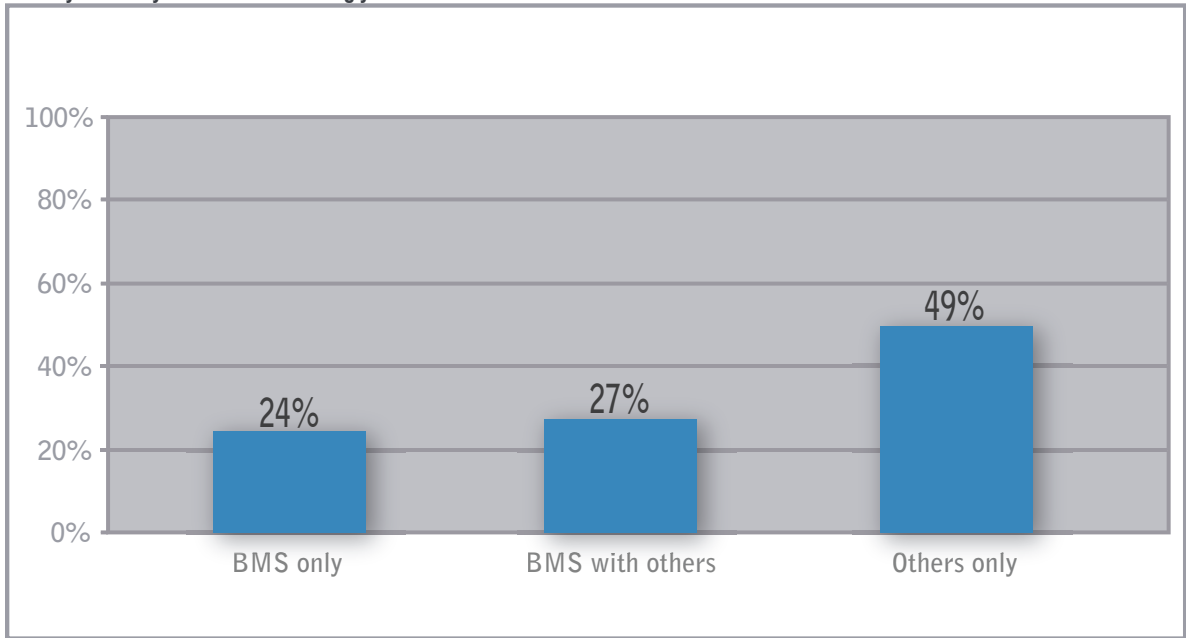


Many data centers miss the whole picture by relying on building management systems

The majority of those surveyed are using monitoring systems, but that high figure masks the use of inadequate tools. About half of those who do monitor (51%) are using building management systems (BMS) for their monitoring. Such systems have broad uses, including for building security, managing elevators, and office temperature control. Some of the features of a BMS are also required in data center monitoring systems, and it's not uncommon for data centers to install a BMS purely for use in monitoring the data center.

However, building management systems have not been designed with the entire data center in mind and provide inadequate detail for managing data center efficiency. Except for large equipment, a BMS will typically be unable to monitor at the device level and will offer little or no support for rack level monitoring, smart power strips or in-row rack cooling which are gaining prominence in many newer data centers. As such, a BMS will necessarily leave significant infrastructure resources unmonitored. That will make it difficult for data centers to plan capacity and optimize resources, two benefits of a monitoring system rated highly by our survey respondents and important to IT organizations. Furthermore, few building management systems provide capacity planning features and most will only be able to support capacity planning programs by enabling data to be exported from the BMS into a separate data center management system.

What system do you use for monitoring your data center infrastructure?



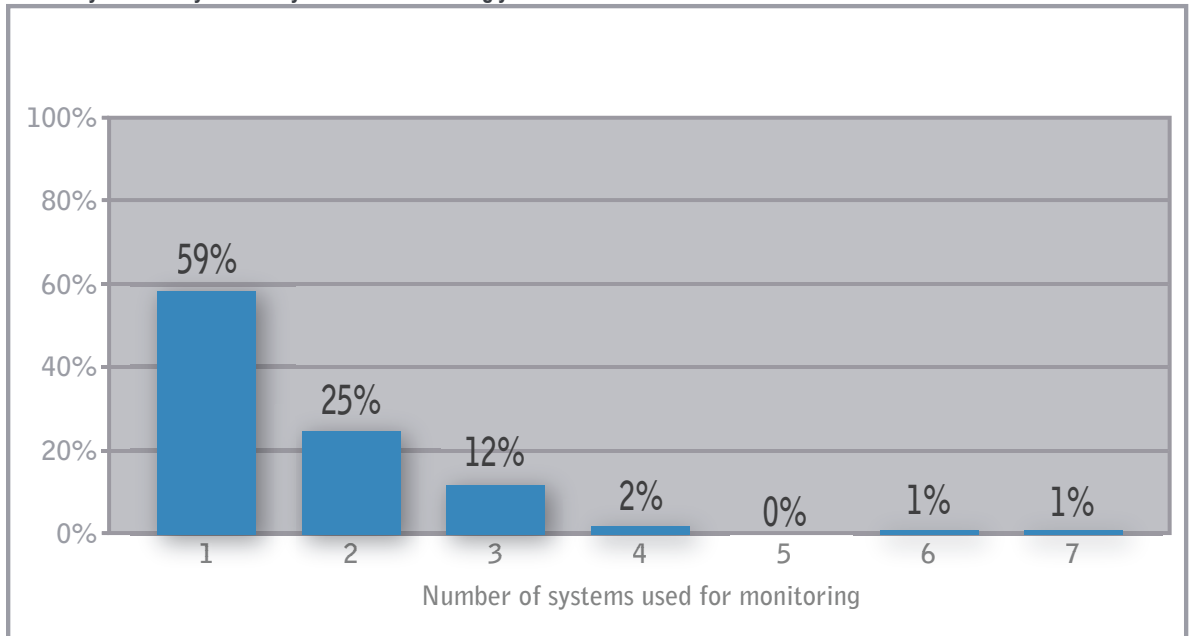
As the chart shows¹, 27% of those who are monitoring their infrastructure are using a BMS together with another monitoring solution. Multiple data sources can make it difficult for management to prioritize and to trace root causes where alerts from different systems relate to the same incident. It also increases the potential for error and adversely impacts cost of ownership to the organization. Where monitoring systems are dedicated to particular types of equipment, or equipment from particular vendors, the risk is that the monitoring solution will increase in complexity as the data center scales up and new monitoring solutions are introduced.

Our research found that 41% of those who are monitoring their infrastructure are using more than one system to do so. In a few isolated cases, six or seven different systems are in use, and in 12% of companies there are three different systems in play.

¹ Respondents were invited to name the systems they are using, and we have aggregated the figures in this report into system types for the purposes of clarity.



How many different systems do you use for monitoring your data center infrastructure?



Only 35% of those who are monitoring their infrastructure are doing so using a single system that is designed for the purpose (ie, that provides a holistic view of the entire data center).

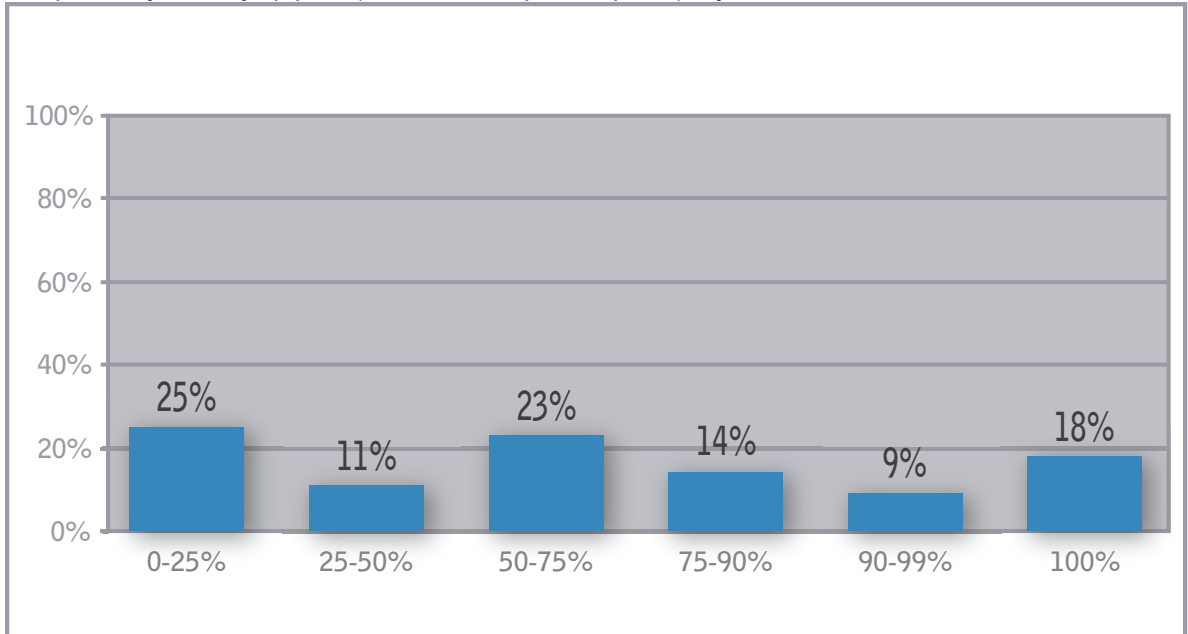
Proportion of equipment monitored

As we've seen, many data centers do not have the tools in place to comprehensively monitor their entire infrastructure. When asked how much of their equipment they do monitor, 73% of respondents admitted that they monitor less than 90%. With 10% or more of the data center being unmonitored, management's ability to respond to outages and carry out preventative maintenance would be severely hampered.

36% admitted that they monitor less than half of their infrastructure. Such ad-hoc monitoring is unlikely to meet the aspirations of data center managers who expressed an interest in capacity planning and resource optimization. With only a partial view of the infrastructure, it is impossible to achieve the holistic view that is necessary to manage the entire data center. Management could end up concentrating on device-specific fire-fighting instead of strategic planning if it cannot see a monitored device in the context of the whole data center.



What portion of your facility equipment (UPS, PDU, CRAC, power strips, etc.) do you monitor in real time?

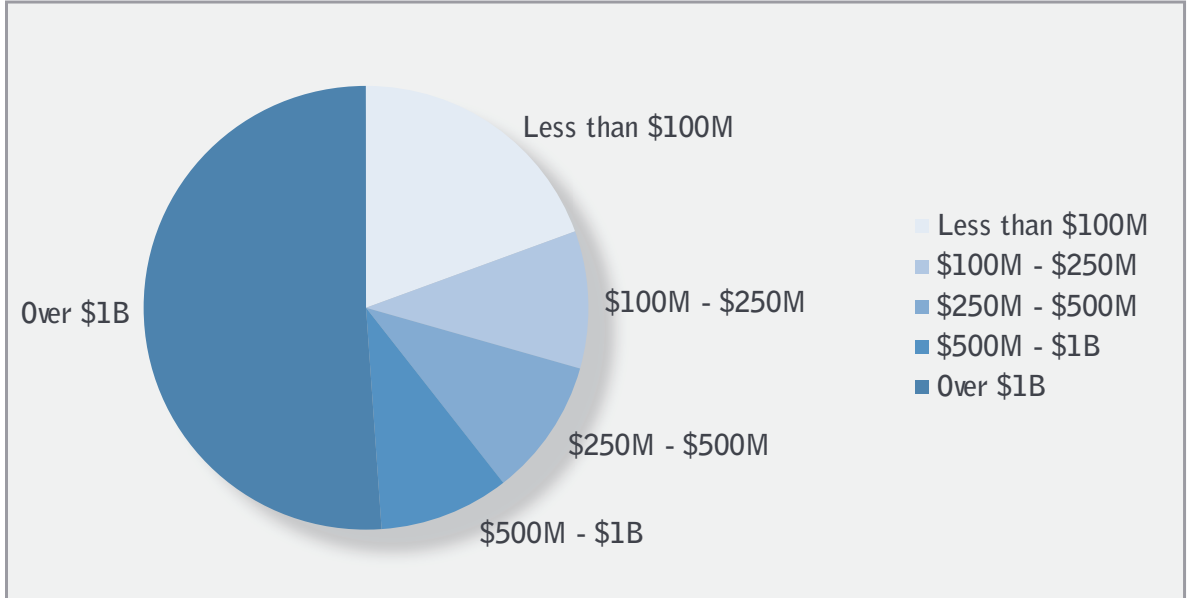




Survey methodology

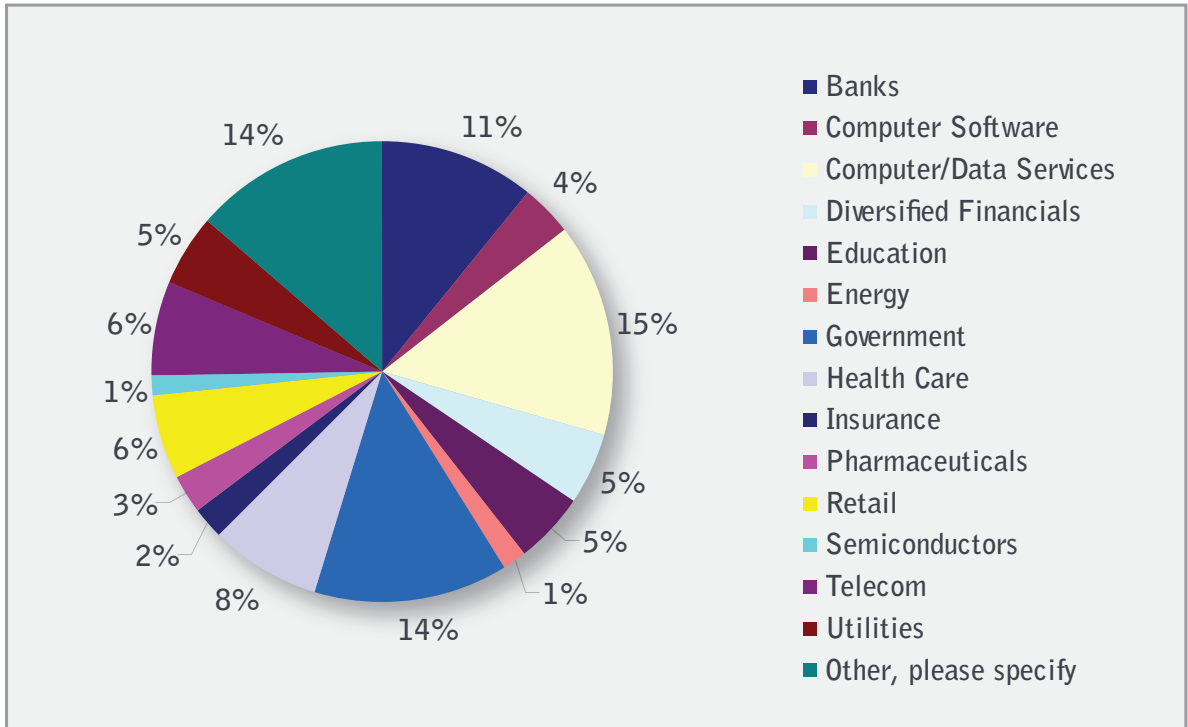
More than 100 data center professionals and executives from a variety of industries participated in this online survey. Survey participants were solicited from an industry database of Aperture customers and prospects. The charts below illustrate the demographics of companies that took part in the survey.

Annual Revenue of Participating Companies



The chart below shows the cross section of types of businesses that participated in the survey. It includes companies across various vertical industries and ranges from smaller businesses to Fortune 100 companies.

Primary Industry of Participating Organizations





Conclusions

Data center management understands the role that monitoring can play in both tactical and strategic management of the data center. Alarm notification was rated as the most important feature of real-time monitoring systems, but it was closely followed by more strategic activities, including capacity planning, preventative maintenance, resource usage tracing and management reporting.

There is enthusiasm for monitoring, with over 68% of those surveyed expressing an interest in monitoring key infrastructure elements including generators, PDUs, cooling units, UPSs, and temperature sensors.

However, most data center managers have not implemented a strategy that will enable them to fully exploit the potential of monitoring systems. There is an over-reliance on building management systems, which cannot enable rack and device level monitoring across the data center. While larger equipment can be monitored using a BMS, any gaps in the system will make it impossible to achieve the holistic view required for capacity planning, resource optimization and other strategic activities.

Additionally, 41% of those who do monitor their infrastructure are using multiple systems to do so. This could be the result of data centers adopting vendor-specific monitoring systems, or allowing ad-hoc monitoring systems to evolve with the data center instead of establishing an early strategy to view everything through a single vendor-neutral system. On top of the additional cost of maintaining multiple systems, data centers will struggle to ensure comprehensive coverage, minimize human error and identify root causes when there are conflicting reporting systems.

Only 35% of those who are monitoring their infrastructure are doing so using a single system that is designed for the purpose. This suggests there is a significant gap between management understanding of the potential for monitoring, and its ability to deliver on those aspirations with a unified strategy and toolset.

The Aperture Research Institute is dedicated to providing the market with current information and trends on enterprise data centers. The institute plans to publish new research notes on a quarterly basis. To read the latest research findings, visit <http://www.apertureresearchinstitute.org/>.



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