

By Andrew Mazer

It's practically a cliché, but that's because it's true: An organization's data is one of its most valuable assets. Today, robust analytics tools enable businesses to take advantage of the full potential of customer information to grow revenue, improve services, reduce costs and efficiently target potential customers. Other data, such as financial records, email repositories, transactional records, contracts and R&D have obvious strategic value and must be protected.

To safeguard data, organizations must ensure that their data centers are well-positioned to grow and evolve as business needs require. Yet data center administrators are facing an array of challenges, from the exploding volume of data that organizations generate and consume to space constraints, power and cooling concerns, and the need to protect against physical threats and cyberattacks. Even the availability of adequate power is becoming a challenge in some locations.



Executive Summary

Most IT executives say that some of their organizations' data centers will max out of power, cooling or space by the end of 2014, according to new research from UBM Tech and InformationWeek Marketing Services. The study, conducted in April 2013, takes an in-depth look at how IT decision makers rate the challenges they face as they evolve data centers to handle fast-growing volumes of data. Among the key findings:

Only 17 percent are actively planning or undertaking to build a new data center. However, over the next two years, 29 percent of respondents

say they plan to perform a major upgrade on one or more data centers and 20 percent would consolidate data centers into fewer facilities.

As few as 18 percent plan only to maintain their current data centers without significantly upgrading hardware. Rather than investing capital in new buildings, respondents are upgrading equipment, consolidating and refreshing hardware.

More than half of the IT execs are actively considering moving forward with server consolidation, blade deployment, virtualization and outsourcing servers/storage, and installing more energy-efficient equipment.

The State of Data Center Evolution

UBM Tech and InformationWeek Marketing Services surveyed 100 business technology decision makers at North American companies with more than 500 employees to gain insight into the state of their data centers, the challenges they face and the strategies they're using — or planning to use — to monitor and manage their IT infrastructure.

Data Centers Are “Aging” Faster than Anticipated: Colo Is Gaining Momentum

More than half the IT decision makers surveyed (57%) say that the state of their data centers' power, cooling and space is fair, serious or urgent — meaning that they anticipate running out of capacity before the end of 2014. As they approach this brick wall at light speed, these organizations will need to quickly identify and deploy solutions that enable them to meet service-level agreements and other commitments.

Thirty-one percent of IT pros flagged aging facilities as their chief problem today, followed by concerns about running out of processing capacity (27%) and fear of losing data (15%). This is a notable change from priorities just five years ago: In a 2008 Siemens-sponsored study of data center energy efficiency, aging facilities were much less of a concern — only 15 percent cited that as their biggest problem. Back then, the big worries were lack of processing capacity (27%) and the risk of losing data (25%).

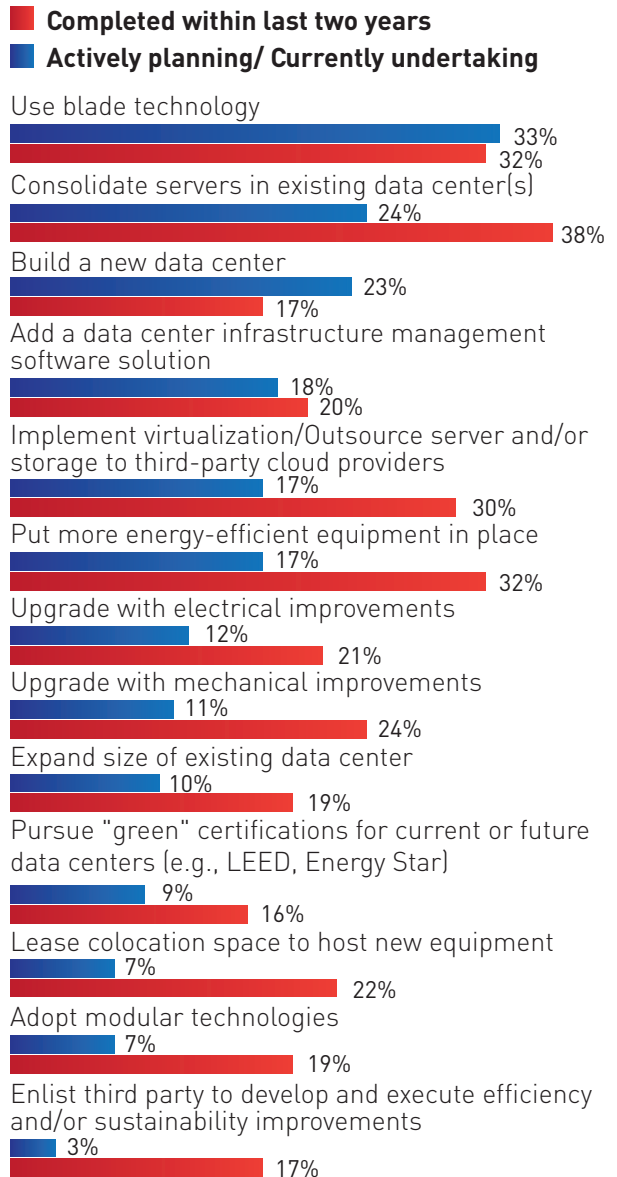
To respond to the threat of running out of capacity, nearly 30 percent of IT executives said they have moved or are currently moving to a collocated facility (see Figure 1), and approximately another 20 percent said they are considering doing so.

“A lot of businesses are outsourcing to colocation facilities, especially after Hurricane Sandy, when many lost power and connectivity for days,” says Kelly Quinn, research manager in the Data Center Trends and Strategies group at IDC. “They install their own equipment and essentially create their own data center in another facility, which provides power, connectivity, security and support.”

One survey participant, data center architect Johnny Martin of Independence Blue Cross in Philadelphia, said that his company had placed both its production and disaster recovery data center in collocated facilities: “Colo gives us cost savings, especially when we compared the depreciation and CapEx to the cost of new construction on stand-alone property. It also was a great vehicle for improving efficiency, because we were able to accelerate turnaround times by 80 percent. With colo, you're not beholden to time-consuming internal reviews by other groups, and you have much tighter control over the entire environment.”

Another approach to extending capacity is to “go modular.” More than a quarter of IT executives said they are planning

Figure 1: What are your organization's plans when it comes to the following initiatives as it strives to meet its growing compute demands?



Data: UBM Tech survey of 100 business technology professionals involved with data center management at companies with 500 or more employees

to install, or had already installed, a modular data center.

“We’ve seen a number of companies set up modular additions to their data centers, which are not only relatively inexpensive, but also can be deployed quickly,” says Quinn, “The only catch is that you need a place to put it — either on the roof or somewhere near the data center. Also, you can’t expand the capacity of a container; they are scalable only by adding new ones.”

Contending with Escalating Costs

Many companies have had to postpone large capital investments in IT infrastructure due to economic constraints over the past several years. The good news is that 58 percent of companies will have an increased IT budget this year, and 25 percent of those will see their budget rise by more than 10 percent.

Still, the expenses of running a data center are also increasing. Nearly two-thirds of respondents said their data center costs have risen over the past few years. And half of those surveyed said they expected that energy consumption in their data centers would rise over the next three years.

Power and cooling costs are driven not only by utility costs, but also by the deployment of high-density blade servers, which pack impressive computing power in a small footprint. Blade deployment is the most common initiative that companies have taken to meet increased computing demand, according to respondents, followed by consolidating servers in existing data centers and building a new data center.

Although less than one-fifth of respondents said their data centers had serious or urgent issues with power, cooling and space, 40 percent said that at least some facilities would reach capacity by 2014. Today's high-density blades are at least partially to blame; despite their small footprint, current-generation blade servers can be power hungry, often consuming five times or more per rack than previous-generation hardware.¹

When asked what the biggest technical challenges in the data center were, most IT executives said "future-proofing"

their data centers to meet growing and changing demands (57%), followed by reducing complexity and improving operational efficiency (50%), and avoiding expensive power interruptions (45%). Other frequently cited challenges were managing assets, tracking changes to the data center environment, and attaining energy efficiency goals (see Figure 2, p. 4).

Tracking Energy Consumption Growing in Importance

IT execs are clearly interested in reducing energy costs. More than three-quarters (78%) of respondents consider energy consumption "somewhat, very or extremely" important in planning for expanded computing capacity.

Most companies are using a variety of tools to measure the power and cooling impact of adding servers. The most common approach is employing dedicated metering to track energy used by cooling systems and IT systems (23%), closely followed by capacity management tools to avoid excessive power and cooling demands (22%). Slightly fewer respondents said they used multiple power meters to measure power usage over time and carefully considered where to locate new servers to minimize cooling demand (see Figure 3, p. 4).

Although many IT pros are closely tracking energy usage in their data centers, 42 percent of respondents said they seldom or never monitor key performance indicators (KPIs) of energy efficiency in the data center. Twenty-two percent said they track KPIs continuously, and 16 percent said they monitor hourly or daily.

About one-third of respondents said that energy costs comprise between 20 and 30 percent of their data center's total cost of ownership (TCO), but almost half said they had no idea of the relationship. The rest were evenly divided above and below that range.

Similarly, almost two-thirds of the IT pros surveyed do not know the power usage effectiveness (PUE) rating of their largest data center, and more than half are not sure of their organization's PUE goals. Only 9 percent of respondents stated that their largest data center had a PUE rating of less than 1.5, indicating that there is plenty of room for improvement.

More companies measure PUE at a simple Category 1 level (18%) than at the more detailed Category 2 or 3 levels (12%). About one-quarter have set a goal to either maintain or reduce their PUE rating.

Despite the unfamiliarity that many IT decision makers have regarding actual power-usage numbers in their data centers, there is a widespread awareness of the importance of managing energy usage and trying to reduce it wherever possible.

For example, as they make their data centers more environmentally friendly, IT execs anticipate the largest

Methodology

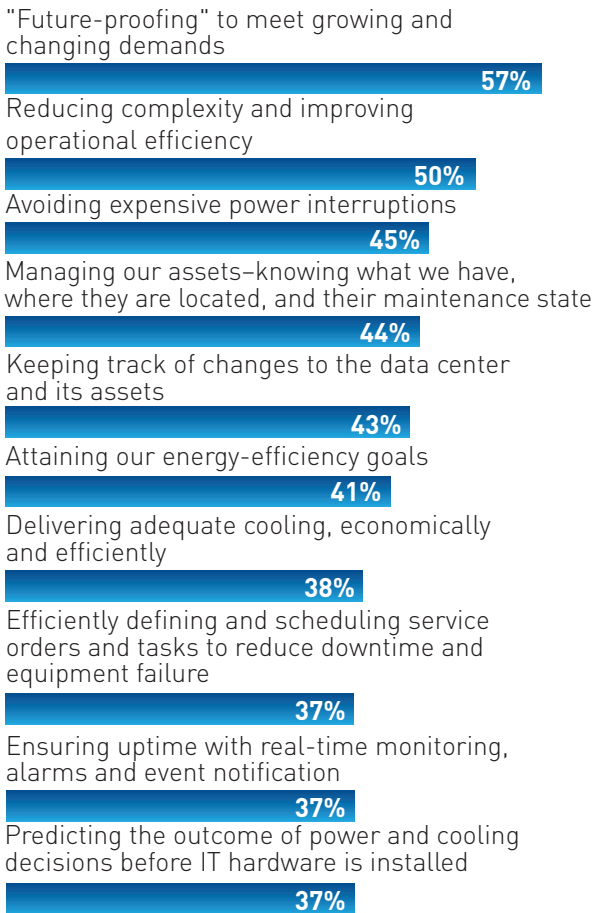
In April 2013, UBM Tech and InformationWeek Marketing Services conducted an online survey on behalf of Siemens on The State of Data Center Evolution.

UBM Tech collected data through an online survey from 100 IT business technology professionals involved with data center management or decision making at companies with 500 or more employees. About half of respondents were IT executives (CIO/CTO or VP of IT) or directors/managers of IT.

The greatest possible margin of error for the total respondent base (N=100) is +/- 9 percentage points. UBM Tech was responsible for all programming and data analysis. These procedures were carried out in strict accordance with standard market research practices.

The State of Data Center Evolution

Figure 2: Thinking about your organization's data centers, rate how challenging the following are to your organization.



Note: Percentages reflect combined scores of 5, 6 or 7 on a 7-point scale where 7 is "very challenging."

Data: UBM Tech survey of 100 business technology professionals involved with data center management at companies with 500 or more employees

benefits will be lower energy costs and better compliance with regulations. More than 40 percent say their companies will take further steps toward making their data centers greener, and an equal number say they would like to go in this direction.

Going Green in the Data Center Is Seen as Business Imperative

"Going green not only reduces our utility bill, it also helps us become a leaner, more efficient organization," says Martin of Independence Blue Cross. "We're simplifying as much as possible, consolidating our distributed servers and storage platforms, eliminating tape silos and so on. We're trying to tune the physical environment as finely as we can."

Still, employing energy-saving technologies can require an initial investment that many IT budgets cannot

Figure 3: What processes do you use to evaluate the power and cooling impact of adding servers?



Note: Multiple responses allowed

Data: UBM Tech survey of 100 business technology professionals involved with data center management at companies with 500 or more employees

accommodate. So, rather than invest in costly projects such as installing solar panels, companies are going after low-hanging fruit.

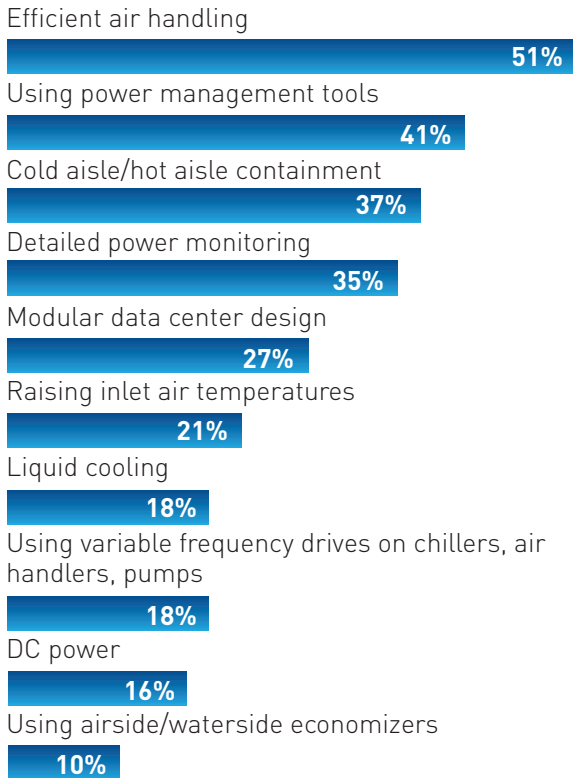
"Most companies today that are going green are primarily interested in cutting their power and cooling expenses. They are looking for short-term benefits and use approaches like hot aisle-cold aisle assignments and perhaps ultrasonic cooling," says Kelly Quinn of IDC. "However, some data center providers, in an effort to keep costs low for their customers, are embracing more sophisticated technologies such as ambient cooling using outside air and fuel cells to create electricity."

The vast majority of IT decision makers have taken proactive steps to reduce power usage in their data centers (see Figure 4, p. 5). The most common techniques cited are optimizing air handling to be as efficient as possible (51%), deploying power management tools (41%), cold aisle-hot aisle containment (37%) and detailed power monitoring (35%).

Companies planning to further reduce their electric bill this year are planning to limit consumption by idle resources

The State of Data Center Evolution

Figure 4: Which of the following practices have you employed in your data center to reduce power usage?



Note: Multiple responses allowed

Data: UBM Tech survey of 100 business technology professionals involved with data center management at companies with 500 or more employees

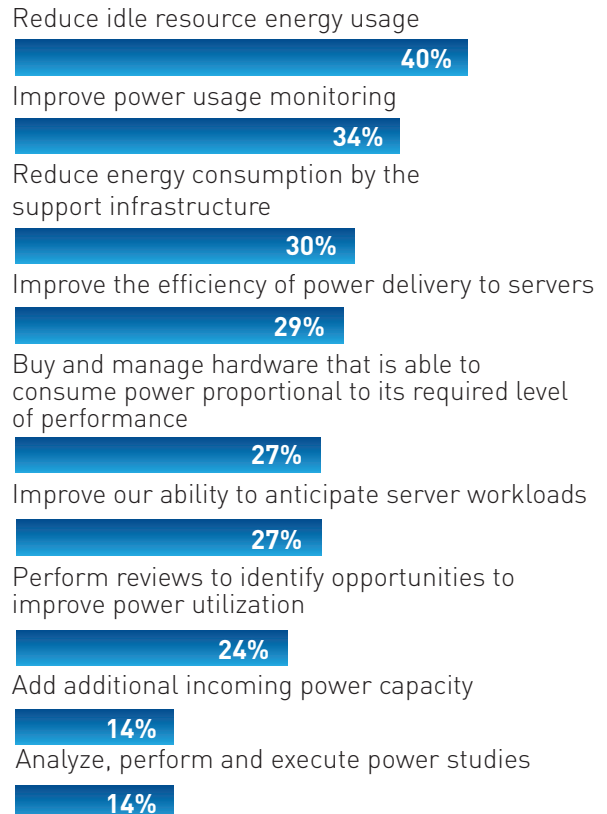
(40%) and the support infrastructure (30%), improve power usage monitoring (34%) and make power delivery to servers more efficient (29%). About a quarter of respondents said they planned to buy hardware that dynamically adjusts power usage to the level of performance required by a given workload (see Figure 5).

In the 2008 Siemens study, organizations were using different strategies to reduce energy usage. Back then, virtualization was the most common project, cited by 45 percent. Installing more energy-efficient hardware and upgrading air conditioning and cooling systems were distant followers, each flagged by 19 percent.

Managing Data Center Infrastructure with DCIM — Becoming a Necessity

Any plan to optimize a data center to handle growth would be incomplete without addressing management tools. IT administrators need detailed visibility and control over all aspects of data center operations so they can monitor the infrastructure and identify potential problems before they escalate.

Figure 5: What are your goals for managing data center power consumption this year?



Note: Multiple responses allowed

Data: UBM Tech survey of 100 business technology professionals involved with data center management at companies with 500 or more employees

The UBM Tech survey asked IT experts about their use of Data Center Infrastructure Management (DCIM) solutions, an integrated set of tools that enable IT administrators to remotely monitor and manage hardware assets, electrical power delivery, equipment and facility cooling, fire and life safety systems, and building security.

While only 15 percent of IT experts said they were using a DCIM solution, almost one-third said they were using some DCIM tools, and 22 percent indicated they would be interested in deploying DCIM capabilities. Figure 6 (p.6) shows which DCIM functions respondents are using and how they rate the importance of each.

An effective DCIM system can intelligently integrate information from IT and facility assets, workflows and work orders, and execute what-if analyses to enable IT administrators to optimize capacity planning and energy use.

For example, DCIM solutions with computational fluid dynamic (CFD) modeling enable IT to create a “virtual data center” that predicts and visualizes the outcome of power and cooling decisions before hardware is installed.

The State of Data Center Evolution

DCIM solutions also address asset management through all life-cycle stages from design, planning and installation to operation and migration.

This capability enables IT to conduct a what-if analysis before installing, moving or changing any equipment, enabling better analysis of how a different layout or scenario will affect operations. Real-time monitoring and notification capabilities enable IT administrators to take proactive steps to minimize downtime and react effectively when necessary.

“DCIM helps create a holistic view of all your resources so you can plan better,” says IDC data center expert Jennifer Kopyy. “It helps companies gain clarity into all the resources in their IT environments and identify the idle or underutilized assets that aren’t doing productive work. Then you can ferret out these ‘zombie servers’ and clean up the environment.”

With workflow, change and document management capabilities, a DCIM solution allows stakeholders in data centers to work in closed-loop processes that facilitate the accurate and rapid performance of service tasks.

The most common DCIM functions being used are power monitoring, fire and safety systems, asset tracking, real-time monitoring, device alarming and UPS/emergency generator controls, and physical/perimeter security systems. These same functions were considered important by more than two-thirds of all respondents.

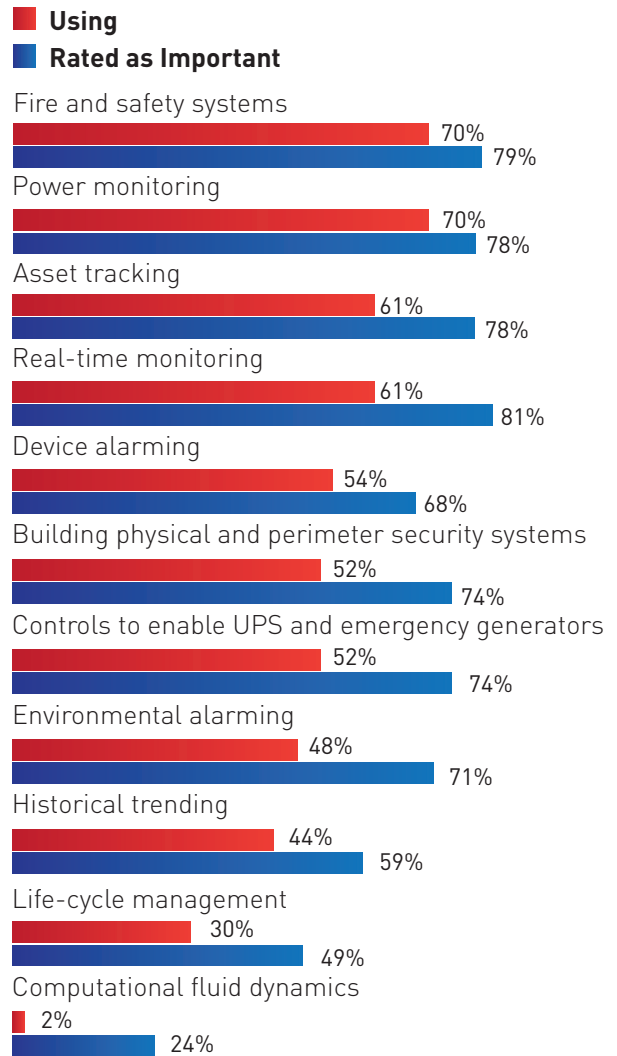
“DCIM makes managing a data center much easier. I can splice any metric I want to track into it, so it’s easy to monitor hardware and set up alarms. We can get cabinet reports, branch circuit monitoring, and real-time views of what cabinets and free-standing equipment are drawing,” says Martin. “We use power tracking to verify our monthly invoices from the colocation providers and shrink our energy use. Having the ability to home in on power usage by rack, cabinet or freestanding mainframe really gives us an edge.”

Just as importantly, DCIM enables data centers to perform more efficiently and support the delivery of business services. “You reduce the time spent on capacity planning, forecasting, impact analysis and investigating problems,” says Kopyy. “DCIM is a strategic investment that helps not only the IT department, but also the entire organization by improving business agility.”

Evolving the Data Center

As IT groups evolve their data centers, they face an array of challenges. Managing capital expenses, implementing robust disaster recovery, and funding their investments were all cited by the majority as the biggest challenges. Security and regulatory compliance were also flagged as key challenges.

Figure 6: Which of the following DCIM functions is your organization using? Please rate how important each of the following features is to your organization.**



*Note: Multiple responses allowed

*Base: 46 respondents who use an integrated DCIM solution or use some DCIM tools or features

**Note: Percentages reflect combined scores of 5, 6 or 7 on a 7-point scale where 7 is “very important.”

**Base: 68 respondents who use an integrated DCIM solution, use some DCIM tools or features, or would like to deploy DCIM capabilities

Data: UBM Tech survey of 100 business technology professionals involved with data center management at companies with 500 or more employees

IT decision makers pointed out the need to prepare their data centers with the capacity and headroom to grow while designing in energy efficiency and manageability. They are aware of how to make data centers greener, according to the UBM Tech research; however, they often fail to track critical

metrics such as PUE, key performance indicators (KPIs), or cost of energy as closely or consistently as they should.

Cutting costs and increasing efficiency are critical to any data center optimization initiative, and many IT administrators have gone for the low-hanging fruit, eliminating redundant platforms through consolidation and employing software tools to handle certain management tasks.

Managing next-generation data centers requires automated tools that deliver real-time information to easy-to-understand dashboards. The UBM Tech survey showed that IT execs understand that integrated DCIM solutions, automated monitoring and cloud enablement are key to lowering costs, boosting productivity, and enhancing the quality and speed with which IT departments deliver services.

As IT administrators continue to evolve their data centers, they will need to identify the management functions they want to implement and select a vendor with the ability to deliver an integrated DCIM solution. Streamlined management is

ultimately the key to realizing the potential of a data center to efficiently deliver new services, protect data, limit operational expenses and keep a lid on energy consumption. ■

¹ Press Release, March 2, 2011, "Gartner Says More than 50 Percent of Data Centers to Incorporate High-Density Zones by Year-End 2015" <http://www.gartner.com/newsroom/id/1569014>

About the Author

For more than 20 years, Andrew Mazer has written about high tech subjects including virtualization, storage, consolidation, cloud computing and optimizing IT infrastructures. In addition to writing case studies, white papers and feature stories, he has designed numerous UBM Tech industry surveys and interpreted their results.

