The fifth annual Uptime Institute Data Center Industry Survey provides an overview of global industry trends by surveying 1,000 data center operators and IT practitioners. Uptime Institute collected responses via email February–April 2015 and presented preliminary results in May 2015 at the 10th Uptime Institute Symposium in Santa Clara, CA.

Uptime Institute survey participants are a mix of data center facilities operations staff, IT managers, and senior executives. The U.S. and Canada make up a significant portion of the response, with growing numbers of participants from around the globe. Nearly half of the respondents manage three or more data center sites (see Figure 1).

Half of the respondents work for third-party commercial data center companies (colocation or cloud computing providers), and the other half work for enterprises in vertical industries such as financial services, manufacturing, healthcare, government, and other industries (see Figure 2). Throughout this report, a distinction will be made between these two broad categories of respondents, as the business requirements for third-party data center providers and enterprise data center owners are very different and drive different behaviors and decisions.

In each year’s survey, we ask participants to compare their organization’s current spending on data centers (including real estate, infrastructure equipment, staffing, operations, etc.) to the previous year’s expenditures. For several years, budgets for the colocation and multi-tenant data centers (MTDC) have grown significantly compared to enterprise spending.
In 2015, 74% of third-party data center respondents reported receiving budget increases, versus just 47% of the other enterprise companies (see Figure 3). This gap is similar to the 2014 and 2013 results:

- 2014: 86% of third-party respondents reported receiving budget increases versus 55% enterprise companies
- 2013: 77% of third-party respondents increased budget versus just 47% of enterprise companies

This budget disparity indicates that enterprise data center workloads are shifting to third-party providers. Yet, this does not connote the end or obsolescence of the enterprise data center.

In 2014, participants reported that one third of their enterprise IT workloads had been outsourced to colos and cloud providers, and that two-thirds of those workloads would remain in-house through 2015. Rather than spending significant
financial resources outsourcing workloads, many enterprise IT organizations seem to be contracting and divesting data center real estate.

Many industry pundits, as well as projected data center construction trends (see Figure 4), point to the continued rapid growth of the colocation industry. But many executives at large enterprise organizations report having a surplus of data center capacity after years of consolidation efforts and increasing fiscal scrutiny. These conditions could signal a coming slowdown for data center builds overall, even in the fast-growing service provider sector.

SHRINKING BUDGETS LEAD TO EFFICIENT IT

While senior executives are focused on cost reduction, operations teams seem to have missed or ignored that message. Over 60% of survey respondents do not believe reducing IT costs or resource consumption is a top executive priority, yet conversations with senior executives and data from other surveys contradict this sentiment. According to 451 Research’s Voice of the Enterprise Q1 2015 report, a survey of thousands of IT professionals, the top three priorities for enterprise organizations are:

• Increased IT asset utilization
• Data center consolidation
• Alignment of data center and business processes
So how did so many get this issue wrong in the survey? This may be attributed to the nature of operational roles in the data center. Operations staff report spending twice as much time in a reactive mode as they should, putting out fires and running in a state of near constant crisis (see Figure 5). There is little incentive or opportunity for these teams to participate meaningfully in strategic planning or setting an organization’s long-term goals.

These conditions make it difficult for companies to address the chronic management dysfunctions facing many IT organizations.

For over a decade, Uptime Institute has tried to address these issues:

- IT decisions made with no accountability for power and real estate costs
- Technical and cultural barriers to improving IT asset utilization
- Misguided executive efforts to use power usage effectiveness (PUE) as a tool to manage IT costs

The clear path for addressing these problems and reducing cost and resource consumption is to take a holistic approach to efficient IT (See: A Holistic Approach to Reducing Cost and Resource Consumption, https://journal.uptimeinstitute.com/holistic-approach-reducing-cost-resource-consumption/). Some forward-looking organizations have started to make headway against these challenges, but the industry still has a long way to go. For example, only 39% of enterprise organizations reported having a formal energy plan in place (see Figure 6).

Additionally, less than one-third of enterprise organizations have an IT chargeback model in place (see Figure 7). Chargeback systems can be a cornerstone of implementing efficiency efforts enterprise wide [See IT Chargeback Drives Efficiency, page 22].

IT chargeback is an accounting strategy that allocates the various costs of delivering IT (services, hardware, software, maintenance, etc.) to the business units that consume them. This accounting strategy improves IT investment decisions and incentivizes efficiency.

Although adoption of IT chargeback is currently slow and difficult, Uptime Institute expects efforts in this area to continue to improve, as organizations increasingly are holding business units to account for IT costs. As
organizations begin to get a handle on accounting for the true costs of IT, many will struggle with abysmal server utilization rates. Industry figures from multiple sources put average CPU utilization rates below 20%, despite increased adoption of server virtualization technologies. Additionally, Uptime Institute and other industry organizations have estimated at least 20% of server hardware is not performing any work at all.

In the 2014 Data Center Industry Survey, the majority of respondents didn’t believe comatose servers were a serious problem in their organizations. And yet, 45% did not conduct any scheduled auditing to identify if they actually had a problem. IT organizations tend to be in denial about this issue, as the utilization is embarrassingly bad, but also because the people procuring and deploying servers had no accountability to the costs associated with poor utilization. Increased adoption of chargeback will likely improve utilization somewhat.

But how does it get that bad in the first place? One reason might be the incredibly long server refresh rates reported in the 2015 survey (see Figure 8). Nearly two-thirds of the respondents install a server in a rack and do not replace it for four years or more. Multiple factors can change in four years in a dynamic IT organization, and so organizations can lose track of many pieces of hardware.

Uptime Institute’s Server Roundup winners have proven that without an incredibly disciplined server decommissioning program, with dedicated resourcing, comatose and underutilized IT equipment will accrue, and bloat IT budgets, hamper new projects, and idly consume expensive infrastructure capacity.

Tracking server utilization is slowly creeping up the lists of priorities, as evidenced by 2015 survey data, ranking fourth overall in a ranking of data center metrics in order of importance (see Figure 9). PUE is still regarded as the most important metric, a finding somewhat skewed by the job responsibilities of the survey sample size, and also what Uptime Institute sees as misapplication of PUE as a management metric.

But the surprising finding in Figure 9 is how low carbon reporting ranks for data center professionals, given the potential havoc this metric can cause for companies in the sphere of public opinion. By now, most organizations are
familiar with the reports from the environmental organization Greenpeace, scoring large data center operators on their environmental impacts. The reports largely focus on web-scale companies with broad public-facing presences and the infrastructure providers who support those companies (see Figure 10).

Greenpeace is well aware of the efficiencies the majority of web-scale operators have engineered into their data center facilities, and the very fabric of their IT operations. And yet, the only metric that concerns the environmental organization is carbon emissions and an organization’s willingness to influence its utility providers to invest in renewable power generation.

Understandably, many data center operations professionals argue that these decisions are above their pay grades and not something they can influence. Yet, no one in a data center organization is going to be able to claim that carbon is not their problem when their company is called out in the media headlines, and their executives are asking questions about what could have been done differently to avoid the negative exposure. Ultimately, everyone associated with delivering data center capacity will need to be conversant in this topic.

**LIFE SAFETY**

Uptime Institute also recommends increased industry accountability relating to life safety. Due to the uninterruptible nature of data center operations, a large percentage of organizations allow maintenance activities on energized electrical equipment. These conditions put personnel at risk of an arc flash accident (see Figure 11). The U.S. Occupational Safety and Health Administration (OSHA) defines arc flash as “a phenomenon where a flashover of electric current leaves its intended path and travels through the air from one conductor to another, or to ground. The results are often violent and when a human is in close proximity to the arc flash, serious injury and even death can occur.” (See Arc Flash and Electrical Accident Risk Mitigation in the Data Center, *The Uptime Institute Journal*, Volume 5, Page 72.)

There are regulations in the U.S. and globally that set safety requirements, but there is wide-ranging industry confusion over how to comply with those regulations and understandable uneasiness with requirements that put personnel at risk. About one-third of organizations allow maintenance activities on energized electrical equipment at voltage levels that could cause health or human-safety consequences.

OSHA and the National Fire Protection Association (NFPA) Standard 70E address electrical safety in the workplace and provide guidance and regulations on safety programs, warning labels, personal protective equipment, boundary requirements, and hazard analysis. And yet, there is widespread confusion over how the
codes should be applied in the data center industry, as evidenced by the responses from North American data center operators and executives (see Figure 12-15).

This confusion over how regulations and codes should be applied is clearly a major issue facing this industry. Even highly informed experts can disagree on how these regulations should be applied. The confusion creates opportunities for accidents and operational exposures to risk that can cause significant injuries and even death.

The most effective way to eliminate the risk of electrical shock or arc flash hazard is to de-energize the equipment. Uptime Institute’s Tier III and Tier IV criteria both require design and installation of systems that enable equipment to be fully de-energized to allow planned activities such as repair, maintenance, replacement, or upgrade without exposing personnel to the risks of working on energized equipment.

DCIM MARKET DYNAMICS
In the fall of 2014, Uptime Institute technical staff with extensive data center design and operations experience began to assess the vendor capabilities, market forces, and buying trends around DCIM. Data from the 2015 Data Center Industry Survey has informed that project, as well as extensive interviews with DCIM providers, reference customers, and our own clients about their DCIM implementations.

Figure 11. Nearly one third of data center operators perform “hot work” or maintenance activities on equipment at voltage levels that pose a hazard to human safety.

Figure 12. The majority of survey participants have reservations about this practice.

Figure 13. Organizations need to familiarize themselves with safety regulations regarding energized equipment.
451 Research defines DCIM as: A data center-wide or organization-wide system or software suite that collects and manages information about a data center’s assets, resource use, and operational status.

For the 2015 survey, 27% of data center operators reported having purchased a commercial DCIM tool (see Figure 16). In 2013, at the peak of the DCIM hype cycle, 70% of respondents had plans to install a DCIM system within two years. Seemingly, there are several obstacles prolonging or thwarting the realization of all DCIM had promised. The main barrier to buying DCIM for enterprise operators is cost. This was also noted as the most significant barrier to DCIM adoption in 2013.

The cost is not only the price of the software—it’s the massive amount of staff time required to conduct due diligence on providers, prepare and install the systems, and the months it could take to tune operations once the systems are installed. The timeline for a DCIM purchase can be staggering. Uptime Institute has heard anecdotes in which companies have spent two years kicking the tires on a DCIM purchase (see Figure 17). Over one-half of the respondents who purchased DCIM, spent over six months just vetting the vendors and products. Once they selected a vendor, over 74% spent over 6 months installing the project.

In the majority of cases, it’s a twelve month journey minimum to purchase and implement DCIM. And Uptime Institute has heard of cases where it took up to five

![IF THE LAW EXPLICITLY PROHIBITED MAINTENANCE ON ENERGIZED EQUIPMENT, WOULD YOUR SITES BE IMPACTED?]

- None 38%
- Few 22%
- Majority 14%
- All 26%

Figure 14. Nearly two thirds of respondents would need to adjust operations, topology and/or maintenance practices to adhere to strict regulations.

![IF YOU HAD RESOURCES, WOULD YOU INVEST IN INFRASTRUCTURE TO PREVENT THE NEED FOR MAINTENANCE ON ENERGIZED EQUIPMENT?]

YES 92%

Figure 15. The vast majority of respondents would prefer to invest in Tier III or Tier IV topology that would prevent the need to conduct maintenance on energized equipment.

<table>
<thead>
<tr>
<th>DCIM MARKET PENETRATION</th>
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<tbody>
<tr>
<td>Purchased commercial DCIM 27%</td>
</tr>
<tr>
<td>Considering commercial DCIM 29%</td>
</tr>
<tr>
<td>No plans for commercial DCIM 36%</td>
</tr>
<tr>
<td>Evaluated commercial DCIM and declined 9%</td>
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Figure 16. The majority of the market has not purchased a commercial DCIM product yet.
years. Five years is a lot of staff time and costs that are rarely included in an ROI calculation. In fact, a staggering percentage of enterprise respondents didn’t expect any return on the DCIM investment at all (see Figure 18).

The third-party data center providers, in the survey and in interviews, found significant value in DCIM software and could make the case for a return on investment. The DCIM tool is a core part of their business function—providing business services like inventory management, shortening their sales cycle. The colos even use a DCIM purchase as a marketing tool. But for the enterprise, only 17% expect a short-term return on the investment and nearly half don’t expect to get a return at all.

There are three primary reasons for this problem:

• Many DCIM purchases are made with no plans for ROI

• Enterprises are using the tools as building management systems on steroids and not taking advantage of the advanced features that actually could provide ROI

• Typically, organizations aren’t getting what they need out of a single tool or vendor

• Pricing volatility all but guarantees organizations will overpay

Figure 17. DCIM can take surprisingly long to deploy, according to those who have done so.

Figure 18. Enterprises generally do not see a short term ROI on DCIM.

Figure 19. Pricing and installation costs can be hard to predict.
According to the survey, the approximate cost of a DCIM deployment runs anywhere from less than US$50,000 to over US$1 million. Vendors will respond that the pricing volatility represents a variety of features and functions, different sized deployments, variable pricing schemes....

The takeaway is that there’s no value assigned to the DCIM product. Pricing ranges all over the board. The vendors are deliberately obscure and over-complicated on pricing to prevent cost comparisons. There is no value assigned in the market (see Figure 19).

Unless an IT organization has an expectation of ROI and can assign a value to a DCIM deployment, the buyer will overpay. In a recent discussion, a client revealed that the pricing scheme on their recent DCIM purchase had been cut in half from the initial bid, to the finalization of the negotiation. That kind of pricing volatility makes the challenging purchase even more difficult.

Stay tuned for a detailed analysis of DCIM market through Uptime Institute’s subscription content service, launching in 2016.

WHAT TO WATCH FOR

The overarching theme of the 2015 Data Center Industry Survey is accountability. The data center industry needs to take accountability for being good stewards of our corporate finances, good stewards of our environment, and also to take a leadership role in defining appropriate life-safety precautions for personnel. The takeaways from 2015 are below:

• Flattening enterprise IT budgets and growing colocation spending had signaled an uptick in outsourcing, but those persistently flat enterprise budgets may now signal an overall slowdown of the data center capital project cycle.

• The majority of survey respondents incorrectly assume that reducing IT cost and resource consumption is not an executive priority. This is largely due to the fact that IT and data center operations teams spend too much time firefighting and not enough time shaping the strategic vision of their organizations.

• Chargeback programs are key to implementing holistic, cost-effective programs to improve IT efficiency, but the industry is only beginning to adopt these accounting techniques.

• Over 70% of the survey respondents in North America report some level of confusion over the regulatory details dealing with performing maintenance on energized data center equipment.

• Nearly half of enterprise IT organizations considering DCIM do not expect a return on investment.

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This paper provides analysis and commentary of the Uptime Institute survey responses. Uptime Institute makes reasonable efforts to facilitate a survey that is reliable and relevant. All participant responses are assumed to be in good faith. Uptime Institute does not verify or endorse the responses of the participants; any claims to savings or benefits are entirely the representations of the survey participants. 

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