The 2016 State of Resilience: Keep your data moving forward

The Future of IT
A Global Look at Practices and Progress

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Introduction

Even the most powerful and visible businesses experienced technology crises in 2015. This past year was notable for several widely trumpeted software malfunctions, hardware failures, and data breaches that cost companies millions of dollars and consumer confidence. At United Airlines, a router crashed, causing roughly 4,900 flights worldwide to be grounded for an hour. The Royal Bank of Scotland failed to process more than a half a million customer transactions because of a technology glitch overnight. The New York Stock Exchange suspended trading for four hours when financial data became unavailable to traders. And the hacking of U.S. Federal Government's Office of Personnel Management, disclosed in 2015, left the social security numbers and personal data of millions of individuals vulnerable.

Clearly, these examples show that businesses are dealing with a tsunami of data, while at the same time suffering from inefficient methods for storing, managing, and protecting it. Petabytes of data—both structured and unstructured—are being created, curated, and stored at lightning speed: Social data, mobile data, e-commerce data, data from medical equipment, scientific instruments, and personal gadgets bombard businesses. The borders of the enterprise seem to be dissolving as corporate employees network across the globe, using their own cellphones and tablets. Now, the "Internet of things" enables electronic devices such as fitness monitors, coffee makers, cars, and even thermostats to collect and exchange data—increasing the need for rapid indexing and storage. In this "always on" environment, application users have strong expectations of real-time access and constant uptime.

In reality, the data deluge puts intense stress on business data storage and protection methods—and on system performance. IT professionals are feeling the strain, because they're on the front lines of managing massive volumes of data, all while protecting their companies from downtime and data loss. New global legislation about sharing and transferring data promises to be an additional headache. And, even while IT professionals are operating and protecting vital systems every day, they're challenged to position the IT department as a competitive business advantage, rather than just a cost center.

In the end, worldwide technology systems must be built for resilience. They must be engineered to survive natural disasters such as storms, power outages, and water damage—as well as human error, hardware malfunctions, and software failures. In this year's report, we examine the ability of businesses to maintain service even in the face of threats and challenges. Are they equipped to manage the data explosion and the trials that lie ahead? Or are they behind the curve in adopting more agile technologies that will give their companies that competitive edge?

Read on to see how to keep your business moving forward and gain deeper insights into how truly resilient today's global businesses are.

Respondent Profile and Methodology

Respondent Profile and Methodology

Five Surveys

- Migration Challenges
- Cloud
- High Availability and Disaster Recovery
- Professional Services/Outsourcing
- Data Sharing

Survey Distribution

This year's State of Resilience, in keeping with the general trend of globalization of data, presents particularly intriguing and deep insights. For this report, we distributed five global surveys in English. Respondents represented a wide range of countries: Saudi Arabia, The United Arab Emirates, and Jordan in the Middle East; Indonesia, Singapore, and Australia in the Asia Pacific; Columbia, Peru, and Brazil in Latin America; France, Italy, and Denmark in Europe; and the U.S. and Canada in North America, to name a few.

In addition, this report contains a number of regional comparisons of IT practices for:
- Latin America
- Europe/Middle East/Africa
- North America

To obtain these comparisons, we distributed surveys translated into Spanish, Portuguese, and German languages. Reponses from these surveys were compiled, along with country data extracted from the global surveys, and combined to obtain regional results. In general, analysis in the report is sourced from the "global survey," or the worldwide English language survey. Where appropriate, regional comparisons are referenced by their specific names in the text or in sidebars.

Dates   August 2015 to October 2015

Delivery System   Surveys were administered online, using web-based survey tools and targeted to IT professionals.

Respondents   2,261. Professional titles varied widely, from CTO and VP of Information Technology, to cloud architect, systems administrator, senior DBA and principal systems engineer.

We would like particularly to thank all the IT professionals who took the time to participate in our surveys. Your responses help contribute to greater knowledge and understanding of the industry.

Central Issues for IT Leaders

The computing industry keeps pushing the limits of technology, but naturally, not all businesses move at the same pace. IT leaders must develop strategies to further their company interests, making deliberate choices about technology acquisitions, while factoring in the dynamics of budgets, staffing, timing, and use of outside consultants.

This year's research reveals the choices that IT leaders make, along with the challenges and opportunities that engage them, as summarized here:

Despite Progress toward Agile Methods, a Gap Widens between Company Recovery Goals and Data Center Reality

This year saw a slight reduction in the number of data protection technologies companies used, possibly a move to consolidate protection and recovery schemes. Our survey data collected over a six-year period revealed that organizations have advanced to use more nimble technologies for HA/DR, such as storage-based replication and software-based logical replication. Despite progress, some of this year's news about data protection is disheartening: Companies are experiencing more data loss compared to last year. Moreover, many IT departments are not meeting their recovery point objectives for mission-critical systems, revealing a fault line between corporate goals and the reality in the data center. True resilience demands that IT capabilities for data protection be aligned with business needs.

Cloud Technology and Storage Take the Lead, IT Leaders Race to Keep Up

Cloud computing has matured tremendously, and the majority of companies have "crossed the chasm" in adopting it. This year saw a substantial jump in the number of organizations using high availability and disaster recovery in the cloud. Yet, even as the cloud has matured, industry keeps evolving the technology—data analytics, networks, bandwidth, and even the physical capabilities of hardware materials. Security, privacy, performance, compliance regulations, and licensing agreements are evergreen worries for IT leaders, especially as the use of public clouds increase. IT professionals will be speeding to stay current with new developments.

Migration is Disruptive, but Cost is Rarely Measured

Findings showed that the rate of failed migrations is fairly high. Moreover, the majority of professionals had delayed migrations out of concerns about downtime. Yet, delayed migrations jeopardize business productivity and effectiveness, as companies experience poor system performance or postpone replacement of hardware past its shelf life. Ironically, most IT organizations indicate that they spend many hours in planning, migration, testing, and cutover—even though they had not estimated the cost of downtime.

"Must Haves" for Business Success: Agile Data Sharing, Information Accuracy

IT professionals have corporate mandates to ensure real-time accuracy of data that's used for business intelligence. However, our research revealed a mixed picture of company capabilities for data sharing. Inconsistent data in shared databases impacts business competitiveness and speed in decision making. Moreover, some IT organizations use tools that are a generation old—the equivalent of employing a hammer for construction when only power tools will accomplish the job. IT leaders must build for future growth by investing in more agile technologies that will deliver accurate, real-time information to the company.

IT Staffing Remains Level Despite Increased Workloads, yet few Consider Outsourcing

Our new study this year shed light on company outsourcing practices and dilemmas. It's possible that some companies are under-resourced in critical areas, such as managed services, HA/DR monitoring, or hardware support. Resilience calls for IT leaders to creatively address the challenges of restricted staffing levels, budgetary constraints, and internal resistance to outsourcing as a solution.

One final note about the regional data presented in this report. In general, the pattern of responses was similar worldwide, but we did detect certain regional variations. We assume that these disparities are rooted in differing economic systems, labor pool issues, resource availability, country-specific calendars, buying trends, or training. When presenting these differences, we have been sensitive to regional issues, while emphasizing the distinctions. We believe that our analysis could help companies—especially global organizations—determine where further development or action is needed.

The State of Migration Survey

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The State of Migration

Performance issues, hardware and software reaching end of service life, and escalating storage requirements make migration a fact of life for companies
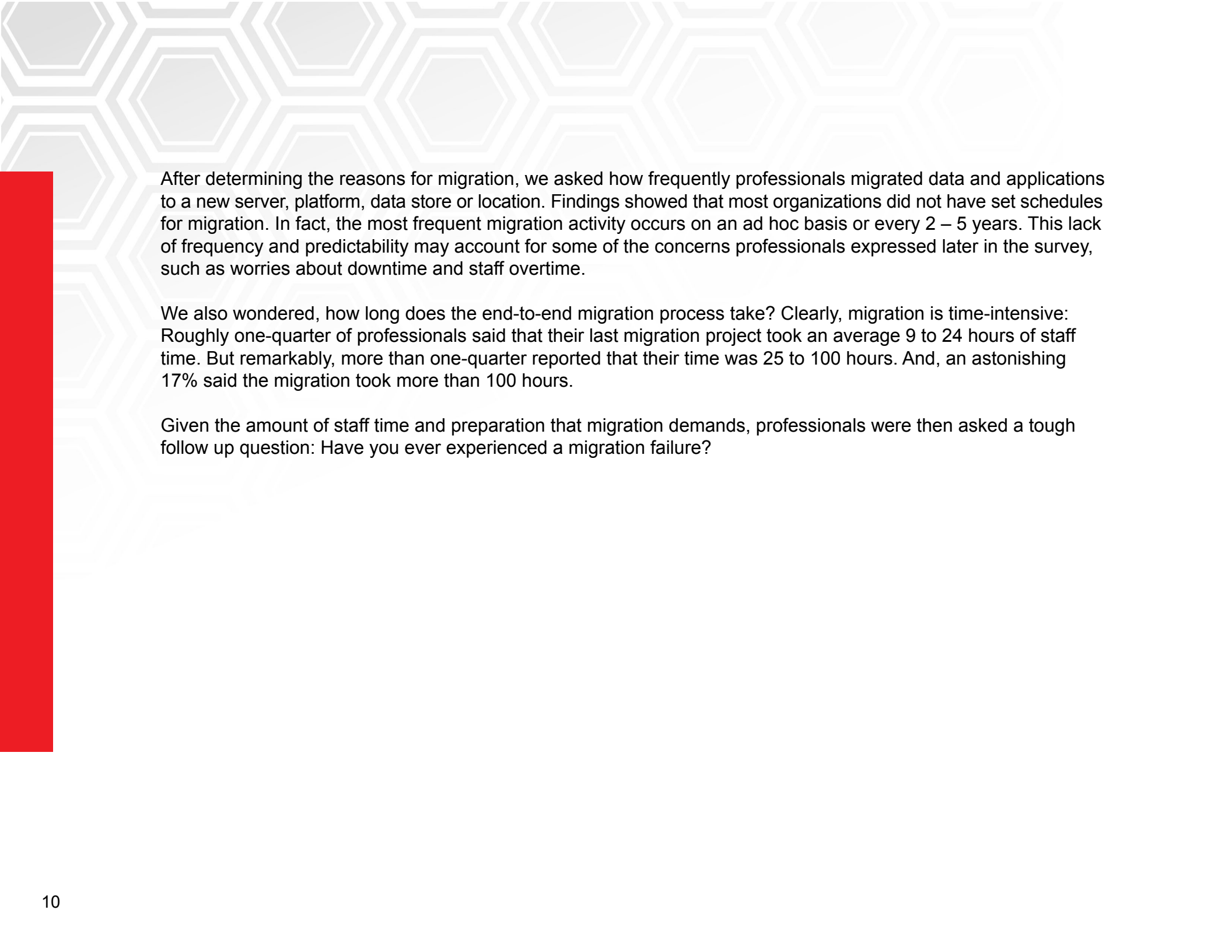
Yet, migration can be a high wire act for IT professionals, as they juggle the risks of system downtime and potential data loss. In the 2016 State of Resilience, we asked questions about company practices, system downtime, and the challenges faced during migration. Nearly 1,000 professionals responded, providing a picture of migration worldwide and for specific geographical regions.

Top Three Drivers for Migration

To begin our survey, we wanted to identify a baseline: Company goals for migration. The top three drivers of migration were the requirement to replace unsupported or outdated server hardware (60%), followed by the need to improve performance (48%) and upgrade storage hardware (46%).

What were the objectives for your organization's last migration?
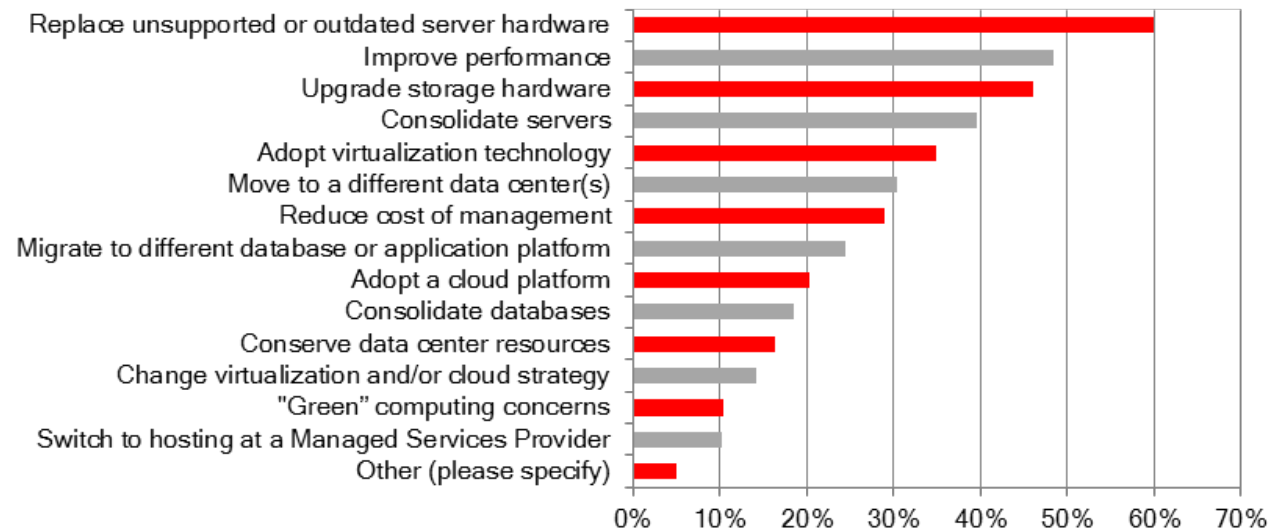
After determining the reasons for migration, we asked how frequently professionals migrated data and applications to a new server, platform, data store or location. Findings showed that most organizations did not have set schedules for migration. In fact, the most frequent migration activity occurs on an ad hoc basis or every 2 – 5 years. This lack of frequency and predictability may account for some of the concerns professionals expressed later in the survey, such as worries about downtime and staff overtime.

We also wondered, how long does the end-to-end migration process take? Clearly, migration is time-intensive: Roughly one-quarter of professionals said that their last migration project took an average 9 to 24 hours of staff time. But remarkably, more than one-quarter reported that their time was 25 to 100 hours. And, an astonishing 17% said the migration took more than 100 hours.

Given the amount of staff time and preparation that migration demands, professionals were then asked a tough follow up question: Have you ever experienced a migration failure?

Migration Failures and Causes: Inability to Restart Applications, Lack of Testing are Culprits

Survey results showed that the failure rate of migration projects is fairly high. In 2015, almost half of IT professionals in the global survey (44%) had experienced a migration failure. An additional year-over-year analysis showed that companies are experiencing more migration failures, an increase from 36% to 44% between 2014 and 2015.

But failure rates alone don't provide a complete picture of the issues surrounding migration. Taking our investigation a step further, we asked about the causes of failed migrations. The two top causes were:

- The inability to start applications on the new server in the required timeframe (55%)
- The lack of testing resulted in late discovery of issues (38%)

Results suggest that these problems could be rooted in methodology or process. Planning for migration is essential: Migration shouldn't be a "ready, fire, aim" effort. Poor preparation and the lack of early testing can result in IT headaches and cost overruns. One final note: Between 2014 and 2015, the primary reasons for migration failure have remained the same, indicating that companies have not addressed these crucial issues.

Migration Failure: 2014 vs. 2015

Legend: ■ 2015 ■ 2014
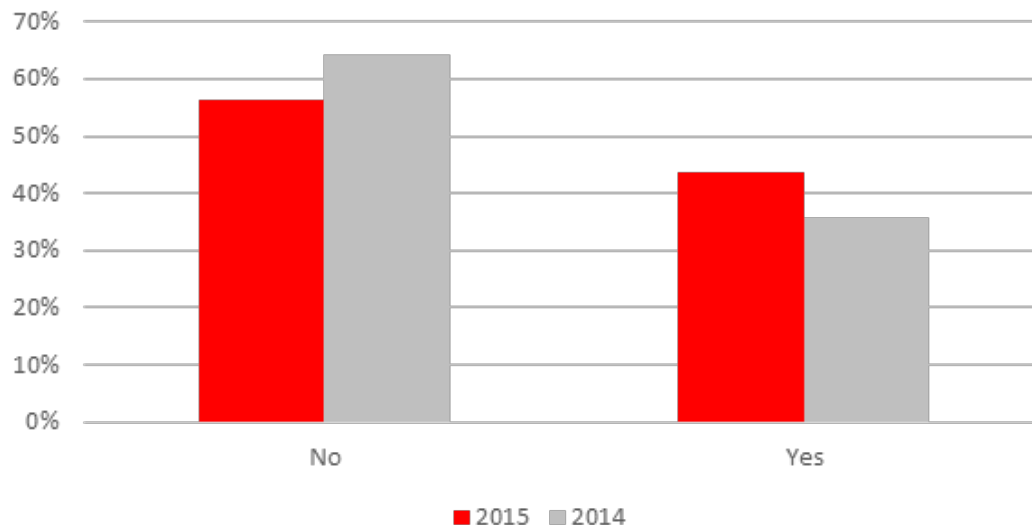
Global Insights

When migrations fail, **Latin American** professionals are much more likely to complete the migration and incur greater than expected downtime (58%) than respondents in **North America** (42%) or in **Europe/Middle East/Africa** (38%).

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Migration Challenges:
Downtime, Overtime in the Spotlight

When we analyzed the challenges that organizations encountered during their last migration, we found that the most formidable ones were system downtime (43%) and staff working overtime during the weekend (40%), shown in the graph.

These findings were substantiated by other data from the survey: Worldwide, most professionals prefer to migrate either after business hours on weekdays (56%) or on weekends (70%), suggesting that they lack confidence that the process will go smoothly during business hours (may differ from peak use).

Considering the last time your organization performed a migration, what were some of the challenges the organization experienced?
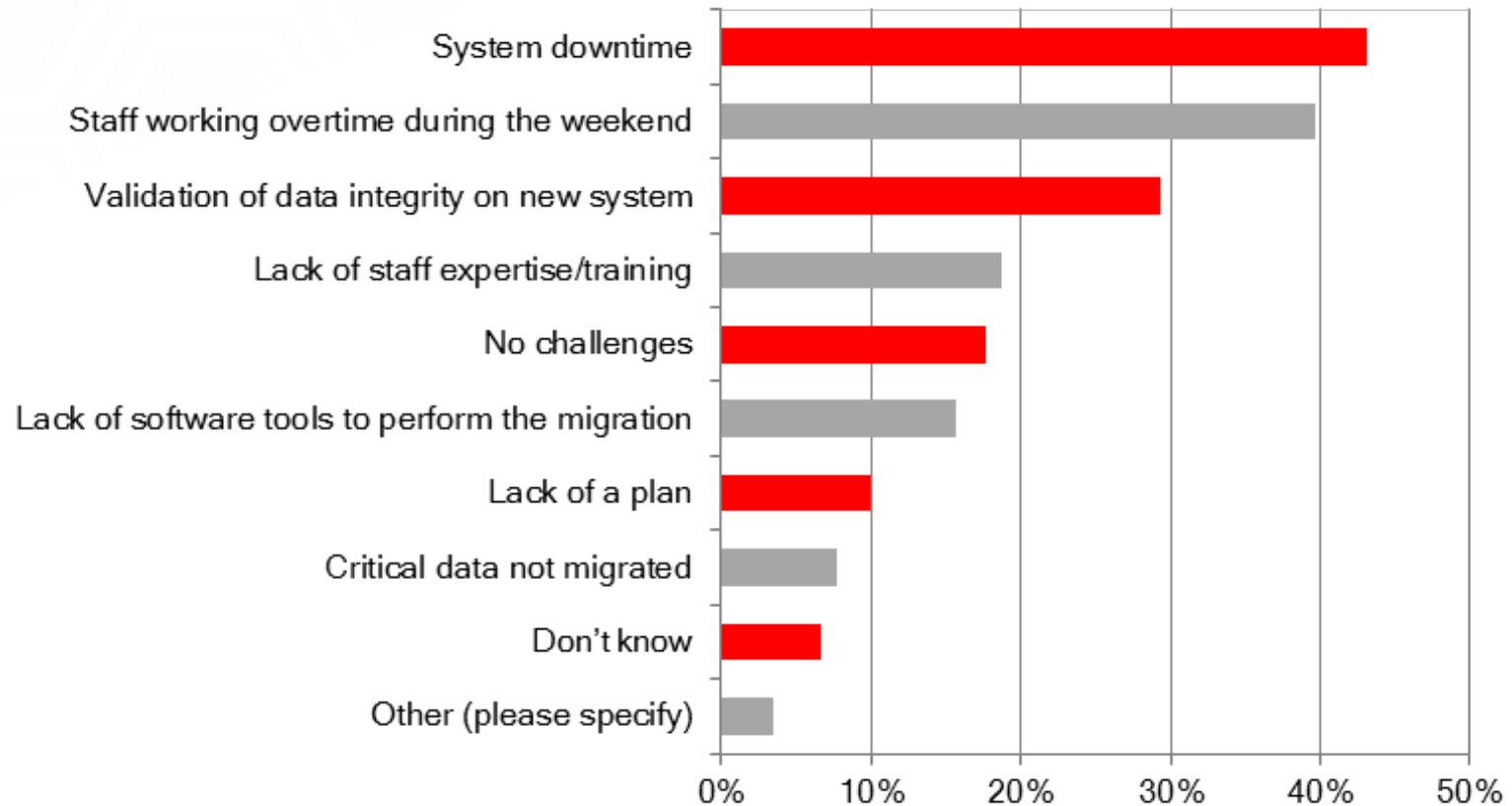
System Downtime during Migration by Region

Globally, almost one-third of respondents (32%) experienced downtime of six hours or more during migration.

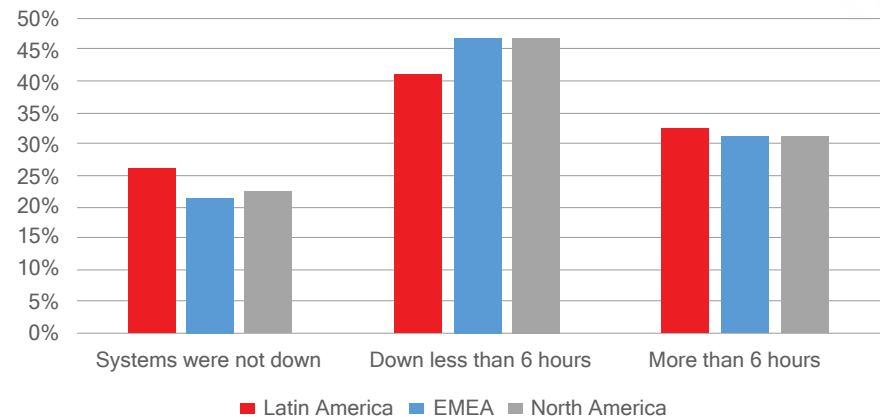However, regional analysis of the data presents a slightly different picture, as shown in the graph:

- Latin American professionals were more likely to report no downtime during migration (26%) compared to those in North American and Europe/Middle East/Africa (each at approximately 22%).
- North American respondents and those in Europe/Middle East/Africa were more likely to report downtime less than six hours (47%) than those in Latin America (42%).
- For the highest category of downtime, there were no material differences in responses: About one-third of IT professionals in each region experienced downtime of six hours or more.

Here's the takeaway: Regardless of region, businesses depend on reliable access to data. A few minutes of migration downtime might not present a problem for a mom-and-pop shop, which could fall back on paper for transaction records. But six hours or more of downtime for any business, particularly financial services or e-commerce operations, can spell disaster. The challenge of downtime, as discussed previously, is the major reason why most IT professionals choose to migrate outside of regular business hours or on weekends—and not during high system activity.

Fast Fact

Who Handles the Task of Migration?
Globally, nearly half of respondents (49%) report that they use a combination of consultants and internal staff for migrations. Another 42% use internal staff exclusively. IT professionals cited the use of staff working overtime during the weekend as one of their biggest challenges.

Migration Downtime by Region

Bar chart showing Migration Downtime by Region with categories "Systems were not down", "Down less than 6 hours", "More than 6 hours" for Latin America, EMEA, and North America.

# The Cost of Downtime: A Universal Problem for Businesses

A remarkable seventy percent of professionals worldwide had not calculated the average estimated hourly cost of migration downtime, including costs of lost productivity, direct revenue loss, damage to reputation, and overtime expenses. Yet, a closer look at the data by region showed that Latin American professionals were ahead of the pack in analyzing downtime costs: 35% of Latin Americans had analyzed costs, versus North Americans and those in Europe/Middle East/Africa (at about 28% each.)

Without a doubt, downtime occurring during a migration can be expensive. But our additional analysis revealed that among companies that calculated the cost, downtime was generally more expensive for North American professionals than for those in Latin America or in Europe/Middle East/Africa (as illustrated in the graph below).

Have you ever completed an analysis of the cost of downtime?

30%

70%

Yes
No
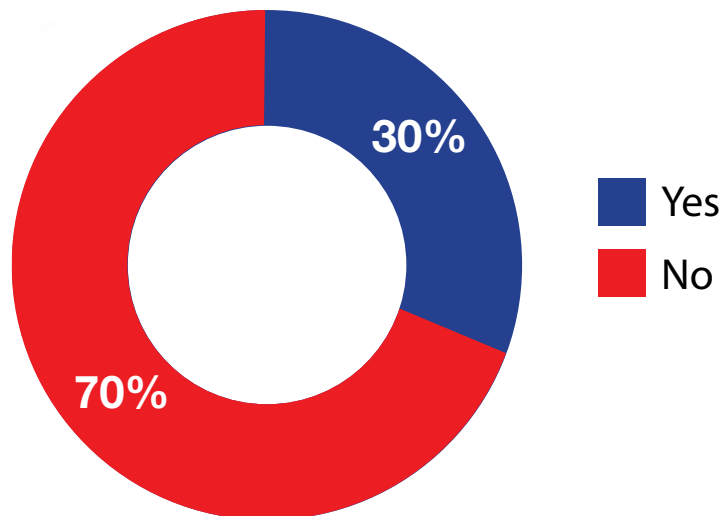
Calculated Cost of Downtime

40%

28%   28%   35%

30%

20%

10%

0%

North American   EMEA   Latin America
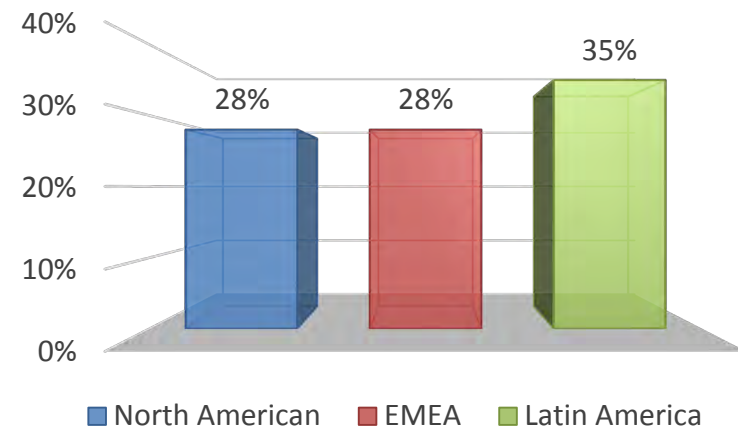
Delayed Migrations: A Deeper Dive by Region

Delayed migrations certainly jeopardize business effectiveness. As discussed previously, replacing outdated or unsupported server hardware were the professionals chief objectives for migration, therefore, there are risks in delaying the process. When hardware or software become outdated, delaying migration can result in a higher total cost of ownership, degradation of system performance, and decreased operational efficiencies.

As illustrated in the following graph, across the three regions that we studied, 66% of the respondents had delayed migrations. But further analysis by region showed that Latin Americans (56%) were less likely to have delayed migrations compared to North Americans (65%) and Europe/Middle East/African professionals (64%).

Have You Ever Delayed a Migration?

No
34%

Yes
66%

Then we wondered, why had IT organizations delayed migrations? When we examined the causes of migration delays by region, a slightly different picture emerged, shown in the graph here. North Americans delayed migrations because of more concerns about downtime than professionals in Europe/Middle East/Africa and Latin America. This was no surprise: As shown previously, our analysis revealed that downtime was more expensive for North Americans. We also found that respondents in Europe/Middle East/Africa more often delayed migrations due to concerns about lack of resources to support the process.

Reasons for Migration Delay by Region

Legend: ■ EMEA ■ Latin America ■ North America
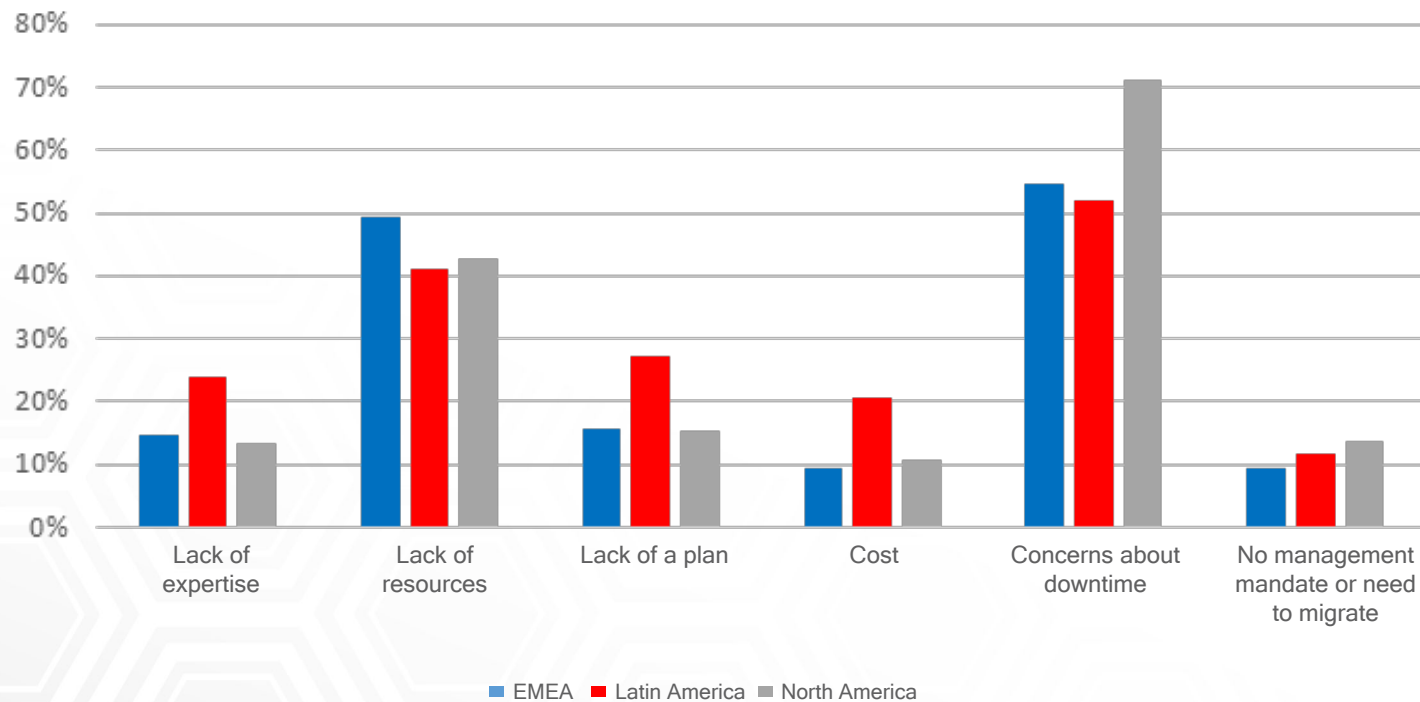
Key Takeaway: Migrations

Migrations are complex and error-prone operations for many organizations. Few organizations achieved zero-downtime migrations. Most had delayed migrations and did not estimate the business cost of downtime. Moreover, the rate of failed migrations was relatively high. Worldwide, the majority of respondents delayed migrations out of concern about downtime, posing a threat to business effectiveness. When it comes to migration, experience counts: IT resilience calls for better processes, practices, and tools, such as planning, testing early in the process, and training for staff.

The State of High Availability and Disaster Recovery

Part of the 2016 State of Resilience Report

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The State of High Availability and Disaster Recovery

For IT professionals, high availability and disaster recovery are really two aspects of a single data protection strategy: In addition to providing users with 24/7 access to critical information, professionals are charged with managing risk and averting disaster in the face of a wide variety of potential system catastrophes. Maintaining continuous uptime is essential for business continuity efforts, preservation of reputation, and revenue generation.[2]

For the sixth year, Vision Solutions has fielded a survey to learn more about the state of company data protection technologies, their practices, and their recovery plans. In 2015, more than 600 IT professionals around the world participated, providing the insightful responses and regional analyses presented here.

Data Protection Technologies in Use

In the past few years, the industry has witnessed significant developments in flexible and cost-effective technologies for high availability and disaster recovery, including software replication, clustering, and more. Given these new developments, we wondered exactly what IT professionals were using to protect company-wide vital systems, applications, and data.

Although 2015 research shows that tape remains the predominant protection technology, a comparison of six years of State of Resilience findings tells a different story. The use of tape remained fairly steady between 2010 and 2013. Then the graph shows a substantial drop in 2014, when tape fell to 70%, and a downward shift again in 2015 to 68%. From the beginning of the six year period in 2010, the use of tape has dropped 12%.[3]

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[2] In our survey, high availability is defined as a solution that ensures a computer system will be continuously operational for a long period of time without experiencing downtime, and in which it can quickly recover from failure.

[3] It's a reality that even gigantic corporations don't store exabytes of data in online data warehouses. High volume businesses like retail, for example, typically store a couple of quarters for trend analysis, then offload the history onto offsite tape.

While tape is still perceived as "old faithful" in the data center, findings indicate that companies might be making a slight shift to newer, more nimble technologies for protection. Certainly, storage-based replication showed a steady increase over a six year period (38% in 2010 and 43% in 2015). Software-based/logical replication showed an uneven pattern of growth, with most occurring between 2012 and 2013: Yet, in 2010 only 39% of companies used this method while in 2015, 45% had adopted it.

Data Protection Technologies: 2010 to 2015

Legend: 2010, 2011, 2012, 2013, 2014, 2015
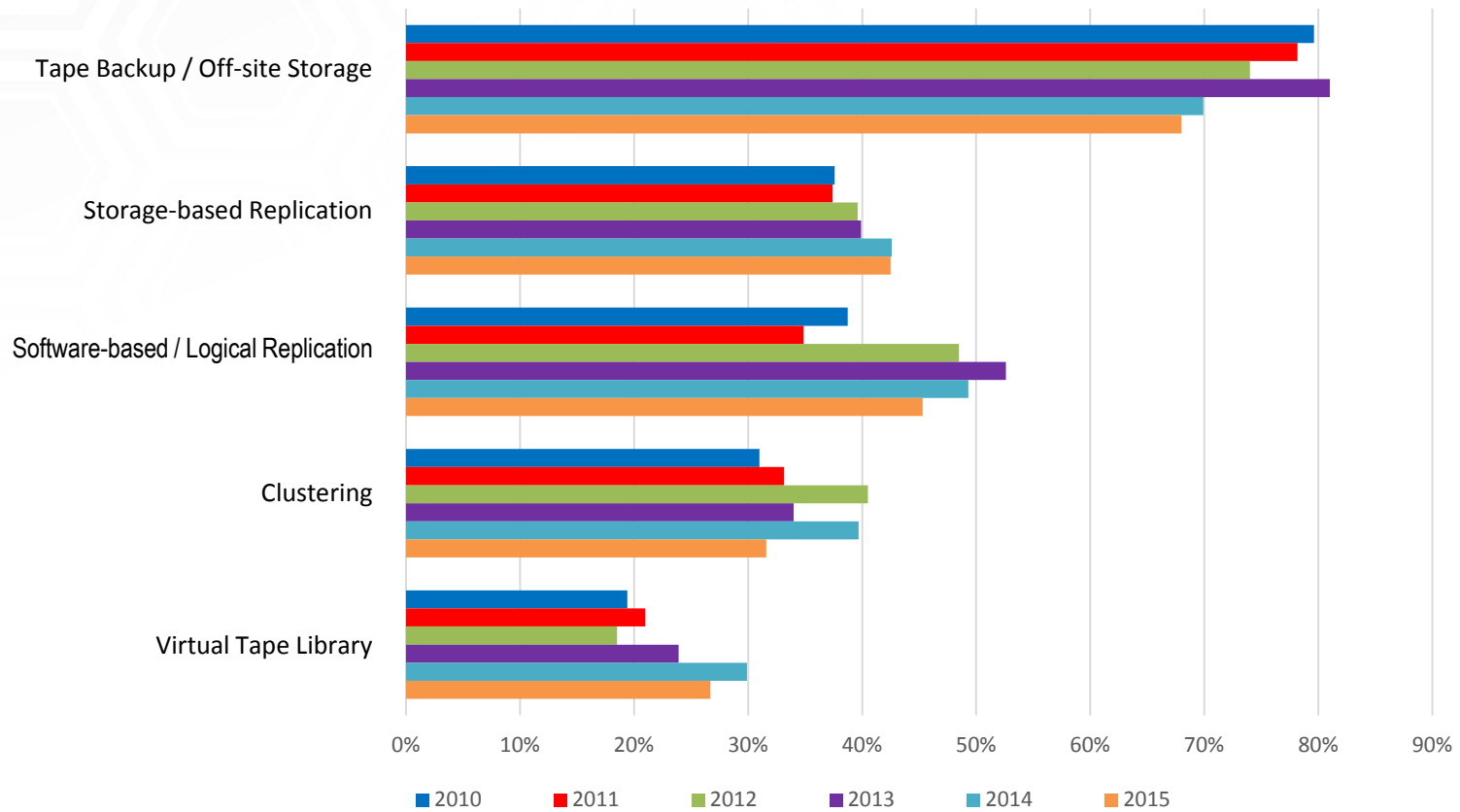
Crunching the numbers, we discovered that the majority of companies worldwide use one to three data protection technologies—but some use four or more. Yet, findings also showed that companies are consolidating protection schemes: The average number of data protection technologies used was 2.9 in 2014 vs. 2.6 in 2015. Our regional analysis showed that in 2015, Latin Americans used an average of fewer data protection schemes (2.4) compared with North Americans (2.9), and European/Middle Eastern/African professionals, used the most (3.0).

Still, the overarching question remains: Is a mixed data protection environment the mark of a resilient organization? The answer isn't completely straightforward: Different business models require different types of data protection scenarios and technologies. Still, IT professionals who manage multiple schemes should question the cost and effort involved. And, they should determine whether it makes sense to reduce complexity and integrate protection schemes for greater ease of use.

Global Insights

Skyrocketing Storage
53% of IT professionals worldwide said that their storage is growing more than 20% per year. No doubt, this escalating demand for storage puts stress on company data protection methods. Storage growth was particularly greater in **Latin America** where 65% of respondents indicated growth of more than 20%, and lower in **EMEA** where the comparable figure was 43%.

Note: Data was not collected for built-in hypervisor replication or built-in application replication prior to 2013. As such, those technologies are not shown on the graph which depicts comparisons across six years of data.

Future Plans for Data Protection Technologies

Hybrid data protection technologies are planned for the future. Plans for protection technologies were relatively evenly split between hardware-based storage solutions and more software-based solutions (35% each). The third most popular choice was to use third party services, such as managed services, cloud, and disaster recovery as a service (26%).

Notably, in year-over-year findings, we saw a decrease in company plans to use replication capabilities for data protection built into hypervisors—from 31% in 2014 to 21% in 2015. This finding suggests that hypervisor capabilities for data protection might not be meeting the needs of IT professionals—or that perhaps adoption of this method has leveled off.

Which of the following describes your organization's future plans for the use of data protection technologies?
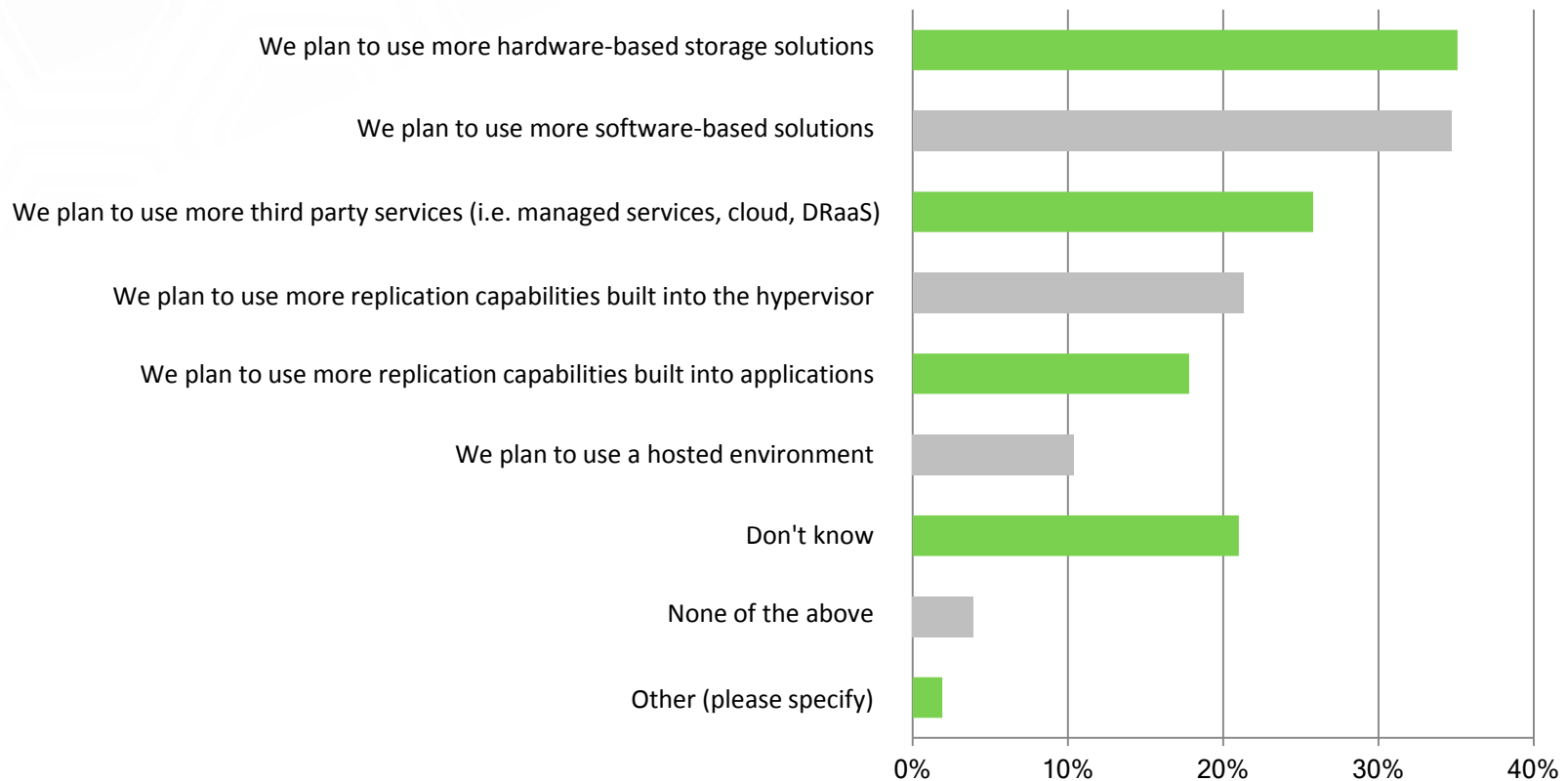
Vulnerabilities: RTO, RPO, and Data Loss after a Failure

Naturally, our findings about company data protection plans led us to examine recovery time objectives for mission-critical systems and data. We saw that almost half of respondents (47%) had a recovery time objective (RTO) of less than one hour after a server disaster or a complete server or application failure. Roughly one quarter (24%) had recovery times less than 30 minutes.

What is your company's recovery time objective (RTO) for your Tier 1 (mission-critical) systems and data after a disaster or a complete server or application failure?
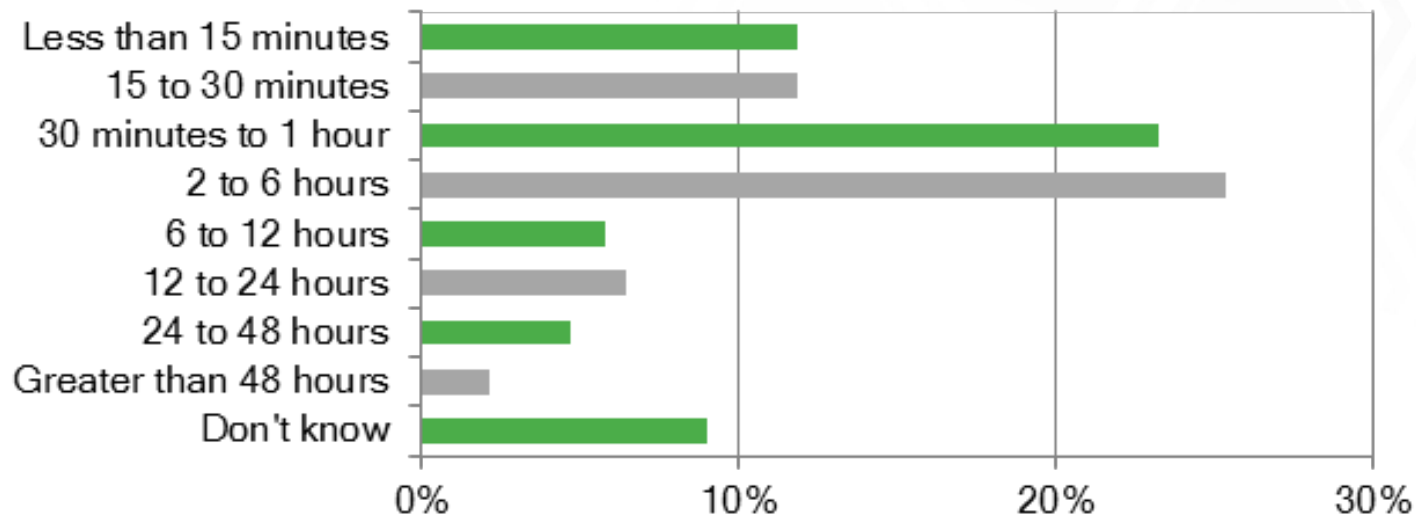

Another picture emerged when we examined company recovery point objectives (RPOs) for mission-critical systems and data (shown in the graph below). Companies do set stringent RPOs: More than one quarter of respondents reported an RPO of no data loss; about a third had an RPO of a few seconds or less; and half the respondents had an RPO of a few minutes or less. However, when we took our investigation a step further and cross-tabulated the findings about RPOs with the question about actual data loss, we uncovered a disturbing fact: Among companies that had an RPO of no data loss and experienced a failure, 53% actually lost between a few hours and more than a day of data.

What do these findings tell us about resilience and data protection? Results seem to confirm that companies are not meeting their recovery point objectives for mission-critical systems—suggesting that their benchmarks are not realistic. Perhaps some businesses are comfortable losing between a few minutes and a few hours of data, even mission critical information. However, businesses such as financial services institutions and e-commerce operations that require continuous uptime will find this level of data loss unacceptable.

What is your company's recovery point objective (RPO) for mission-critical information, expressed in time?
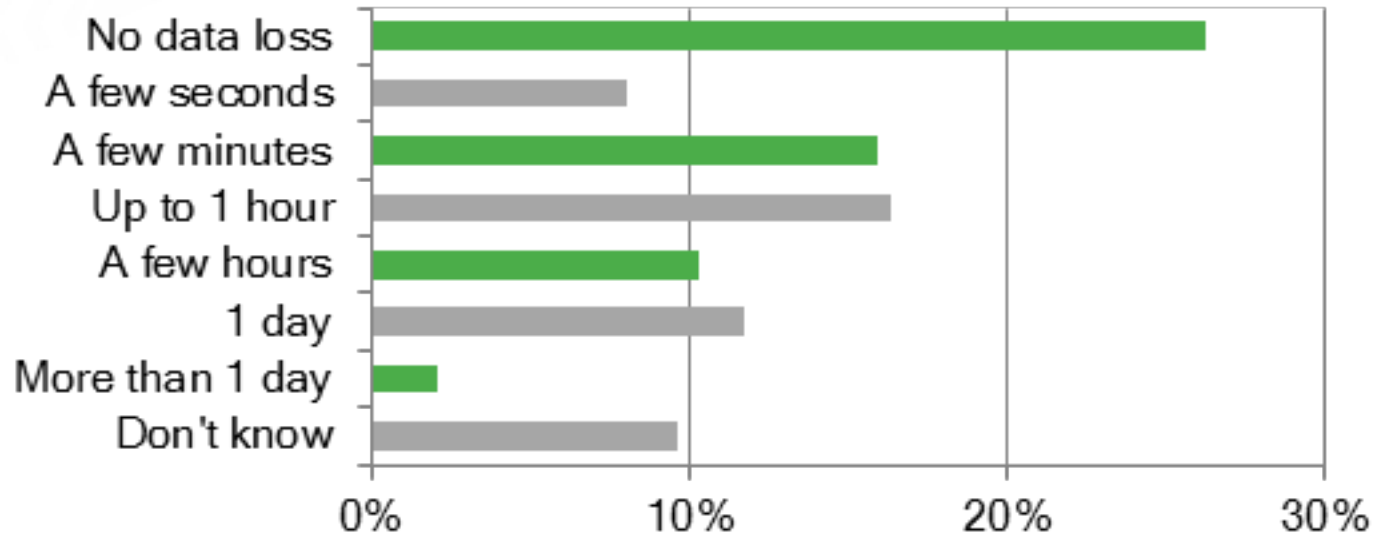
Low Confidence in Recovery Plans, Some without Plans

Survey findings revealed that most IT professionals are not confident that their recovery plans are bulletproof. Globally, 85% of professionals either had no recovery plan or were less than 100% confident that their recovery plan was complete, tested, and ready to meet their recovery time and recovery point objectives. Only 15% worldwide were completely confident.

This year we wanted to dig deeper into the subject, so we analyzed IT confidence in recovery plans by geography. As shown in the graph, professionals in North America had the highest levels of confidence in their plans; those in Europe/Middle East/Africa were second, followed by those in Latin America. Remarkably, 31% of Latin American IT professionals reported that their companies had NO disaster recovery plans in place, as compared to 16% of professionals in Europe/Middle East/Africa and 6% in North America.

Recovery Plan Confidence by Region
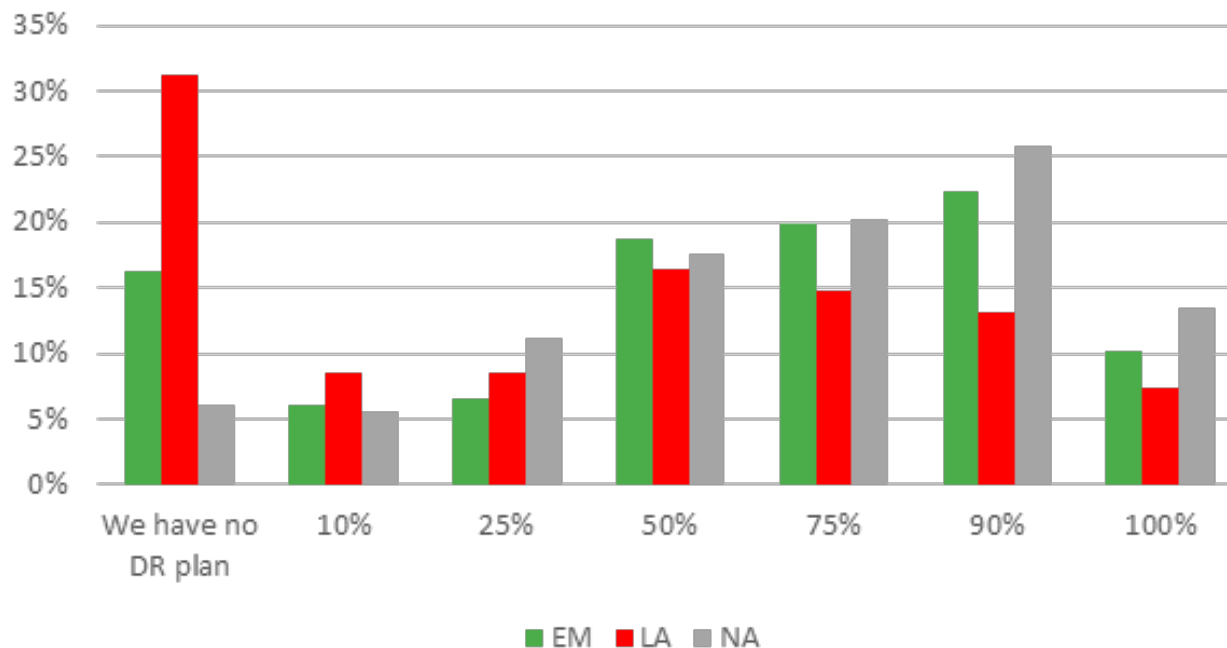
Global Insights

An astonishing 31% of **Latin American** IT professionals reported that their company had NO disaster recovery plans in place, as compared to 16% of professionals in **Europe/Middle East/Africa** and 6% in **North America**.

Spotlight on High Availability

Survey results provided a snapshot of several corporate practices and policies regarding High Availability (HA) solutions:

13%

13% of companies do not have an HA solution

28%

28% say that they audit their HA solution once a year (the most frequent schedule). 20% audit quarterly, and 20% monthly

33%

33% of IT professionals monitor their HA solution less than 15 minutes a day (the most common amount of time spent)

30%

30% perform role swap tests once a year (the most common schedule). 18% never perform the tests

44%

44% say they don't know or are not completely current regarding upgrades, audits and role swap tests with their HA solutions

Key Takeaway: HA/DR

The survey highlights company gaps and vulnerabilities regarding data protection, business continuity, and disaster recovery. Data loss is truly a soft spot for businesses worldwide. Many companies are not meeting their RPOs for mission-critical information, suggesting that their benchmarks might not be achievable. Storage failures and lack of backup copies are the primary reasons for data loss, indicating that companies are not leveraging the full benefit of high availability solutions.

Survey findings indicate that IT organizations should step up efforts to:

- Assess workflow processes and practices, particularly backup methods

- Train staff for HA/DR management

- Adopt state-of-the-art tools and technologies that ensure near-zero downtime

- More frequently test recovery plans for vulnerabilities

- Calculate the real cost of downtime to the organization, and use this as a metric justify the acquisition of advanced data protection tools

The State of Cloud Computing

Part of the 2016 State of Resilience Report

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The State of Cloud Computing

Cloud is perceived as a game changer by small and large businesses alike, as they seek to leverage its potential for enhanced performance, provisioning, cost savings, and flexibility. Clearly, it's maturing as a technology, to the extent that companies worldwide are spending billions of dollars on cloud infrastructure.

Yet despite its evident benefits, cloud technology has recently been the focus of several thorny issues: IT professionals and executive teams are asking provocative questions such as, "Will our service level agreements with a cloud supplier adequately protect our organization?" or "Who's responsible for data breaches in the cloud—our provider or our company?" or "What type of cloud will scale to fit our business model?"

In this year's State of Resilience, we wanted to learn more about the types of clouds and services in use, protection schemes in the cloud, and the hurdles the technology might present, along with other tough issues confronting IT professionals.

Industry Insight

The Skyrocketing Business Investment in Cloud

Globally, private cloud IT infrastructure spending will grow by 16.8% year over year to $11.7 billion, while public cloud IT infrastructure spending will grow by 32.2% in 2015 to $21.7 billion.

In most regions, growth in public cloud IT infrastructure spending will exceed growth in spending on private cloud IT infrastructure as public cloud service providers will continue to invest in expansion of their datacenters and service offerings.

**International Data Corporation, Cloud Spending Forecast, July 2015**

The Baseline: Majority Use the Cloud

The use of cloud computing has grown rapidly and is no longer perceived in the IT industry as an emergent technology.

Over six years of surveys, we saw cloud follow the classic pattern of the technology adoption lifecycle—from innovators and early adopters in 2010 (22% actively using cloud), accelerating to include the late majority of businesses (67%) in 2015.

Still, findings regarding cloud adoption don't tell the entire story: Even though cloud is a pervasive, vital component in today's computing environment, standards for service agreements, security, and privacy in the cloud are still evolving. Further questions in our cloud survey uncovered the uncertainties and issues that confront IT professionals, discussed in the following pages.

Have You Ever Delayed a Migration?
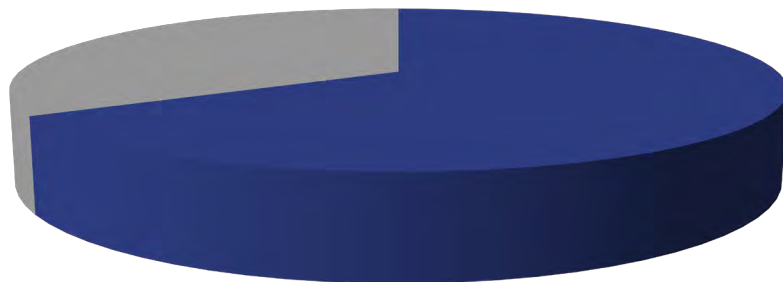
No
34%

Yes
67%

Types of Clouds: Public Clouds Predominate

IT professionals face myriad choices when choosing the right type of cloud for the needs of a business. Performance, cost, personnel expertise, and current infrastructure investment are all factors to be considered. So, we wondered what kinds of cloud delivery models companies were using. As shown in the graph, the majority of companies use public clouds (57%), followed by hosted private (50%), and hybrid (40%).

However, could company size be related to the type of cloud? When we cross-tabulated the data, we found that predictably, the smallest companies—those with between 1 and 10 employees—were most likely to use public clouds (73%), as opposed to the largest companies—those over 1,000 employees (52%). Public clouds are a natural fit for smaller companies, enabling them to make a lower initial investment in technology, which can be expanded as the organization grows.

More importantly though, our year-over-year analysis revealed an overall shift in the types of clouds companies used: Between 2014 and 2015, the use of public clouds increased by 11%. In the same time period, the use of hosted private clouds and on-premises private clouds each decreased by approximately 7%, shown in the graph.

Perhaps this evident shift to public clouds is causing some of the discomfort IT professionals expressed later in our survey—namely concerns about internal infrastructure control and data privacy examined later in this report.

Cloud Types 2014 vs 2015
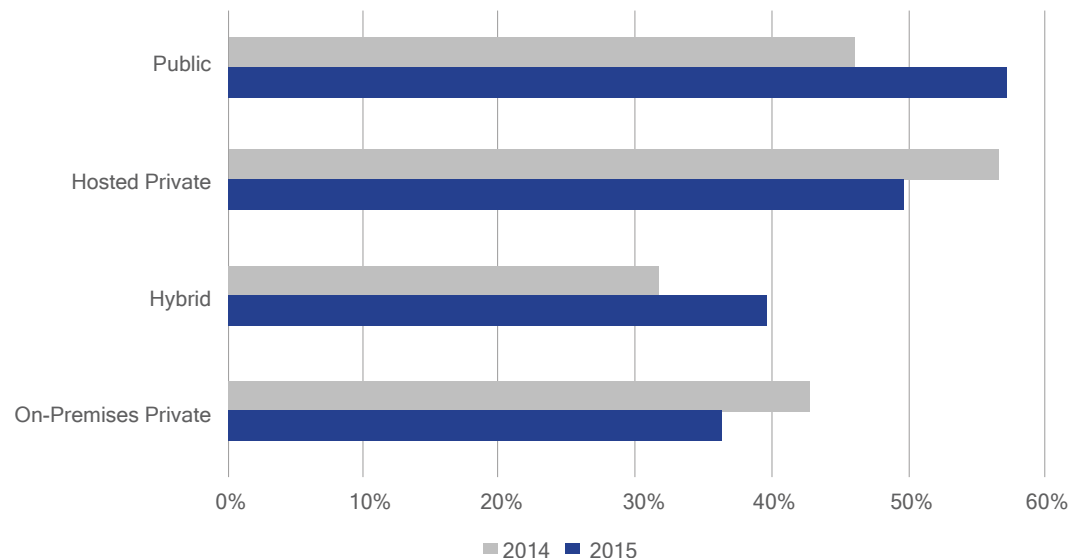
Note: This was a select all that apply question so answers will not total to 100%.

■ 2014 ■ 2015

Most Popular: Software as a Service, Infrastructure as a Service

Overwhelmingly, Software as a Service (SaaS) is used by the greatest number of respondents who use cloud (72%), followed by Infrastructure as a Service IaaS (59%), illustrated in the graph. We also found that SaaS and IaaS will continue to dominate business plans for future use of services, at 35% and 28% respectively.

These findings dovetail with other results showing a decline in the on-premises private and hosted private delivery models. SaaS is a major change from the on-premises delivery model: Typically a cloud provider delivers SaaS applications for end users in a one-to-many model. Customer relationship management, collaboration software, and office productivity tools are just a few of the applications survey respondents are running in the cloud.

Also, a majority of professionals report using IaaS, the model in which hardware, servers, network, and operating systems or storage are delivered by a cloud provider. IaaS enables companies with fast growth or unpredictable spikes in usage to pay as needed—in a flexible, expandable scheme. IaaS can reduce the need for companies to purchase additional hardware, add data center power or grow floor space. In fact, additional research has shown IaaS to be a hot, fast-growing cloud service type: Gartner Inc. contends that global IaaS spending will grow 32.8% in 2015, putting it at $16.5 billion by the end of the year.[5]

Does your company currently use any of the following cloud services?
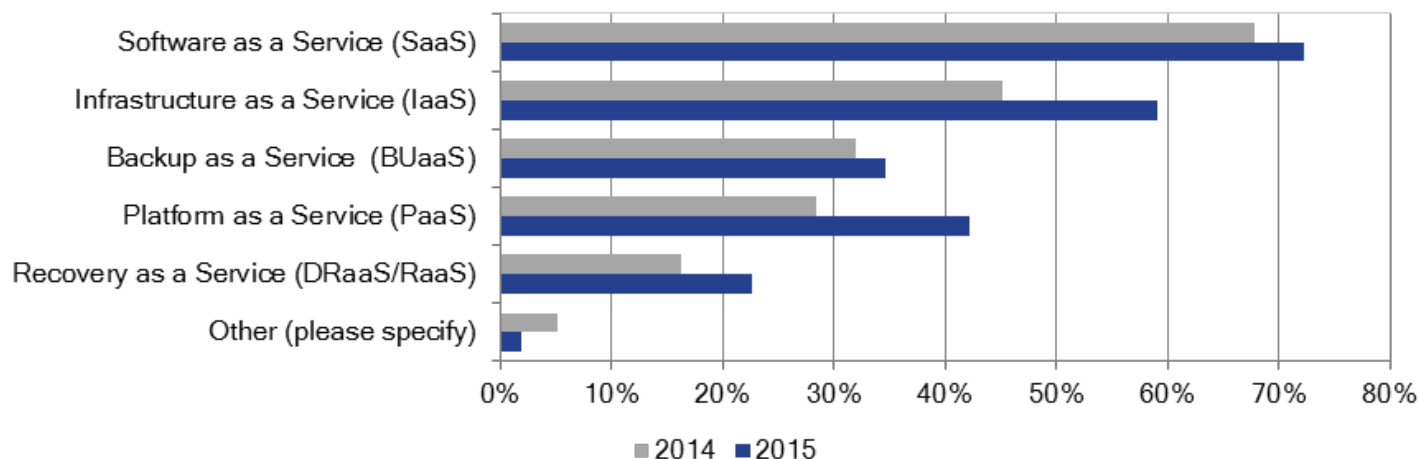
Industry Insight

Business Risk: Departments Buying Services Outside of IT

"Forty percent of IT spending is occurring outside the IT department. Cloud IaaS as a service is increasingly enabling IT buying decisions to be made beyond the control of the IT department, bringing new business risk. This is because different lines of business consider their own isolated application requirements rather than the underlying security and compliance issues."

Three Steps to Establishing an Enterprisewide, Cloud IaaS Strategy,
Tim Haynes, Gartner, Inc. April 2015

High Availability and Disaster Recovery (HA/DR) in the Cloud

This year's survey revealed that the majority of companies with a cloud platform use HA/DR in the cloud. Ground to cloud had the highest incidence of current use (27%), followed by intra-cloud at 25%, as shown in the graph here. These were also the two configurations most likely to be used in the future.

Digging deeper into the data, we found that companies are using a variety of cloud software platforms, from Microsoft, VMware, and Amazon, to OpenStack and IBM. It's probable that organizations are now using HA/DR built into their clouds by some of these vendors.

In sum, HA/DR in the cloud is now a widespread protection scheme. As we predicted in last year's report, we expect this trend to continue: The use of HA/DR in the cloud will advance with the adoption of cloud computing overall. No doubt, organizations are striving to ensure availability and protect their vital assets in the cloud.

Does your company currently use any of the following HA/DR configurations with your cloud platform(s)?


35
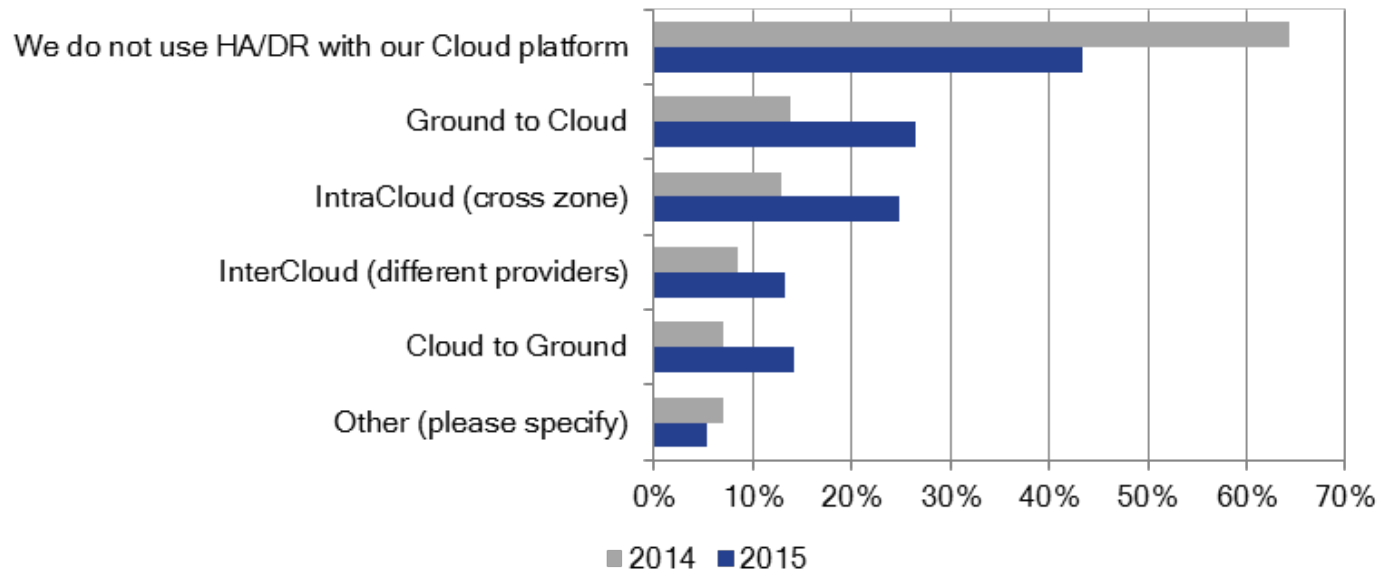
Running Mission-Critical Applications in the Cloud

IT professionals note that their companies are using or protecting their most vital assets in the cloud. Of companies that use cloud, 41% are entrusting their mission-critical (Tier 1) applications to it. Another 44% are using or protecting Tier 2 applications in the cloud. In total, 85% of companies are running or protecting Tier 1 or Tier 2 applications to the cloud.

Although professionals evidently place high trust in cloud platforms, infrastructure control and data security remain their ever-present concerns, as we'll see in subsequent discussions. Against this backdrop, IT professionals must be vigilant to ensure best practices and procedures—executing sound service agreements for protection and adhering to compliance regulations for data storage and transfers.

What application tiers does your company currently use in, or protect to, the cloud?

Legend: 2014, 2015
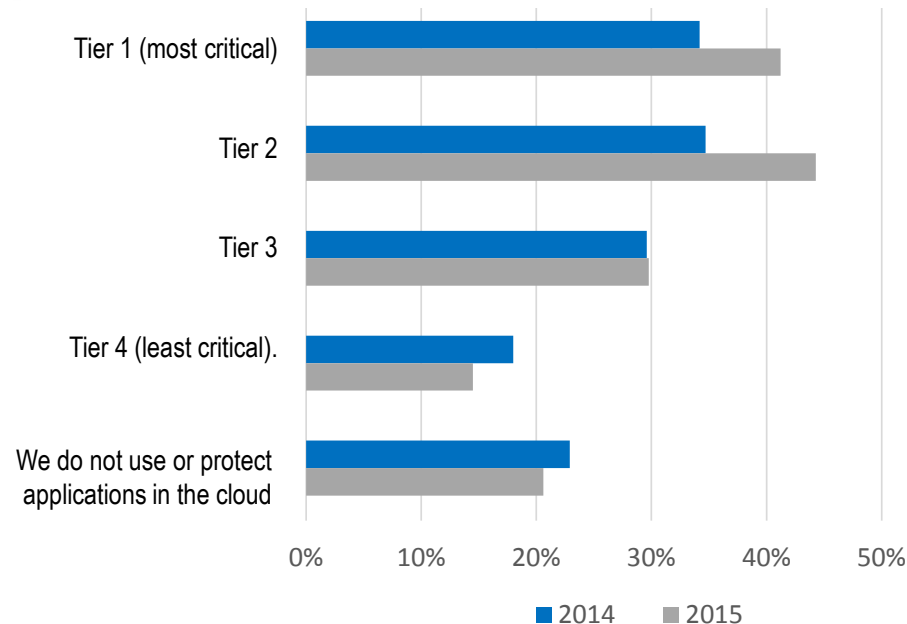
Industry Insight

Who's Responsible for Data Breaches in the Cloud?

Most data owners assume that the cloud provider is responsible for security and is accountable in case of a breach. That may or not be the case, depending upon the way your service contract is written. In sum, the customer should vet the cloud provider for adherence to standards.
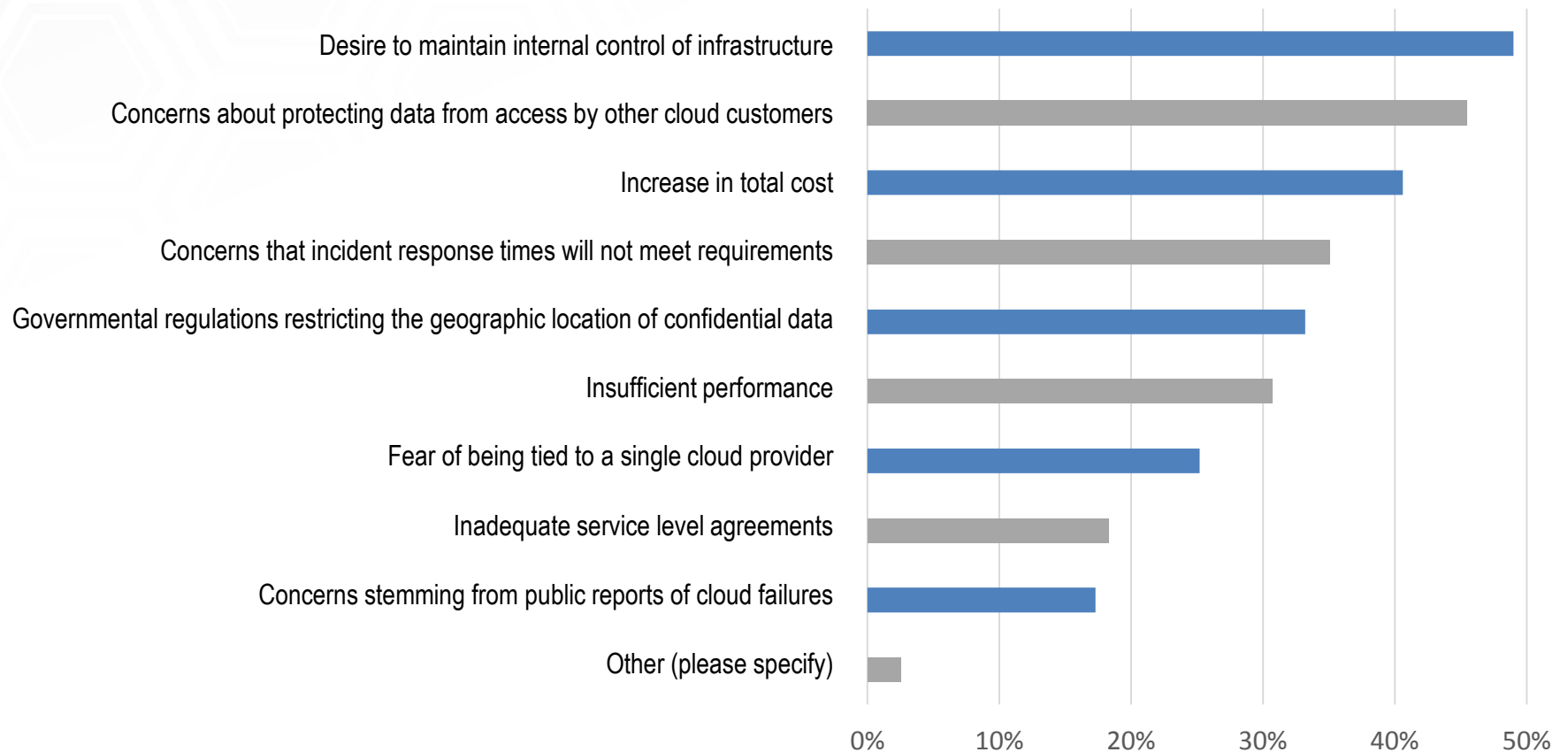
"A key point to note about data compliance: At the end of the day, the data owner is ultimately responsible for protecting it. This is not only true for the cloud in which you reside, but also the systems and applications you maintain within the cloud."

Information Week, The 7 Worst Cloud Compliance Nightmares, August 12, 2015 Andrew Froelich

Biggest Cloud Challenges for IT: Infrastructure Control, Data Protection

Globally, nearly half (49%) of professionals report that maintaining control of their infrastructure is a challenge with cloud, and 46% express misgivings about protecting data access from other cloud customers. As discussed previously, some cloud spending decisions are being made outside the reach of the IT organization---and professionals are losing control. What's more, new global legislation and compliance rules about data sharing beyond country borders could indeed give IT leaders a headache.

What are the challenges you see in using or planning to increase your organization's use of cloud computing?

Challenge	Percentage
Desire to maintain internal control of infrastructure	~49%
Concerns about protecting data from access by other cloud customers	~46%
Increase in total cost	~41%
Concerns that incident response times will not meet requirements	~35%
Governmental regulations restricting the geographic location of confidential data	~33%
Insufficient performance	~31%
Fear of being tied to a single cloud provider	~25%
Inadequate service level agreements	~18%
Concerns stemming from public reports of cloud failures	~17%
Other (please specify)	~3%

Cloud Challenges: A Regional Perspective

Latin American professionals were:

45% More concerned than global survey respondents that incident response times in the cloud would not meet their requirements (45% Latin Americans vs. 35% of non-Latin Americans)

31% More concerned that their service level agreements would not be adequate (Latin Americans 31% vs. 18% of non-Latin Americans)

33% Less likely to use or protect applications in the cloud (33% of Latin Americans did not protect applications in the cloud vs. 18% of non-Latin Americans)

Industry Insight

IT Headache for Global Companies: Compliance with Regulations, Privacy of Data in the Cloud

The issues surrounding data privacy and compliance regarding data sharing and storage in the cloud are complex. Here's a timely example: Europe's highest court recently struck down a pact that allowed companies to transfer digital information between Europe and the U.S. This ruling could have an immediate impact on companies that rely on the flow of data from social media sites for advertising purposes, as well as other multinational businesses.

"The data-transfer ruling does not apply solely to tech companies. It also affects any organization with international operations, such as when a company has employees in more than one region and needs to transfer payroll information or allow workers to manage their employee benefits online."

New York Times, "Data Transfer Pact between U.S. and Europe Is Ruled Invalid," Matt Scott, October 6, 2015

Key Takeaway: Cloud

Cloud computing has nearly become a standard, with the majority of the companies using it in some form—and more planning to use it in the future. This year's data shows that public clouds were the top choice for the majority of businesses in the study. In general, companies appear to find the most value by using software as a service in the cloud or renting the cloud infrastructure—such as storage, network, servers, or operating systems—in an on-demand model. HA/DR protection schemes in the cloud have gained momentum this year.

Still, IT professionals continue to express concerns about data protection and privacy in the cloud. IT leaders must take steps to understand the issues of accountability for data in the cloud and review their service agreements with cloud providers, so to ensure compliance and protection of their most sensitive information.

The State of Data Sharing

Part of the 2016 State of Resilience Report

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The State of Data Sharing

In this high speed business environment, IT professionals are under pressure to demonstrate value and provide a competitive advantage to the company.

To meet this demand, IT leaders are expected to provide accurate, actionable, and near-real-time data for business intelligence—reports on retail purchases, customer feedback, information on manufacturing inventory levels, split second stock trades, and more. Yet given the exabytes of data created every day, how can IT ensure information integrity and accuracy? Can IT deliver the data that's needed for business decision making?

It's a tough job, and for this reason, we fielded an entire survey on business data sharing practices, the tools they use to synchronize data, and the obstacles they encounter. More than 300 professionals responded to our survey, showing a high level of interest in the subject.

**Does your organization share data between multiple databases?**
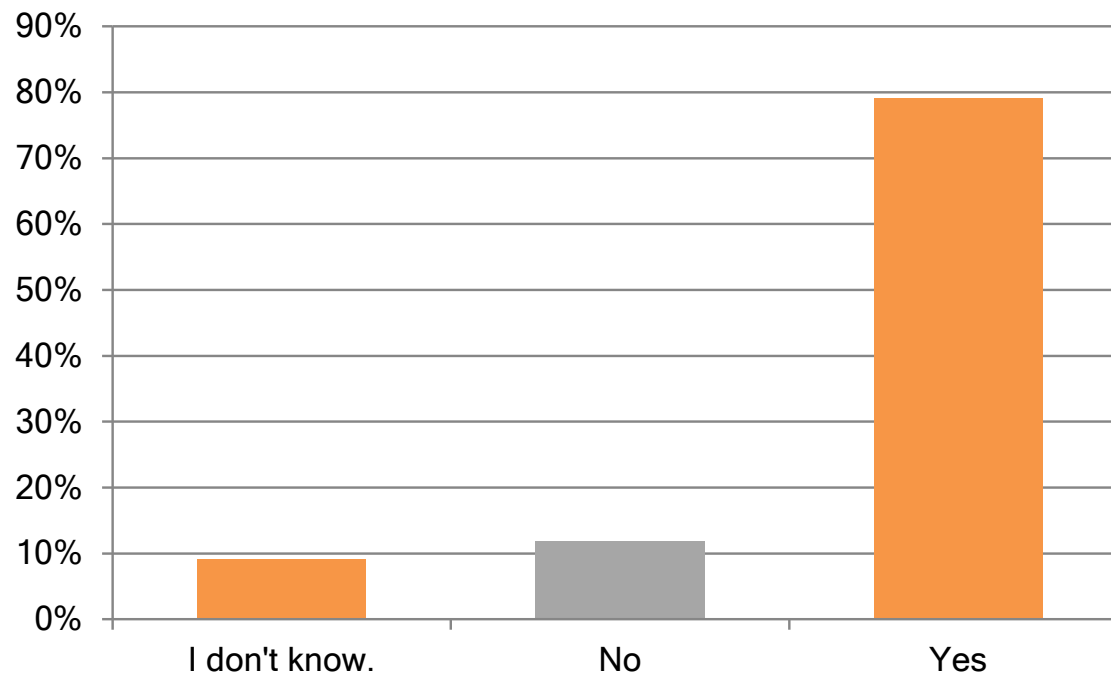
A Close Look at Alignment: IT Data Sharing Practices and Business Goals

First, we wanted a baseline of how many companies rely on multiple databases and how many were sharing information among those databases.

As shown in the graph on page 43, we discovered that 79% of companies rely on multiple databases, including those associated with business applications. Then, we found that 68% of those with multiple databases share data among databases, a number consistent with last year's survey.

For the purposes of this survey, data sharing is defined as moving copies of data from one database to another. Does your organization share data between multiple databases?
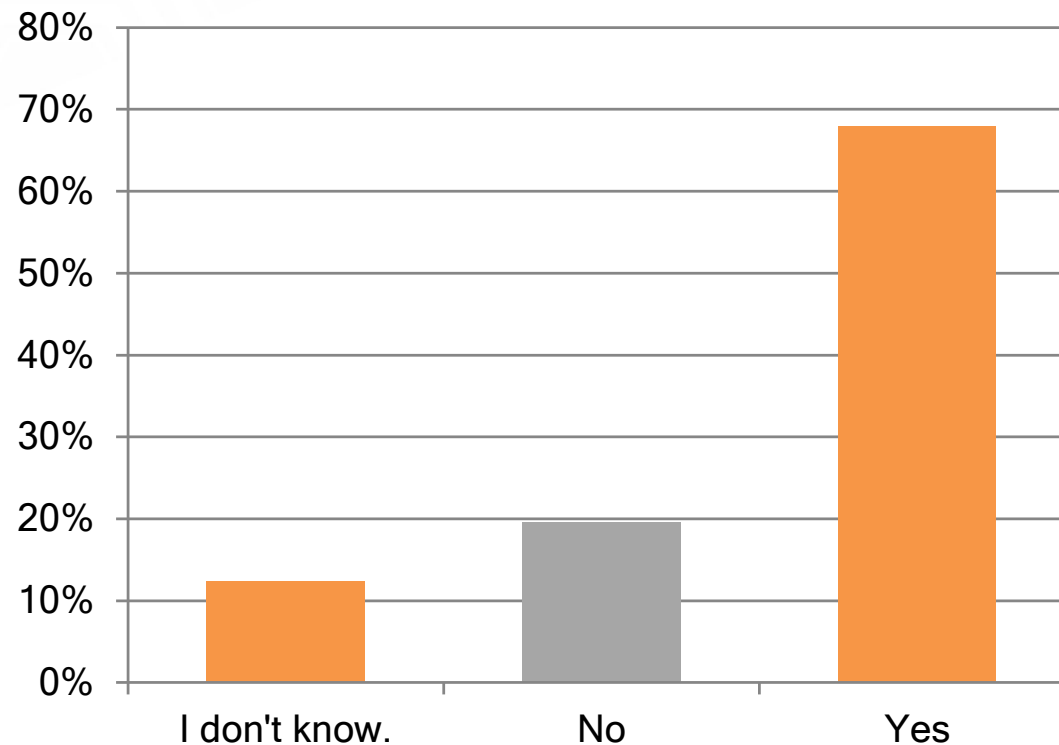
Continuing our investigation, we asked respondents about their business purposes for data sharing, as illustrated in the graph. The top objective of IT professionals was to report on data offloaded from production data and to gain business intelligence on data offloaded from the production database (both in the 60% range). Moreover, later in the survey, nearly three quarters of professionals noted that their organizations want to use data to provide the company with a competitive business advantage.

Taken together, all these findings made us wonder: How well positioned are IT organizations to deliver accurate data for reporting and business intelligence? Do their processes for data sharing adequately support company goals?

For what business purposes does your organization share data between databases?
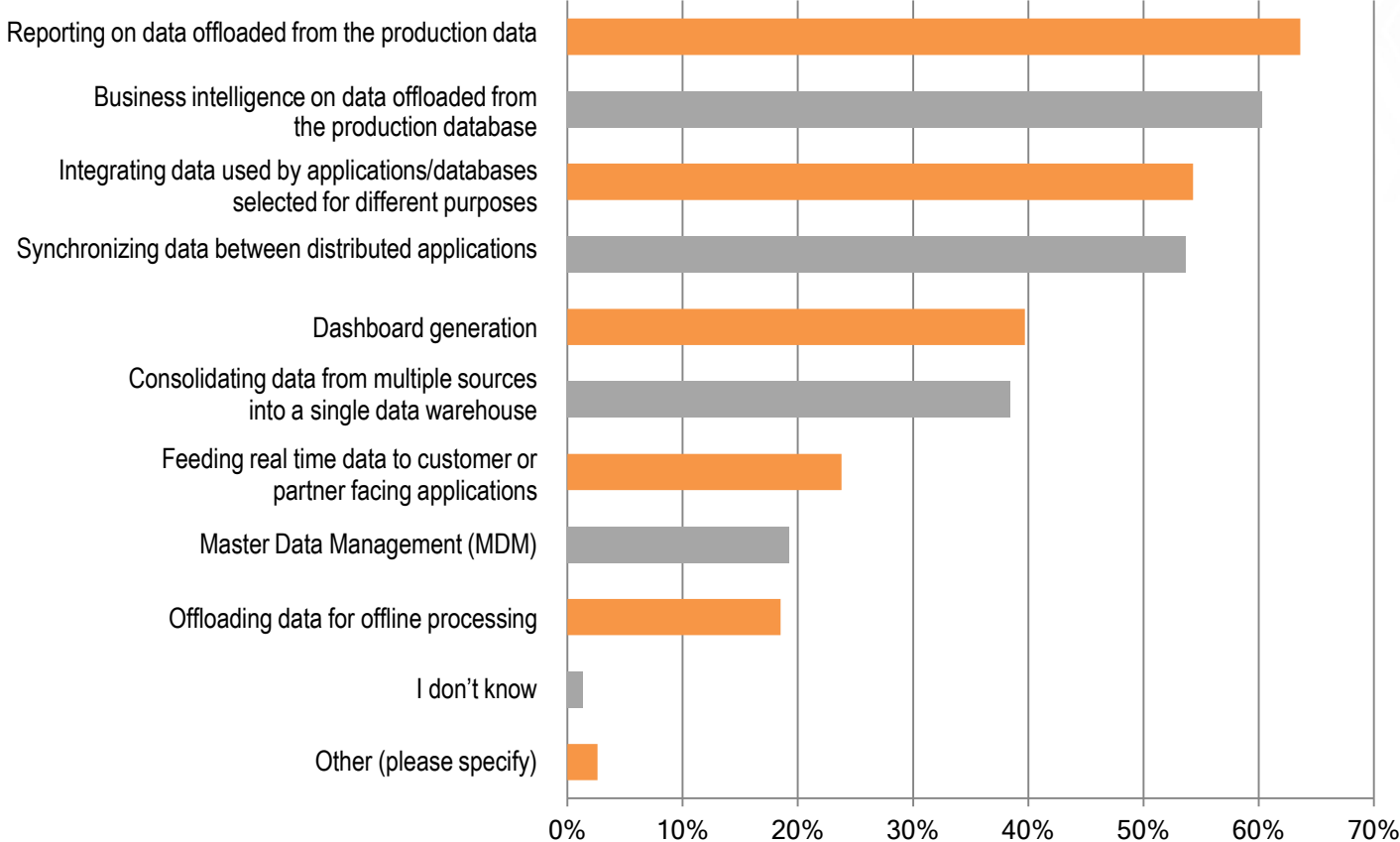
Note: This was a select all that apply question so answers will not total to 100%.

Vulnerability: Data Inconsistencies Diminish Business Effectiveness

We next focused our investigation on the issue of redundant data in shared databases and found that more than six out of ten professionals said their databases contain redundant data. Of these, more than a quarter report that they do not have processes in place to synchronize redundant data across their databases. Redundant data in itself is not necessarily a problem, because redundancy can protect vital information against system failures or data loss. However, unsynchronized, redundant data can lead to data anomalies and corruption, waste valuable storage space, and increase time for database maintenance.

More revealing was our finding that the majority (70%) are concerned about inconsistent information stored in their databases, as shown in the graph below. Data inconsistencies are a complex problem for all businesses, but particularly for those that depend upon accurate data by the nanosecond, such as stock exchanges, e-commerce sites, or airline flight control—where current data can make a life or death difference.

Are you concerned that there may be inconsistent information stored in different databases within your company?

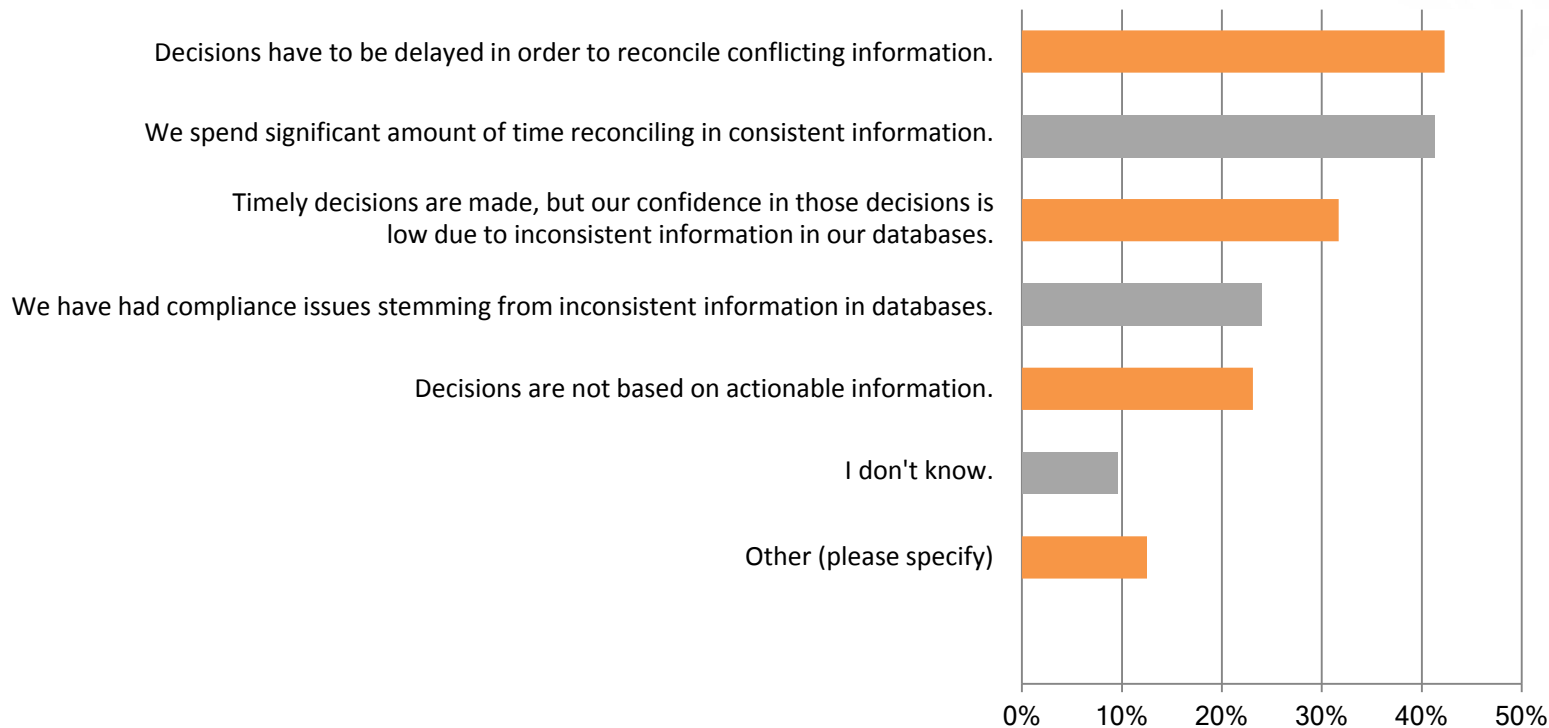| No	Yes
30%	70%

This issue of inconsistent data takes on even greater magnitude, given the types of businesses that participated in this study:

- Overall, survey respondents worked in larger organizations, where data must be used for strategic decision making. Roughly half of them work in companies that have more than 500 employees. The majority (54%) say they have two to five data centers, 15% have six or more.
- Industries that survey respondents most often worked in were computer services and software, banking, financial services, and government & public safety—where data is the lifeblood of the organization.

Without a doubt, data inconsistencies impact business efficiency. As shown in the graph below, the inability to consolidate different databases causes companies to delay business decisions (42%), spend productive staff time reconciling discrepancies (41%), or have low confidence levels in decisions made because the data isn't consistent (32%).

When companies have to delay business operations or strategic decision making because data isn't accurate, they lose time—and their competitive edge. In sum, they are less resilient.

How does an inability to consolidate different databases impact decision-making for your business?

Decisions have to be delayed in order to reconcile conflicting information.	
We spend significant amount of time reconciling in consistent information.	
Timely decisions are made, but our confidence in those decisions is low due to inconsistent information in our databases.	
We have had compliance issues stemming from inconsistent information in databases.	
Decisions are not based on actionable information.	
I don't know.	
Other (please specify)	

Note: This was a select all that apply question so answers will not total to 100%.

47

Data Sharing Tools and Techniques

Given the challenges the survey identified, we decided to examine some of the "nuts and bolts" components of data sharing—the techniques and the tools that companies employ. Is there a gap between corporate expectations of leveraging data for business intelligence and the tools that IT professionals actually use? And what does this tell us about IT resilience?

Shown in the graph, the majority of companies use manual scripting to share data between databases (54%), followed by FTP/SCP file transfers (46%), and in-house tools (40%)—with no substantial change since last year. The drawback of these methods is that manual scripts

and homegrown tools can be slow and error-prone. Moreover, they eat up the time of in-house resources for maintenance and quality assurance.

Ironically, fewer companies use third party conversation and replication software for data sharing (36%) compared to the methods above. As noted previously in this report, the majority of organizations offload data from a production server for the purposes of reporting and business intelligence. No doubt, they're concerned about preserving system performance. Yet, when properly implemented, newer technologies, such as replication, can provide reliable synchronization across disparate systems and data availability up-to-the-minute without degradation in response time.

What techniques does your organization use to share data between databases?
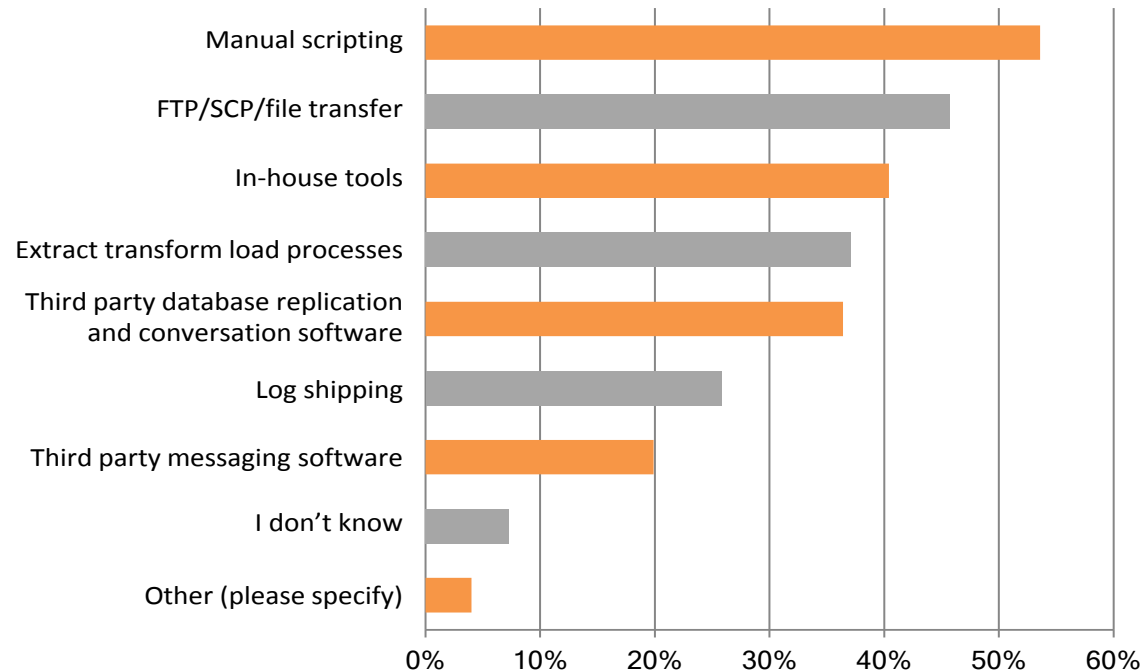
Note: This was a select all that apply question so answers will not total to 100%.

Digging deeper into the results, we found that IT professionals manage highly complex data sharing environments, which undoubtedly complicate their work. Companies are using a diverse set of databases, applications, and platforms.

Windows was the predominant operating system, followed by Linux, along with a smattering of other operating systems. Over three quarters of respondents had two or more operating systems, with Windows and Linux being the most popular.

IT professionals also manage heterogeneous database environments.[7] Microsoft SQL Server was used by roughly three out of four companies. Yet Oracle, MYSQL, Microsoft Sharepoint, and IBM DB2 were also popular. A quick glance at individual responses showed that one professional was actually managing databases from six different vendors.

Surely, there's stress on the data center to ensure that all these complex systems are in sync. Not only are companies' daily business processes multi-layered, their financial, sales, and human resource data must move consistently and accurately to users. To ensure this, IT needs the best techniques for data sharing—not tools that are more than a generation old.

Fast Fact

Data Sharing Techniques Vary Regionally
- 51% of Latin American professionals use Extract Transform Load processes vs. 37% of non-Latin American respondents.

- 32% of Latin American professionals use Manual Scripting vs. 54% of non-Latin American respondents.

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[7] 60% managed three or more database platforms.

A Note about the Trend Toward Big Data Analytics

Industry media and the executive suite have been abuzz with the talk of big data for some time. So, we asked respondents about this technology and learned that globally, many businesses are exploring or planning to evaluate big data analytics.10% currently use a big data solution in production, and 12% are evaluating and testing a solution now. Another 21% report that they plan to evaluate it within the next year. In fact, year over year, the number of companies using, evaluating, or planning to evaluate big data jumped from 28% in 2014 to 43% in 2015. Yet a sampling of responses showed that the majority of professionals report that they have inconsistent information stored in different databases. Moreover, some companies don't yet utilize tools to synchronize their redundant data.

Obviously, not every business will tackle a big data project soon. However, companies that plan to use large quantities of internal data—point-of-sale, manufacturing, or customer information—need consistent, up-to-date, synchronized data. Will IT professionals be squeezed between this push for data analytics on one hand, and their legacy practices in the data center on the other? Certainly, IT processes and tools need to progress in step with ambitious plans their companies might have for big data.

Is your organization currently employing, or planning to employ, big data solutions for advanced analytics?
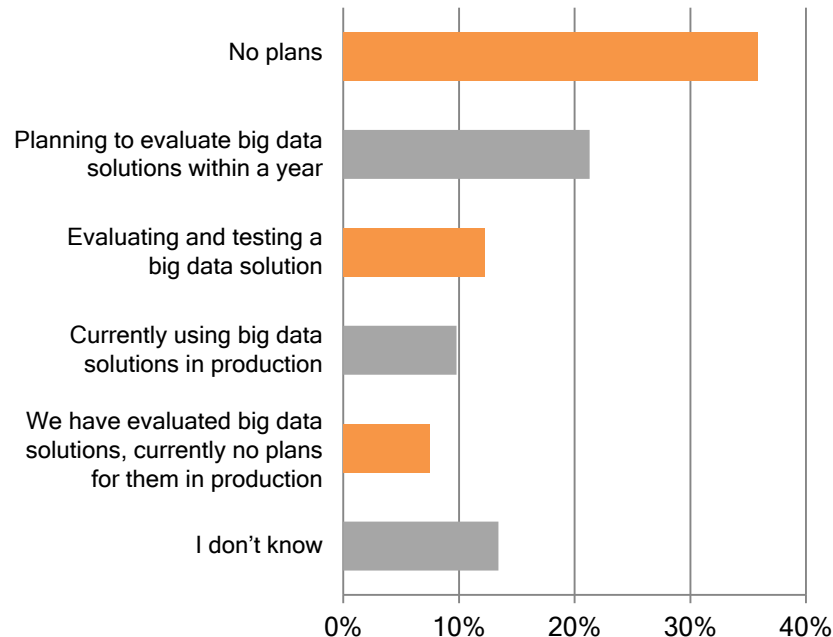
Key Takeaway: Data Sharing

The good news in this year's survey is that companies have strong goals to use their data to gain a competitive advantage and business intelligence. The not-so-good news is that IT professionals might experience difficulties in fully realizing these goals. Why is this the case?

The survey showed a lack of alignment between the ambitious plans of a company—and the tools, technologies, and processes they use. The biggest headache for professionals appears to be redundant and inconsistent data in shared databases, which impacts businesses efficiency and speed in decision making. Moreover, professionals are using older technologies and processes to move data between databases.

Insights into IT Professional Services/Outsourcing

Part of the 2016 State of Resilience Report

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Insights into IT Professional Services/Outsourcing

When it comes to choosing IT professional services, no two companies are created alike. What works for one organization, may not work for another. Why? There's a complex set of decisions involved in outsourcing IT services: Scalability and flexibility; the cost versus the possibility of being under-re-sourced; the need to bridge skills gaps in the internal IT staff; and the "build versus buy" dilemma. However, if IT departments eschew outsourcing, they run the risk that business units will strike out on their own to seek services—while not understanding compliance and security concerns, especially related to the cloud. In fact, as mentioned previously, 40% of all IT spending is now occurring outside the IT department.

In our new Professional Services/Outsourcing Survey IT leaders told us about their environments, their obstacles to outsourcing, and the kinds of services they plan to seek outside of their own IT resources. The following are just a few of the highlights of the survey.

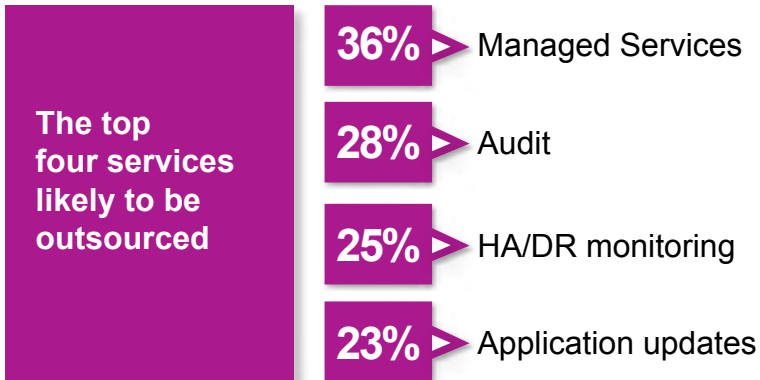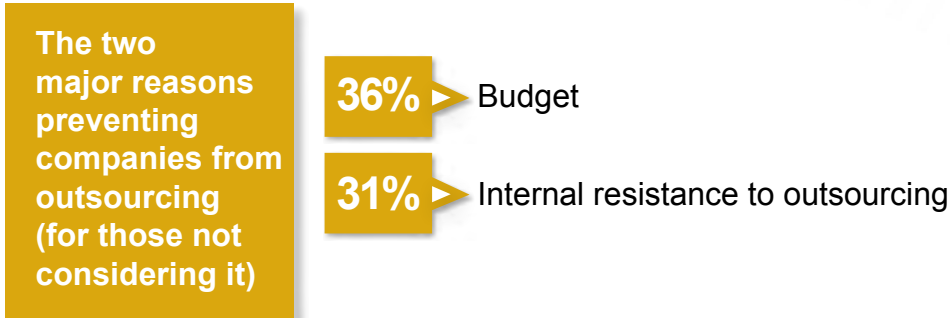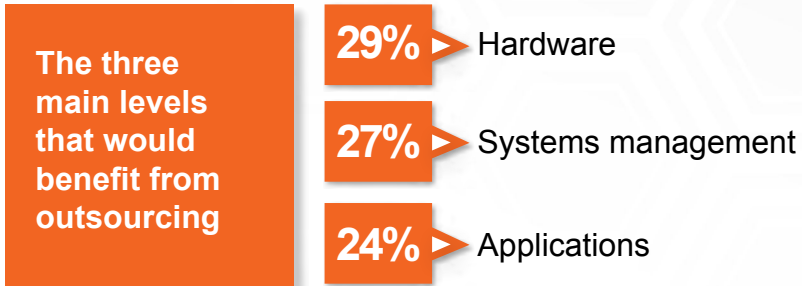**Changes to the resource structure for managing systems in the past year**

47% > Our resources have stayed the same

30% > We have fewer people

23% > We have more people

Changes to organizational responsibilities for managing systems in the past year

47% > We have more responsibilities

43% > Our responsibilities have stayed the same

10% > We have fewer responsibilities

Professionals considering outsourcing their IT functions

52% > Yes

48% > No

The three main levels that would benefit from outsourcing

29% ▶ Hardware

27% ▶ Systems management

24% ▶ Applications

The two major reasons preventing companies from outsourcing (for those not considering it)

36% ▶ Budget

31% ▶ Internal resistance to outsourcing

The top four services likely to be outsourced

36% ▶ Managed Services

28% ▶ Audit

25% ▶ HA/DR monitoring

23% ▶ Application updates

The figures here highlight the outsourcing conundrum. Less than one quarter of IT professionals have added staff, but roughly half of them have additional responsibilities. Despite this, less than half of them have considered outsourcing, mainly due to budget constraints or internal resistance— even though they would benefit from help in critical areas such as managed services, audit, HA/DR monitoring or hardware support.

Note: This was a select all that apply question so answers will not total to 100%.

In Conclusion

In Conclusion

Businesses must evaluate their resilience in terms of how well all their IT systems work in balance with each other—data, applications, hardware, networks, external vendor software, and partners.

- Alan Arnold, CTO Vision Solutions

At the start of this report, we noted that IT professionals are confronted with exploding volumes of data and the pressure to fulfill corporate expectations of near-continuous uptime and access to that data. At the same time, they're challenged to advance the data center environment, evaluating the best tools and techniques that will ensure resilience.

Throughout our surveys, we wanted to learn how healthy IT systems are. How easily can systems recover from routine interruptions—and more disastrous failures? Do system components support each other to manage and protect vital information? How well do they work to deliver data businesses need to build competitive advantage?

In fact, today's technology environments might be compared with an ecosystem, with different components moving through various lifecycles from new growth, to peak development, and finally to decline. When some technologies are at their peak, others are on a downward swing. Moreover, many components of these systems are highly dependent upon each other for the well-being of the system. Imbalance occurs when vital components are out of sync. Just as ecosystems can reach a tipping point when they can't recover rapidly, so this can occur in technology environments, resulting in a decrease in resilience.

Our surveys certainly have shown cycles of change in the technology systems over several years. As an example, cloud, formerly a nascent technology, is now climbing toward a peak. Companies virtualized, then adopted cloud, and now are confronted with other technologies that support cloud computing—namely high availability,

security, data protection, and analytics. This year we saw that organizations are investing more in public clouds, using high availability schemes and running mission-critical applications in the cloud, and experimenting with big data analytics.

Yet even as there has been progress on several fronts, other areas lagged. Some findings revealed incongruence in IT practices; others showed that IT was not completely aligned with business goals. IT professionals are managing heterogeneous data center environments—multiple platforms, databases, and applications--using an assemblage of older tools and techniques. Many, for instance, employ traditional schemes for data management and protection, with the consequence of greater risk of faulty data and downtime. Instead, their companies could be using next-generation methods to deliver synchronized, up-to-the-minute data for business intelligence. Resilience demands that IT leaders implement better cross-platform strategies, and develop practices that support heterogeneity and uptime.

In the end, each organization must determine an acceptable level of risk tolerance, based on company revenue model, budgets, and staff. Our research demonstrates that IT professionals must look at their systems in a more holistic way: Hardware, software, networks, outside consultants, service agreements, and personnel training all working together to minimize risk and advance business goals. Evaluating the health of an entire system in this manner is a complex job, but it's evident that IT leaders are up to the task.

Footnotes

[1] The question asked respondents to estimate time for planning, actual migration, testing, and cutover.

[2] In our survey, high availability is defined as a solution that ensures a computer system will be continuously operational for a long period of time without experiencing downtime, and which can quickly recover from failure.

[3] It's a reality that even gigantic corporations don't store exabytes of data in online data warehouses. High volume businesses like retail, for example, typically store a couple of quarters for trend analysis, then offload the history onto offsite tape.

[4] More than 20% use 4 - 6 data protection technologies.

[5] "Gartner Says Worldwide Cloud Infrastructure-as-a-Service Spending to Grow 32.8 Percent in 2015," Gartner Inc. May 18, 2015, http://www.gartner.com/newsroom/id/3055225

[6] Data synchronization ensures the consistent flow of information from one endpoint to another, while ensuring data accuracy. It maintains data consistency across disparate systems.

[7] 60% managed three or more database platforms.

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Vision Solutions is the premier provider of software solutions designed to protect data, minimize downtime and maximize resources for the modern data center.

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