



ActualTech Media

2015 State of Hyperconverged Infrastructure Market Report

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Developed in Partnership with:

 **HYPERCONVERGED.ORG**

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About ActualTech Media

ActualTech Media is comprised of well-known VMware vExperts, authors, analysts, and speakers with considerable depth and breadth of technical and IT leadership expertise. The company produces custom content assets aimed at educating IT buyers. To that end, ActualTech Media developed hyperconverged.org. Hyperconverged.org's mission is to help IT professionals understand the world of hyperconvergence. From time to time, the company conducts surveys designed to gather information about IT priorities, purchase criteria for new data center architectures, such as hyperconverged infrastructure. Its reports can inform your data center modernization strategy.

Executive Summary

ActualTech Media surveyed over 500 technology professionals and members of organizational management in order to gauge people's understanding of hyperconvergence, as well as how the market is adopting such solutions. We also sought to understand how well expectations are meeting reality when it comes to hyperconverged infrastructure. The survey results represent small (100 to 500 employees), midmarket (500 to 5000 employees), and large enterprises (5000 employees or more) mostly in North America and Europe.

Based on the data collected, Actual Tech Media concludes:

- **Hyperconverged infrastructure is still in its infancy.** Those currently adopting hyperconverged infrastructure is a small percentage of the overall, and the outlook is that organizations will adopt such solutions over the next 24 to 36 months.
- **VDI remains a key use case for hyperconvergence.** VDI was a significant driver for the adoption of hyperconverged infrastructure, possibly driven by the catalyst event of a Windows desktop upgrade a few years ago. Today, however, other workloads are just as important.
- **Companies are desperately seeking ways to simplify IT and reduce costs.** Despite an increase in IT spending this year, many organizations still strive to reduce spending—both in capital expenditures by investing in technology that provides a healthy ROI, and in operational expenditures.
- **Many IT professionals have not fully grasped the concept of hyperconvergence.** “Why would we go back to direct-attached storage?” is a common question with skeptics.
- **Hardware refresh is not a huge driver for hyperconverged infrastructure for large organizations.** This is likely due to the fact that refresh cycles occur within functional silos in large enterprises keeping IT professionals focused on only what they know, as well as the existence of well-established processes for technology replacement.
- **Rapid virtual machine provisioning is an important outcome.** Larger companies, likely faced with a greater volume of workloads to provision and deploy, look to accelerate deployment. This is less of a factor for smaller organizations.
- **Although a factor, dissatisfaction with legacy storage is not a major one.** However, while satisfaction with legacy storage may not be a factor, it is likely that these same organizations have concerns around overall operational efficiency in IT, the category in which legacy storage management might fall.
- **Data center consolidation is a significant priority for larger companies.** Again, this is more than likely born from a desire to reduce costs and improve efficiencies in IT.

Introduction

Hyperconverged Infrastructure

In this survey, hyperconverged infrastructure is defined as a virtual computing infrastructure solution that seamlessly combines several data center services in an appliance form factor, which accelerates the speed and agility of deploying virtualized workloads, reduces complexity, improves operational efficiency, and lowers costs. Hyperconverged infrastructure is characterized by:

- *A software-centric design;*
- *Commodity x86 hardware components that combine hypervisor, compute, storage, and storage switching with other IT services, such as data protection, in the stack, effectively eliminating the need for discrete IT components;*
- *A single “building block” appliance that, when combined with additional building blocks, provides a single, scalable resource pool; and seamlessly scales in capacity and performance;*
- *A high degree of automation;*
- *The ability to manage aggregated resources as efficiently as possible within and across data centers as a single federated system and through a common toolset;*
- *Design, delivery and support by a single vendor.*

For more information about hyperconverged infrastructure, see [Appendix A: Hyperconvergence Background](#).

Report Objectives

To assess the State of Hyperconverged Infrastructure, ActualTech Media surveyed over 500 IT professionals at companies with a minimum of 100 employees, who have knowledge of their company’s IT environment and strategy, and whose organization has at least one data center and at least 25% of its x86 production servers virtualized.

ActualTech Media’s goal is to understand the top challenges organizations are facing regarding IT infrastructure and service delivery, and how hyperconverged infrastructure addresses these challenges. Specifically, this report focuses on answering the following questions:

- What are the respondents’ top IT priorities for next 12 to 18 months?
- What are the top “pain points” in running virtualized workloads using the respondent’s current infrastructure?
- What is the general awareness of hyperconverged infrastructure?
- What is the interest level in hyperconverged infrastructure? Why or why isn’t there interest?
- For those interested in hyperconverged infrastructure, what is the timeframe for adopting/deploying it?
- What are the main drivers for deploying hyperconverged infrastructure?
- What criteria are used to evaluate hyperconverged infrastructure?
- What benefits can be expected from deploying hyperconverged infrastructure?

In addition to the various sizes of organizations, those taking part in the survey represent a wide sampling of industries. For more information on the demographics of the respondents, please see [Appendix B – Respondent Demographics](#).

Key Hyperconverged Infrastructure Market Drivers

The survey results underscore a few key market drivers for hyperconverged infrastructure:

1. **Legacy infrastructure costs are too high.** This problem is identified in the reasons why organizations are considering hyperconverged infrastructure: to reduce costs.
2. **Respondent organizations are eager to improve IT operational efficiency.** As on-premises IT infrastructure increasingly has to compete with public cloud economics, organizations seek to reduce run-rate expenses.
3. **Data protection is identified as the largest problem facing IT departments.** This is likely a result of the complexity of IT infrastructure, the dynamic nature of the data center, and the sheer volume of data to protect.
4. **Organizations are seeking increased use of virtualization.** The operational, financial and business benefits of virtualization have been proven out at most companies, fueling a desire to expand virtualization for the server and desktop realms, as well as other areas of the data center, such as storage.

Despite these drivers, there appears to be a lack of understanding – or lack of belief – among survey respondents for the breadth of services that can be included in hyperconverged infrastructure solutions. This report will, in part, provide guidance to IT professionals regarding the adoption of hyperconverged infrastructure. In addition, this report will also provide guidance for infrastructure vendors.

Research Findings

Real-World Hyperconverged Infrastructure Adoption

Hyperconverged infrastructure has only been recently introduced, with the earliest market entrants very focused on specific use cases, such as VDI. However, as the technology matures and new vendors enter the market, adoption momentum is picking up.

Hyperconverged Infrastructure Uptake

According to Figure 1, nearly one-quarter (24%) of survey respondents already have hyperconverged infrastructure in place. At first, that statistic may sound pretty good given that hyperconvergence is still relatively new in the market; however, respondents may have been predisposed to be positive regarding the topic at hand considering this survey's origins on ActualTech Media's hyperconverged.org site. In fact, the "real" number may be somewhat lower with a wider cross-section of IT professionals.

Have you already adopted hyperconverged infrastructure? (N=507)

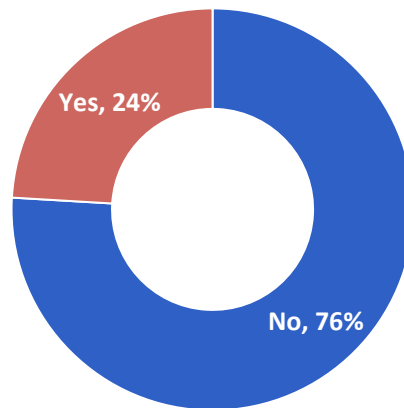


Figure 1 – Hyperconverged Infrastructure Adoption

Hyperconverged infrastructure is a market that continues to be in need of comprehensive education and outreach efforts. It is a nascent market and technology, and there seems to be a constant stream of new vendor entrants in the space. Moreover, with each new vendor come new approaches to solving infrastructure challenges. In reviewing various communities of IT professionals, such as Spiceworks, and with understanding the types of questions ActualTech Media asked about hyperconverged infrastructure, it remains more than apparent that end users are in need of more content education to create a more informed buyer. This is one of the reasons that we developed www.hyperconverged.org, a site that is dedicated to educating the market about hyperconverged infrastructure.

In examining adoption rates across organizations of different sizes in Figure 2, it's clear that there exists a slight variation between small, midmarket and large enterprises that have already adopted. The larger the organization, the more likely it is to have already deployed hyperconverged infrastructure. As shown in Figure 3, a similar pattern emerges among those planning to adopt: the larger the organization, the more likely it is to plan to adopt hyperconverged infrastructure.

Current Adopters vs. Non-Adopters of Hyperconverged Infrastructure By Size of Company

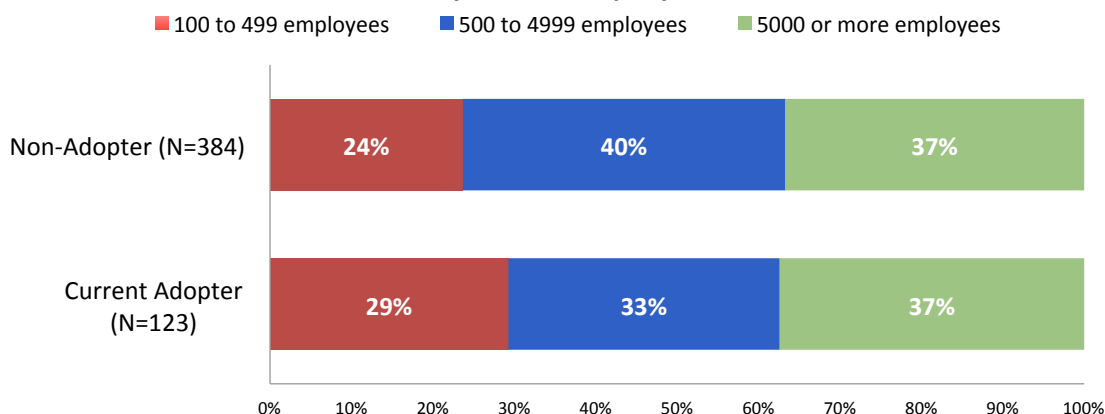


Figure 2 – Hyperconverged Infrastructure Adoption By Company Size

Plans To Adopt Hyperconvergence Within Next 24 to 36 Months By Company Size

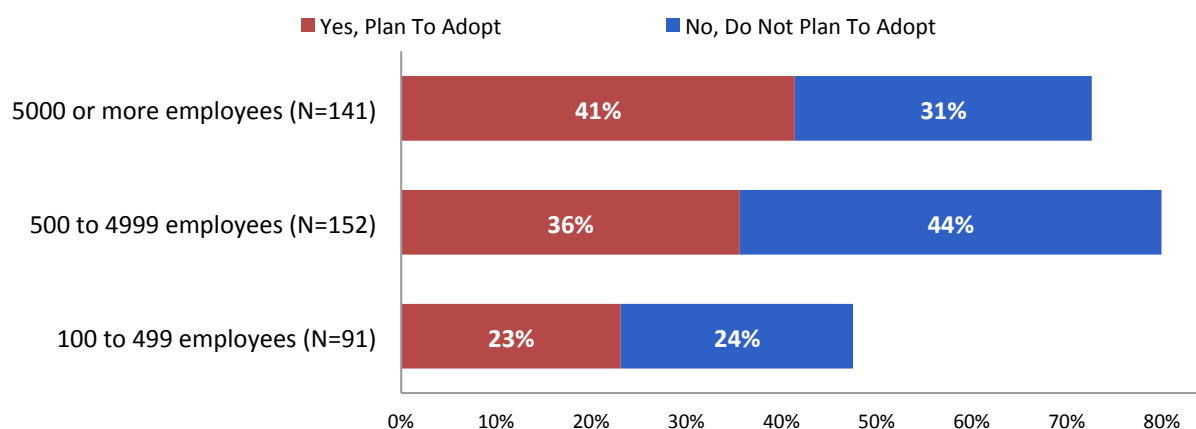


Figure 3 – Adoption Plans For Hyperconverged Infrastructure By Company Size

Planned Adopters

As would be expected, there are a number of respondents planning to adopt hyperconverged infrastructure. More than half (54%) of those who haven't already adopted plan to deploy hyperconverged infrastructure in the next 24 to 36 months.

In examining the purchase criteria for hyperconverged infrastructure among planned adopters (see Figure 4), the top five criteria provide insight into what is important to IT infrastructure buyers: availability, cost, ease of scale, recoverability via native data protection, and management. These also tie into the three major themes uncovered in the survey:

- **Ensuring service delivery** – IT's ability to set expectations for service quality, availability and timeliness. High availability and data protection are integral for IT to set these expectations.
- **Cost savings** – Reducing costs for both capital and operational expenses.
- **Simplicity** – The ease of acquiring, deploying, and managing IT infrastructure, and deploying IT workloads.

**For hyperconverged infrastructure supporting your mission-critical applications, which criteria are most important in evaluating a solution?
(N=207, Multiple Responses)**

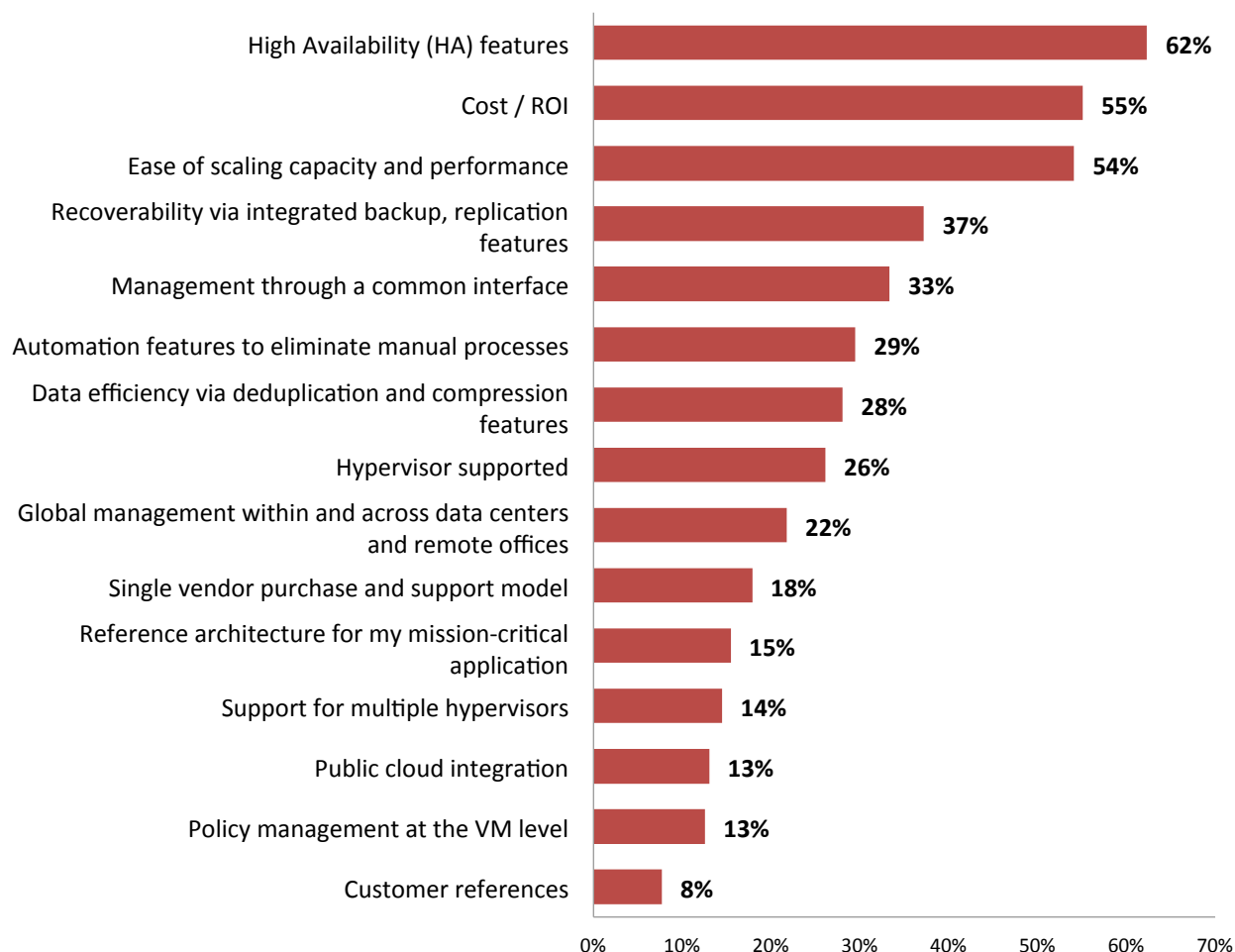


Figure 4 – Planned Adopters Purchase Criteria for Hyperconverged Infrastructure

Figure 5 compares those planning to implement hyperconverged infrastructure with those that have already implemented such solutions. There are slight differences in the top five criteria. As we saw in Figure 4, planned adopters value high availability, cost/ROI, ease of scaling capacity and performance, recoverability via integrated backup and replication, and management through a common interface. Figure 5 shows that adopters also value high availability, ease of scaling capacity and performance, cost/ROI, and management through a common interface, but in a slightly different order. For adopters, the hypervisor supported was also a top-five concern.

Given the level of effort that some vendors have put into enabling support for multiple hypervisors, it's somewhat surprising to see this perceived need so low on the list (12 out of 15 for planned adopters and 14 out of 15 for adopters). However, we see a couple of possible reasons for this:

- Almost all of the solutions in the market provide support for VMware vSphere, the current market leader in virtualization.
- The focus for such solutions is on the workloads and the outcomes and not as much on the inputs. People are willing to switch hypervisors if it makes sense to do so.

- There are solutions in the market targeting all of the major hypervisors. Since there is product choice, it's not as critical that a specific solution support everything.

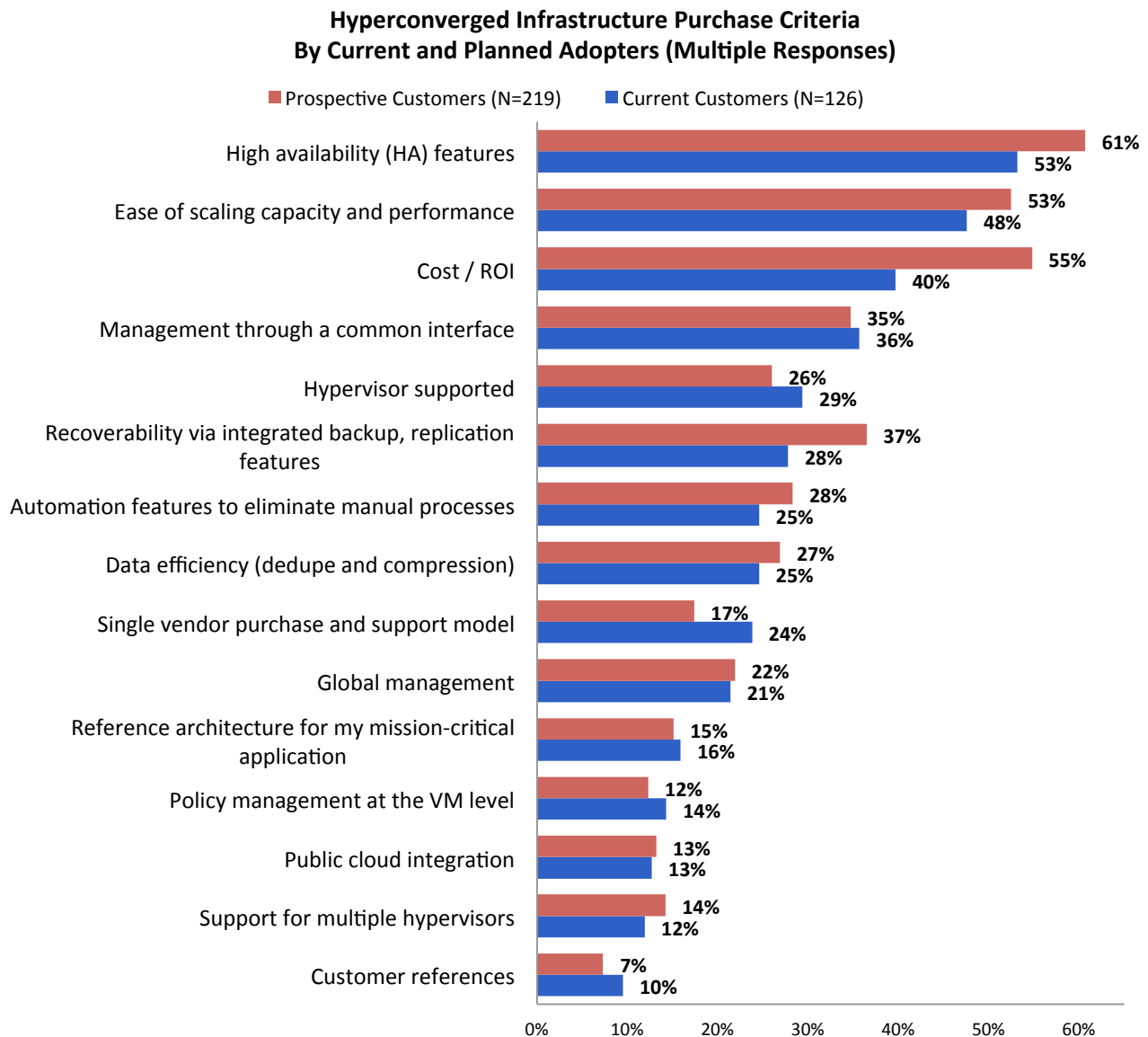


Figure 5 – Hyperconverged Infrastructure Purchase Criteria By Current and Planned Adopters

We aren't that surprised to see adopter criteria results based on other data in this report. Perhaps the primary surprise is that, even though we see availability as a key driver, data protection falls lower in the list. Again, this could be the result of adopters not knowing that hyperconvergence—through simplification and consolidation—can address data protection challenges. It could also be that current adopters chose a vendor that does not have comprehensive data protection capabilities baked in.

The widest gap between perception (planned adopters) and reality (current adopters) is with cost. Planned adopters prioritize cost/ROI for hyperconverged infrastructure more than current adopters. This might be the result of current adopters, AKA early adopters, de-emphasizing budget in their selection criteria in favor of gaining other bigger benefits. In other words, the decision to introduce hyperconverged infrastructure was driven less by cost and more by the overall benefits of modernizing data center architecture.

Expectations Meet Reality

Figure 6 identifies the outcomes that respondents expect to see from a hyperconverged infrastructure solution. In this case, current versus planned adopters' points of view are contrasted. It's no surprise to see some response alignment here, although there are some interesting variances. For example, the number one benefit of hyperconverged infrastructure with planned adopters is improving operational efficiency. However, the actual number one benefit realized is improved scalability. This is not to say that hyperconvergence fails to meet its promises. In fact, we believe that the information shown in Figure 6 indicates that hyperconverged infrastructure actually does a reasonably good job of living up to the hype. Rather, those that have chosen to deploy a solution are just seeing slightly varied outcomes versus the expectations of those simply considering a solution.

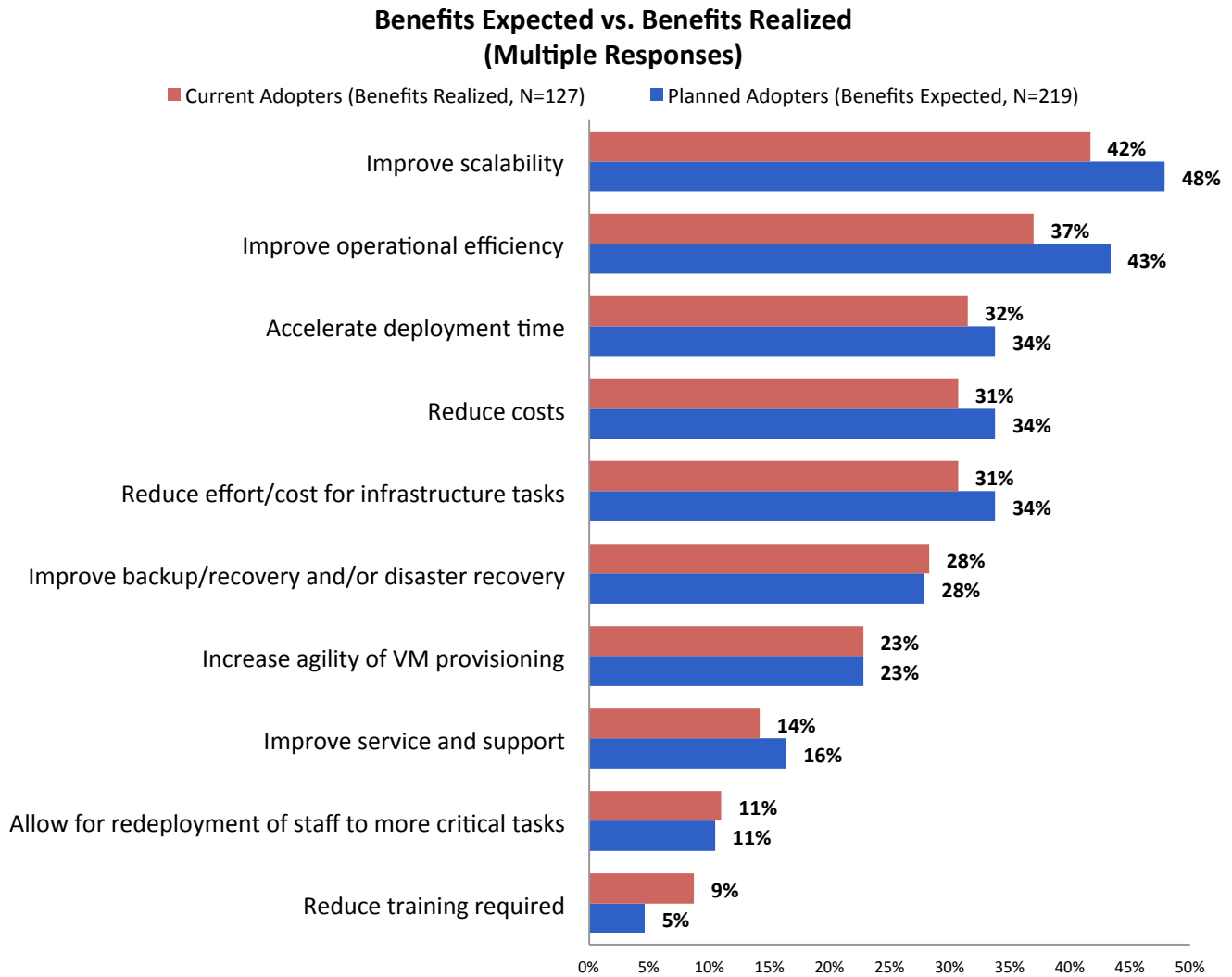


Figure 6 – Benefits Expected (Planned Adopters) Versus Benefits Realized (Adopters)

The largest of gaps between planned adopters and reality with current adopters is with the top two benefits: improve operational efficiency and reduce costs. This data doesn't suggest that current adopters saw gaps in perceived versus actual benefits realized, but it does suggest that there is a higher perception among planned adopters that hyperconverged infrastructure will deliver greater operational efficiency and cost reduction.

Non-Adopters

Not everyone is enamored with the potential for hyperconverged infrastructure or simply has no present need to re-examine data center operations. There are a myriad of reasons that respondents identified as challenges around hyperconverged infrastructure adoption.

In what is good news for hyperconverged infrastructure vendors, the top reasons that respondents are not considering the technology, as shown in Figure 7, have nothing to do with the technology itself but rather have to do with the business cycle:

- **Current solution works just fine.** The adage "If it's not broke, why fix it?" holds true for many respondents. However, that won't always be true. Business priorities change on a dime, and understanding the delta benefits that may come from modernizing the data center with hyperconverged infrastructure solutions may be useful in the future.
- **Recently upgraded infrastructure.** For most hyperconverged infrastructure vendors, there is no need for a forklift. Many solutions can integrate with the existing environment although different solutions offer varying degrees of integration opportunities. Whether new applications are being deployed or there is a specific use case, such as VDI or ROBO, there may be an opportunity to introduce hyperconverged infrastructure into the environment.

Conversely, these same organizations identified overall IT challenges that can be addressed by hyperconverged infrastructure, as outlined throughout this report. **Error! Reference source not found.** contains a combination of IT priorities cross-analyzed with answers to the question about whether or not hyperconverged infrastructure adoption is of interest to the respondent.

We see some misalignment between potential hyperconverged infrastructure outcome expectations and IT priorities. For example:

- **Backup, recovery, and disaster recovery (DR) ranked low on the list.** Depending on vendor, there can be a significant improvement with a hyperconverged infrastructure solution. Either vendors need to do more work to help customers see these benefits or customers are wary of what they're hearing from vendors.
- **The same goes for Remote Office/Branch Office (ROBO) needs.** Hyperconverged infrastructure solutions have the potential to transform these kinds of efforts and enable new business continuity opportunities, but this issue ranked dead last on this list.

What is the primary reason that you have no interest in deploying hyperconverged infrastructure in the near term? (N=177)

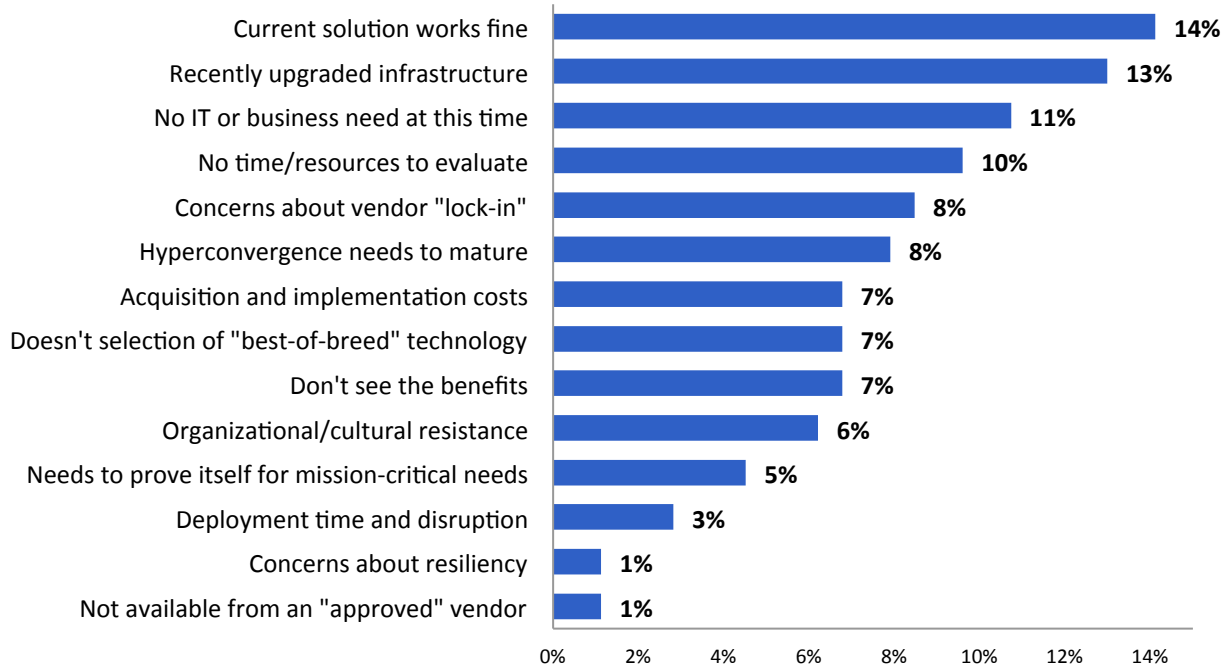


Figure 7 – Primary Reason For No Interest In Hyperconvergence

IT Priorities By Intention to Adopt Hyperconverged Infrastructure (N=383)

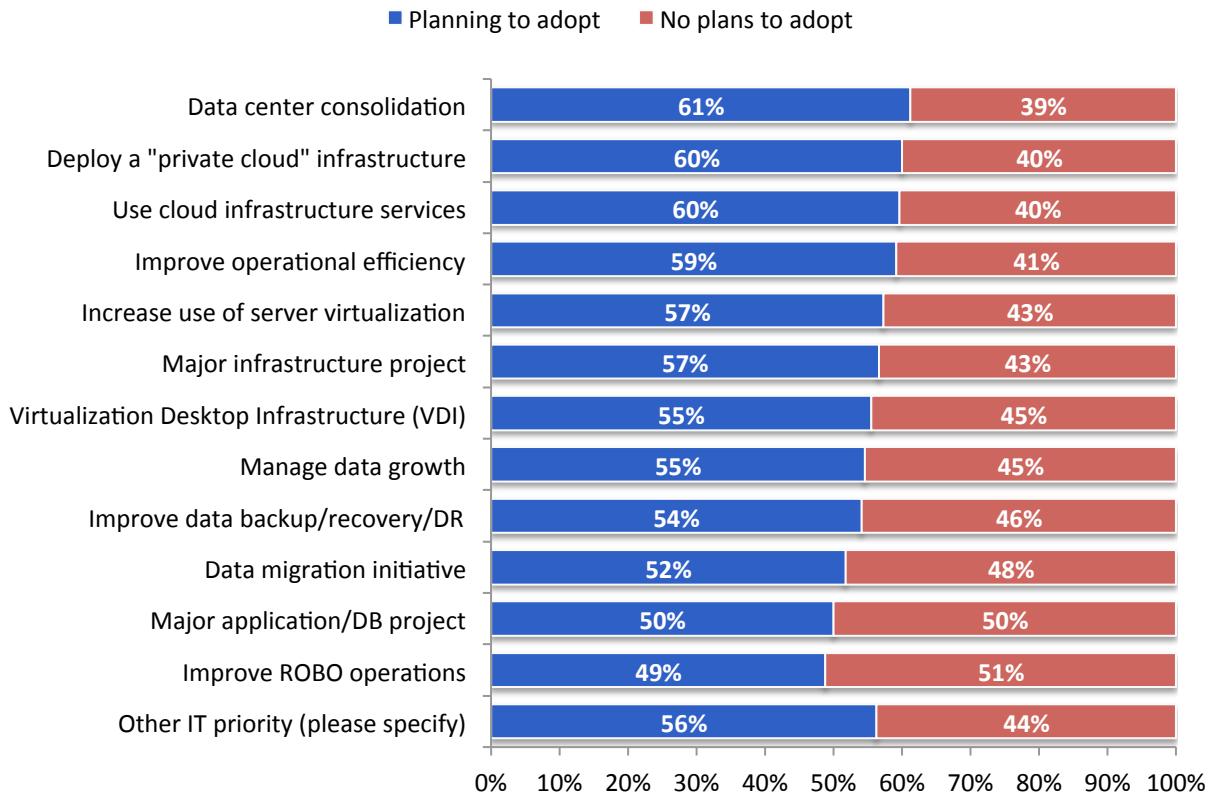


Figure 8 – IT Priorities By Intention to Adopt Hyperconverged Infrastructure

There are other reasons that respondents are not considering hyperconverged infrastructure at this time. Some are related to the technology and others aren't:

- **Hyperconverged infrastructure needs to mature.** This makes sense as a concern given its relatively recent entry into the IT marketplace, coupled with the fact that it's a rapidly changing space.
- **No time or resources to evaluate.** Given that improving operational efficiency is one of the most expected outcomes from hyperconverged infrastructure, for organizations that are seriously strapped for time, the technology should be on the evaluation short list.
- **Concerns around vendor lock-in.** Lock-in can be a serious concern, but companies do it every day. They "standardize" on platforms and software, thus locking themselves into solutions. If something is the right solution, lock-in is not necessarily a downside. In a virtual environment, it's rather simple to migrate workloads to something else using a tool such as VMware vMotion.
- **Don't see benefits.** It is clear that more market education is necessary for many respondents to fully understand the full breadth and depth of outcomes that can be realized with hyperconverged infrastructure.
- **Acquisition/implementation costs.** There is validity in this concern, depending on the solution. This holds true especially for small and midsize organizations that may be strapped for financial resources. Regardless of the selected hyperconverged infrastructure solution, there is usually a need to start with a minimum of two or three nodes for full redundancy and availability. This can be a significant buy in, but it is also an opportunity for lower cost hyperconverged infrastructure vendors to carve out a substantial market.

There is also the fact that vendors with longstanding reputations are finally just dipping their toes into this space, which is becoming increasingly fragmented as more and more vendors jump in. These companies are well-trusted and will lend validity to the entire concept behind the technology and eventually help people become more comfortable with entrusting their mission-critical workloads to a new architectural paradigm. That said, many of the early-to-market vendors offer the most innovation in their solutions. Therefore, while sticking with an incumbent vendor is safe, the organization may miss out on the innovation that delivers more fully on the expected benefits.

Adoption Timeframe

Overall, hyperconverged infrastructure is a long play. As shown in Figure 9, less than 12% of respondents plan to adopt it within the next six months and about three-quarters of respondents plan to deploy within the next year or two. It's a rapidly growing space, but it's definitely in its infancy, although VMware gave the entire space a huge push when it announced its hyperconverged infrastructure offering in late-2014. If the survey results are any prediction of the future, however, late 2015 to early 2016 should see a major wave of adoption begin to take place. So, for those that are still learning about this technology, you're not alone.

In what timeframe are you interested in adopting hyperconverged infrastructure (N=209)

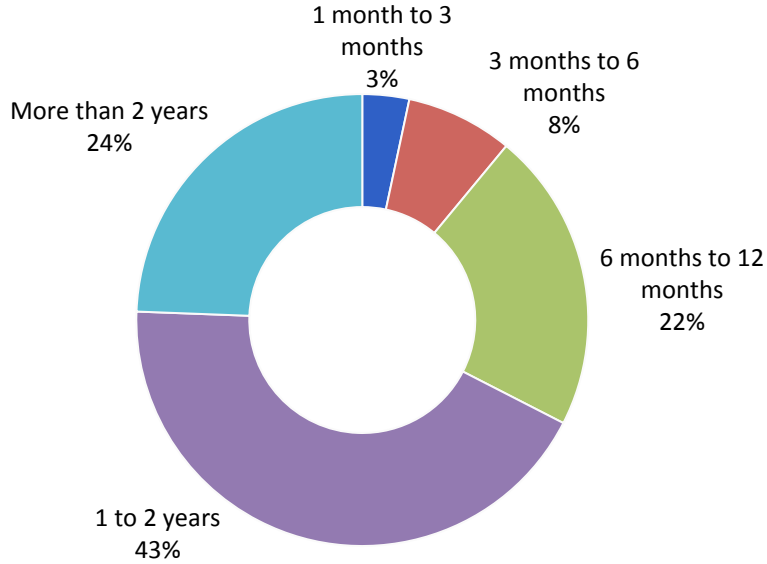


Figure 9 – Timeframe For Adopting Hyperconverged Infrastructure

Considering this same information broken down by company size (Figure 10) seems to suggest that the focus from vendors over the next twelve months should be on large and mid-sized companies, which is somewhat surprising given that there is a perception that hyperconvergence is an SMB/midmarket solution rather than an enterprise one.

Timeframe for adopting hyperconverged infrastructure broken down by company size (N=208)

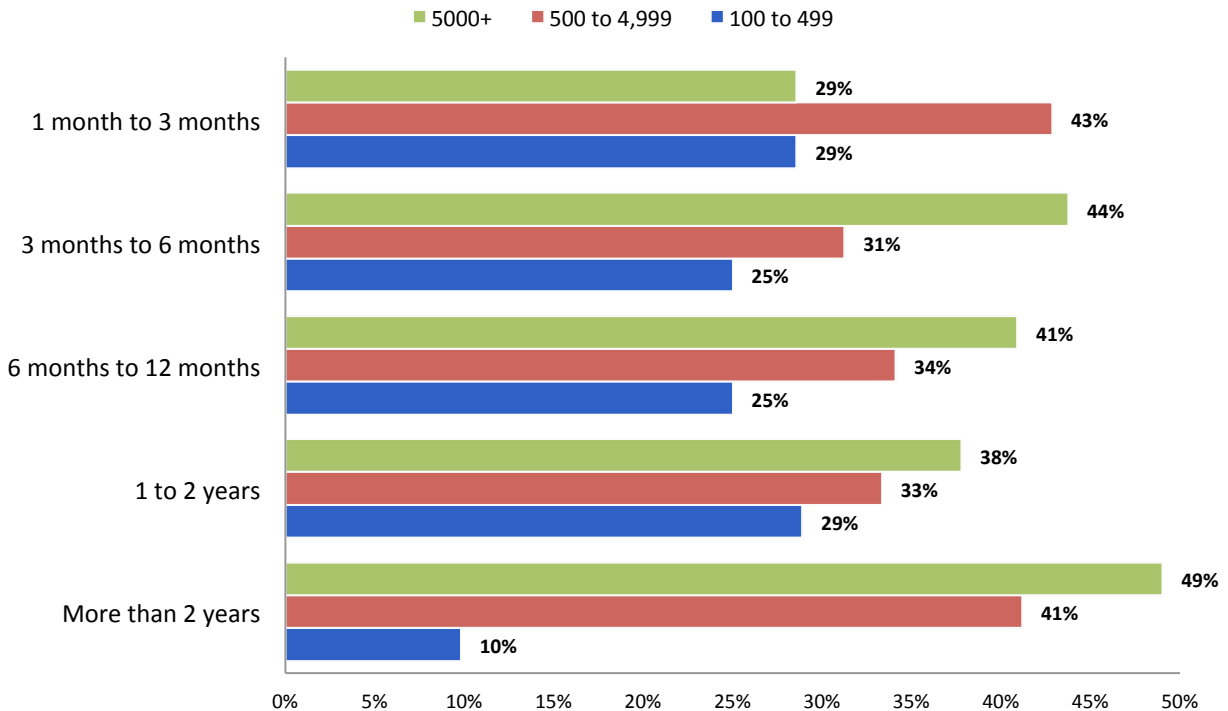


Figure 10 – Timeframe For Adopting Hyperconverged Infrastructure By Company Size

IT Priorities

Survey respondents focused on two key pain points in the top five IT priorities, and three infrastructure initiatives. As shown in Figure 11, improving data backup, disaster recovery and business continuity topped the list—likely a statement regarding the difficulties of maintaining on- and off-premises copies of data in today’s dynamic, diverse and always-on data center. Today’s modern data center is characterized by relentless data growth, an increase in virtualization and cloud deployments, remote/branch offices, business-critical applications with a low tolerance for downtime, and an increasingly mobile workforce, all of which introduce significant data protection challenges.

**Which of the following would you consider to be your organization's most important IT priorities over the next 12 to 18 months?
(N=528, Multiple Responses)**

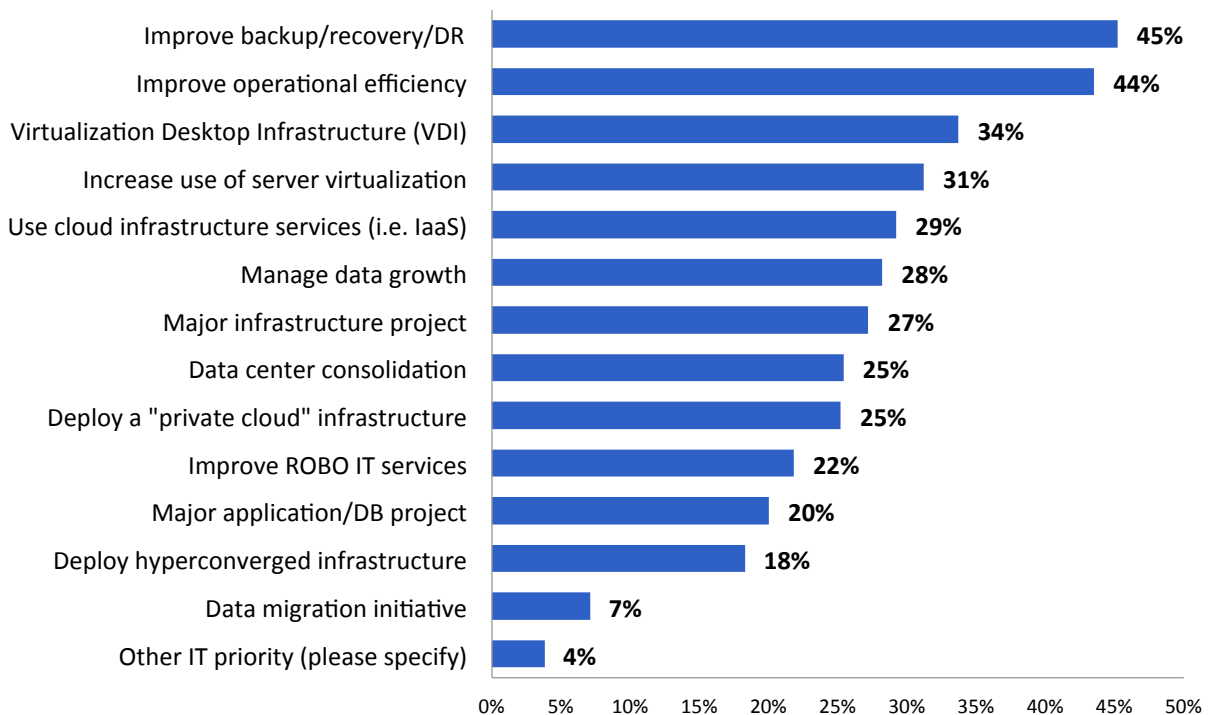


Figure 11 – Most Important IT Priorities Over The Next 12 to 18 Months

Improving operational efficiency ranks second. Operational efficiency is a measure of IT’s ability to achieve its objectives with the minimum allocation of run-rate resources, including staff, budget, and time. Since this typically impacts the lion’s share of IT’s budget, IT organizations are motivated to simplify and automate to introduce productivity improvements.

Rounding out the top five IT priorities are: Virtualization Desktop Infrastructure (VDI), increasing the use of server virtualization, and use cloud infrastructure services. These priorities underscore the shift IT organizations are making to modernize infrastructure.

Interestingly, deploying hyperconverged infrastructure is closer to the bottom of the priority list. Hyperconverged infrastructure’s priority ranking relative to the top five initiatives signals its nascence in the market, and the lack of awareness among IT professionals. Ironically, with the exception of using cloud infrastructure services, hyperconverged infrastructure has a direct impact on advancing the rest of the top-five priorities.

IT Priorities By Company Size

When the results are compiled by company size, the differences in IT priorities over the next 12 to 18 months are evident. As shown in Figure 12, the top-five priorities for respondents at smaller companies (100 to 499 employees) rank differently from the aggregate responses, and from midmarket (500 to 4999 employees) and large enterprises (5000 employees or more). Improving data backup, disaster recovery and business continuity remains at the top spot across the board.

Smaller companies then prioritize improving operational efficiency, increasing the use of server virtualization, major infrastructure deployment, and improving remote office/branch office (ROBO) IT service/efficiency. These respondents prioritized ROBO over VDI, when compared with the aggregate responses.

Midmarket organizations are focused on VDI, improving operational efficiency, increasing server virtualization, and major infrastructure deployment in their top five. Mid-sized enterprises don't waiver much from the aggregate responses, with the exception of a major infrastructure deployment replacing use of cloud infrastructure. Clearly, these companies are interested in keeping IT in-house.

Evidently, large enterprises have cloud on their minds. Large enterprises ranked improving operational efficiency equally with improving backup and disaster recovery, followed by using cloud infrastructure service, VDI, and deploy a private cloud infrastructure.

With regards to hyperconverged infrastructure, its priority over the next 12 to 18 months doesn't vary much across companies of different sizes. In fact, deploying hyperconverged infrastructure appears in relatively the same spot in a stack-ranked list regardless of company size.

The largest gaps in priorities between companies of different sizes include:

- **VDI** – Midmarket companies are nearly twice as likely to prioritize desktop virtualization versus smaller companies.
- **Deploying a private cloud infrastructure** – Larger enterprises are nearly twice as likely to prioritize private cloud versus their smaller counterparts.
- **ROBO** – Twice as many smaller companies than larger enterprises prioritize improving remote/branch office IT/efficiency.

**Which of the following would you consider to be your organization's most important IT priorities over the next 12 to 18 months?
(N=528, Multiple Responses, By Company Size)**

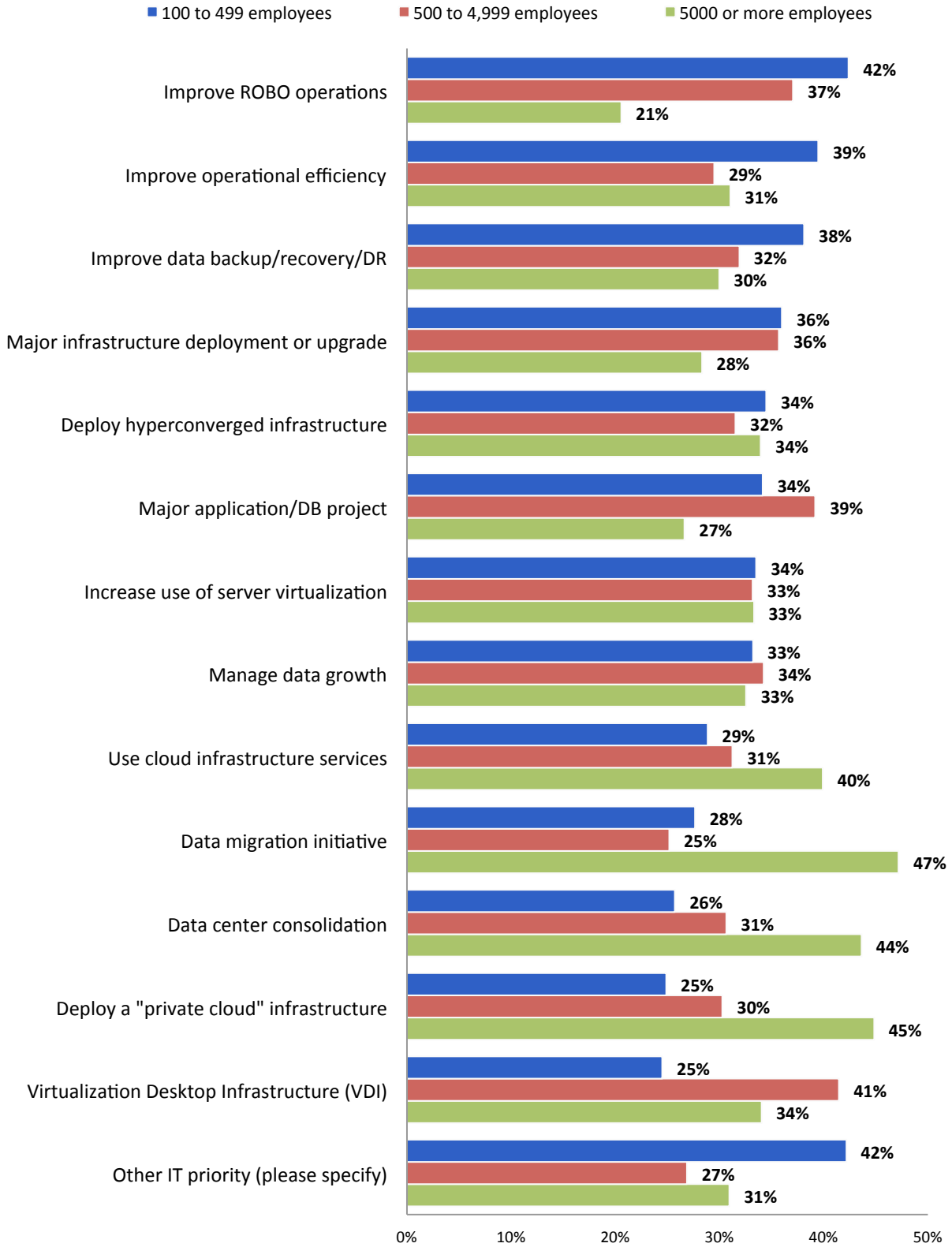


Figure 12 – IT Priorities By Company Size

IT Priority Alignment with Hyperconvergence

Today’s data centers are complex and difficult to manage. Over the years, IT leaders and staff have procured “point solutions” in attempts to correct challenges introduced by other services. For example, as new business needs began to overcome storage performance capabilities, companies bought flash-based caching systems. As disaster recovery needs became more critical, WAN accelerators were introduced in order to make replication solutions work. And the list goes on. Every time the cycle is repeated, the data center gets increasingly complex. Moreover, each new service introduces new costs in the form of maintenance, as well as the need for staff skills.

Data centers are among the most costly physical assets owned and operated by organizations. The cost is not just in the equipment that is deployed, but also in the sheer effort that it takes to manage that equipment, keep it running, and keep it maintained year over year. To make matters worse, many companies have deployed Band-Aid-like solutions to patch over problems that are introduced as the data center grows more complex or has challenges meeting emerging business needs.

To address these and other problems, companies are modernizing their data centers. As shown in Figure 13, **17% of survey respondents cite cost reduction as their primary driver for considering hyperconverged infrastructure.**

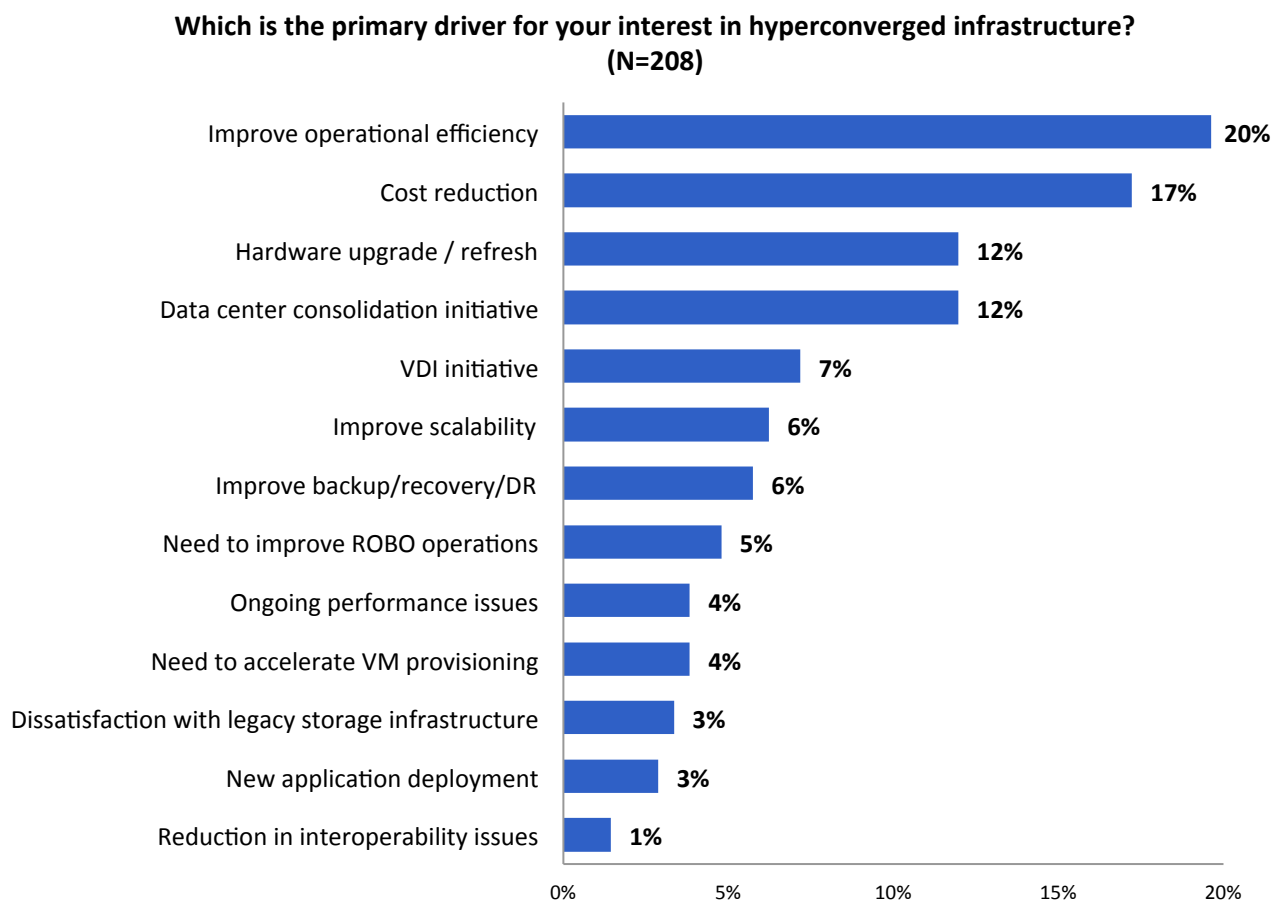


Figure 13 – Primary Driver For Interest in Hyperconverged Infrastructure

In comparing key drivers for hyperconverged infrastructure against larger IT initiatives, it was surprising to see that data protection ranked seventh in the list despite the fact that it was

identified as the highest IT priority to address. This may be due to the fact that enterprises are not equating modernizing the architecture with hyperconverged infrastructure with modernizing data protection; they continue to view hyperconverged solutions as simple conglomerations of servers and storage. Since, to many people, “hyperconverged” simply means exactly this, it may not be so far-fetched and they may not consider data protection as a key part of the hyperconverged package. Many hyperconverged infrastructure solutions include backup, recovery, disaster recovery, and business continuity capabilities. We believe there is opportunities for vendors with comprehensive data protection capabilities to further educate the market.

Company size does play a role with respect to which drivers are of most importance to IT, but not as much as would first appear. Drivers for hyperconverged infrastructure at large enterprises stand out, including the need to accelerate virtual machine (VM) provisioning, improve scalability, and improve operational efficiency. Similarly, for midmarket companies, VDI and hardware upgrade/refresh drivers are most apparent. For smaller organizations, hardware upgrade/refresh is the most compelling driver.

Priorities Matched By Interest in Hyperconvergence

Solving the critical IT challenges that were identified in Figure 5 is really important. Fortunately for many, hyperconvergence has the potential to solve many of the identified challenges. Figure 14 provides a breakdown for how these critical IT priorities align with respondents’ interest in deploying hyperconvergence.

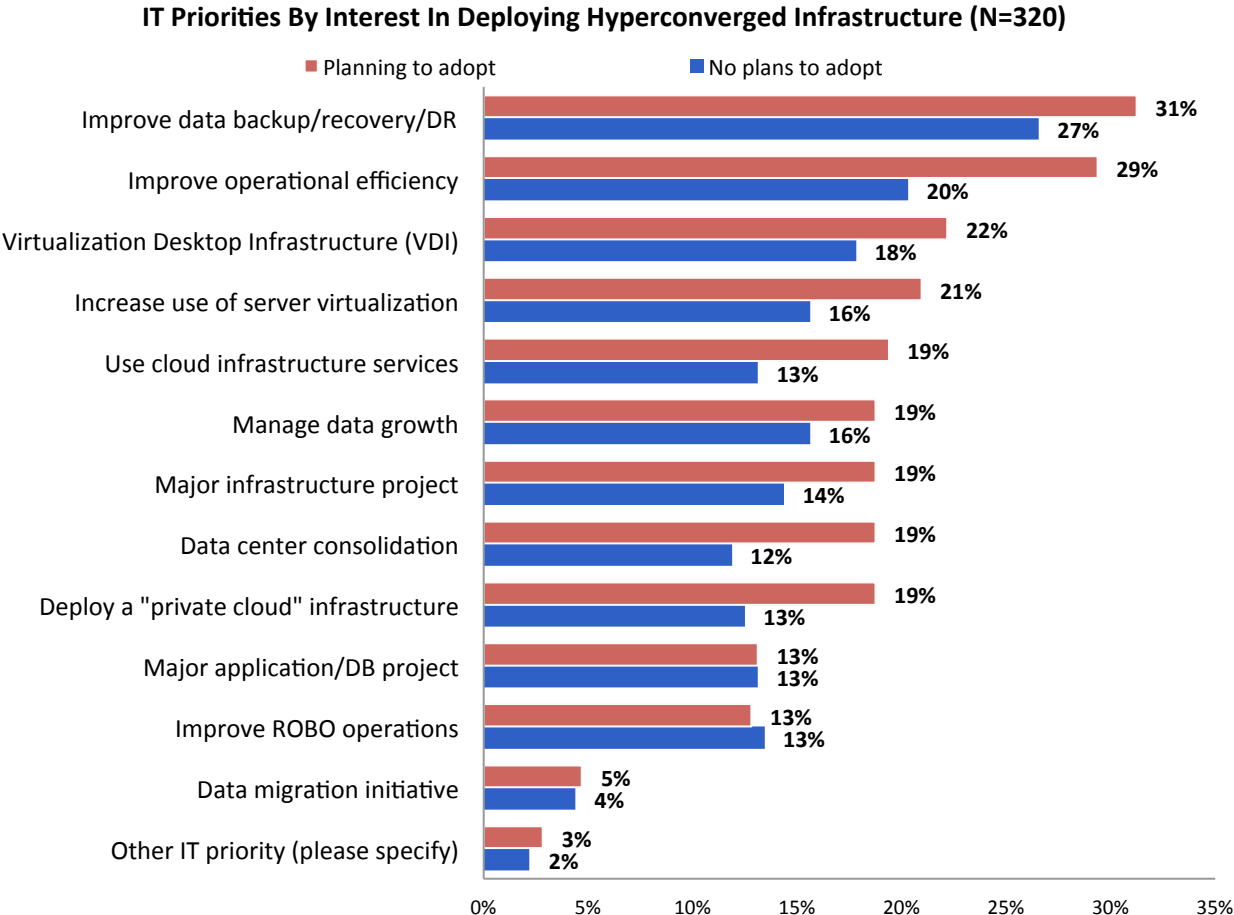


Figure 14 – IT Priorities By Interest In Deploying Hyperconverged Infrastructure

As we consider IT priorities by examining those considering hyperconvergence, a number of items become apparent:

- **Hyperconverged infrastructure vendors need to do more work to explain their data protection capabilities.** Many companies that identified backup and disaster recovery as critical priorities have no plans to consider hyperconverged infrastructure. Disaster recovery and backup/recovery are perennial problems. Any vendor that can help solve these challenges will have some advantage over other hyperconverged vendors in the market.
- **Similarly, many companies with remote office needs have no plans to consider hyperconvergence.** This is despite the fact that hyperconverged infrastructure provides great support in these scenarios with its ability to create a massive resource pool across hyperconverged infrastructure instances across sites and provide a single point of management. There's an opportunity for vendors to inform customers about the ROBO-friendliness of hyperconvergence.
- **Data center consolidation and private cloud deployments remain a sweet spot for interest in hyperconverged infrastructure.** These are two classic use cases for introducing next-generation data center architecture support the scale-out, agility, elasticity, automation and simplicity promises of cloud models.

Cost Savings

Some hyperconverged infrastructure vendors go far beyond a simple combination of servers and storage, and bring to the environment enterprise-class functionality that was difficult to achieve with legacy systems. This generally happens by way of the reduction technologies that are built into the system. Data reduction, for example, enables the assimilation of a number of infrastructure components such as data deduplication devices for production and backup workloads, load balancers, WAN accelerators, backup tools, and more. The goal for these types of systems is to reduce as much as possible the sheer variety of components running in the data center to make the system as a whole easier to manage and easier to scale. With production workload data reduced into as compact a form as possible, downstream operations, such as replication across a WAN, take place without the need for specialized equipment such as WAN accelerators.

Data Center Consolidation

Respondents that work in larger organizations identified data center consolidation as a critical IT priority. Data center consolidation can be lumped into either cost savings or operational efficiency or both. It's an important undertaking for many respondents with 25% indicating that it's a critical IT consideration. In fact, **12% of those considering hyperconverged infrastructure identify data center consolidation as their primary driver.**

Savings Beyond CapEx

When direct costs are compared between legacy architectures and hyperconverged infrastructure, it's likely that the cost for the hyperconverged system will be lower than the traditional solution. Most hyperconverged infrastructure systems are built on commodity, general-purpose x86 hardware, vastly reducing hardware costs in a data center. Further, don't forget the hardware beyond servers and storage. If there is no longer a need for an SSD-based caching appliance or a WAN accelerator, those hardware costs can also be eliminated.

These potential CapEx savings are just the very beginning of the story and can be dwarfed by the operational savings that can be realized. In fact, the *real* savings in a hyperconverged infrastructure scenario comes from operational savings. This converts savings from a single event (which is often a capital expense or CapEx) into something that takes place on an ongoing basis (which is often an operational expense or OpEx). Among the savings:

- Eliminates ongoing maintenance fees for ancillary appliances and services that are eliminated.
- Reduces power and cooling costs thanks to reduced hardware requirements.
- Reduces the need for ongoing training for a myriad of disparate platforms since many are eliminated.
- Lowers – or redirects – costs for technical IT personnel by simplifying operations.
- Improves processes with more high-level policy-based approaches, and fewer classes of hardware to manage.

As shown in Figure 15, among those that have adopted hyperconverged infrastructure, **nearly one-third (31%) identified cost savings as a key benefit.**

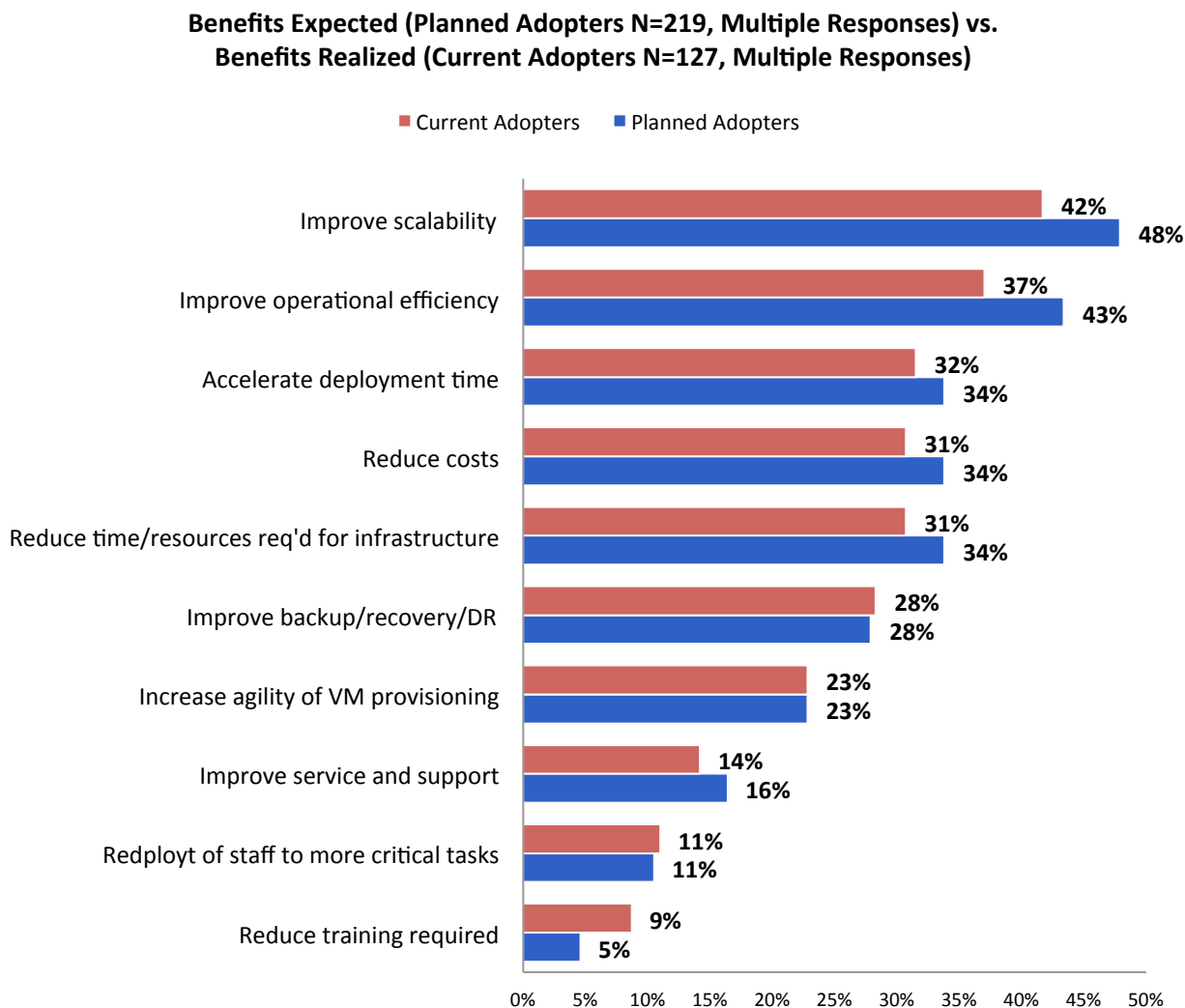


Figure 15 – Benefits Expected (By Planned Adopters) Versus Benefits Realized (By Current Adopters)

Simplicity

The bottom line is that making operations easier is another cost savings outcome from hyperconverged infrastructure; however, this one has serious second order benefits that can impact both the bottom line and even top line revenue. In the survey, improving operational efficiency (i.e., simplifying operations) is the biggest single driver for respondents considering hyperconverged infrastructure, with 20% of respondents indicating agreement. Among all respondents, **over 43% identify improving operational efficiency as a key IT initiative**. Among respondents that have adopted hyperconvergence solutions, **37% identify improved operation as a top benefit**.

Policy-Driven Administration

Policy enablement can lead to powerful automation. Consider this: many organizations strive to align business and technology policies with what is possible in the infrastructure. As more and diverse vendors and solutions are introduced into the data center, it becomes increasingly difficult to ensure that policies are consistent across all systems. Inconsistencies can lead to inefficiencies as IT struggles to keep up, or can lead to even worse outcomes, such as data loss or long recovery times in the event of some kind of outage.

By consolidating a myriad of data center functions in hyperconverged infrastructure, businesses can begin to apply policies that flow through the complete data center lifecycle without having to make a “synapse jump” from one vendor to another or between different kinds of devices. This can be particularly important when it comes to data protection policies, which will be discussed below.

Transforming Scalability

Consider scalability in the current data center. When the need for new resources arises, a flurry of activity takes place. New hardware is selected and procured, testing is performed, downtime is scheduled, and the new resources are eventually brought on line. Sometimes, this is a days-long process, but it can be a months-long one. Consider what needs to take place when adding expansion shelves into existing storage systems, for example. The sheer effort that goes into ensuring that shelf and even individual disk firmware revisions are current and that the system is running appropriate versions of software can be staggering.

This is why many of today’s scaling operations are considered “events” around which significant planning must occur in order to ensure success. They are time consuming and can be costly. This kind of scaling methodology also reduces the agility of the business. When IT needs to take weeks or months to deploy new infrastructure, the result is a business that waits.

Most hyperconverged infrastructure solutions on the market today have implemented a scale-out expansion architecture, which provides near-linear resource scalability. As the data center environment expands, new blocks of infrastructure carry with them additional compute, RAM, networking, and storage resources. Moreover, this scalability feature is a part of the base infrastructure. Rather than scaling being an “event” that requires weeks of careful planning, expansion takes place in a matter of minutes with little or no disruption to the existing environment. This is really important. It transforms scaling from an event to just another routine operation, as it should be. The ability to scale at will and without worry will be transformational for some organizations. It enables far more business agility than was provided in the past, when architectures were far more rigid and far more brittle.

Although only **6% of respondents identified improving scalability as their primary motivator for considering hyperconverged infrastructure**, this choice was sixth most popular, making it an important driver. Moreover, improving scalability can be considered a simplification feature, which is in line with the larger survey results. What's really important in scalability happens when looking at those that have already adopted hyperconvergence. **Forty-two percent of respondents identified improved scalability** as a key outcome for their projects—the number one response (see Figure 15).

When it comes to scaling, hyperconvergence attacks this issue from two angles:

- Enables companies to grow with reasonable granularity to reduce the amount of wasted resources that need to be deployed.
- Simplifies scaling operations. Simply plug in the new appliance, add it to an existing resource pool, and use it.

Other Simplicity Results

In re-examining an earlier chart regarding drivers for interest in hyperconvergence (see Figure 16), at 20%, improving operational efficiency garnered the most responses of the selections provided. Improve scalability, which can be considered an operational efficiency, got 6%. There were other responses that can reasonably be considered operational efficiency, reinforcing this critical need and desire in many organizations. These responses include:

- Reduction in interoperability issues (1%).
- Need to improve ROBO infrastructure and operations (6%).
- Need to accelerate VM provisioning (4%).
- Solve ongoing performance issues (4%).

When combined in this way, 39% of responses can be considered improving operational efficiency in some form. Even the 17% of respondents that identified cost reduction as their primary objective could be lumped here given that the outcomes can be similar. Likewise, data center consolidation can be considered here. As such, financial and operational efficiency account for the majority of the responses (68%) around need for hyperconverged infrastructure.

**Which is the primary driver for your interest in hyperconverged infrastructure?
(N=208)**

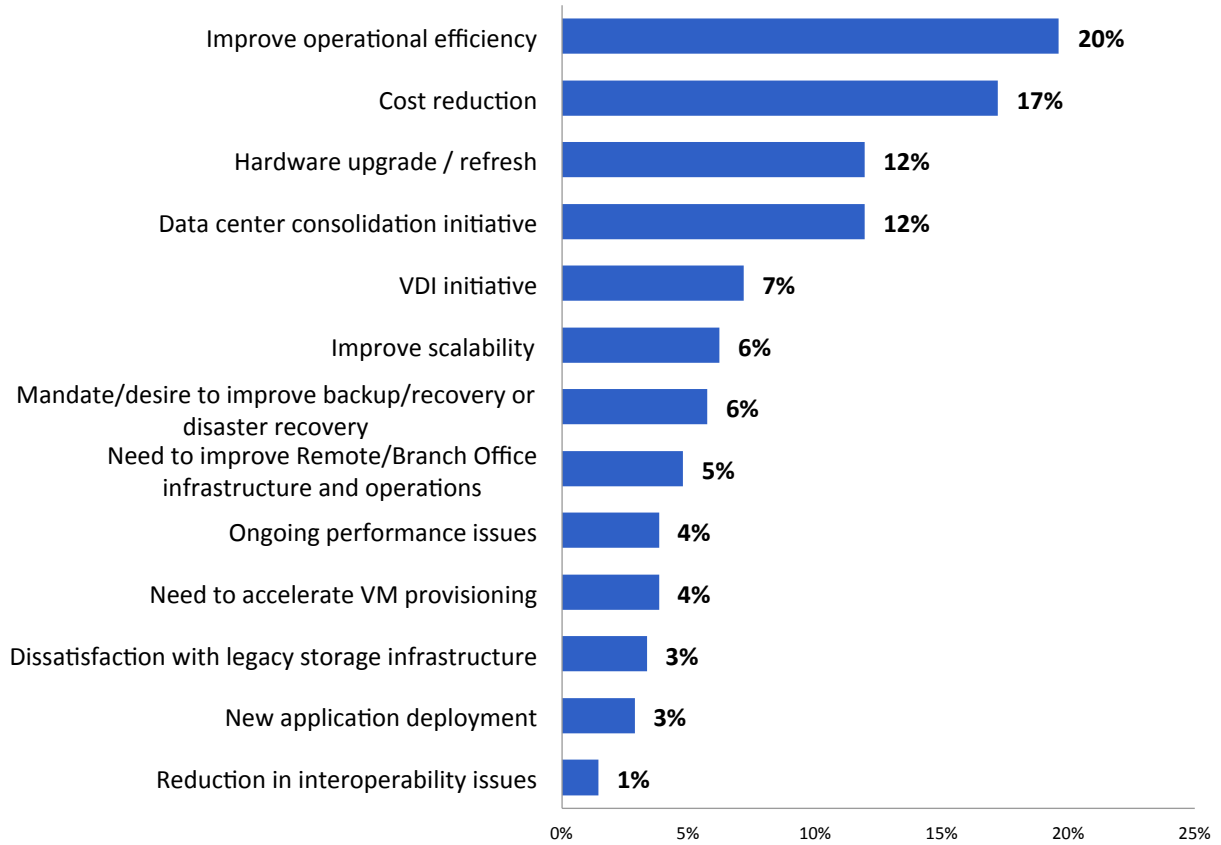


Figure 16 – Primary Driver For Interest In Hyperconverged Infrastructure

Data Protection and Disaster Recovery

When asked about the most critical IT priorities in an organization, improving data backup and disaster recovery emerged as the single most important overall need. However, when asked about the primary reason that organizations are considering hyperconverged infrastructure, respondents did not rate data protection very highly – it was the sixth-highest factor. In our opinion, this disparity comes from a lack of understanding for how hyperconverged infrastructure solutions address these issues and is an opportunity for vendors in this space to educate end users about data protection challenges and how hyperconvergence addresses them. That said, it's entirely possible that end users have, in fact, scanned the hyperconverged infrastructure market and determined that data protection is not a strong feature in the solutions they've reviewed. It would behoove vendors to gain a better understanding behind the misalignment between this top IT priority and the view of how hyperconverged solutions address this issue.

Overarching Policies

The virtual machine is the center of the universe when it comes to applications in most modern data centers. Most new workloads are deployed in virtual machines. However, consider the state of centralized policy in the data center. For data centers that have equipment from a wide variety of vendors or that have a lot of “point solutions,” such as WAN accelerators and replication tools, there could be a number of touch points when it comes to policies. These various touch points don't always align very well with one another, particularly when there are different vendors in the mix. For example, while it may be possible to define some policies at the hypervisor layer, it's often difficult to apply storage policies that have any awareness of virtual machine boundaries, although that is starting to change as storage vendors adopt VMware vVols. However, there are a myriad of other devices in the data center that can suffer from the same problem.

Since the virtual machine is the center of the data center universe, why not implement a system that focuses directly on these constructs? Hyperconverged infrastructure solutions provide this opportunity to varying degrees, depending on vendor. Rather than go to three different places to define storage, backup, and replication policies, some hyperconverged infrastructure systems enable these policies to be attached to the virtual machine.

Conclusions

Hyperconvergence Takeaways

Seeming Mismatch Between Hyperconvergence Expectations and IT Priorities

The largest challenge facing IT pros is backup and recovery, but it's not at the top of the list when these same people consider the potential benefits of hyperconverged infrastructure. It's entirely possible that the respondents do value the potential for improving backup and recovery, but have become enamored with the hyperconvergence benefits that ranked higher on the list. In short, it may not be that they don't value hyperconverged infrastructure backup and recovery options, but that they just see the other benefits as potentially being more impactful.

It's also entirely possible that respondents simply do not believe that hyperconverged infrastructure solutions are mature enough to replace critical data protection services. Data protection, while being one of the most unexciting IT responsibilities, is also one of the most important. Organizations have built carefully crafted constructs to handle this responsibility and may be very wary of upsetting the balance.

Adoption Will Be Big, But Not Right Away

It's clear that hyperconverged infrastructure is of interest ... just not immediately. There are a lot of reasons for this, many of which were revealed in the answers provided by those explaining why they *don't* have interest in the technology. These reasons include:

- The organization has already performed a recent data center technology upgrade.
- The technology still needs to mature. There are many CIOs that are very conservative – and rightly so – when it comes to critical data center infrastructure. For many, there is a perception that this is still a young market that has a lot of growth and change ahead of it.

We expect to see hyperconvergence adoption increase rapidly as more mainstream vendors enter the market, a move that really justifies the entire concept. VMware's foray into the space in 2014 was just the beginning and was a big step toward pushing acceptance of the approach.

Hyperconvergence Lives Up To the Promise

Unlike many other technologies, hyperconverged infrastructure appears to be largely living up to the hype and expectations based on respondents' reaction to what they expected to see versus what they're actually seeing. The alignment isn't perfect, but there is relatively little separation between expectations and reality. Oftentimes, technology that is as hyped as hyperconverged infrastructure has become completely fails to meet expectations.

Research Implications For IT Professionals

Continue to Evaluate

Many IT pros are weighing the potential benefits for hyperconverged infrastructure and many remain on the fence over whether it's an appropriate solution for their needs. As this space continues to mature and as vendors continue to enhance their offerings, end users should re-evaluate their needs regularly, and evaluate them against current products. Even if today's hyperconverged product mix doesn't fit needs, check back in six months. The amount of energy and innovation in the hyperconvergence space is incredible. Moreover, as some of the reasons for non-adoption begin to expire – i.e. just replaced infrastructure – we highly

recommend that organizations seek deep understanding of the hyperconverged market as a part of the data center upgrade cycle.

Consider Needs Holistically

Many of the challenges facing IT organizations appear to fall within different resource silos. Over time, IT pros have been trained to look at data center resources and services individually rather than collectively. The “best of breed” approach has become commonplace in many organizations, but has led – in some cases – to significant complexity in the data center. Rather than considering hyperconverged infrastructure as a simple “servers + storage” replacement solution, end users should look at the full market and consider the potential benefits beyond just servers and storage. Such benefits might include disaster recovery, data protection, data reduction, and, in some cases, even networking. Hyperconverged infrastructure has the potential to address a number of the items that were identified as IT priorities.

Take a TCO Approach to Cost

Many organizations look at the initial price of a solution as the barometer for how much that solution will cost. With hyperconverged infrastructure, this cursory approach will not be sufficient as hyperconverged infrastructure can replace many different products in the data center. As outlined above, many different items on the hyperconvergence benefits list can be translated into cost savings. However, if not considering the options as a part of the overall cost savings of a solution, hyperconvergence may appear to be more expensive than traditional approaches. When including potential productivity savings and other operational improvement benefits, a hyperconverged solution may be much less costly than a traditional approach to data center infrastructure.

Consider A Single Use Case to Start

While hyperconvergence promises to revolutionize the data center, there’s no need to do a complete rip and replace. For new initiatives or pockets of technology refresh, consider implementing hyperconverged infrastructure. Finding a focused entry point to introduce a modern architecture may be more realistic and less risky.

Research Implications For Vendors

Education

Results of this survey indicate that IT buyers may not fully understand the hyperconvergence trend or respondents may feel that adoption of hyperconverged infrastructure will not take place for years. Although respondents may not have a complete grasp of hyperconvergence, it is clear that many are facing IT challenges that can be quickly addressed through the adoption of hyperconverged infrastructure solutions; they just don't know it. This points to a need for hyperconverged infrastructure solution vendors to target materials at potential users that focus on the pain points discussed in this report.

Hyperconvergence Adoption Timeframe

For vendors in the hyperconvergence space, analyzing the adoption timeframe data point by IT priorities reveals a clear plan of action. Although it's true that operational efficiency is a huge takeaway, when considering adoption timeframes, this factor doesn't come to play until the three- to six-month mark. Even though it certainly needs to be emphasized as a key benefit of hyperconverged infrastructure for longer-term deals.

The data suggests some guidance for hyperconverged infrastructure vendors:

- For immediate term – next 1 to 3 months
 - **Data growth.** Help customers better manage the growth of data in their organizations.
 - **Data center consolidation.** Large customers have an immediate need and desire to consolidate both systems within data centers, and the number of data centers they manage.
 - **Infrastructure deployments.** There is clear opportunity for those that are on the cusp of deploying new infrastructure.
- Next 1 to 12 months
 - **Improving operational efficiency.** Help customers realize the major potential benefits that come from improving operational efficiency through the implementation of hyperconverged infrastructure solutions.
 - **VDI.** While not as strong as it may have been in the past, virtual desktop initiatives may remain a way to introduce hyperconverged infrastructure to an organization.
 - **Private cloud.** IT organizations are re-thinking IT service delivery with cloud computing principles in mind: enable rapid provisioning of IT resources from a central resource pool, enable elasticity of resources, and introduce automation. Coincidentally, these are some of the same benefits of hyperconverged infrastructure.

Appendix A: Hyperconvergence Background

IT is under ever increasing pressure to pay more attention to critical business needs. Over the years, these efforts have been met with mixed success, and, in recent years, there is evidence that businesses are currently dissatisfied with IT's progress in this regard. In early 2015, CIO magazine released the results of their annual survey in which they query both IT leaders and non-IT executives regarding overall satisfaction with technology services. In this particular survey, CIOs and other IT leaders will be disappointed to learn that their business counterparts are not in agreement as to the overall efficacy of IT.

There is good reason for this rift. Over the years, the IT department has managed to accrue all kinds of technology components intended to solve individual problems brought about by previous purchases. IT has implemented solid state disk caching systems to improve storage performance, WAN accelerators to move data more quickly across the Internet connection, deduplication in backup appliances and software to manage backup data growth, and much more. Each time a new component is added, new complexity is introduced, which increases costs and widens the rift between IT and the business.

Moreover, comprehensive data protection and disaster recovery also remain elusive goals for many IT organizations. These kinds of processes have often traditionally required dedicated equipment and software, which means that there is additional cost and complexity associated with these kinds of tools.

The past few years have seen major upheaval in the ranks of the information technology vendor market, particularly for those vendors that sell technology targeted at the data center. Nowhere is this market more in flux than in the converged infrastructure space and, specifically, the space that has become known as hyperconverged infrastructure.

Hyperconverged infrastructure is a rapidly growing space that is defined by systems that basically eliminate the need for traditional SAN devices and, in some cases, collapse even more devices. Obviously, that doesn't mean that storage is no longer a critical part of the data center. In fact, hyperconverged infrastructure solutions came into existence due to the significant challenges that organizations faced with their legacy SAN-based storage solutions. In recent years, business needs have begun to far outstrip the ability of legacy storage solutions to keep up with growing performance needs. It's common knowledge that emerging services such as virtual desktops and data analytics require significant levels of storage performance. However, even mainstream virtualization needs are driving this performance need as companies steadily extend their virtualization efforts to include large Tier-1 applications such as ERP, Microsoft Exchange, Microsoft SQL Server, Oracle, and more.

At the same time, CIOs and other business decision makers are working hard to ensure that IT is meeting the needs of the business. Over the years, the data center has become an increasingly complex place requiring teams of staff members to make sure that systems remain operational. As the aforementioned performance challenges have appeared, IT staff have struggled to keep pace and the result has been the introduction of even more complex system requiring more upkeep, more maintenance dollars, and more staff.

Hyperconverged infrastructure was introduced to solve the performance, cost, and complexity challenges that have plagued IT. These systems operate by returning to an IT environment that leverages direct-attached storage running on commodity hardware, but many solutions go far

beyond this baseline. In these baseline systems, there are a multitude of hard drives and solid state disks installed in each of the x86-based server nodes that comprise the environment. Installed on each of these nodes is the traditional hypervisor but, in addition, there is software made available by hyperconverged infrastructure vendors. There are vendors that collapse services such as deduplication, compression and WAN optimization; data protection; and cloud gateway technologies into their solution. At its most basic level, this software aggregates all of the storage from across all nodes of the environment and presents it back to the hypervisor for consumption by virtual machines. In essence, hyperconverged infrastructure leverages the concepts behind software-defined storage systems in order to modernize and simplify the data center environment.

Hyperconverged infrastructure is akin to the Swiss army knife in that this single solution has the capability to meet numerous needs and solve numerous problems.

Appendix B: Respondent Demographics

Geography

Given the nature of the survey, it's not a surprise that 75% of respondents hailed from North America (see Figure 17). Beyond North America, EMEA garnered 21% of the responses with the balance coming from APJ and ROW.

Which of the following is the geographic location of your company's headquarters? (N=512)

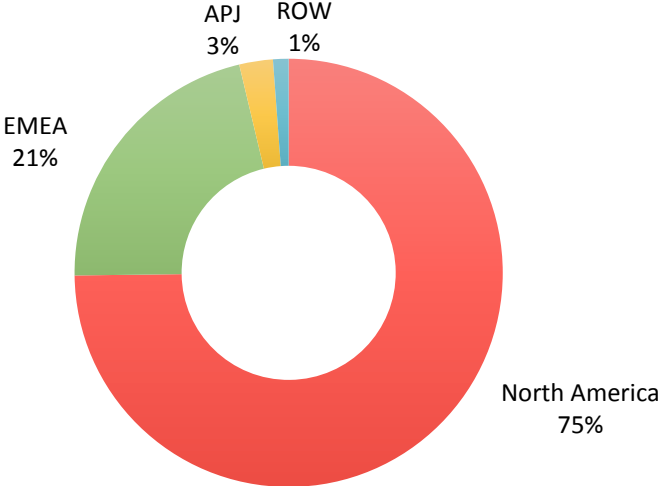


Figure 17 – Geographic Location of Respondent’s Company Headquarters

Number of Employees

As far as company size goes, respondents work in organizations that run the gamut from as few as 100 employees to well beyond 20,000 employees. Note that the survey eliminated responses from respondents that work in organizations with fewer than 100 employees. Beyond that, there is surprising consistency in the number of respondents per size band, as shown in Figure 18.

Please note that, for simplicity, we combined company size categories into small, medium, and large in order to more easily perform company size comparisons in this report.

Approximately how many total employees does your organization have worldwide? (N=512)

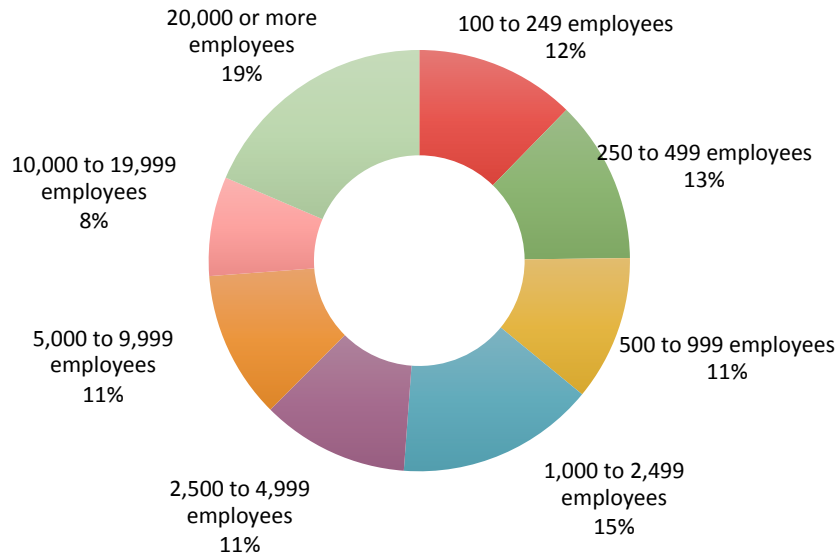


Figure 18 – Respondent's Company Size (Total Employees)

Respondent's Protagonist

The vast majority of respondents represent the IT organization within their companies. Shown in Figure 19, close to half (49%) of all respondents identified as IT staff with another half (50%) of remaining respondents working in IT management. A scant 1% of respondents identified as executive management. This statistics should not be construed as proof that executive management has nothing to do with decisions around hyperconverged infrastructure. Instead, bear in mind that respondents were identified through lists that are comprised primarily of IT staff and management.

Which describes your current role? (N=512)

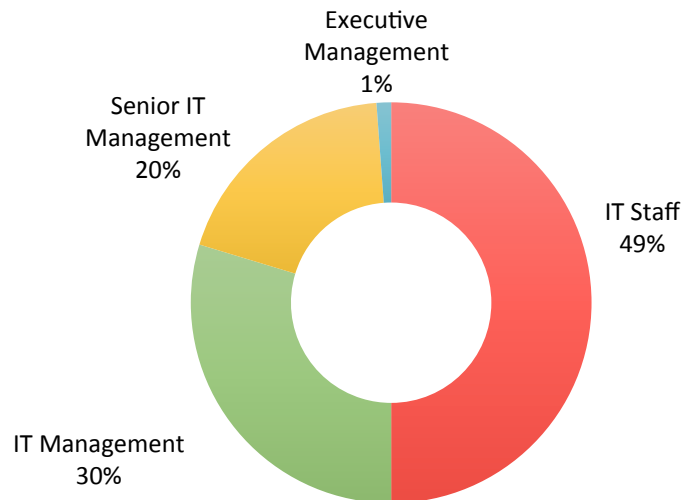


Figure 19 – Respondent's Current Role

It's interesting to note that, in smaller organizations, management takes a larger role in these decisions. In Figure 20, note how companies with 100 to 499 employees steadily rises as evidence of this fact.

Current Role by Company Size (# Employees)

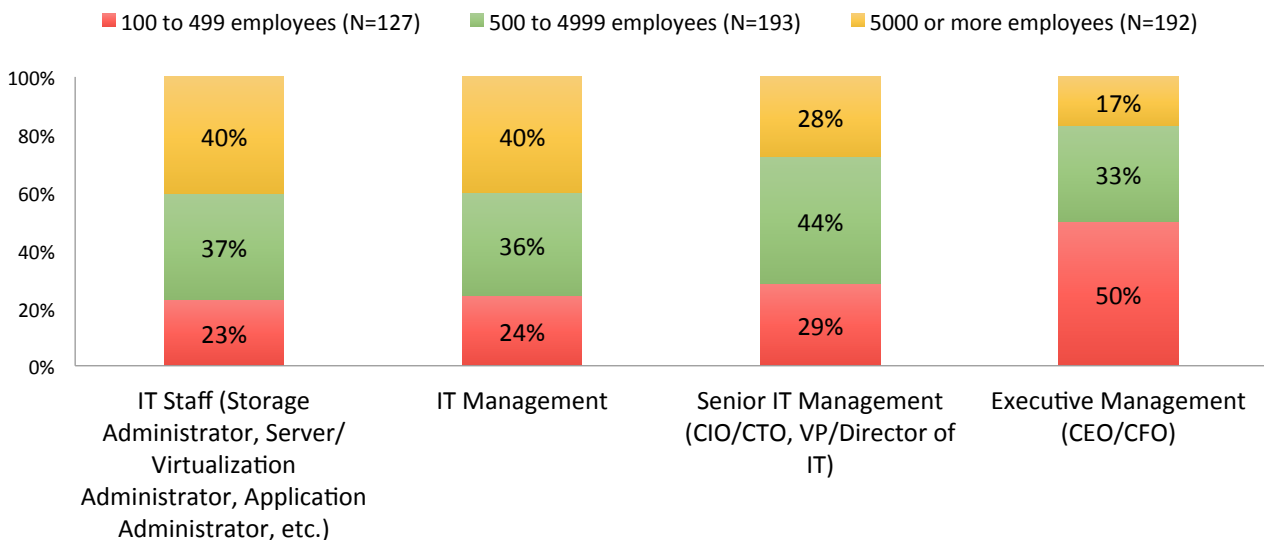


Figure 20 – Respondent's Role By Company Size

Respondent's IT Functional Responsibility

Hyperconverged infrastructure is a topic that enjoys attention from across the spectrum of job roles within the IT organization (see Figure 21), but with concentration (29%) by those with responsibility for x86 virtualization and systems management. Additionally, 45% of respondents identified as being in either a management or architecture role. Remaining respondents hail from the generalist ranks as well as security, storage, networking and security. We were surprised to see that only 1% of respondents identified as being responsible for end user computing. Virtual Desktop Infrastructure (VDI) was one of the original targets for hyperconverged infrastructure in its early days. It's very obvious that the technology has moved beyond its roots.

Which best describes your functional responsibility in IT? (N=512)

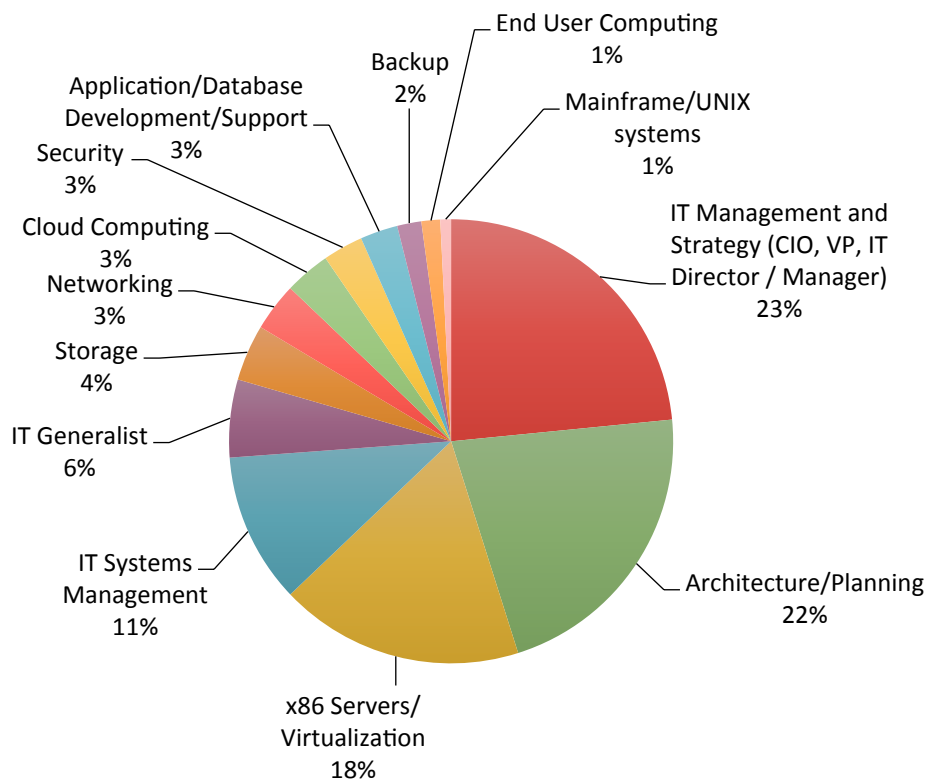


Figure 21 – Respondent's Functional Responsibility In IT

Figure 22 provides a look at the responsibility breakdown by company size and reveals some interesting pieces of information:

- Smaller organizations seem to have much more involvement from IT senior leadership than those in larger organizations.
- Although not borne out of the survey, it's a fact that architects don't often exist in smaller companies. That's likely one of the big reasons that more architects responded for larger companies.

IT Function By Company Size

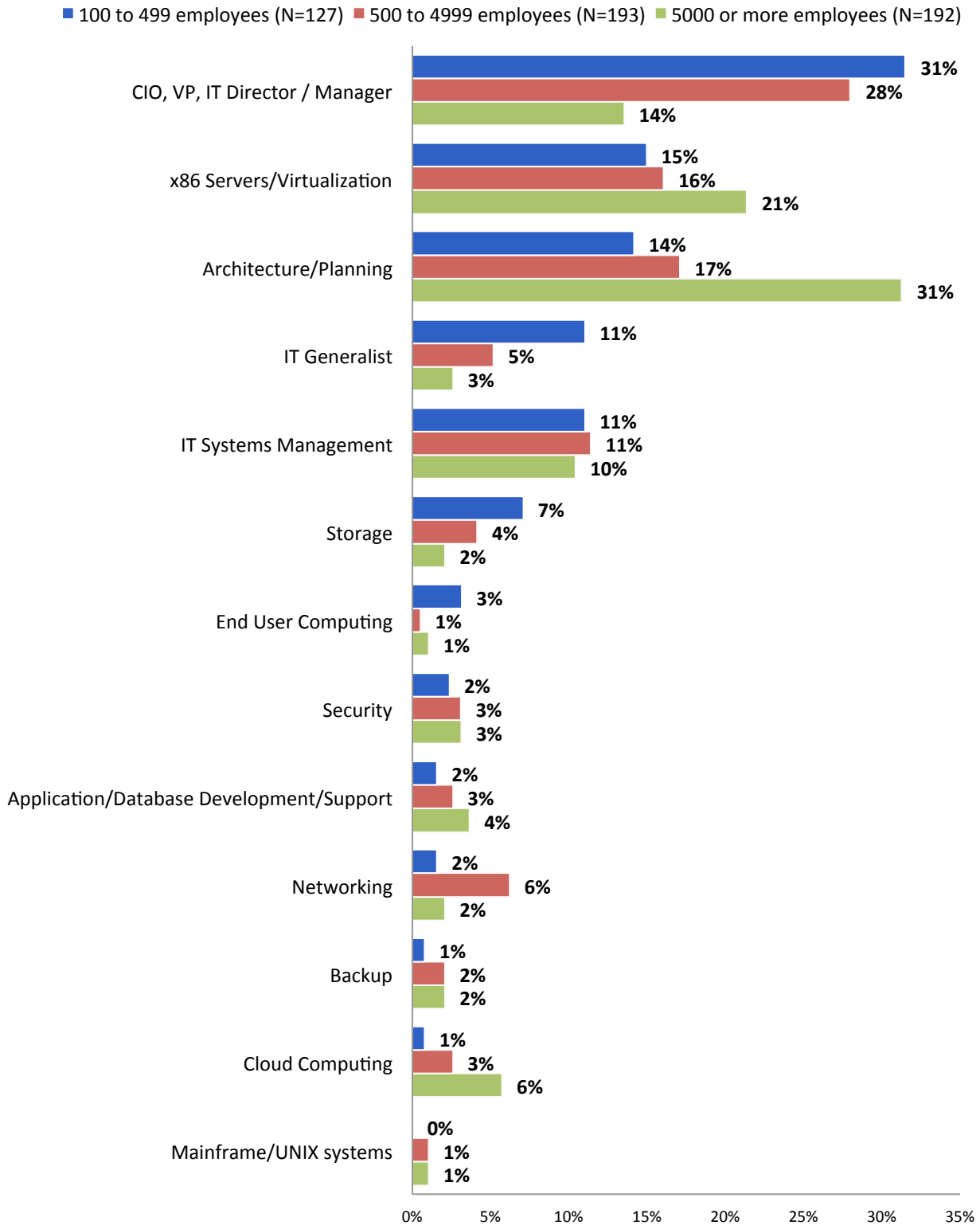


Figure 22 – Respondent's IT Function By Company Size

Principal Industry

As shown in Figure 23, industry representation among respondents was heavily skewed toward Information Technology, Financial Services, and Health Care with these three categories making up well over one-third (41%) of the respondents. Also well represented were Manufacturing and Education, which, when combined with the previous industries, made up more than half of all respondents. It should be noted that it's possible that some respondents include themselves in the Information Technology category even if they actually represent a different vertical, so analysis around this response should keep that in mind.

Which of the following best describes the principal industry of your organization? (N=511)

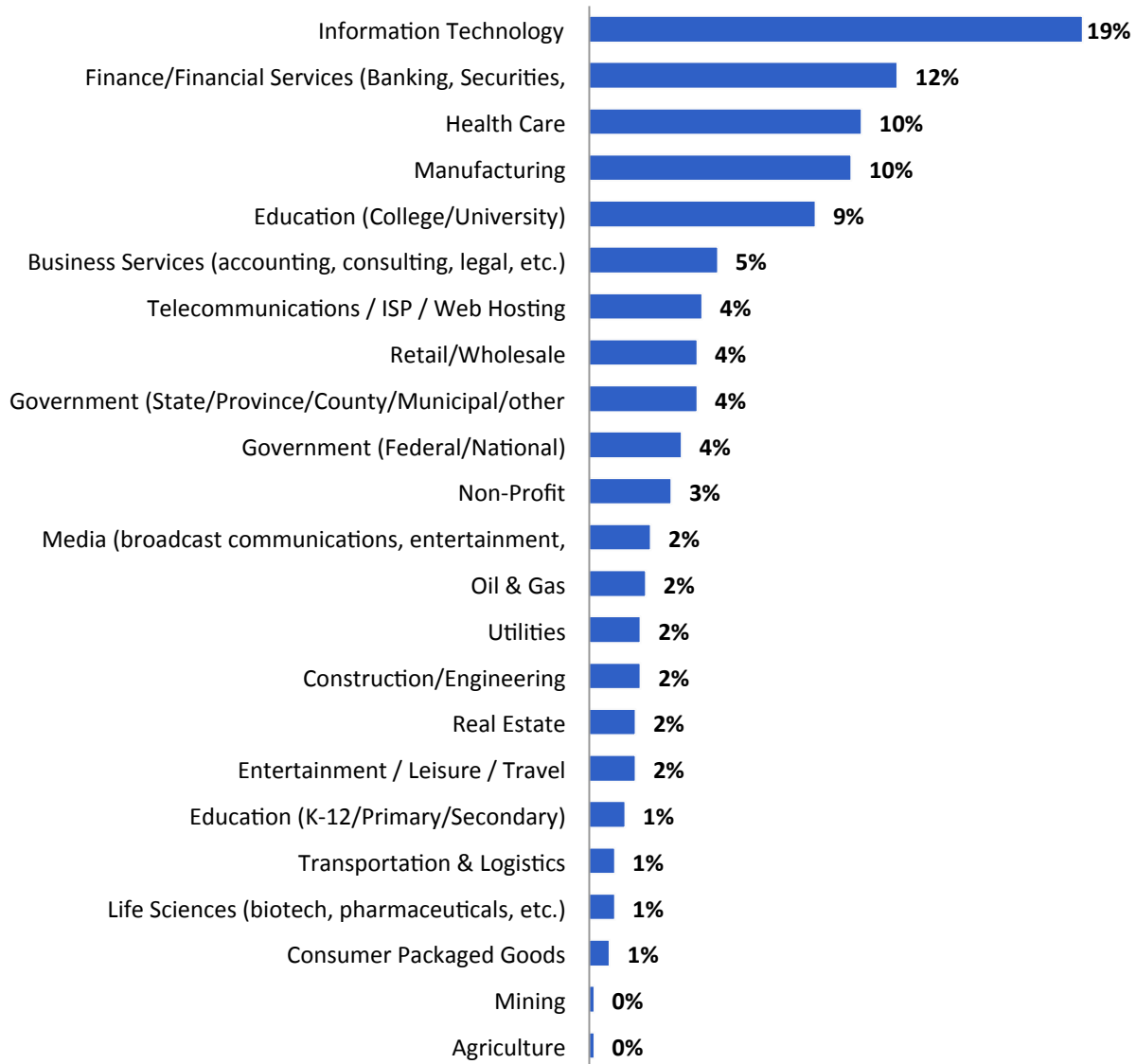


Figure 23 – Primary Industry of Respondent's Organization

Technical Characteristics

Number of Data Centers

It's no surprise to see that, as an organization gets larger, its number of data centers also increases as shown in Figure 24. For example, 56% of respondent companies with 100 to 499 employees have just a single data center. Just 3% of companies in this size range identified as having 20 or more data centers. With hyperconverged infrastructure, this question becomes critically important and having multiple data centers begins to open up far more opportunities for improving backup and recovery, business continuity, and more.

Number of Data Centers by Company Size (# Employees)

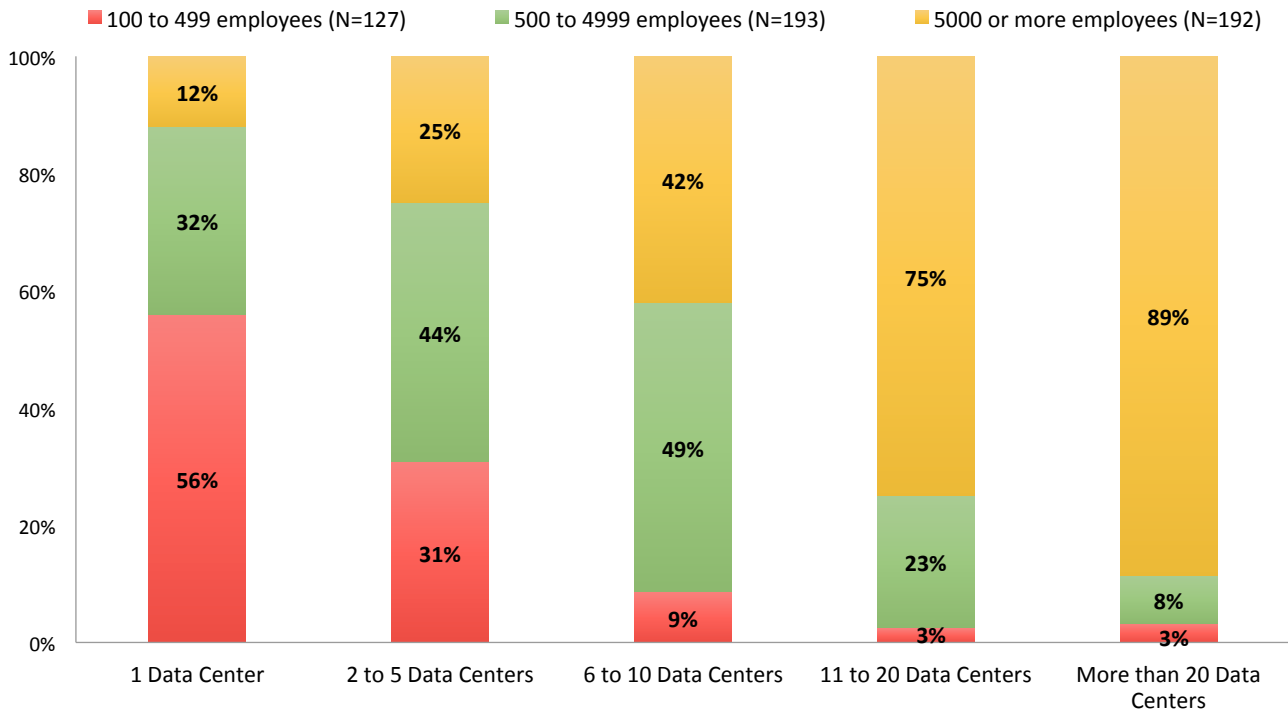


Figure 24 – Number of Data Centers In Respondent's Organization – By Company Size

Virtualization Penetration

Company size and hypervisor use are great statistics but are largely meaningless unless there is significant virtualization penetration in the organization. That is, what percentage of the data center environment is virtualized? Figure 25 shows that 85% of respondents are at least 50% virtualized. This is critically important as organizations consider hyperconverged infrastructure, for which virtualization is a prerequisite.

Of all x86 servers that can be virtualized in your environment, approximately what percentage have been virtualized to date? (N=512)

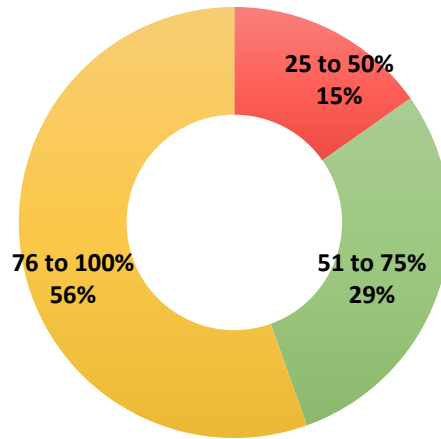


Figure 25 – Percent of Eligible x86 Servers Virtualized To Date

How Virtualization Affects IT Priorities

For those already heavily virtualized, it's no surprise that they don't have a need to increase use of virtualization as much as others, as is clearly seen in Figure 26. Here, too, the big trends plot well. Increased operational efficiency and better data protection are out in force. However, for those with less virtualization in place, there are two interesting observations:

- Operational efficiency is far more important for those that are less virtualized. This could be interpreted as indicating that those more heavily virtualized have more efficient operations overall.
- Virtual desktops are not that important to those with less virtualization. This information can be interpreted as meaning that these organizations are simply behind the curve and are still focused on server rather than desktops.

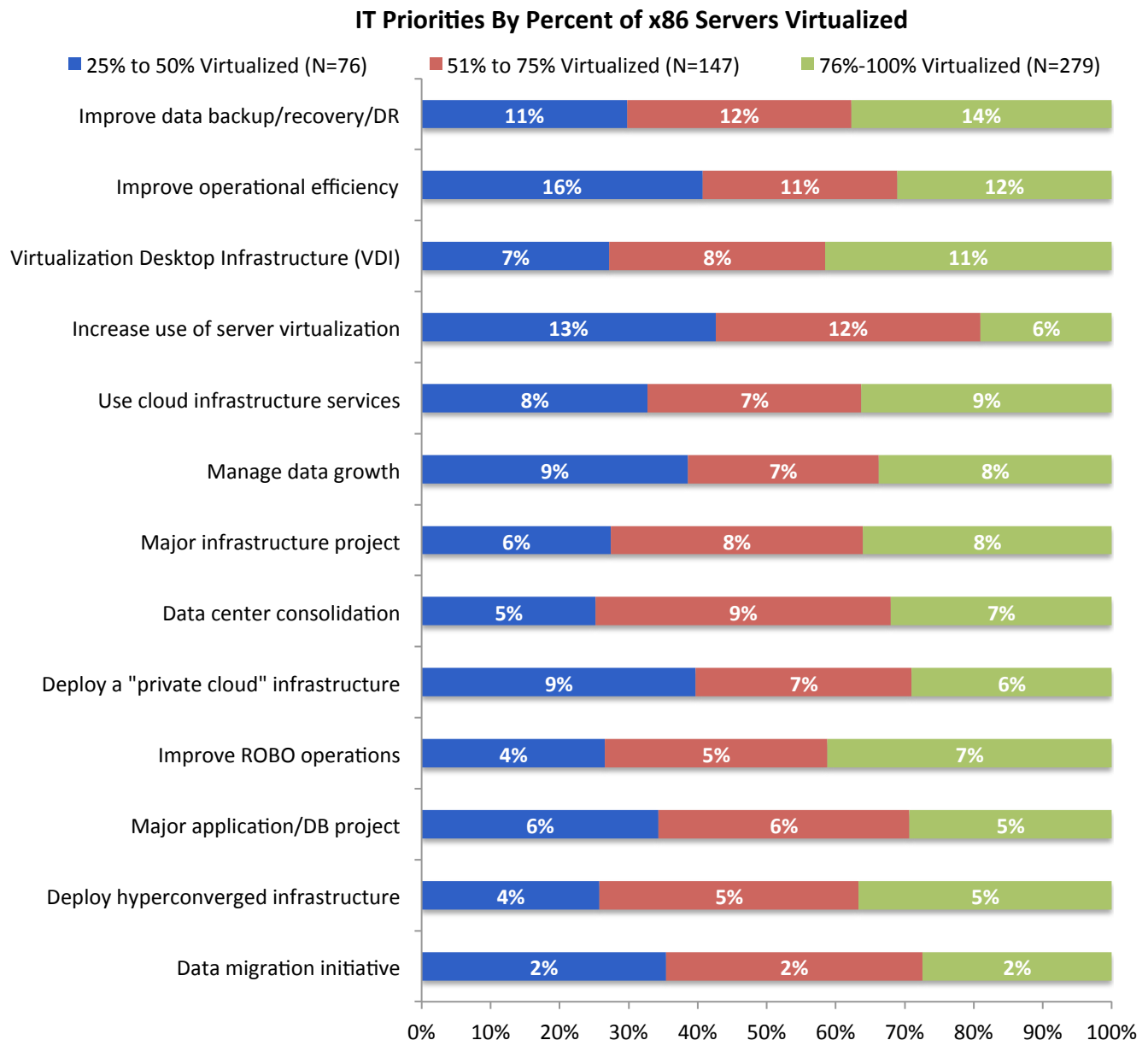


Figure 26 – IT Priorities of Respondent's Organization – By Percent of x86 Servers Virtualized

Hypervisor in Use

As Microsoft Hyper-V and KVM become more popular as alternatives to VMware vSphere, it's always interesting to discover what is truly going on with regard to the hypervisor. It comes as no surprise that most respondents are using VMware as their hypervisor of choice, particularly given VMware's longevity and feature set (see Figure 27). Hyper-V, however, is coming up fast with almost one-third of respondent companies in production with this hypervisor. Citrix XenServer enjoys 18% penetration among respondents while KVM garnered 6%.

For hyperconverged infrastructure vendors, the message is very clear. If you're supporting VMware only, you're doing just fine... for now. We expect to see Hyper-V usage continue to grow quickly in coming years, particularly due to the fact that a new version will ship with Windows 10 Server. Even though XenServer is ahead of KVM today, we believe that KVM is a more strategic opportunity than XenServer in the long run. Many organizations focus their Xen efforts on virtual desktop scenarios whereas KVM is used for more general purpose virtualization needs. As such, we see KVM as a more strategic part of hyperconvergence vendor roadmap efforts than XenServer, but neither is critical at this point and we don't believe that lack of support for either XenServer or KVM puts any hyperconverged infrastructure vendor at risk.

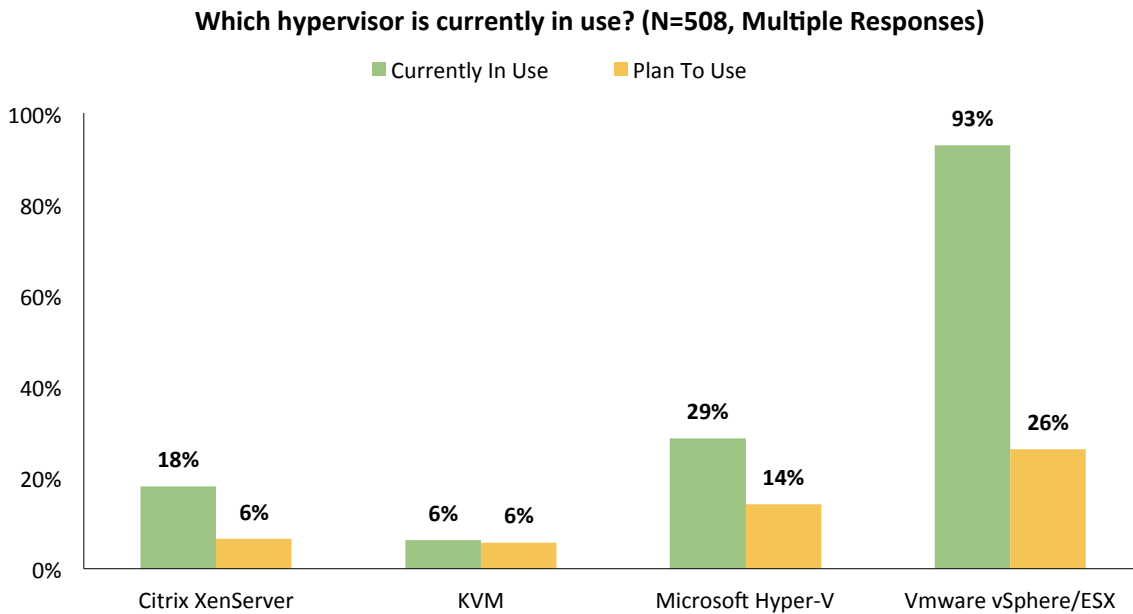


Figure 27 – Hypervisors Currently In Use In Respondent's Organization