



# Hyperconverged Infrastructure in the Modern Enterprise

*Datcenter Challenges and Hyperconverged Infrastructure Sentiment*



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**Hewlett Packard**  
Enterprise

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# Introduction

Hyperconverged infrastructure – the melding together of servers and storage into a single appliance with streamlined management – is a technology growing in popularity even as people struggle to figure out exactly what it can do, what it can't do, and just how it impacts the IT organization.

In order to understand these items, ActualTech Media partnered with Hewlett Packard Enterprise and surveyed almost 550 information technology professionals. Respondents hailed from more than 40 different industries and represented companies of all sizes. People from across the spectrum – from CEOs to VPs of Infrastructure to IT Generalists – responded to our survey. In some cases, the respondent's role yielded interesting information, as you will learn later in this report.

Our goal was multifaceted. We sought to learn about people's existing datacenter challenges, how they feel about emerging technologies, such as hyperconverged infrastructure and software defined storage, and then to discover perceptions around hyperconvergence.

## Key Findings

- 29% of survey respondents disagree with the statement “The IT environment in our company enables users to service their own needs without having to regularly engage directly with IT.”
- 45% of respondents say that they have difficulty maintaining staff breadth and depth of skills. Cost and simplicity are key drivers for hyperconverged infrastructure. We believe that these two data points are related.
- There remain organizations that have not virtualized any of their systems. It's only 2% of respondents, but these organizations are effectively locked out of hyperconverged infrastructure adoption until they are willing or able to adopt virtualization in some form.
- Hypervisor choice correlates directly to company size. Smaller companies equally prefer vSphere and Hyper-V (32% each) while larger ones favor vSphere (67%) over Hyper-V (18%).
- Multi-hypervisor support is not a key driver for hyperconverged infrastructure. This is partially due to the fact that 64% of respondents run a single hypervisor. As long as the solution supports their chosen hypervisor, there is no need to support others.
- Software defined storage and hyperconverged infrastructure are equally compelling to respondents, with each technology garnering just over 50% of respondent votes when they were asked which trends they would consider for adoption. Only 26% of respondents expect to consider adoption of containers as a future direction.
- 33% of respondents have deployed hyperconverged infrastructure in some form while 46% are considering it. Only 21% have indicated that they will skip this option. This bodes very well for vendors in the space as there will be ample opportunity for growth.
- Smaller companies are more likely to deploy hyperconverged infrastructure to replace their entire datacenter environment. Larger companies are the likeliest to adopt hyperconvergence as just a part of their datacenter strategy.

- Reducing cost is the key benefit that companies look for in a hyperconverged infrastructure adoption. Almost 60% of respondents identify this as their primary driver. 51% want easier deployment and 46% want it to be easier to scale the datacenter environment. These results align with the common wisdom that businesses are looking for datacenter environments that are less expensive to operate and that are more flexible.



## About The Author

Scott Lowe is a partner in and co-founder of ActualTech Media. Scott has been in the IT field for close to twenty years and spent ten of those years in filling the CIO role for various organizations. Scott has written thousands of articles and blog postings over the years and regularly creates compelling new content for clients.

## 543 Respondents



## 17 Countries



## 22 Verticals



## 49 U.S. States



# Datacenter Challenges

**T**he datacenter is the hub for nearly every piece of technology in an organization. Databases reside there; networks terminate there; storage spins away. Over the years, IT staff have continued to add resources and services to this business-critical location. At first, such additions weren't that problematic; IT staff could assimilate some new technology. Over time, though, additions have become more complex and, in some cases, more expensive. Let's look at some facts from our survey.

In its current form, the datacenter environment isn't easy to manage, at least according to the 28% of survey respondents who disagreed with the statement "the existing datacenter environment is easy to manage and does not require subject-matter (resource-specific) experts for each resource." 44% were neutral on this same statement while 28% agree with the statement.

Figures for these statistics appear in Figure 1 on the next page.

When asked about their thoughts on the statement "The IT environment in our company enables users to service their own needs without having to regularly engage directly with an IT staff member," 29% of respondents disagreed. Many traditional datacenter services don't lend themselves well to self-service. However, there are a number of emerging trends that aim to change this paradigm. User self-service has the potential to transform an organization by freeing up IT staff as users begin to serve their own needs—for example, a developer spinning up his own virtual machines for testing. However, such efforts require significant investment in software for the infrastructure, and not all organizations see this as a priority. Such investments include buying infrastructure that can be "composed" via software-based tools and that include application programming interfaces (APIs) to do so.

In what is very good news for IT organizations, 56% of respondents agree that their IT organizations consistently meet the needs of their businesses. On the other hand, this means that 44% are not feeling that IT can meet the needs. However, bear in mind that the survey targeted IT pros and that the results may look different if end users are targeted in such a survey.

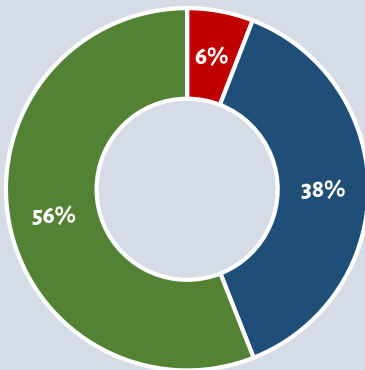


Common concerns—cost and scale of the data center environment—don't seem to be major issues for survey respondents, with 10% feeling that their datacenter environment is not affordable and 14% indicating that scaling their datacenter resources is not a simple task. That said, an additional 45% and 42%, respectively, indicated that they are neutral on these issues, which could be easily construed as there being room for improvement on these fronts.

There are a number of ways in which “not affordable” can be interpreted. It could mean that the initial acquisition cost for new hardware is too high. It could mean that the ongoing maintenance costs are too high. It could mean that the solution requires too many IT staff to be dedicated to it and, as such, the costs are too high.

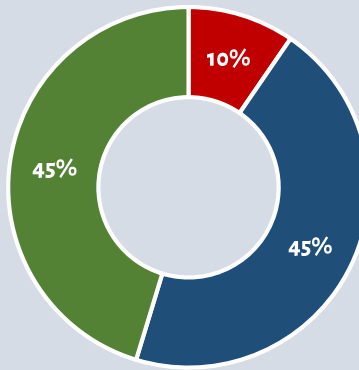
**Our IT organization consistently meets current business needs**

■ DISAGREE ■ NEUTRAL ■ AGREE



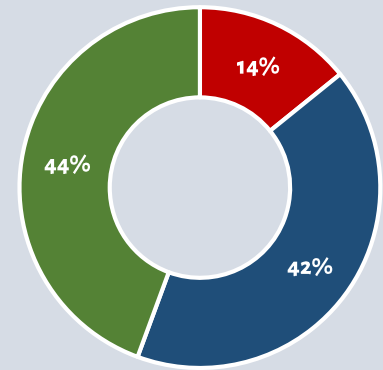
**Our data center environment is affordable**

■ DISAGREE ■ NEUTRAL ■ AGREE



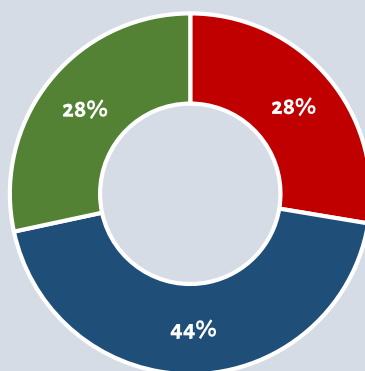
**Our data center environment is very easy to scale—to grow as new business needs emerge**

■ DISAGREE ■ NEUTRAL ■ AGREE



**The existing data center is easy to manage and does not require subject-matter experts**

■ DISAGREE ■ NEUTRAL ■ AGREE



**The IT environment in our company enables users to service their own needs**

■ DISAGREE ■ NEUTRAL ■ AGREE

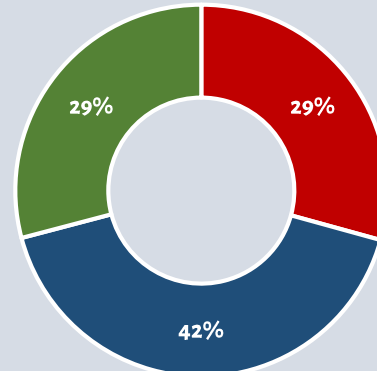


Figure 1: Respondents' views regarding the IT organization and the datacenter

## Virtualization Penetration

Interestingly, there remain organizations that have not yet implemented any kind of virtualization. 2% of survey respondents indicate that they are in this category. However, 67% of respondent organizations are at least 50% virtualized. Over the years, this statistic has steadily move from the lower end of the spectrum toward 100% for some companies. When it comes to the topic of hyperconvergence, this virtualization penetration statistic In Figure 2, you can see that, as you move from 0% virtualized closer to 100% virtualized, the trend line definitely increases, indicating that more companies are doing more virtualization.

### How heavily virtualized is your current environment?

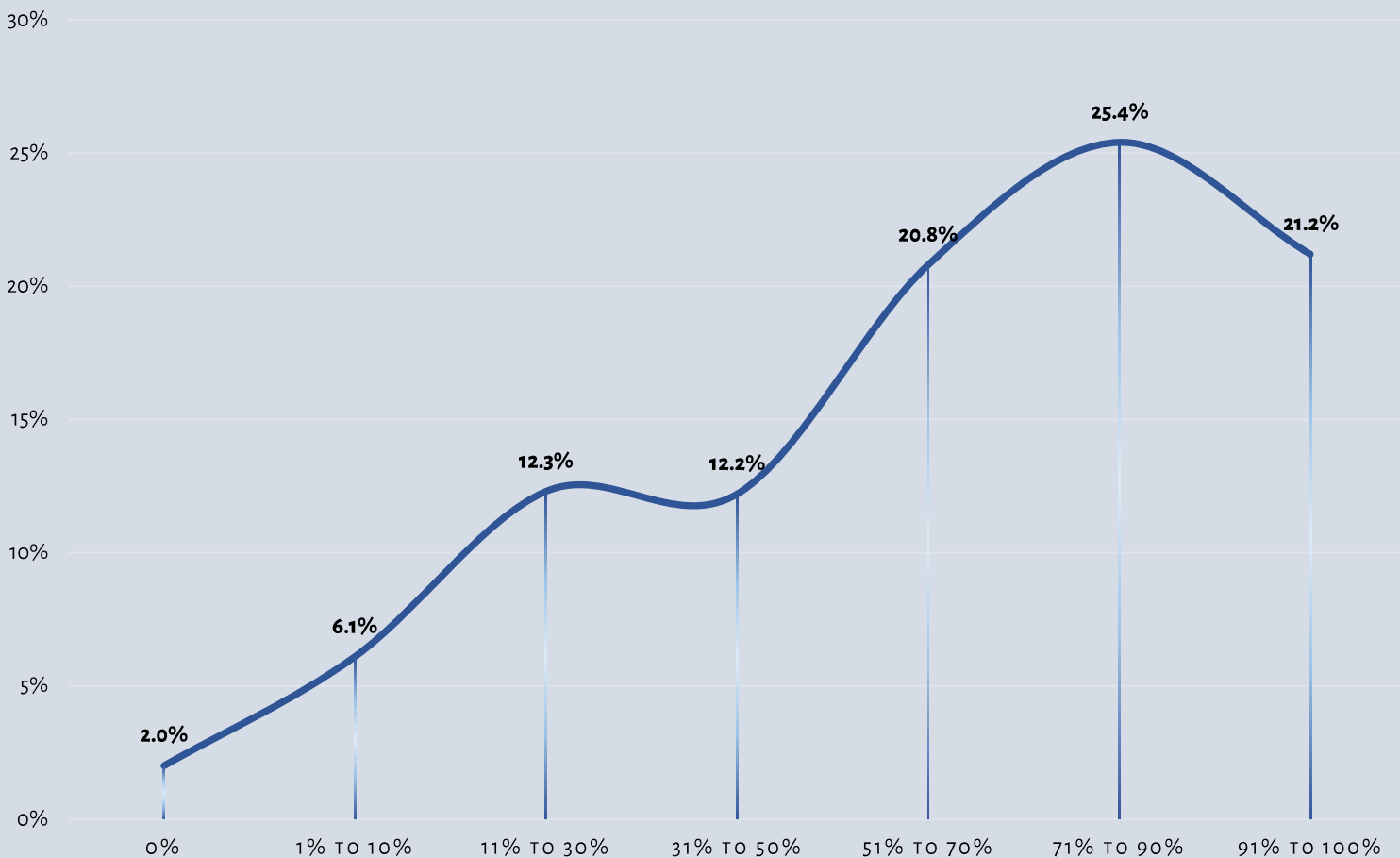


Figure 2: Virtualization penetration in the respondent company



## Hypervisor Usage

It comes as no surprise that VMware remains the most popular choice in terms of hypervisor. vSphere continues its datacenter dominance with just under 68% of the market in our respondent population. That's followed by Hyper-V, which takes around 37% of the market. This is far higher than previous surveys by ActualTech Media have indicated. Oracle's hypervisor, which has been experiencing tremendous growth, comes in third with 17%. Xen garners 13% and KVM 10%. KVM is an interesting case here and is enjoying something of a renaissance thanks to hyperconverged infrastructure. There are a number of hyperconvergence platforms that support just KVM. The vendors that provide the platform have built infrastructure around KVM – backup, DR, etc. – to enable KVM's use for production workloads.

### What hypervisors are in use in your organization?

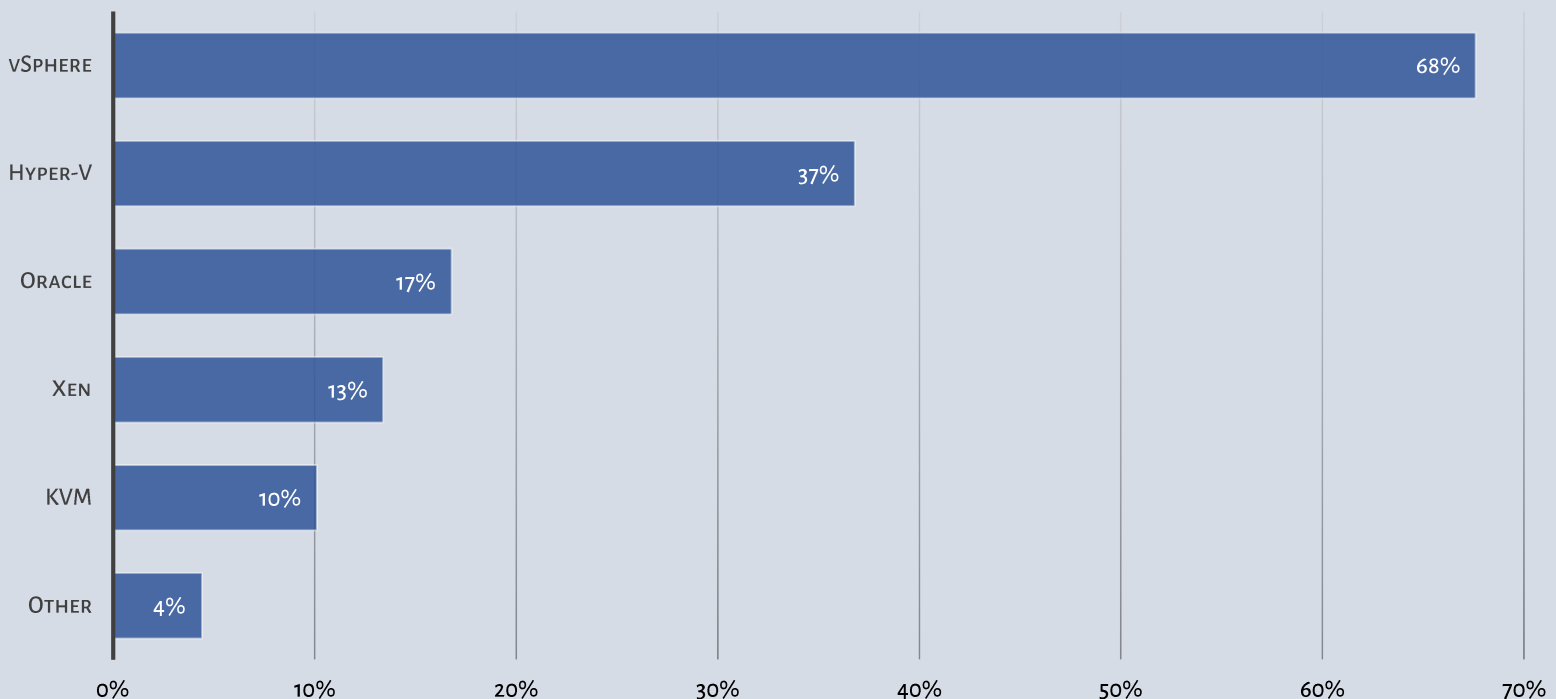


Figure 3: Hypervisor selection in respondent organizations

It's really not a surprise at all that vSphere is the clear choice when looking at all respondents, but things start to look more interesting when the data is considered in terms of virtualization penetration. In Figure 4(next page), you can see that, for those that are less than 50% virtualized, vSphere and Hyper-V are neck-in-neck for the top spot. Beyond 50% virtualization, vSphere's popularity steadily increases and hits 67% for those that are 91% to 100% virtualized. Possibly, for companies that are not mostly virtualized, the hypervisor is seen as a commodity. Further, since respondents were allowed to choose more than one hypervisor, it's very likely that different hypervisors have different purposes.

For some, vSphere is a production hypervisor and Hyper-V is used for lab work. However, for many smaller organizations that don't need centralized hypervisor management, Hyper-V's free price tag and simplicity is often very compelling, particularly in verticals, such as education and non-profit, in which Microsoft provides aggressive product discounts. In general, vSphere and Hyper-V both enjoy support from vast ecosystems that provide comprehensive management, deployment, monitoring, and other ancillary tools, making them more popular than some other options.

### What hypervisors are in use in your organization? (by virtualization penetration)

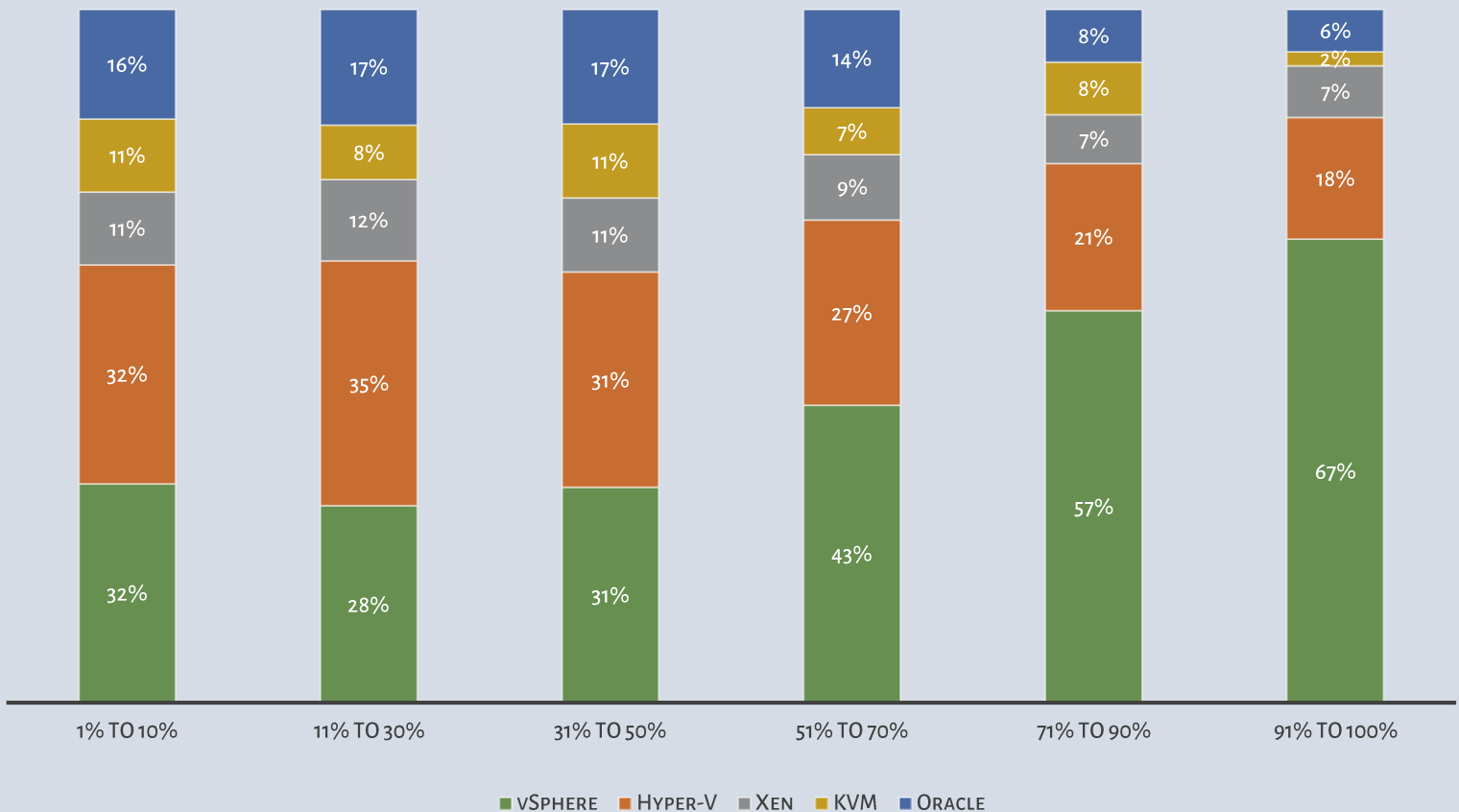


Figure 4: Hypervisor selection in respondent organizations broken down by virtualization penetration

As you can see in Figure 5, 64% of respondents use a single hypervisor, which means that 36% of those using a hypervisor are using multiple products in their environments. 25% use two hypervisors and the remaining respondents use three or more.

## Number of hypervisors in use in respondent organizations

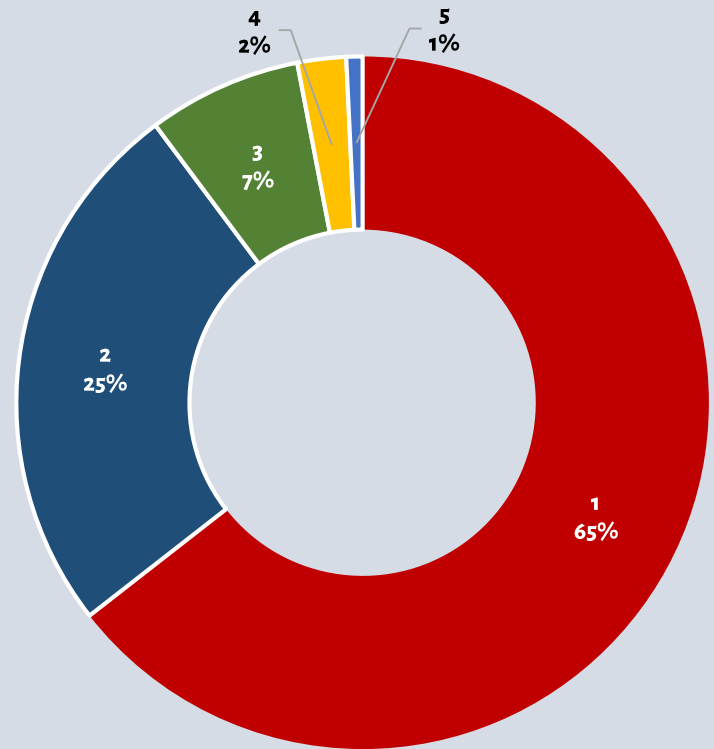


Figure 5: Number of hypervisors in use in respondent organizations

## Perceived IT Challenges and Needs

A number of emerging datacenter architectures have been created in response to a perceived need to make managing the datacenter simpler than it has been in the past. The real question, though, is this: just how valid are people's concerns around datacenter complexity? Is this a real phenomenon?

One way to determine where people's concerns lie is to ask them about their most significant challenge. To that end, we asked survey respondents to indicate their level of agreement with a number of statements. On the the statements people were asked to respond to was to say whether their organization is experiencing "difficulty maintaining wide breadth of staff skills and knowledge." Over 45% of respondents agree that they are experiencing problems in this area. In other words, these respondents are struggling to maintain appropriate staffing levels with staff with sufficient skills and knowledge to maintain their datacenter environments. There could be any number of reasons for this concern. Many organizations have chosen to run barebones IT operations and may have never had sufficient staff and skills. Other organizations may have reduced their IT staff as a cost savings measure and now find themselves having difficulty maintaining everything.



This challenge is followed by more challenges that are likely directly related to staff skills: primarily, datacenter complexity. 34% of respondents say they are experiencing challenges supporting their remote office/branch office environments and 33% say that datacenter complexity is a key pain point. Just what do people mean by “complexity” as it pertains to the data center? In general, as companies have added more and more equipment and services and variety to the data center, it’s required new skills, more money, and more time to maintain. At the same time, the variety of services much all be carefully intertwined and integrated with one another. Over time, these integrations can become so tangled that unraveling them to make adjustments to the environment to meet new business needs can become difficult and expensive.

## Which of the following IT challenges, if any, do you believe are impacting your company?

CHALLENGE

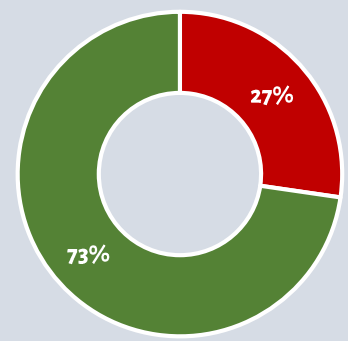
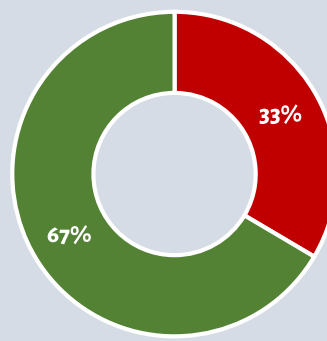
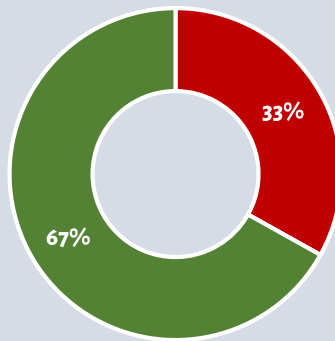
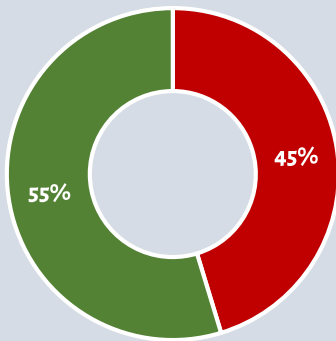
NOT A CHALLENGE

Difficulty maintaining wide breadth of staff skills and knowledge

Data center complexity

Remote office or branch office support challenges

Data center expense



Lack of reliable virtual desktop infrastructure

Need to deploy private cloud

Inability to support big data initiatives

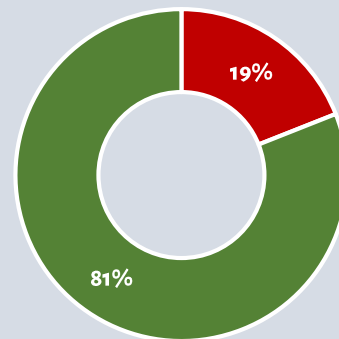
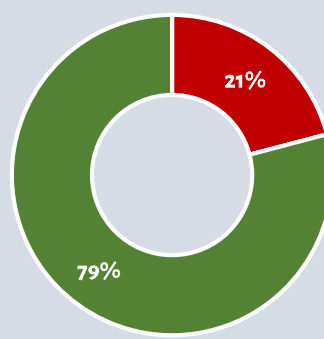
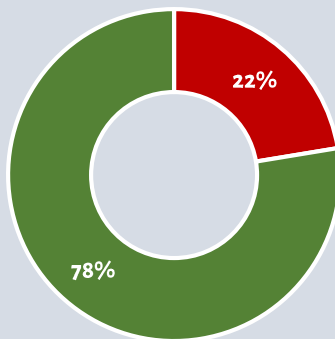


Figure 6: Key IT challenges facing respondent organizations

All of the identified concerns point to a critical need for new ways to implement and manage critical datacenter infrastructure. In response to these critical needs, vendors are responding with the development of hyperconverged infrastructure, which boasts far simpler deployment and administration models than generally found with more traditional datacenter products and approaches.

Adoption of hyperconverged infrastructure shouldn't mean that businesses must compromise when it comes to certain infrastructure capabilities. We asked respondents to identify the importance of a number of infrastructure capabilities. Unsurprisingly, the need for high availability was acknowledged as the more important infrastructure feature with a rating of 4.55 out of 5. High performance—again, unsurprisingly—was also rated very high, with 4.27 points out of 5. Rounding out the top 3 features was business continuity, with 4.22 out of 5 points.

It's always interesting to watch the market react to perceived user needs. For quite some time, hypervisor choice in the form of support for multiple hypervisors has been an oft-discussed requirement for hyperconverged infrastructure. However, in light of the fact that 64% of respondents use a single hypervisor, it's not surprising that multiple hypervisor support scored just 2.88 out of 5 points. However, one wouldn't want to mistake that for thinking that hypervisor choice isn't important. After all, if you intend to deploy hyperconverged infrastructure, you do need the solution to support whatever hypervisor you're running. Not all solutions support all hypervisors.

## How important are the following infrastructure features to your business?

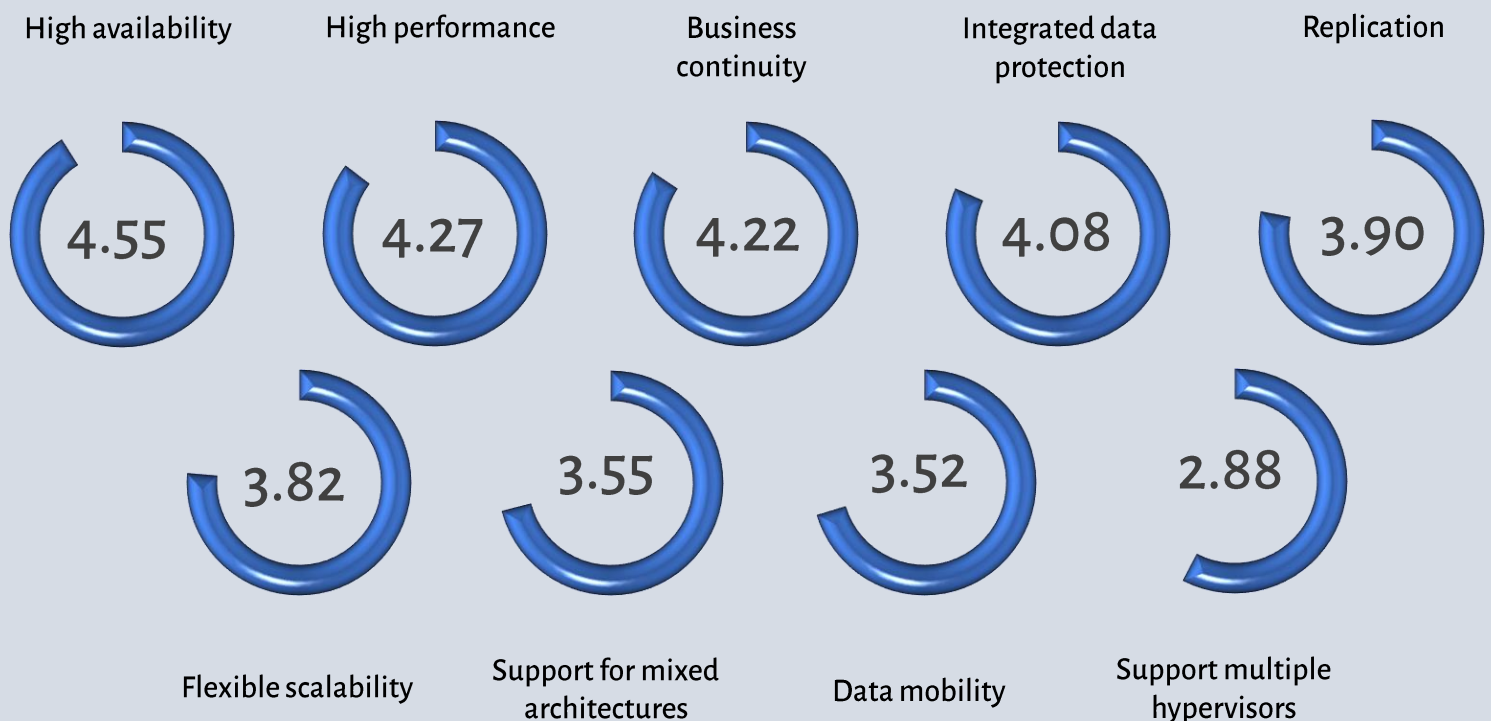


Figure 7: Criticality of specific infrastructure features and capabilities

## Adoption of Emerging Technologies

We wanted to find out from respondents their overall interest levels in several emerging technologies, one of which is hyperconverged infrastructure. 51% of respondents indicate that they expect to eventually adopt hyperconverged infrastructure and 52% say the same regarding software-defined storage (Figure 8). Only 26% say that implementing container-based virtualization is on their roadmap. Given the application revisions that are necessary to really support containers (at least at present), this low consideration rate comes as no surprise.

### What trends you expect to consider for adoption?

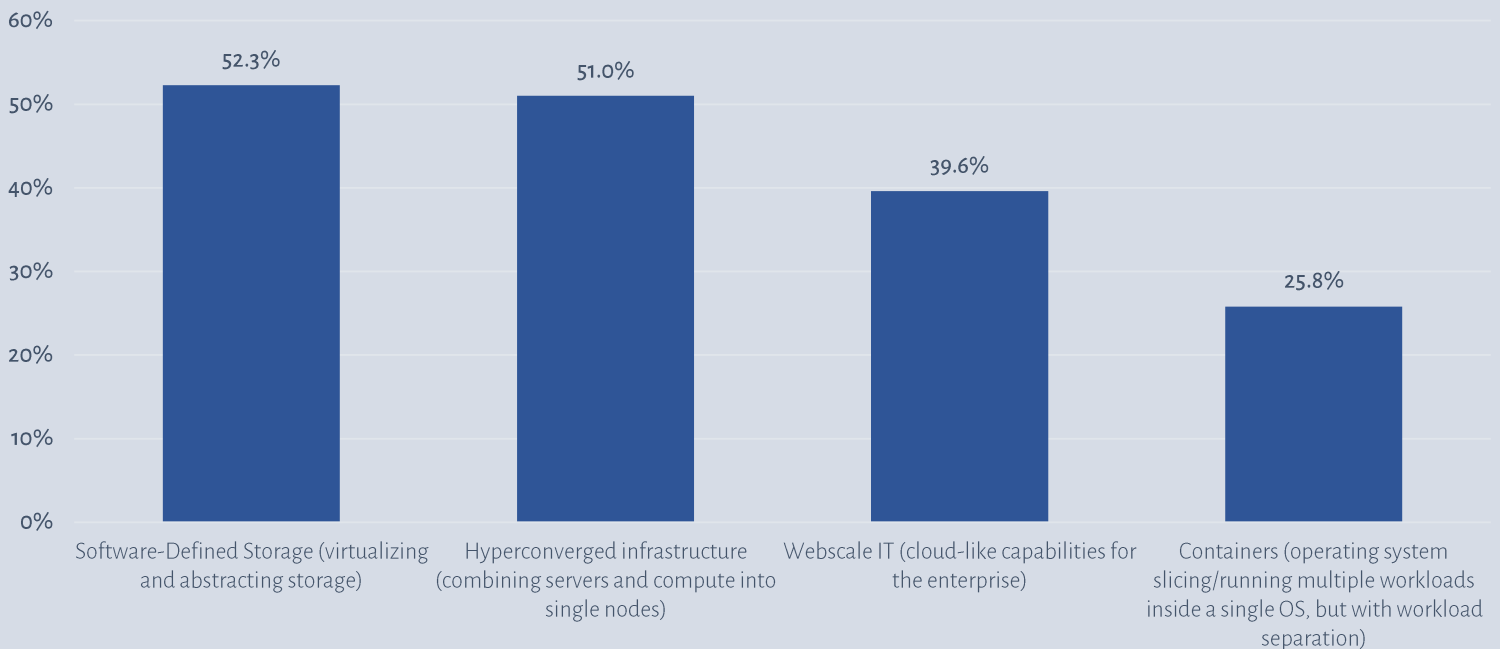


Figure 8: Datacenter trends under consideration for adoption



## Key Findings

- With 29% of survey respondents disagreeing with the statement “The IT environment in our company enables users to service their own needs without having to regularly engage directly with IT,” we believe that there is ample opportunity for hyperconverged infrastructure vendors to realize significant gains through the introduction of orchestration and self-service capabilities.
- 45% of respondents say that they have difficulty maintaining staff breadth and depth of skills. Cost and simplicity are key drivers for hyperconverged infrastructure. We believe that these two data points are related. This is a key driver in hyperconvergence adoption. Simplicity—or at least less complexity—must be a cornerstone feature for new product deployments.
- There remain organizations that have not virtualized any of their systems. It’s only 2% of respondents, but these organizations are effectively locked out of hyperconverged infrastructure adoption until they are willing or able to adopt virtualization in some form.
- Hypervisor choice correlates directly to company size. Smaller companies equally prefer vSphere and Hyper-V (32% each) while larger one favor vSphere (67%) over Hyper-V (18%).
- Multi-hypervisor support is not a key driver for hyperconverged infrastructure. This is partially due to the fact that 64% of respondents run a single hypervisor. As long as the solution supports their chosen hypervisor, there is no need to support others.
- Software defined storage and hyperconverged infrastructure are equally compelling to respondents, with each technology garnering just over 50% of respondent votes when they were asked which trends they would consider for adoption. Only 26% of respondents expect to consider adoption of containers as a future direction.

# Hyperconverged Infrastructure Sentiment

**T**here is no question that hyperconverged infrastructure is a market trend that continues to grow. When asked about their own hyperconvergence deployment status, 7% of respondents say that they have moved their *entire* computing environment to this technology. This figure may not seem that significant, but as you view the entire storage market, removing 7% of that market from consideration of traditional approaches to storage can be considered the beginnings of a serious market rebalancing.

26% say that they have moved some of their environment to hyperconvergence and 46% more are considering some kind of hyperconvergence deployment. Only 21% say that they will definitely not be undertaking such deployments.

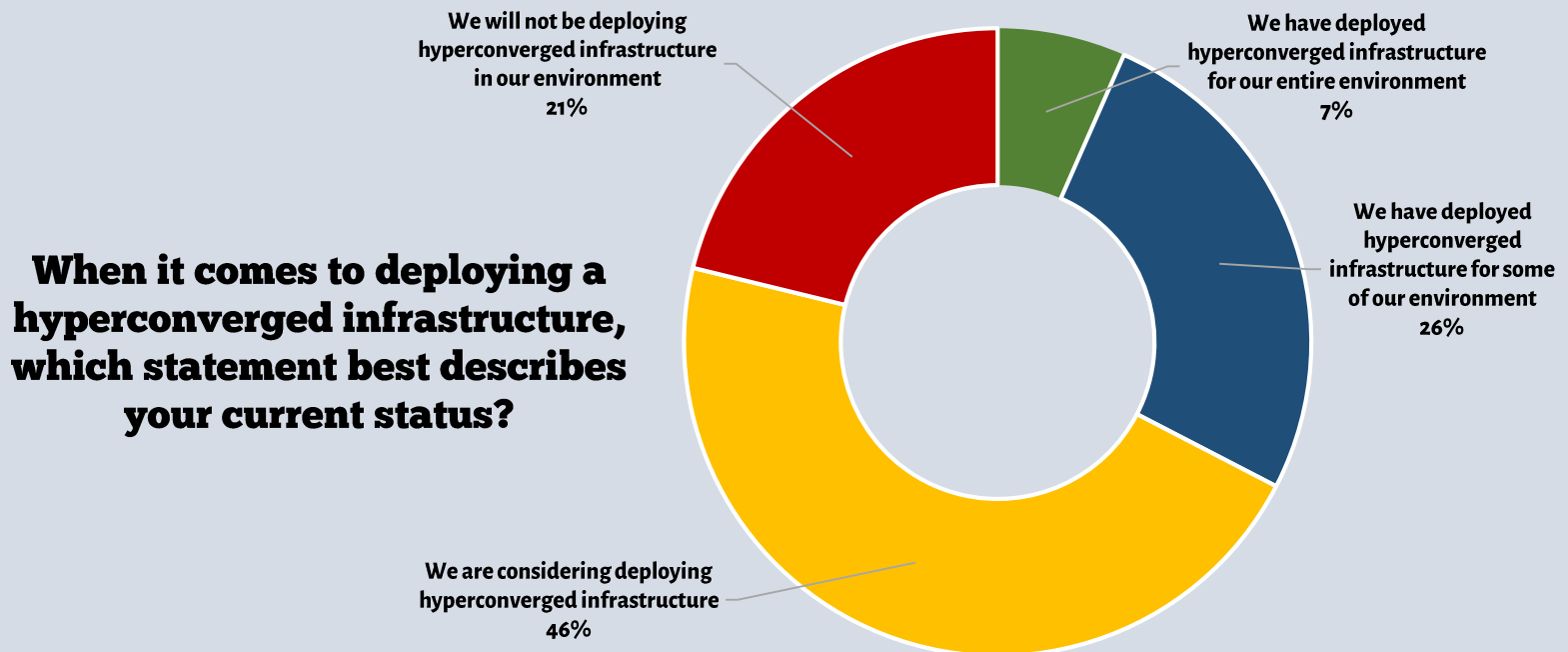


Figure 9: Hyperconverged infrastructure implementation status

Going a bit deeper, as you can see in Figure 10 (next page), reveals some interesting trends. In fact, Hyperconverged infrastructure seems to be of more interest to larger organizations as opposed to smaller ones, but it's not a straight-line trend. With a little math, it's easy to see that 67% of very small companies have not yet deployed hyperconverged infrastructure. For very large companies, that number is only 52%. Those indicating that they have no intention of deploying hyperconvergence are predominantly small companies—those with between 0 and 499 employees. Once we get past that 500 employee mark, things start to look a little better for this nascent technology, with less than 20% of those in companies with 10,000 or more employees effectively eschewing the hyperconvergence trend.

## HCI Deployment by Company Size

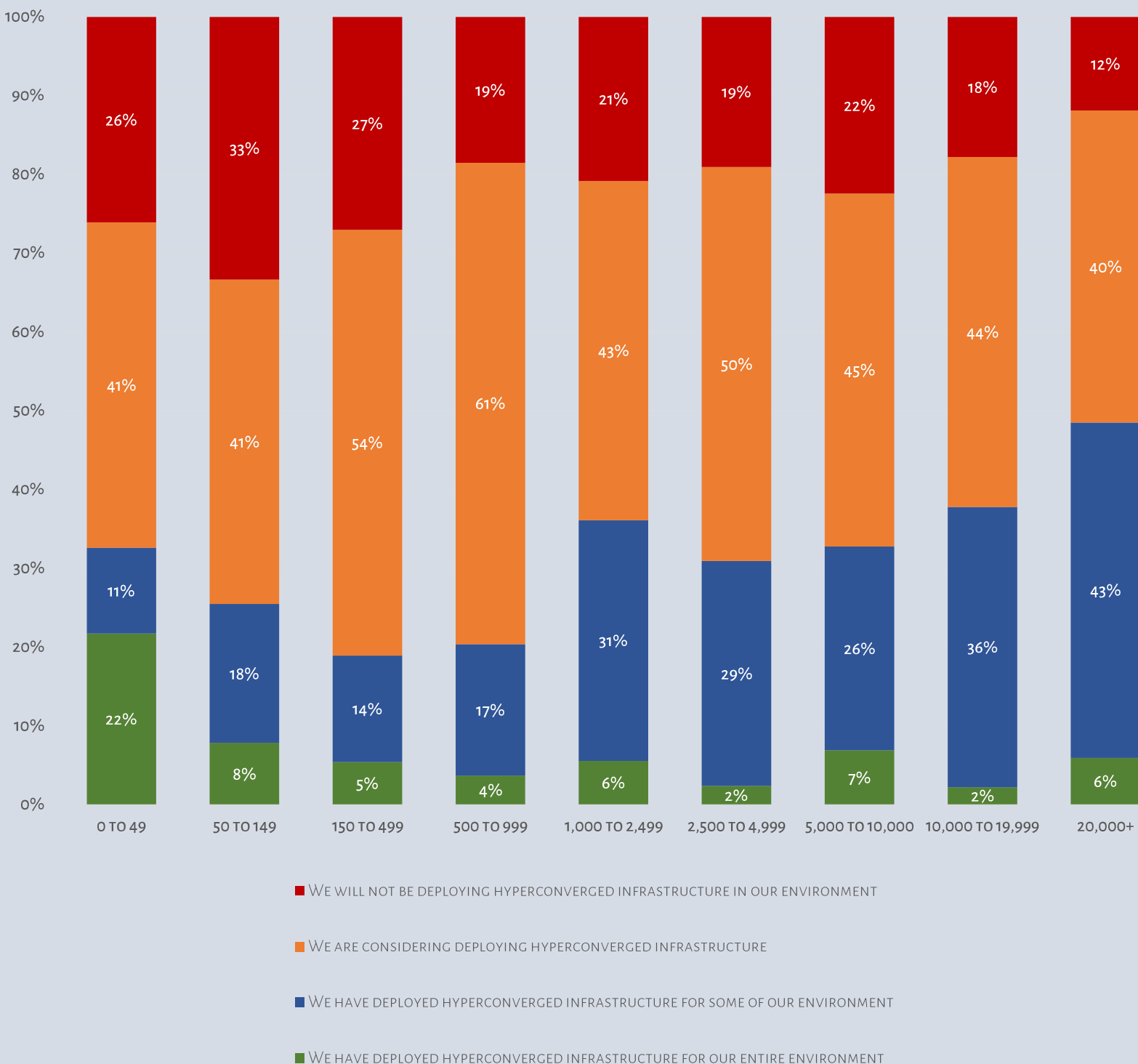


Figure 10: Hyperconvergence implementation status by size of company



Given the trends the market is seeing in hyperconverged infrastructure, it's interesting to go even deeper. As you can see in Figure XX, the data includes only those companies that have actually deployed hyperconvergence. It's very clear that smaller organizations are more likely to have deployed hyperconvergence for everything while it's far more likely for larger organizations to use hyperconvergence as just one element of their datacenter arsenals. There are trend lines on this chart to help demonstrate this very clear fact.

### HCI deployment by company size (adopters only)

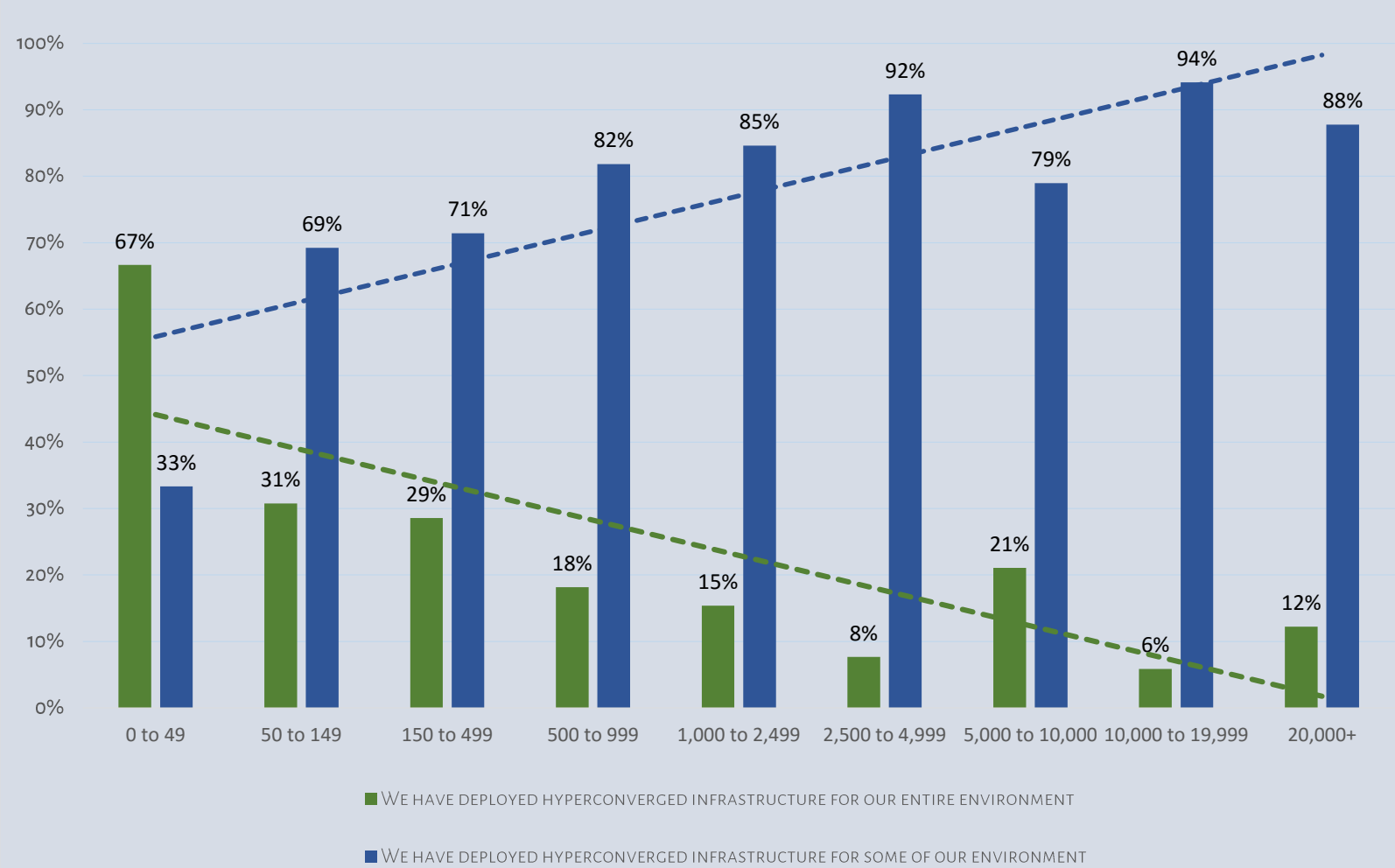


Figure 11: Hyperconvergence implementation status by size of company (adopters only)

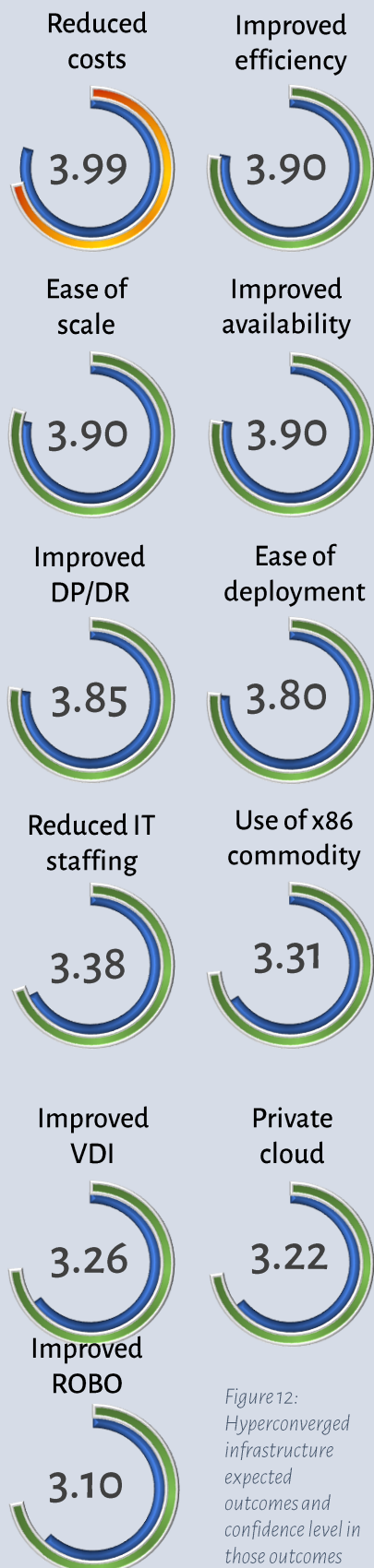


Figure 12:  
Hyperconverged  
infrastructure  
expected  
outcomes and  
confidence level in  
those outcomes

## Hyperconvergence Outcomes

We wanted to discover how people feel about or expect to realize from hyperconverged infrastructure as they deploy or seek to deploy the technology. To that end, we asked respondents to rate the importance of a series of either expected or experienced outcomes. Cost reduction was rated as the most important expected or experienced outcome, garnering 3.99 out of 5 points. Three outcomes tied for second place, with 3.90 out of 5 points:

- Improved infrastructure availability
- Improved operations efficiency
- Ease of scaling or growing the environment

No one outcome rated below 3.10, which says that companies are expecting their hyperconverged infrastructure deployments to do a lot for them. The 3.10 rating went to improved ROBO operations, a use case that not everyone needs to support, making that 3.10 rating even more striking.

We also asked people to tell us their confidence level in actually being able to achieve each of these outcomes. It's fine to hope for or expect an outcome, but much more insight is gained when asking whether people really feel that such outcomes will be realized. In general, we find that people have confidence that hyperconvergence will result in ease of scale, but they're less confident that it will reduce costs overall. They are also confident that hyperconverged infrastructure will result in efficiency gains in the organization as well as improved infrastructure availability.

In short, people's expected outcomes and their confidence level in these outcomes is relatively evenly aligned, with one exception: cost. People would like to experience cost reduction as a result of their deployment of hyperconverged infrastructure, but fewer believe they will actually realize a cost reduction.

In the charts you see on this page, the inner circle represent people's hoped-for or realized outcomes while the outer circle represents their belief that they will actually realize the outcome. Most of the outer circles are as long as – or longer than – the inner circle, indicating that people have a high level of confidence in those outcomes.

There are a lot of different reasons that companies consider new datacenter architectures, and hyperconverged infrastructure is no exception. In this case, 58% of respondents are hoping that hyperconverged infrastructure can help to reduce the cost of running IT. Second, with 51% of respondents voting in favor, is making datacenter infrastructure easier to deploy. This can easily be construed as a cost savings measure as can the item that came in third place, which is making it easier to grow datacenter resources as the need arises. There are a number of additional benefits for which we sought input, which you can see in the charts below.

### What are the top potential benefits that interest you?

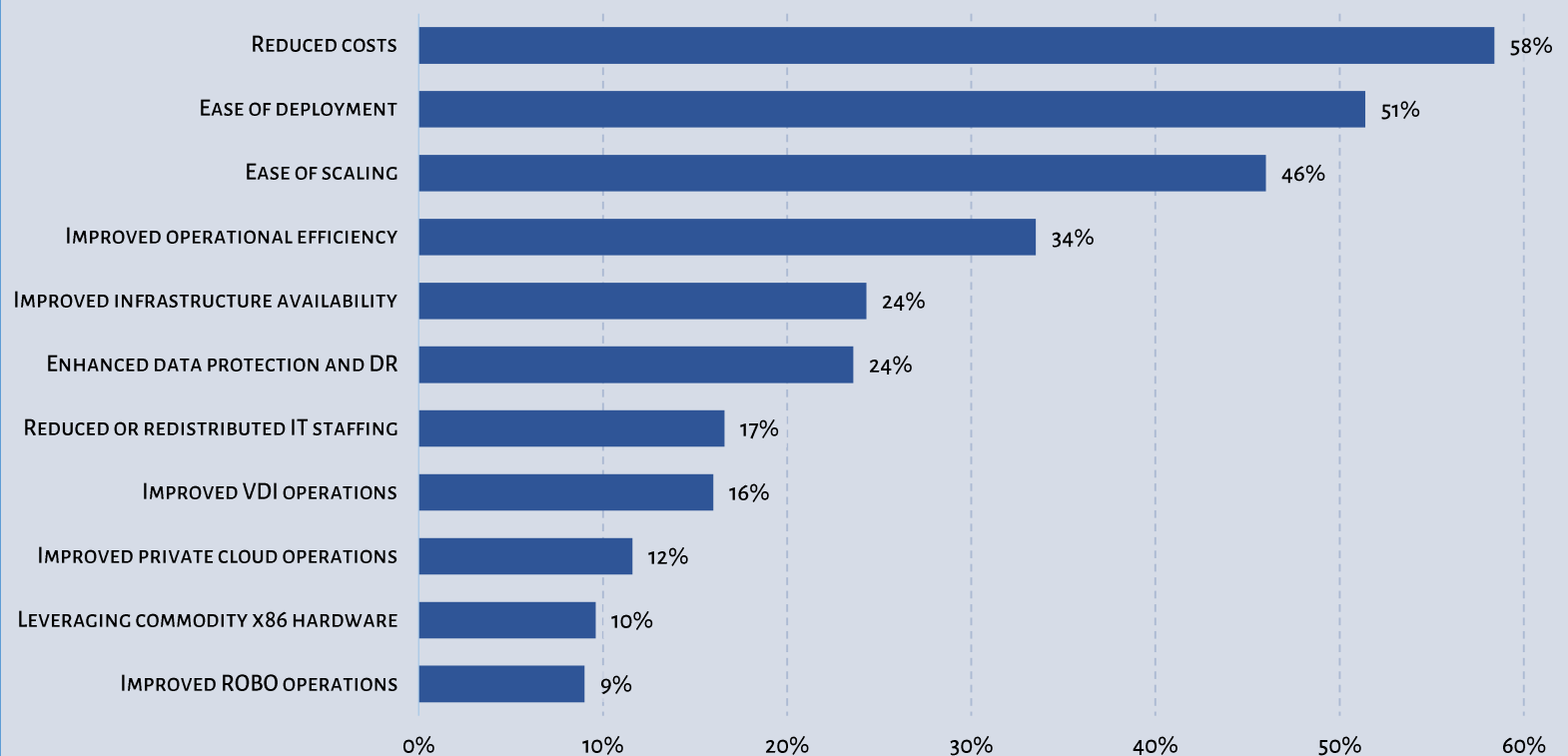


Figure 13: Top interesting hyperconverged infrastructure benefits



## Hyperconverged Infrastructure Concerns

People don't like vendor lock-in and there are concerns around the overall cost of hyperconverged infrastructure solutions. Those were identified as the most serious barrier to adoption for the technology at present. On the cost front, people's concerns seem to revolve around the perceived initial acquisition cost for a solution. Depending on the selected vendor, those costs can be quite high. However, there may be—most likely, there *will* be—offsetting operational savings that could come in the form of reduced power and cooling, reduced hardware needs, lower staffing costs, and more. Of course, these potential sources of savings depend on how the company decides to deploy hyperconvergence. (what do you mean 'how'?)

**Do you believe that hyperconverged infrastructure suffers from any serious drawbacks that need to be considered?**

I don't know enough about hyperconvergence to have an opinion either way  
55%

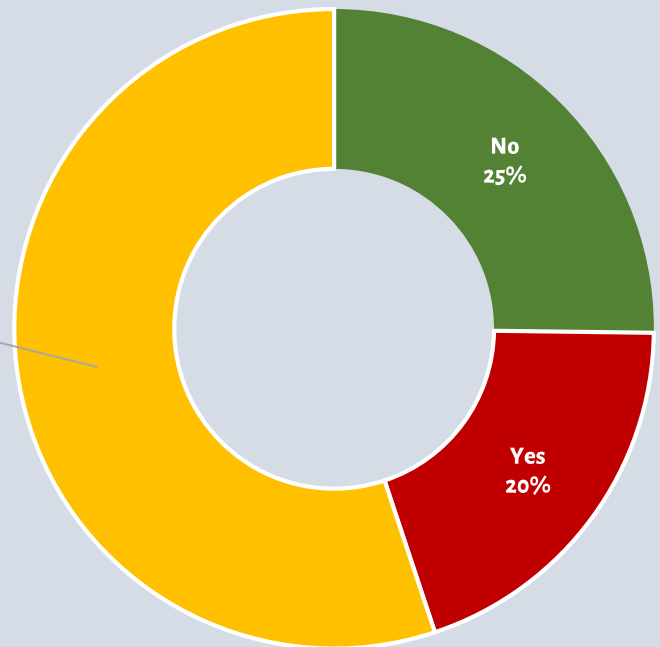


Figure 14: Feelings regarding hyperconverged infrastructure drawbacks

Respondents also had concerns around the ability of hyperconverged infrastructure to scale resources linearly. Many see it as wasteful spending to, for example, add more CPU and RAM as new appliances are added to increase storage capacity. However, this is quickly being addressed in the market as vendors release new appliances that are differentiated from one another. For example, it's possible to buy nodes that vary in size, with one node being suitable for those that need to add more compute and another node being suitable for those that need to focus on adding more storage. Further, some vendors have introduced software-only tools that enable users to precisely configure their own hardware resources. In the chart below, red lines indicate that many respondents have serious concerns around that element.

## How serious do you believe that hyperconverged infrastructure challenges may be?

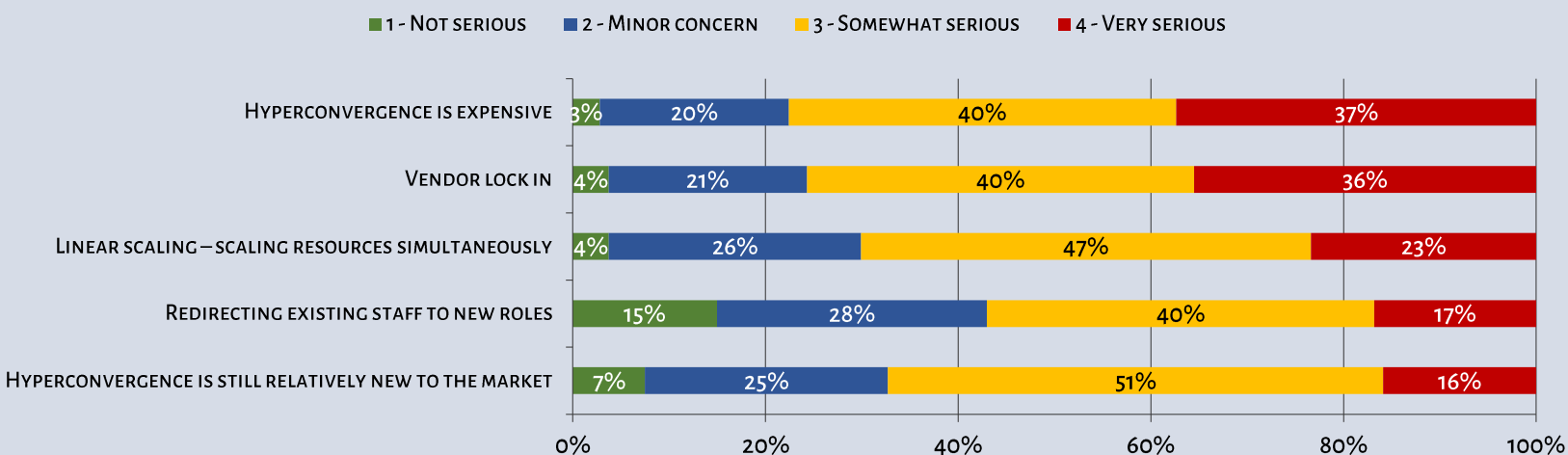


Figure 15: Perceived severity of challenges around hyperconverged infrastructure

### Key Findings

- 33% of respondents have deployed hyperconverged infrastructure in some form while 46% are considering it. Only 21% have indicated that they will skip this option. This bodes very well for vendors in the space as there will be ample opportunity for growth.
- Smaller companies are more likely to deploy hyperconverged infrastructure to replace their entire datacenter environment. Larger companies are the likeliest to adopt hyperconvergence as just a part of their datacenter strategy.
- Reducing cost is the key benefit that companies look for in a hyperconverged infrastructure adoption. Almost 60% of respondents identify this as their primary driver. 51% want easier deployment and 46% want it to be easier to scale the datacenter environment. These results align with the common wisdom that businesses are looking for datacenter environments that are less expensive to operate and that are more flexible.

## Appendix A: Respondent Demographics

**F**or our survey, we had 543 respondents from across all company sizes. Figures 16 through 19 provide you with an overview for the characteristics for the set of respondents we had for this survey.

**How many people work in your company?**

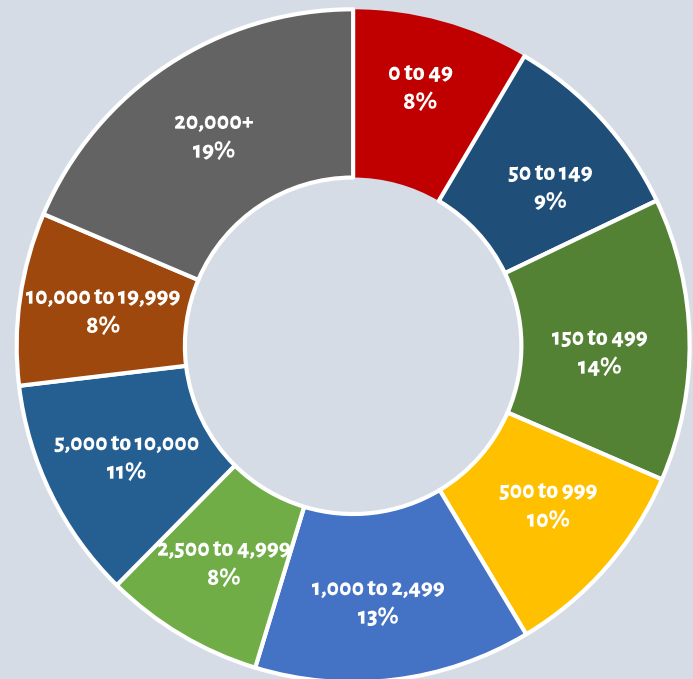
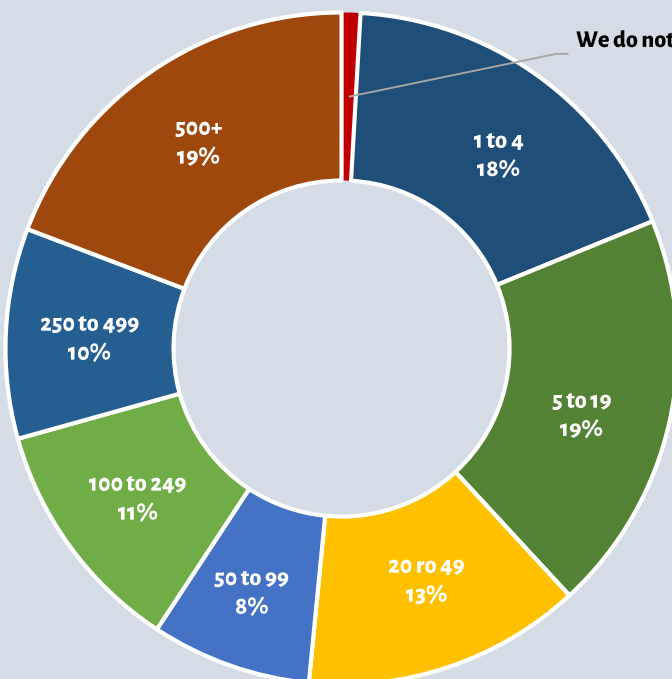


Figure 16: Number of people who work in the organization

**We do not have an IT staff**  
1%



**How large is your IT staff?**

Figure 17: Number of IT staff employed by the organization

## What is your industry vertical?

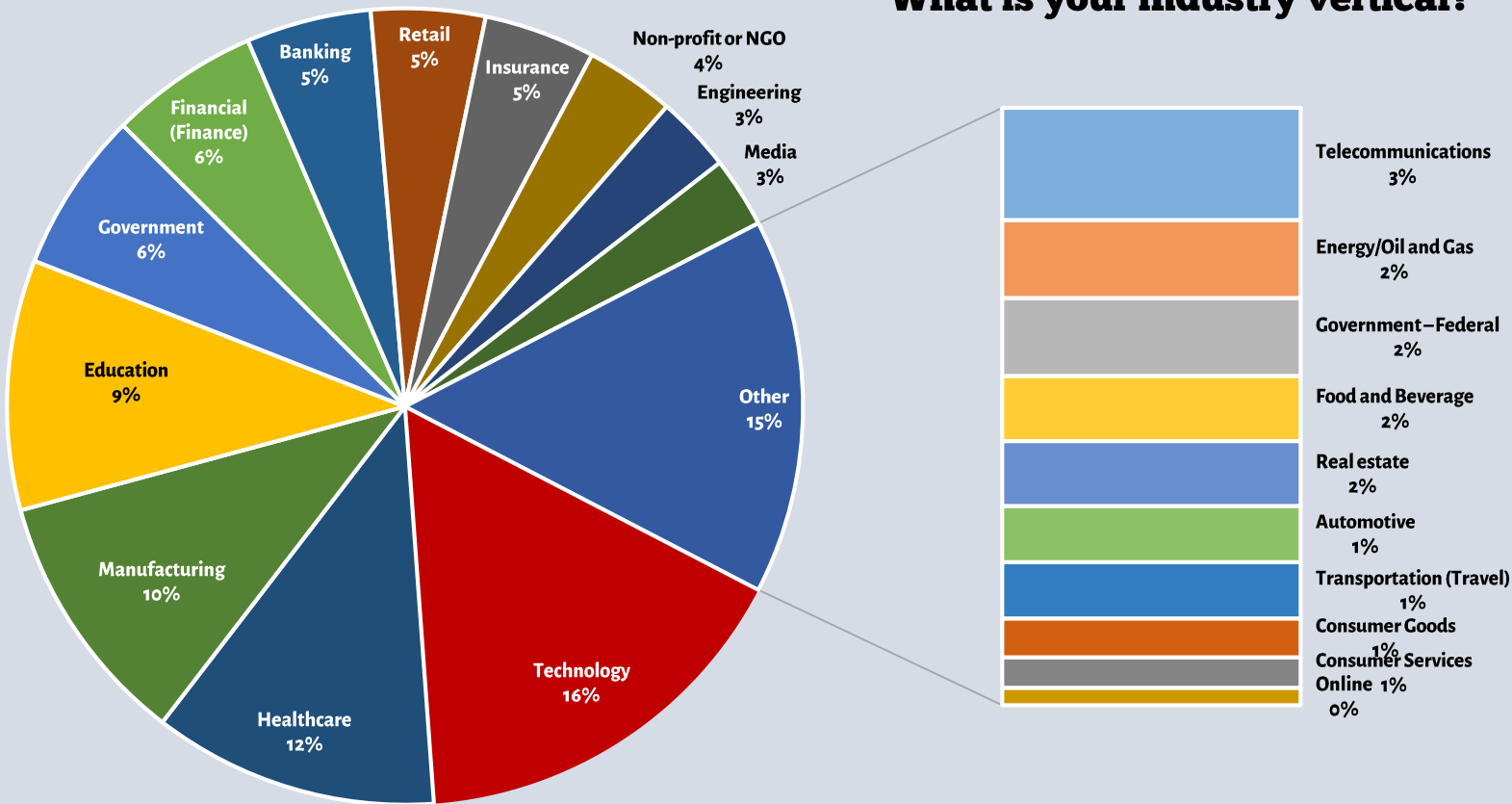


Figure 18: The industry represented by survey respondents



## Which job most below most closely matches your job responsibilities?

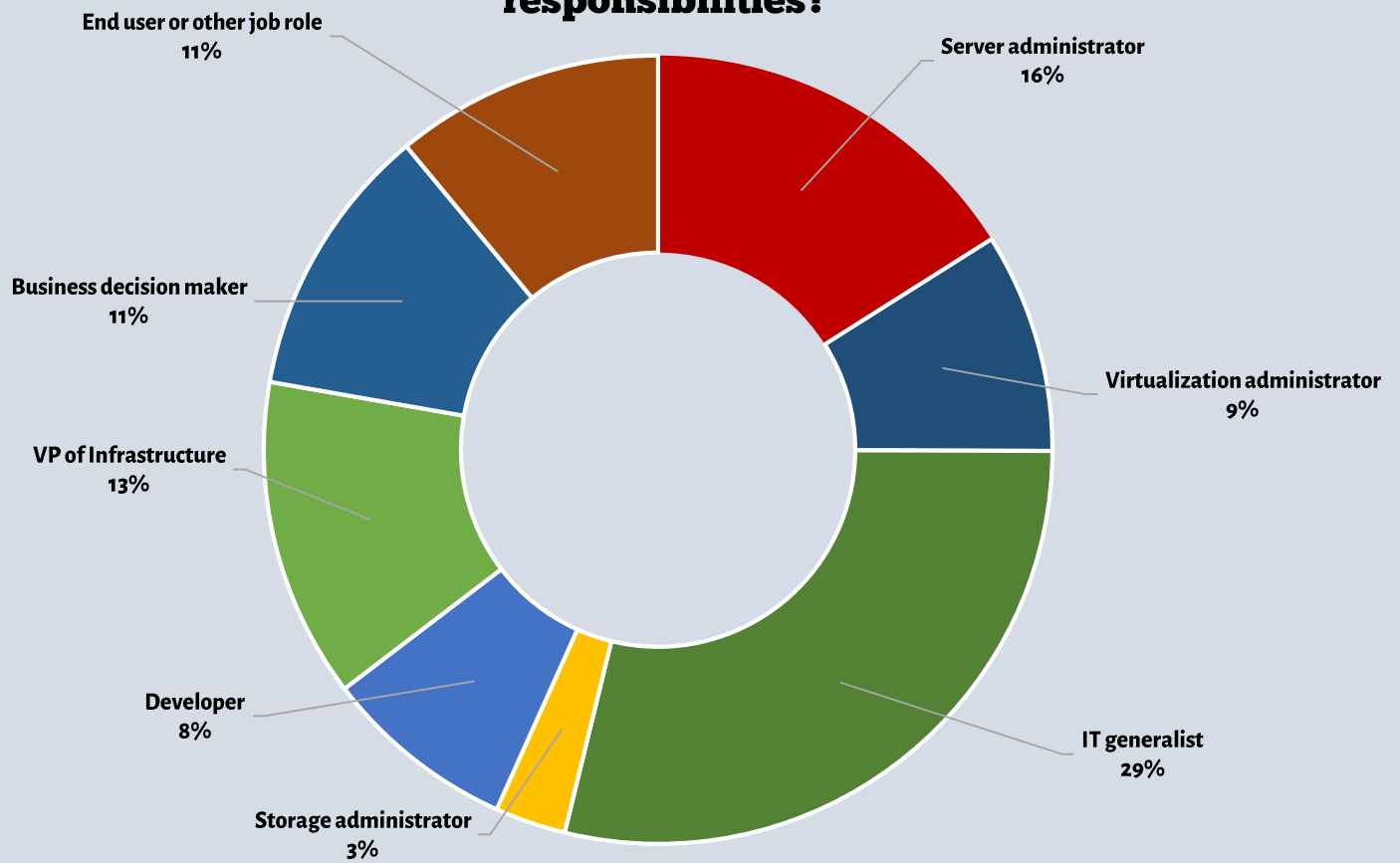


Figure 19: Respondents' general job category

## About

### About HPE

HPE creates new possibilities for technology to have a meaningful impact on people, businesses, governments and society. With the broadest technology portfolio spanning, software, services, and IT infrastructure, HPE delivers solutions for customers' most complex challenges in every region of the world. More information about HPE (NYSE: HPE) is available at <http://www.hpe.com/info/hyperconverged>.

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