PATHFINDER REPORT

Transform your Business with HCI

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COMMISSIONED BY

About this paper

A Pathfinder paper navigates decision-makers through the issues surrounding a specific technology or business case, explores the business value of adoption, and recommends the range of considerations and concrete next steps in the decision-making process.

About 451 Research

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I. Executive Summary

Hyperconverged infrastructure (HCI) is becoming a popular architecture choice, particularly for businesses consolidating infrastructure as part of a hybrid IT strategy to extend compute and storage resources outside the enterprise. At its current level of progress, HCI could soon become a foundation layer for the next generation of infrastructure at enterprises, mid-sized companies and remote deployments. Hybrid cloud is the next frontier for HCI, with most players looking to develop cloud orchestration and workload-migration capabilities to become hybrid cloud enablers for enterprises and service providers.

Today, many organizations still have questions and uncertainty about HCI:

- What are the most effective uses of HCI today and in the future?
- Who benefits from HCI, and who doesn't?
- What enterprise infrastructure challenges could be solved with HCI?

This report will provide data and analysis to provide perspective on how the HCI market could be evolving, and to better understand the key requirements enterprise IT administrators should consider as they begin their initial deployments or expand their current HCI deployments to new workloads or locations.

II. State of the HCI Market

It can be argued that hyperconverged infrastructure is the most disruptive infrastructure product category to have emerged in the last decade because this new class of infrastructure not only introduces innovations, but it also has the potential to change the roles and responsibilities of infrastructure professionals. Although we have had scale-out and flash-optimized architectures to support server and storage resource requirements for workloads and clients for many years, HCI adds a new dimension in that it allows organizations to manage and optimize these resources without the costly expertise of IT specialists. The deployment numbers for HCI reveal its growth potential, and as virtualized infrastructures continue to grow, the commercial adoption of HCI should only increase in coming years.

DEPLOYMENT DATA

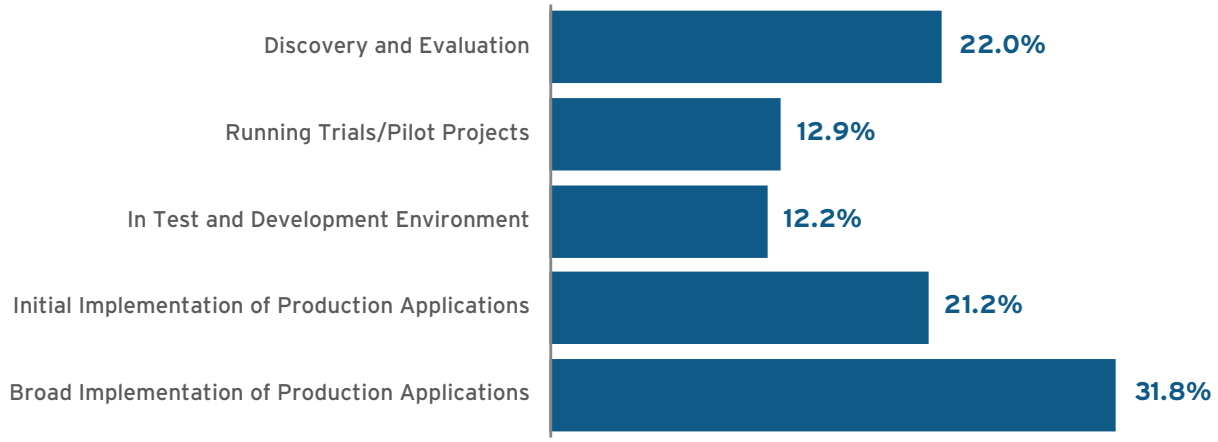
Today, we are still in the early stages of the commercial ramp-up of HCI offerings. In our Voice of The Enterprise (VoTE): Servers and Converged Infrastructure, Vendor Evaluations November 2016 survey, more than 64% of the 638 respondents said that they either have deployed or will deploy HCI within two years. In the study, 35.3% reported that they had HCI in use in their organization, while an additional 29.3% said they have plans to deploy or were already conducting proof-of-concept trials. Given that 35.4% of respondents did not have HCI in their near-term plans, there is still a substantial group of infrastructure professionals that could consider HCI at some point.

Focusing on organizations that have already deployed HCI, only 31.8% of the 255 respondents said they were using their HCI platforms for the broad implementation of production applications, while 21.2% were in their initial stages of production deployments, and the rest of the customers were using the systems for test and development and other reproduction use cases (see Figure 1).

451 Market Monitor predicts that the HCI market will close out 2016 with $1.837bn in revenue and projects a CAGR of 41% that will put the market at a little under $6bn in 2020. Going forward, HCI will be diverting revenue away from traditional infrastructures with siloed environments.

Figure 1: Adoption Status of HCI.

Q: Which of the following best describes your organization's adoption of hyperconverged infrastructure?



Source: 451 Research, Voice of the Enterprise: Servers and Converged Infrastructure, Vendor Evaluations 2016

WHY HCI WILL CONTINUE TO GROW – PROBLEMS FACING IT ORGANIZATIONS

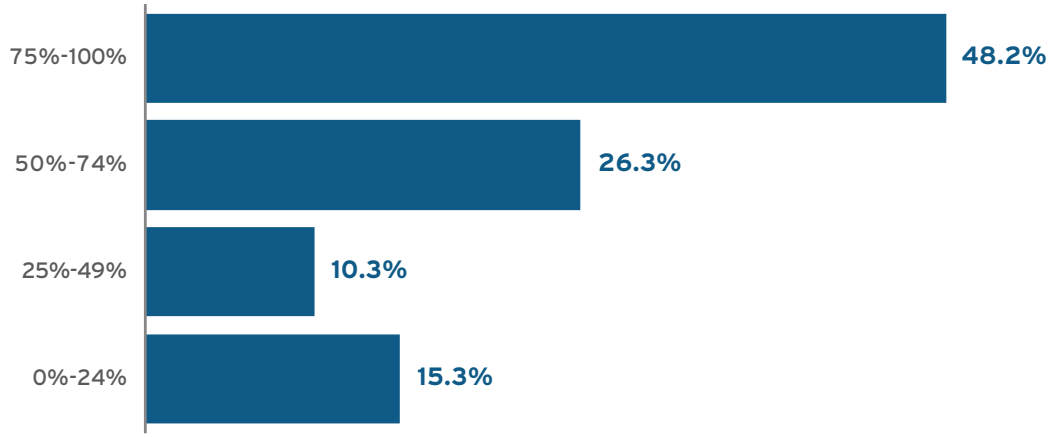
IT professionals face a myriad of challenges as they establish their next-generation infrastructures. As organizations progress from virtualization to cloud environments, they will face challenges in resource provisioning, troubleshooting and data protection, which will be limiting factors if the HCI deployment cannot provide adequate capabilities.

VIRTUALIZATION CHALLENGES

In the VoTE: Servers and Converged Infrastructure: Vendor Evaluations November 2016 survey, 74.5% of the 575 respondents reported that the majority of their x86 servers were running VMs, with 48.2% claiming 75-100% of their x86 environment was virtualized. As more mission-critical and performance-sensitive applications transition from physical servers to VMs, the target market opportunity for HCI will grow.

Figure 2: Percentage of x86 servers running virtual machines.

Q: What percentage of your organization's x86 servers are running virtual machines (VMs)? (Binned)



Source: 451 Research, Voice of the Enterprise: Servers and Converged Infrastructure, Vendor Evaluations 2016

Virtualization and cloud teams have risen to power over the last decade and are now looking to wield their influence to boost their own management and resource utilization capabilities. For 38.4% of respondents in the VotE: Storage, Organizational Dynamics survey, VM administrators had a growing role and influence in storage procurement, and we believe this trend will only increase with time. In that same survey, 50.2% of respondents claimed systems administrators and 46.1% claimed server administrators had influence, which further amplifies the growing trend toward systems and storage management consolidation. While these teams worked closely with colleagues in the storage team in the past, a number of factors have forced cloud and virtualization teams to take a more active hand in infrastructure purchasing and management decisions including:

- **Slow resource provisioning:** The rising expectations of customers and partners has greatly increased the need for rapid resource provisioning for storage, processing, memory and networking – especially in virtualization and cloud environments. Slow provisioning continues to be a major cause of client dissatisfaction at organizations, and is usually one of the biggest drivers that business stakeholders use to move workloads to public cloud environments. To stay relevant, IT organizations must look to accelerate provisioning through the use of automation and integrated toolsets that cut across the server, storage and networking silos in a traditional IT organization. This is a key area of business transformation since it will help companies gain insights faster with new analytics and business intelligence workloads that are slowly evolving from batch operations to real-time processing.
- **Lack of visibility and inefficient troubleshooting:** The narrow focus of specialized storage, networking and application management tools makes troubleshooting a difficult process. Cloud and virtualization teams want broader access to management tools to help pinpoint where problems are occurring, and they are no longer content to wait for other colleagues to help them.
- **Inadequate protection for virtualized business-critical applications:** With the exception of sandbox environments, few workloads are considered non-critical in most environments today, and as such, cloud and virtualization professionals need faster and more granular recovery tools to protect their workloads. As the need for disaster recovery and business continuity continue to rise, IT organizations will need to have simplified tools that are highly integrated and optimized for the infrastructure. Going forward, infrastructure and workloads must work together seamlessly to help facilitate workload migration, both in the event of a disaster and for the opportunistic consumption of idle resources at another facility or another cloud.

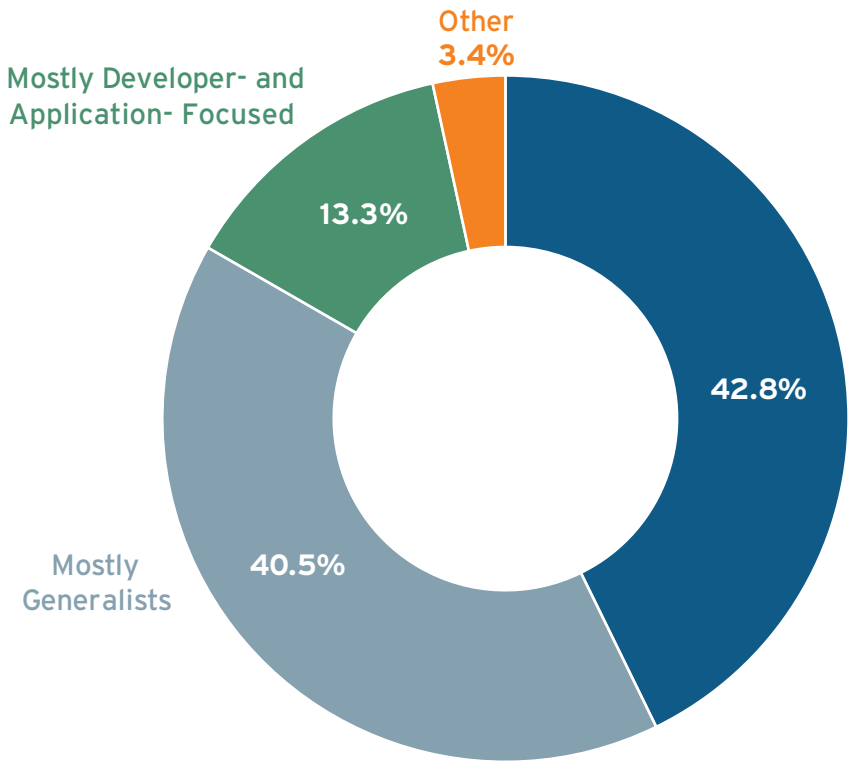
IT GENERALISTS ARE LARGE PORTION OF INFRASTRUCTURE STAFFING

IT generalists currently represent the majority of IT professionals for midsized and smaller organizations, and these generalists require simple and intelligent tools to proactively fulfill their duties. In our VoTE: Storage Q2 survey, only 19% of small organizations with headcounts under 250 reported that their IT staff consisted mostly of specialists (see Figure 3).

Although organizations with 1,000-9,999 employees (60% with mostly specialists) and large 10,000+ organizations (70% with mostly specialists) are more invested in the siloed approached to IT with dedicated storage, networking, server and software teams, as companies struggle to cope with data and workload growth, more of the burden of day-to-day resource provisioning and management will fall on the shoulders of generalists.

Figure 3: There's an Even Split Between Generalist and Specialist IT.

Q. Which of the following best characterizes the layout of your IT technical teams?



NUMBER OF STAFF	PERCENTAGE WITH MOSTLY SPECIALISTS
1-249	19%
250-999	33%
1000-9,999	60%
10k+ Employees	70%

Source: 451 Research, Voice of the Enterprise: Storage, Q2 2016

III. Key Requirements for HCI

HCI is now emerging as a potential solution to the growing infrastructure challenges facing IT professionals. We view HCI as a form of software-defined storage, and like other next-generation storage products, organizations are turning to HCI for improved overall storage agility and to attain a better scaling model for storage.

As organizations evaluate HCI offerings, they should include a number of factors in their selection criteria including scalability, ease of use, and hardware support and interoperability. Although many HCI vendors use similar terms in their marketing campaigns, the technological capabilities and service and support execution will be the key factors that determine whether an organization's implementation will succeed. These are some of the key factors to focus on when evaluating an HCI platform:

- **Scale-out architectures to handle data growth**: With the constant growth of storage and application workloads, scale-out architectures are ideal because they allow IT professionals to add capacity to their infrastructure non-disruptively while minimizing the management impact of adding nodes. In contrast, traditional infrastructure often requires time-consuming migration operations that could incur downtime or lead to degraded performance as workloads are moved to new hardware systems. Entry-class configurations for HCI are available to support as few as 200 VMs in contrast to larger converged infrastructure offerings, which support as many as 2,000-5,000 VMs with prices well over $1m.

  Another key benefit of scale-out architectures is that they allow organizations to start out with a small configuration and gradually grow storage infrastructure to match the needs of their workloads. This benefit is ideal for extending IT infrastructure to remote offices where IT staff may not be available or may be lack storage and virtualization expertise, which is a factor we address later in this report.
- **Certified hardware and systems support:** Many organizations are looking to take advantage of the low cost and rapid innovation taking place with commodity hardware components such as processors, solid-state storage and networking adapters. The transition to commodity hardware will take several years to accomplish, and right now, only 36% of organizations we have surveyed are using SDS running on standard x86 servers. Appliances are the preferred deployment form factor for HCI adopters, and this has been the case for storage systems for decades.

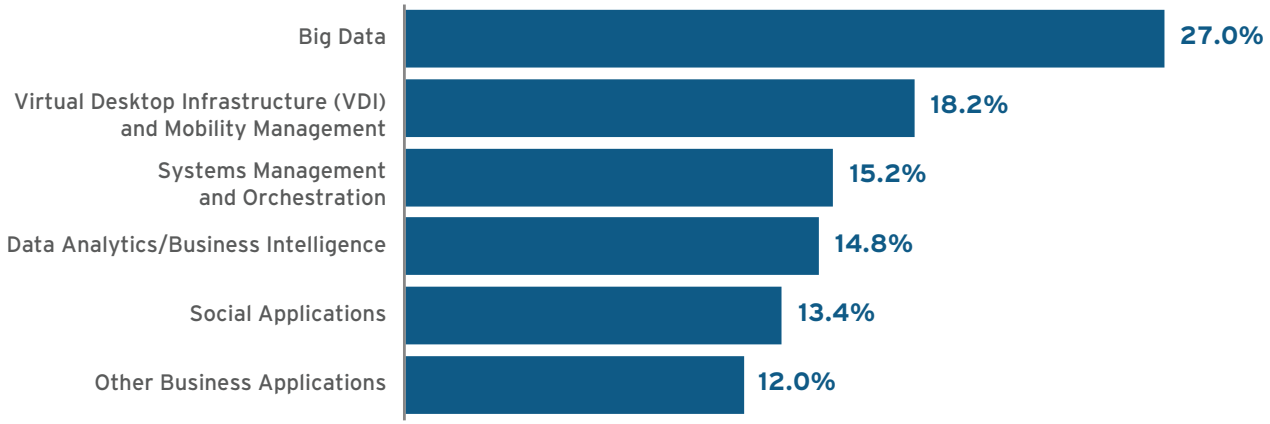
  The customers that are interested in leveraging commodity hardware in their infrastructure should closely evaluate the hardware interoperability of their HCI software providers. Beyond basic interoperability, organizations need to be comfortable with the service and support provided by their HCI and/or commodity hardware vendor to ensure that problems are resolved as quickly as possible and that finger-pointing between suppliers does not become an issue.
- **Automation and orchestration:** To become more cloud-like and to appeal more strongly to DevOps customers, HCI offerings must add cloud orchestration and automation capabilities. To function in a hybrid world, on-premises infrastructure players must understand their cloud services equivalents, not only in terms of resource consumption but also in regard to workflows and dependencies. This entails many of the core capabilities of cloud-based disaster recovery (DR).

  As we expand into greater levels of workload migration beyond DR, the need for automation will only increase, because many organizations today are still struggling with provisioning and resource management. In our VotE: Storage, Organizational Dynamics 2016 survey, we found that only 22.9% of respondents had chargeback, while just 13.2% were using showback. The vast majority of customers were not using either of these means for enforcing fiscal discipline, which is a clear warning sign that there is a lot more work to do to get to automated environments.
- **Support for future applications:** HCI products were initially developed to support virtualized servers, and we expect to see HCI sold into production container environments at some point. When we asked IT professionals about the next generation of applications coming to their datacenters in the next two years, big data (27% of respondents), VDI (18.2%) and data analytics/business intelligence (14.8%) all ranked high in our survey findings (see Figure 4).

  As all-flash HCI becomes deployed more widely, we expect to see more performance-sensitive database applications and other production workloads moving over from traditional infrastructure.

Figure 4: Next-generation applications coming to datacenters in the next two years.

Q. Do you plan to add any of these applications/workloads in two years?



Source: 451 Research, Voice of the Enterprise: Storage, Q1 2016

IV. Recommendations

HCI SHOULD BE A BUILDING BLOCK FOR A HYBRID CLOUD STRATEGY

Right now, the majority of HCI deployments are going into organizations' core and central datacenters, with 77.2% of respondents reporting that they had HCI at those sites in our VotE: Servers and Converged Infrastructure Vendor Evaluations November 2016 survey (see Figure 5).

We firmly believe HCI will be an important infrastructure building block for hybrid cloud environments going forward. In our survey, 25.5% of respondents were using HCI at a third-party colocation or an outsourced service provider site, and as service providers continue to implement HCI as a service or use the resource as an IaaS building block, HCI's scalability and ease of use will enhance the elasticity and infrastructure management of providers. Ultimately, organizations that do not take proactive steps to make their on-premises infrastructure more cloud-like with faster provisioning and granular resource allocation will find themselves on the outside looking in as business stakeholders seek to transform their companies with improved agility and faster insights.

As organizations choose their HCI and cloud service provider partners, technology integration and third-party services will be important to evaluate. For example, some cloud providers are offering backup and archive services, which could be used to protect and boost the efficiency of the data and workloads that organizations are trying to manage.

For many organizations, hybrid cloud is the ultimate and inevitable goal both for their next-generation on-premises infrastructure and also for their consumption of public cloud resources. The true value of hybrid cloud platforms and HCI appliances will be derived from the seamless IT orchestration that can be used to blend resources together to create a value proposition that is greater than the sum of the hardware, software and services parts. Hybrid cloud wins in the end because traditional cloud services benefits, such as elasticity, cannot come with compromises related to data and workload control.

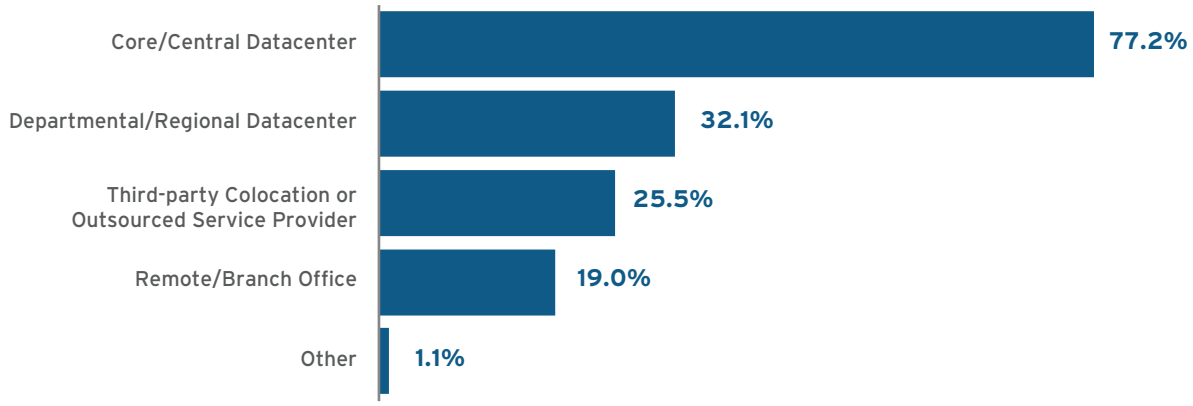
EXPAND HCI DEPLOYMENTS FOR REMOTE SITES AND DR

Likewise, although HCI is already being deployed in regional datacenters (32.1% of respondents) and at remote/branch offices (19%), these numbers will increase. Replication is a key feature for HCI offerings today, and is necessary for efficiently moving datasets and workloads between central and regional datacenters. In remote and branch offices, replication can ensure that data created and modified at the edge is adequately protected at the central datacenter or a remote backup site.

HCI is also currently being used in DR scenarios, where HCI's ability to migrate workloads between sites is valuable. As the 'recovery point objective' and 'recovery time objective' requirements of line-of-business stakeholders and clients increase, more workloads will require the DR protection that HCI can provide.

Figure 5: Current HCI Deployment Locations.

Q: In which locations have you deployed hyperconverged infrastructure at your organization?



Source: 451 Research, Voice of the Enterprise: Servers and Converged Infrastructure, Vendor Evaluations 2016

ORGANIZATIONAL CONSIDERATIONS

Just as with any other significant infrastructure upgrade project, it is important to collaborate with business stakeholders before implementing an updated HCI infrastructure to ensure it will be able to satisfy a broad array of workloads while delivering the benefits of storage, compute and network resource consolidation. To do this, there must be a collaboration between business stakeholders and domain experts to ensure that the service classes the HCI deployment will be providing can be defined according to workload needs. Without this step, organizations run the risk of building a menu from which no one wants to order. This step is crucial because it will also affect HCI system purchasing decisions. For example, if an organization's workloads do not need high performance and low latency, it would be more economically prudent to deploy less-expensive controllers and more hard drives to keep costs down.

Within the IT team, responsibilities for HCI will need to be sorted out to streamline and optimize resource delivery. HCI's ability to allow generalists to not only handle a large number of workloads but also to have access to powerful data protection and workload-migration capabilities will be disruptive. Traditional storage tasks such as replication, snapshots and cloning need to be done efficiently to ensure data is protected and accessible at the right levels. Each organization will have to decide whether this responsibility should pass to generalist teams or whether storage or backup administrators should continue to be responsible.

In the area of provisioning, though, HCI's ability to rapidly create and deploy storage and compute resources will be transformative for the business. Organizations should consider using showback or chargeback in conjunction with their new infrastructure to ensure that there is fiscal responsibility for how resources are leveraged. Where possible, teams should automate to reduce management burdens. With relatively flat budgets and rapidly growing data stores, the only way IT professionals will be able to say ahead is by automating as many processes as possible.