



# Digital Transformation

Streamlining IT Modernization With  
Converged and Hyperconverged  
Infrastructure

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COMMISSIONED BY

**HITACHI**  
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## 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.

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## EXECUTIVE SUMMARY

Digital transformation is a subject of growing interest for enterprises seeking to remain competitive in their given market. Infrastructure is one area where improvement can have a significant impact on easing the digital transformation journey. Converged infrastructure (CI) has become an increasingly favored approach over the last few years – largely because of its ability to provide consistency and accelerate time to value for IT investments – and hyperconverged infrastructure (HCI) is becoming a popular architecture choice as well. At its current level of progress, HCI could soon become a foundation layer for the next generation of infrastructure for enterprises, mid-sized companies and remote deployments, as well as a means to address business needs that are becoming increasingly dynamic. Many organizations have lingering questions about digital transformation and relevant infrastructure:

- What kind of business goals should enterprises demand from their digital transformation?
- How will next-generation workloads such as containers and big-data analytics require organizations to consider digital transformation?
- What transformation challenges do CI and HCI address?

This paper provides data and analysis to offer perspective on how digital transformation could be impacting businesses and their infrastructure choices, and to help better understand the key requirements enterprise IT decision-makers should consider as they begin or continue on their digital transformation journeys.

## Digital Transformation: What Is It, and How Do We Get There?

451 Research defines digital transformation as the result of IT innovation that is aligned with and driven by a well-planned business strategy, with the goal of transforming how organizations serve customers, employees and partners; support continuous improvement in business operations; disrupt existing businesses and markets; and invent new businesses and business models.

Before organizations start their digital transformation journey, they should prioritize key business goals, including:

- 1. Lower risk** – Digital transformation must help customers minimize risk by helping them make better decisions with data. The growing use of analytics will allow organizations to recognize risks sooner and will help them identify threats in business exposure or competition. Another key benefit for lowering risk is that stakeholders will be able to build trust in the digital competencies their IT organization will provide.
- 2. Improve products and services** – A personalized customer experience is a core goal for many organizations today, and digital transformation will allow businesses to innovate to deliver new products and services to match the ever-changing demands of customers. Digital transformation can help improve the delivery of digital and physical products while making the buying experience more convenient for customers.
- 3. Speed to market** – To improve speed to market, organizations are also looking to integrate customer feedback gathered from communities and social media with internal analytics to ensure that future products are developed rapidly and hit the market with enough time to take advantage of a business opportunity.
- 4. Lower costs** – Digital transformation can help organizations streamline business processes to boost efficiency and make the workforce more productive. Organizations are also using this process as a means and justification for updating and improving financial analytics.
- 5. Increase revenue** – Increasing market share should be a core goal for any digital transformation initiative. By leveraging data to improve the marketing and promotion of products and services, organizations will be able to find new ways to cross-sell and upsell to the client base, while also exploring possibilities in untapped markets.

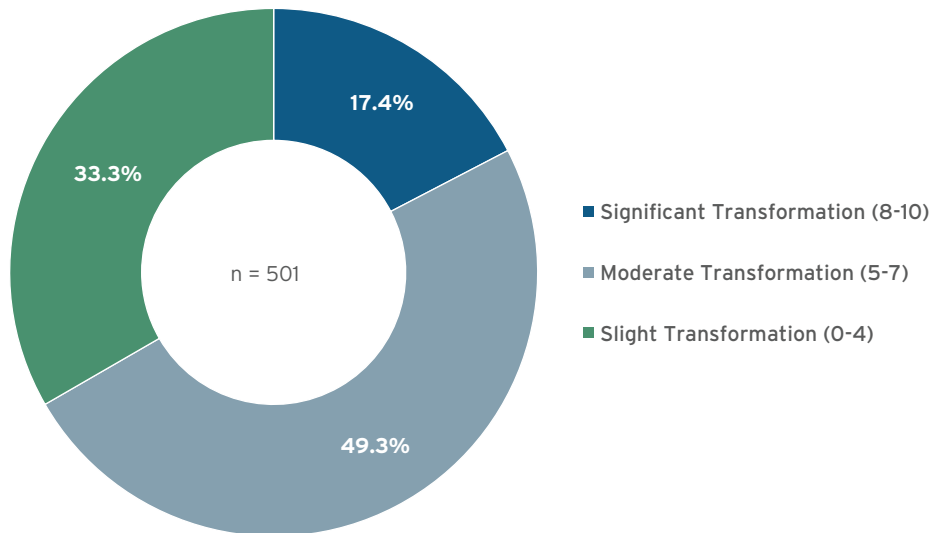
Digital transformation involves changes to a business brought on by technological advancements. Transformation is not superficial and often involves reworking of business models to incorporate and benefit from new technologies. Ideally this process should be beneficial to an enterprise, and if well executed it can result in cost savings, superior agility and increased revenue. However, there is a requisite amount of change needed, and to be successful, IT professionals and their business stakeholders must work together to set reasonable expectations.

### IT ORGANIZATIONS MUST TRANSFORM TO REMAIN COMPETITIVE

In our 2016 Voice of the Enterprise (VotE) Storage Q2/Q3 2016 survey (see Figure 1), 67% of respondents indicated that their business would require a moderate to significant amount of digital transformation over the next five years, with 18% expecting significant transformation, 49% striving for moderate transformation, and the remainder indicating that slight transformation would be taking place over this time frame. As it stands, IT infrastructure must change in order to keep pace with and enable the impending digital transformation that businesses are anticipating they will undertake. Without sufficiently scalable and reliable infrastructure, businesses run the risk of impeding their ability to meet their business stakeholders' current and future requirements.

Figure 1: IT Infrastructure Must Change To Accelerate Digital Transformations

Q. How much IT transformation does your business require over the next 5 years?



Source: 451 Research, Voice of the Enterprise: Storage, Q2/Q3 2016

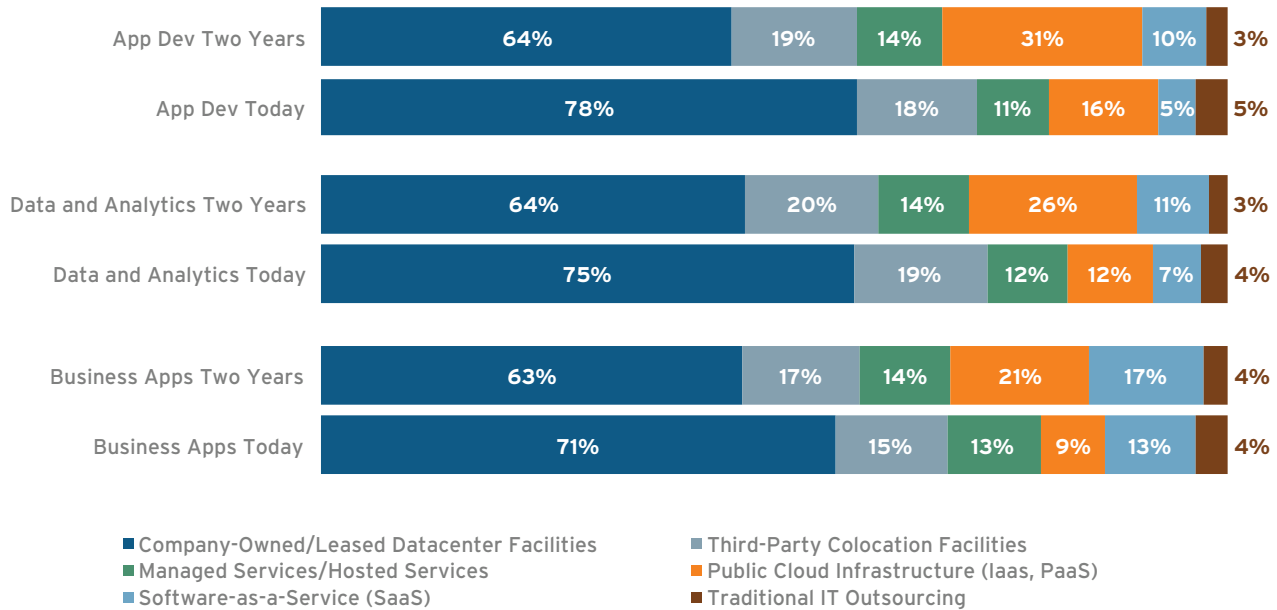
## Top Goals for IT: Respond Faster to Emerging Business Needs

Improving response time was the top IT goal for 2017 among respondents in our VotE survey. Velocity has become the key differentiator for organizations as ever-evolving customer demands increase the need for rapid product development and delivery. As cloud becomes a bigger part of the infrastructure equation, it will be more important to ensure there is consistency between on-premises resources and remote resources from a service provider or hyperscale cloud.

- 1. IT's top goal for 2017 is reducing the time required to respond to the needs of the business.** Digital transformation and business transformation are inexorably linked. In our 2016 VotE Storage Budgets and Outlook survey, 29.3% of respondents cited responding faster to business needs as the most important goal for their organization's IT environment in 2017. The next most common response was cost reduction at 23.7%, followed by reliability and availability improvements at 21.1%. Agility is still at the forefront of enterprises' goals as the ability to respond quickly to business needs becomes increasingly imperative.
- 2. The high frequency of production application deployments requires acceleration.** In a Q1 2016 cloud study commissioned by Red Hat, a monthly cadence for production application deployment was the most popular option being implemented by respondents, indicated by about 35% of the survey base. Even more frequent deployment, at a weekly interval, was the next most popular option, followed by a quarterly deployment schedule. As the deployment cadence picks up pace, infrastructure must be able to accommodate the increasing workload and the inherent challenges that this dynamic presents.
- 3. Infrastructure must become more cloud-like.** Although many workloads have already begun to migrate beyond traditional on-premises infrastructure onto the public and private clouds available from service providers, a complete exodus to cloud is not expected to happen anytime soon. Hybrid clouds, blending on-premises infrastructure and cloud services, are the future for most enterprises (see Figure 2). As workloads shift between the various forms of cloud, consistency and standardization will be required to ensure that workloads can access the resources they require regardless of where they are run. Private clouds will continue to be leveraged in use cases where customers want to retain control of their data, and also for steady workloads that do not require the instant elasticity of public cloud services.

**Figure 2: Workloads Are Moving to Private and Public Clouds**

Q. Which deployment locations does your organization currently use for primary storage for your workloads? And in 2 years?



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

## Be Prepared for New Applications and Workloads

New applications, workloads and customer requirements have always been drivers for change in IT infrastructure, and this era of digital transformation will be no different. Conventional applications such as databases and ERP will remain important workloads, but to meet future requirements, infrastructure must become quicker in terms of provisioning and execution and deeper in terms of providing rapid access to far larger data sets than were previously seen in datacenters. To that end, containers and big-data applications will drive the need for digital transformation.

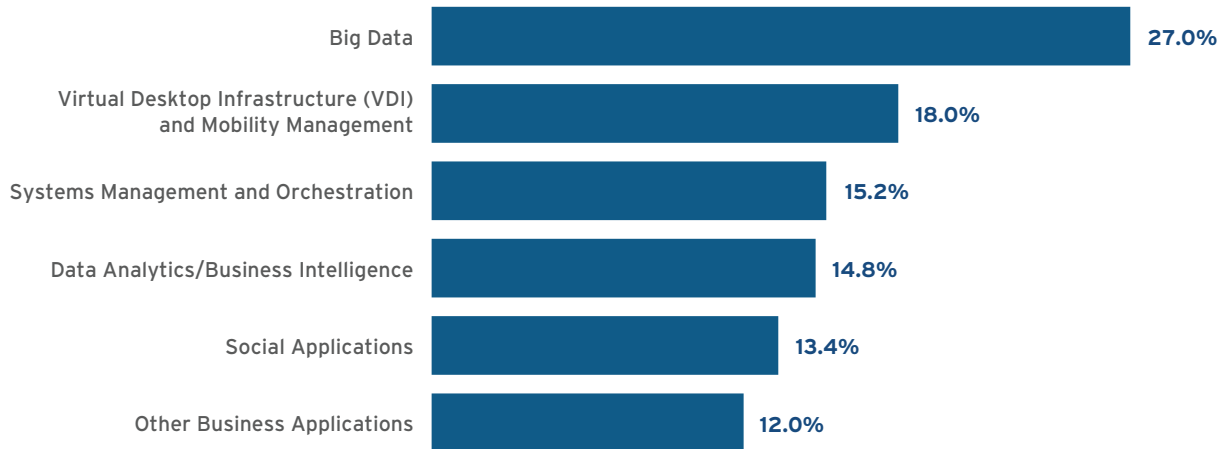
### BIG DATA AND ANALYTICS ARE AREAS FOR GROWTH

In the VotE Storage Q1 2016 survey, big data (27% of respondents), data analytics/business intelligence (14.8%), and social applications (13.4%) were workloads in which administrators expected to see rapid growth over the next two years. As big data and business intelligence become more widely used on a production level, scalability will become a key concern given the large volumes of data these deployments consume. With the rise of digital transformation, high performance and the ability to accelerate time to insight will also become major goals for organizations, which are all striving to make more informed decisions to remain competitive.

When planning the next major infrastructure upgrade, it's critical to choose vendors that have partnerships with both legacy and emerging software vendors, which will ensure that deployments and support will be consistent.

**Figure 3: Big Data and Analytics**

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



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

**CONTAINERS WILL BE DISRUPTIVE**

Containers are rising in prominence and must be accounted for when designing future infrastructure. Recently containers have emerged as an enabler of more efficient DevOps, big-data implementations and microservices. This can be attributed to a number of factors, including improved resource sharing and efficiency compared with VMs, as well as their ability to be rapidly deployed across different platforms, as required in many cloud deployments.

In 451 Research’s Voice of the Enterprise: Software-Defined Infrastructure Workloads and Key Projects 2016 survey, 23.7% of respondents claimed to have containers in use at their organization, and at this point 62.1% of the container workloads are considered implementations of production applications.

So why do we need containers? While server virtualization capabilities allow for resource consolidation, containers have the ability to take infrastructure to the next level:

- 1. Accelerated provisioning speed and efficiency** – Containers can be launched or killed nearly instantaneously, which is a key reason they will become more prominent for handling opportunistic or ‘bursty’ workloads. By contrast, a conventional VM has to go through an entire boot process, which could take anywhere from seconds to minutes to accomplish.
- 2. Improved resource sharing** – Containers have the same consolidation benefits as any virtualization technology, but with one major bonus – there is no need to reproduce operating system code for every container. If the operating system takes up 10% of a workload’s footprint, then in a hardware-virtualized platform, 10% of the whole asset is spent on OS code – regardless of the number of workloads being run on the asset. System containers are essentially operating system virtualization in which workloads share OS resources such as libraries and code. In a container environment, adding containers to a physical system does not require the operating system overhead, which frees up additional processing, memory and storage infrastructure resources.
- 3. Simplified transitions and consistency between test/dev and production** – Test and development is a major area where early adopters are taking advantage of containers. As containers gain more powerful capabilities for storing and securing data, we will likely see more production workloads using this architecture. When this happens, developers will be able to easily move their test/dev projects into production without major code rewrites through the use of container technology. This powerful workload mobility benefit will allow applications to become location-agnostic, and to easily bounce between on-premises and cloud environments.

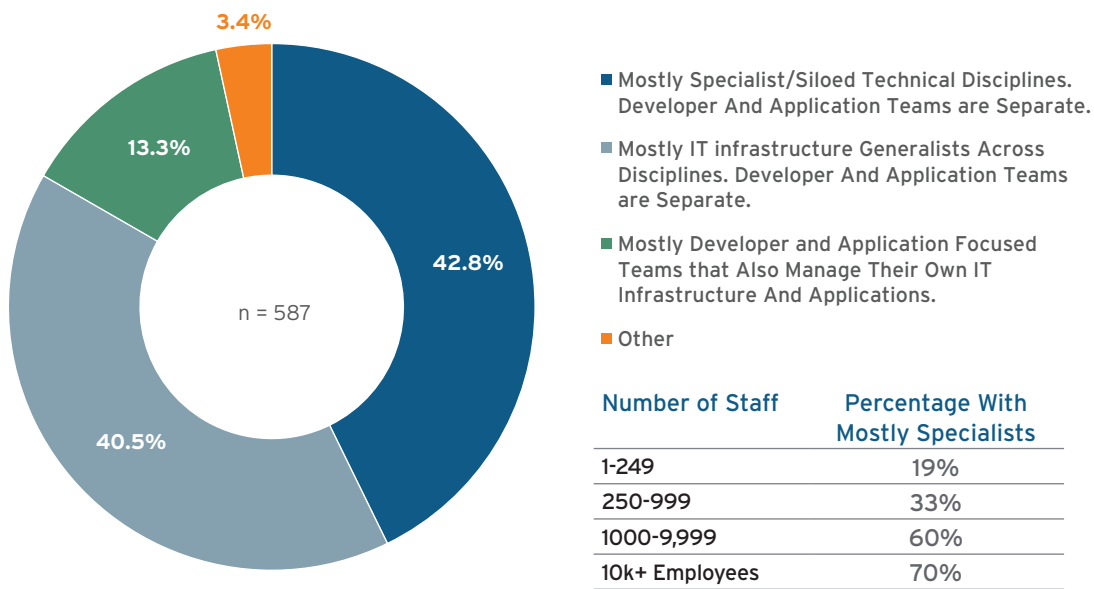
## Ease of Use and Intelligent Management Tools Are Key Requirements

While ease of use is rarely a major driver in traditional IT environments, where specialists with certifications and advanced skill sets are often looking after the datacenter resources, simplified deployment, maintenance and support will be a key area of differentiation for modern infrastructure offerings.

The changing composition of the IT workforce will increase the value of simplicity (see Figure 4). While most large organizations (which we define as 10,000+ employees) have 70% of their IT staff in specialist roles, the opposite is true with smaller organizations, where generalists are the norm. As large companies gradually hire more generalists to fill IT positions, it will become more important for infrastructure to have management tools that can proactively locate potential problems and inefficiencies.

**Figure 4: Rise of the Generalist Drives Need for Simplicity**

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



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



## Accelerate Business Transformation with Next-Gen Mission-Critical Infrastructure: Converged & Hyperconverged

Converged and hyperconverged infrastructure are growing in popularity primarily due to their ability to quickly and consistently provide infrastructure resources while also reducing management and maintenance concerns. In the world of digital transformation, it isn't the big company beating the small one as much as it is the fast company outmaneuvering slower rivals.

Converged and next-generation hyperconverged infrastructure can deliver business and IT value in new and evolving ways:

**1. Improved system performance and scalability** – Converged infrastructure and HCI both provide standardized hardware and deployment configurations, which can provide the performance stability required for production workloads. Both HCI and CI offer all-flash storage as an option for increasing performance.

As organizations continue with digital transformation, their supporting infrastructure must have the scalability to meet new demands. 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 nondisruptively while minimizing the management impact of adding nodes. By 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.

Another key benefit of scale-out HCI 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.

**2. Simplified management and operations** – To become more cloud-like and to appeal more strongly to DevOps customers, organizations must invest in infrastructure offerings that have 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 with regard to workflows and dependencies.

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 ahead to get to automated environments.

**3. Single point of support** – A common pain point for infrastructure professionals is the finger-pointing that occurs between storage, server, application and networking vendors while troubleshooting complex enterprise environments. A key benefit of converged infrastructure and HCI is that these deployments have primary vendors that are not only ready to be the first point of contact during an incident, but also have the ability to work closely with partners to quickly resolve issues when they arise.

**4. Reduced costs to deploy and maintain** – Cost reduction continues to be a key goal for IT professionals who are forced to provide more services without major increases in budgets. Converged infrastructure and HCI further help customers achieve cost reduction goals because their capabilities are largely based on software running on top of low-cost commodity hardware, rather than depending on expensive specialist hardware. HCI and CI provide specialized management tools to simplify daily maintenance and provisioning tasks, which should allow IT departments to manage fast-growing workloads without adding new staff and the opex associated with them. When looking at these offerings, it's important to also evaluate management and automation capabilities, which can improve agility while reducing costs.

## **Recommendations: Evaluating Infrastructure Architecture Choices**

Converged and hyperconverged infrastructures bear many similarities – notably in their intended purpose of providing agile, more cost-efficient architecture choices – but there are differences to be considered as well.

HCI is typically composed of identical ‘building blocks’ with virtual storage on an internal disk and turnkey software. The ability to start small and scale up is a key attribute that makes HCI popular with customers ranging from enterprises to SMBs, where the need for ease of use is amplified. As far as pricing goes, HCI offerings are available at starting prices as low as \$25,000, which should appeal to organizations that require flexibility to scale in order to meet changing business needs. HCI can also scale to meet enterprise performance and uptime requirements.

By contrast, converged infrastructure uses more flexible building blocks, allowing for a wide range of use cases. It can also make use of more sophisticated management and automation functionality. One key benefit of CI is the ability to scale server, storage and networking independently based on workload – you do not have to overprovision when adding resources. CI also brings all the data integrity and protection capabilities of enterprise-grade arrays, which is still highly favored in mission-critical environments.

Regardless of choice, with specialized and dedicated hardware-based CI and the tight-knit integration of components in HCI, enterprises must ensure that infrastructure providers have a well-rounded portfolio of storage, server, networking and management technology in order to simplify operations and accelerate their digital transformation.