White Paper

Accelerate IT Transformation with Hyperconverged Infrastructure (HCI)

Implementing the Right Hardware Foundation Now for Increased IT Agility

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Introduction

Today's competitive business environment demands that organizations continue to innovate at all levels to stay relevant and drive profitability. With this in mind, more organizations are embracing the concept of digital transformation—leveraging new digital technologies to rethink business processes and help them become more innovative, user-oriented, and customer-focused.

While there are many aspects to the overall digital transformation of the business, IT must transform as well. IT transformation requires adoption of modern data center technology pillars, adoption of modern IT processes, and a focus on IT and business alignment. The result is increased IT agility and responsiveness; enhanced IT spending efficiency; shifts in IT funding to new projects and innovation (rather than maintaining and troubleshooting the status quo); and higher levels of internal stakeholder satisfaction and improved competitiveness and business outcomes.[1]

This paper focuses specifically on modern technology pillars: how and why software-defined technology in the form of hyperconverged infrastructure (HCI) is being deployed.

To illustrate how HCI supports an organization in enabling IT transformation, ESG interviewed customers who are leveraging Dell EMC HCI appliances, specifically VxRail and XC Series. These case studies illustrate how these solutions are laying a solid hardware foundation that will guide the way to increased IT agility, flexibility, and efficiency.

Why HCI?

Hyperconverged Infrastructure and IT Agility

HCI plays a significant role in enabling IT agility and flexibility. ESG defines hyperconverged infrastructure as a software-defined infrastructure approach that seamlessly combines compute, storage, and data services in a single solution running on industry-standard x86 systems, with the intention of running virtualized and/or containerized workloads. These systems are enabled by a distributed architecture (file system and/or object store), clustering multiple systems within and between sites to form a shared resource pool and enable high availability, workload mobility, and efficient scaling of performance and capacity. These systems are typically managed through a single management framework or orchestration tool with policy definition and activity execution at the VM/container level. It is the combination of being fully virtualized, clustered, and scalable that helps drive greater IT agility.

Hyperconvergence and IT Agility

A whopping 87% of IT managers already using HCI agree that it makes IT more agile, with 25% strongly agreeing.

Indeed, this is more than a marketing message or theoretical benefit from deploying HCI. When IT managers already using HCI were asked if it played a role in making IT more agile, *87% agreed* that it does, with 25% stating it had made them significantly more agile (see Figure 1).[2]

[1] Source: ESG Research Insights Paper, *How IT Transformation Maturity Drives IT Agility, Innovation, and Improved Business Outcomes*, April 2017.
[2] Source: ESG Master Survey Results, *Converged and Hyperconverged Infrastructure Trends*, October 2017.

Figure 1. HCI Technology Makes IT More Agile

Do you believe hyperconverged infrastructure technology has made your IT organization more agile? (Percent of respondents, N=208)

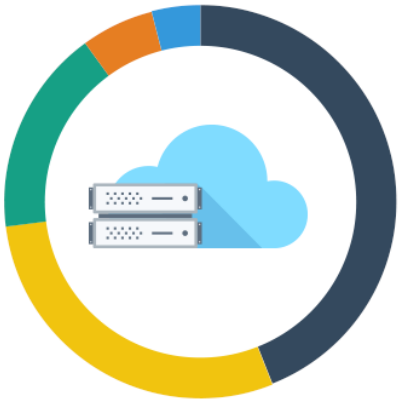
- Yes, hyperconverged infrastructure technology has made us somewhat more agile, **62%**
- Yes, hyperconverged infrastructure technology has made us significantly more agile, **25%**
- No, hyperconverged infrastructure technology has not made us any more agile, **11%**
- Don't know, **2%**

Source: Enterprise Strategy Group

This agility is why HCI technology is playing such a key role in data center modernization. The key outcomes of data center modernization are that the environment is more cloud-like and allows IT to deliver IT-as-a-service (ITaaS). Indeed, nearly three-quarters of IT managers surveyed believe that hyperconverged infrastructure platforms enable them to emulate cloud services in their own data centers, with 44% indicating that hyperconverged solutions give them the *best* chance to become more cloud-like in their daily operations (see Figure 2).[3]

Figure 2. The Relationship Between CI and HCI Technology and Data Center Modernization

Which of the following statements do you believe is most accurate in terms of the relationship between converged or hyperconverged technology and your organization's data center modernization efforts with the goal of becoming more "cloud-like" by delivering IT-as-a-service? (Percent of respondents, N=324)



- We believe hyperconverged infrastructure platforms give us the best chance to become more cloud-like and deliver IT-as-a-service, **44%**
- We believe that either converged or hyperconverged infrastructure platforms positions us to become more cloud-like and deliver IT-as-a-service, **29%**
- We believe converged infrastructure platforms give us the best chance to become more cloud-like and deliver IT-as-a-service, **17%**
- Don't know, **6%**
- We don't believe that either converged or hyperconverged infrastructure platforms positions us to become more cloud-like and deliver IT-as-a-service, **4%**

Source: Enterprise Strategy Group

[3] Ibid.

Based on this research, it is safe to conclude that modern data centers will look much different than those in the recent past. While IT infrastructure went through very little change between the 1980s and early 2000s, the advent of server virtualization brought about some level of change, helping to virtualize the server layer and drive efficiency through workload consolidation. Converged technology, which packages up server, storage, and networking into a single engineered system layered with server virtualization, came on the scene in 2009. While converged technology offers many benefits, such as predictable performance and workload isolation, it also still requires storage and server management expertise. A few years later, we saw HCI technology emerge. Hyperconvergence takes consolidation to the next level, with virtualization of and orchestration between server and storage layers, removing the need for specialized skill sets and enabling even more hardware and workload consolidation.

The Hardware Foundation Matters for Future Digital Transformation

Transformation requires agility, which is often associated with cloud and with quick deployment, ease of management, and simplicity. Yet cloud means IT loses some of the control it has on-premises. With HCI, IT can gain many of the actual benefits associated with using the cloud without the downside of losing control or potential security and regulatory issues that using the cloud can open the organization to. Today, IT can have the on-premises answer (essentially an HCI-based private cloud) or deploy a hybrid cloud with many products, enabling the best of both worlds. Traditional commodity servers were focused on being compute engines, not compute and storage like HCI requires, and they certainly were not built for cloud integration, as many solutions are today.

HCI enables the organization to modernize its data center and, subsequently, become more cloud-like. Becoming cloud-like begins with choosing a hardware platform, specifically an HCI platform. However, HCI platforms can go beyond the physical integration of multiple hardware and software components across disparate server and storage systems. Rather, an organization can benefit most from an integrated platform—in one box—in which components are designed specifically to offer the benefits that HCI can bring to the table.

While IT organizations can build HCI appliances based on commodity servers, such servers were built to handle general purpose compute operations, not the complex and fast orchestration of operations that offer the IT agility and efficiency expected from HCI. This "do it yourself" HCI approach requires hardware to deliver this agility and efficiency, while (hopefully) configuring the appliance with software nuances and limitations in mind—not to mention lifecycle management of future software releases. Making the infrastructure easy to set up and truly simple to manage is surprisingly complex, though, so ideally the hardware and software of the HCI appliance are developed in lock-step, ensuring that neither component is exhausted when processing tasks stack up. This design attribute will allow the solution to scale efficiently as the appliance supports additional workloads. And the server needs to be built with HCI as a primary use case. For example, Dell EMC's 14th generation servers are purpose-built for HCI with over 150 specific requirements for HCI workloads.

Moreover, HCI appliances offer improved reliability and performance, as manufacturers "harden" these appliances by conducting rigorous validation and testing processes. Both reliability and performance become critical as the system scales to support additional workloads over time. If an organization is running mission-critical workloads on HCI appliances, these appliances must not fail as doing so may expose the company to brand erosion or worse. Performance is equally important as end-users seek consistency when performing tasks using applications loaded onto the appliance.

IT should also think past the initial (and fast) deployment benefits of HCI to consider the entire lifecycle of the system—some appliances (such as those from Dell EMC) are built with the full lifecycle in mind, from deployment through upgrades, as well as tasks like scaling and meeting support needs.

Finally, an HCI appliance eases the purchase, installation, and management of IT hardware and software resources. Buying individual hardware and software components requires IT to spend time in sizing out workload requirements over a multi-year period, which may lead to increased and, perhaps, excessive capital costs. More time is then spent on installing and integrating these components into some cohesive system, while the process also requires multiple consoles to perform overall system management. On the other hand, a manufacturer will ideally design the HCI appliance to support a recommended number of workloads, making the purchase decision easier for IT. Also, IT no longer has to purchase server, storage and software resources separately based on future workload requirements. Rather, IT can start small and be flexible by scaling in incremental units as required. The fact that the HCI appliance is already integrated in one form factor makes system management much easier to accomplish.

Dell EMC's Investments in HCI

Recognizing that HCI can help organizations evolve their IT environments to offer cloud agility and efficiency, and affirmed by continued strong customer demand and adoption, Dell EMC offers multiple solutions to serve as the ideal foundation for IT transformation depending on their needs from build-your-own HCI to turnkey appliances to rackscale HCI with integrated networking. Dell EMC VxRail and Dell EMC XC Series are HCI appliances that give IT organizations the simplest entry into HCI and are the focus of this paper.

Both VxRail and XC Series appliances leverage Dell EMC PowerEdge 14th generation servers, designed specifically to support a myriad of HCI workload types. The 14th generation PowerEdge servers are designed with software-defined storage requirements built in (about 150 of them), which makes it uniquely optimized for HCI workloads. It also brings users the performance benefit of the latest PowerEdge servers for HCI—powerful and predictable performance enables support for even more demanding workloads and applications. Versus previous generations of PowerEdge, users get benefits such as double IOPS, 2x faster response times sustained <1ms, and up to 3x more VDI users per node.

Figure 3. Dell EMC HCI Appliances

Source: Dell EMC

IT administrators have multiple configuration options for any IT environment with HCI appliances built on PowerEdge servers and their integrated software-defined storage (SDS) options. As engineered systems, these solutions offer the flexibility to accommodate any organization's workloads in discrete, predictable increments. VxRail is jointly engineered with VMware and optimized for VMware environments, while XC Series can work with multiple hypervisor types. In keeping with meeting its customers' desire to operate in a more cloud-like manner, Dell EMC offers flexible payment options: Cloud Flex for HCI (available for VxRail) provides customers with a way to deploy HCI leveraged as a service with monthly payment options, allowing it to be consumed with OpEx, rather than CapEx, dollars.

Given the pace of technology change in the past few years, combined with the fact that IT organizations have applications they may have been running for years on legacy hardware, an organization's IT evolution can have many starting points. For this paper, we picked IT organizations that are leveraging Dell EMC's HCI appliances so that they can truly offer ITaaS to their end-users, thus paving the way to true digital transformation. Here are their stories.

Your Hardware Foundation Matters when Preparing for the Future

Sometimes you just need to be up and running quickly and efficiently. It may be because you don't have IT resources to throw at deploying, managing, and maintaining assets at remote sites, as one customer we talked with discussed, or it could be because you want to leverage whatever IT resources you have for software development and to stay ahead of the competition, as another discussed. For these users, having an easily deployed, hands-off appliance really matters. They started from completely different places, but landed on the same types of solutions—where they were willing to spend a little more on CapEx to save on OpEx, ultimately with a lower TCO, and invest in future growth.

Manufacturing Company Streamlines Remote Office Operations with Dell EMC VxRail Appliances

This global manufacturing company, based in the midwestern region of the United States, needed to find a way to support its five regional offices with no local IT staff. The company has over 2,000 employees, and all manufacturing is done in the three plants it has in the USA. Regional offices are sales and distribution centers. Each site has some local IT infrastructure in case network connections between them were down. The company located its IT infrastructure in a colo data center, hosting both DevOps and quality assurance (QA). The data center housed its disaster recovery site also. This company needed a "cloud-like" environment to instill IT agility and efficiency considering the distributed environment and lack of staff. It got that by implementing Dell EMC VxRail Appliances.

The company's IT transformation actually started seven years ago with an effort to improve response time and resource utilization via virtualization. At that time, IT had 200 servers, with only 20 virtualized, based on IBM blades. Then the company discovered VMware, and the agility and efficiency it could obtain by not relying on purchasing a fixed number of servers for each application and going through lengthy physical integrations. IT drastically reduced the time to spin up new servers from days to hours, increasing business responsiveness. Over the next three to five years, the company virtualized the rest of the environment via VxRail, and is now 99% virtualized. During this time, the company was still seeking ways to increase agility and efficiency within its IT environment.

Prior to embracing HCI, the company employed disparate products from both EMC and Cisco—(converged infrastructure) Vblock, (all-flash) XtremIO, VNX and Isilon storage, and Cisco switches. While employing what the company viewed as best-of-breed components, it spent much time on both planning and migration. This was not in line with the company's goal of "making it easier for IT to support the business."

As the company evaluated new technologies, its main criteria were performance, VMware support, and SAP certification. In light of wanting to advance the IT agility and efficiency achieved with VMware, the company decided to look at HCI, specifically the Dell EMC VxRail Appliance. After initial examination, what attracted the company to VxRail was the performance and ease of use. Also, the company had previous good experiences with Vblocks—its first foray into converged infrastructure—which made it want to explore more of the Dell EMC portfolio. To evaluate the VxRail Appliance, IT opted to deploy it initially in the company's remote facilities, as they posed a lower risk to the overall IT infrastructure.

The Impact of Implementing VxRail Appliances

As the company deployed VxRail, it quickly saw the advantages of HCI. The legacy IT remote site architecture consisted of at least one Cisco rack mount server and one VNX storage array, taking up a significant amount of rack space. The VxRail Appliance delivered four nodes that included both server and storage in a 2U form factor, a noteworthy reduction. This showed the company that the appliance approach could help it scale as needed without spending much on the initial capital outlay or occupying a huge footprint. It noted that this would particularly help in supporting new big data initiatives. In one remote site, the company thought it needed to add another rack but instead freed up one quarter of a rack by installing HCI. The company also found that it reduced power by up to two-thirds of its typical consumption, adding to operational savings.

IT also found that the time required to install and manage the VxRail Appliances versus its traditional approach was greatly reduced. Unlike integrating disparate IT hardware components and managing the entire system via multiple consoles, IT installed the appliance with very little downtime, reducing end-user and business impact. As for manageability, IT can log into the VxRail Manager at any location and see how all the nodes in all remote locations are performing—as one IT employee noted, "giving them anything that they need" to ensure that IT is up and running smoothly. Since the installation, one IT employee noted that he has "rarely had to log in" to check on the health of the VxRail Appliances.

> While the previous solution took up significant rack space, the VxRail Appliance delivered four nodes that included both server and storage in a 2U form factor, a noteworthy reduction.

The company's goal was to make IT better able to respond to the needs of the business by making it easy to manage, deploy, and troubleshoot the IT environment by deploying VxRail. And the effort has been a successful one. IT can now spin up new applications in hours versus days and weeks, and has achieved 100% uptime. This is important: The cost of downtime—especially during peak times—could be $10-15k per hour, per manufacturing line. One system administrator noted that he can do his job from anywhere and be completely responsive to business needs—he is no longer tied to the office.

Online Gaming Company Taking a Fast Path to Transformation with Dell EMC XC Series

One of the world's largest e-sports companies was facing a challenge. This global company has almost 20 offices worldwide, and over 600 employees. It runs both online and offline events and major e-sports tournaments that can draw as many as 20,000 contestants where the audience watches professional gamers compete. The central offices are in western Europe, and it has regional offices worldwide including Australia, Scandinavia, Russia, Spain, and Portugal.

The company operates on three key pillars of IT:

- Corporate IT provides first level support.
- IT event crew sets up worldwide events.
- IT operations is responsible for online development such as website production.

Websites are part informational, part interactive. Both professional and amateur players can compete in small, online tournaments. The online tournaments are all powered by Dell EMC XC Series.

The company started its journey before digital transformation was a broadly talked about topic—and didn't follow a classic path. The company was founded in the early 2000s, and wasn't burdened by large amounts of legacy infrastructure. In fact, the company prides itself on being early adopters of new technology. The biggest initial challenge was a lack of money to invest in building out IT infrastructure. So, with a shoestring budget, the IT team members:

- Were very hands on.
- Did everything themselves, manually.
- Used a lot of open source software.
- Bought used servers and installed everything themselves.
- Had no data center, and hosted out of their offices.
- Had no SAN storage, and used local disk storage, with local service.

Once the company was up and running and could invest in IT, it started a steady transformation journey and:

- Made a large investment in an EqualLogic iSCSI SAN for centralized, shared storage.
- Used the KVM Hypervisor as a virtualization platform.
- Incurred no licensing fees for operating systems.

The new approach was much better than the secondhand, scraped-together manual approach the team was using, but it introduced some challenges. Every three to five years, the company spent a lot of money on a new iSCSI SAN appliance from Dell EqualLogic. After gaining some experience with managing the iSCSI SAN, the team was looking for ways to simplify and streamline IT operations using software-defined storage. The IT team tried CEPH (open source distributed storage) and different open source options, but quickly realized it was hard to recruit technical staff with the skills needed. That's when the company decided to shift away from hands-on maintenance, and to invest in an easy-to-maintain infrastructure, with the goal of freeing up resources to develop products rather than spending time on maintaining the core infrastructure. And that's when the company invested in the Dell EMC XC Series.

The Impact of Implementing XC Series

At the time the company adopted XC Series, it had five IT staff. The approach the company wanted to use had developers also maintaining the infrastructure, and all the VMs. Before XC Series, this wasn't possible since it required IT staff to have specific skills and knowledge, and not everyone had that knowledge, so the company had to hire specialists rather than developers. Now, using a simple XC Series interface, the customer said "at least 50% of those five people we have in IT can now work on our core products rather than working on infrastructure. Before, they used to maintain all the VMs…this is not needed anymore." Aside from reducing management overhead, the company felt it was saving significantly because it used the built-in hypervisor and didn't have to pay additional licensing fees. The company has completely shifted away from the open source and DIY approach, and has been running XC Series for over a year now.

The next step in the company's journey is to bridge to the cloud and operate in a hybrid manner, using XC Series and AWS. The team will start off with a three to six-month trial of running VMs in the cloud to ensure full understanding of performance profiles, usage patterns, and predictability, then will determine which aspects of the operation will run on-premises and which aspects in the cloud. For data privacy purposes, the company will keep some applications on-premises, but the overall goal, the customer said, is to "take the best of both worlds and migrate seamlessly between the two."

The customer is very happy with his journey to date: "It was a pretty straightforward journey to go with Dell EMC XC Series. We really like it, and feel it was the right choice, it's a great product. It was the right decision for the right time, and I can recommend without any major drawbacks."

The Bigger Truth

HCI plays a significant role in enabling "cloud-like" IT agility and flexibility. While IT managers agree that it offers improved scalability, simplified management, and lower total cost of ownership, they truly value the agility that HCI can bring to an IT environment, especially for those organizations with digital transformation initiatives. It is this agility that supports the delivery of ITaaS, allowing end-users to embrace the advantages of cloud to respond to business priorities without expending time and resources unnecessarily. And achieving "cloud-like" IT requires an appliance that integrates server and storage components that have been specifically designed to handle workloads running on an HCI platform in a compact form factor, not spanning multiple racks.

To support customers in their IT transformation efforts, Dell EMC offers two appliances—the VxRail Appliance for customers who already leverage VMware and the XC Series for those who need hypervisor choice. Dell EMC HCI appliances leverage PowerEdge 14th generation servers that have been designed with HCI needs in minds. With its hardware design optimized for supporting different types of workloads, these servers can support multiple configurations as they are integrated with SDS capabilities, providing a scale-out cluster with predictability in performance as nodes are added. Furthermore, the appliances work across multiple generations of hardware for additional flexibility.

Achieving "Cloud-like" IT

Achieving "cloud-like" IT requires an appliance that integrates server and storage components that have been specifically designed to handle workloads running on an HCI platform in a compact form factor, not spanning multiple racks.

ESG recently spoke with two current Dell EMC customers who have implemented these appliances in their organizations and quickly experienced the benefits that HCI offers. Not only have they freed up floorspace and reduced related expenses, but more importantly, the HCI approach has ultimately helped IT to reduce the time for installation and management, reducing any downtime that can potentially affect business operations negatively. Getting infrastructure up and running now consumes hours—not days—of planning, migration, and implementation. Scaling the infrastructure is also more efficient as IT can add appliances while adding little overall downtime. Because HCI appliances are designed to support multiple types of workloads smoothly, IT administrators spend less time on managing and monitoring the infrastructure. This hands-off management, fast installation, and scale makes IT more agile in responding to the needs of the business.

For customers who are in the process of digital transformation, HCI appliances, specifically those with tightly integrated software and hardware optimized to deliver HCI's unique benefits, can help to modernize the IT environment to allow it to deliver true business impact via agility. HCI represents the next logical step in the evolution of data centers in providing "cloud-like" IT. Dell EMC takes it one step further with its integrated lifecycle management, ensuring that all aspects of infrastructure operation are seamless for IT, so that IT can send more time supporting the business and less time managing the infrastructure.

Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides actionable insight and intelligence to the global IT community.

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