

HYPERCONVERGENCE GOES MAINSTREAM

This approach to data center infrastructure has become a trusted method for simplifying IT environments and powering digital transformation efforts.

EXECUTIVE SUMMARY

In recent years, organizations across industries have adopted hyperconverged infrastructure (HCI), an approach to IT architecture that combines storage, computing and networking into a single system.

Hyperconvergence has been described as "the best of both worlds" by some data center administrators and industry observers, who see the model as offering the elasticity and scalability of public cloud providers, alongside the control and security of an on-premises system. More than any other outcome, perhaps, organizations are seeking simplicity from their hyperconverged infrastructure. At a time when IT shops are striving to spend less time and energy on routine maintenance and support — and focus more on planning and executing strategic projects that will help the business to thrive — HCI offers a way to deliver and scale in-house IT resources in a unified, simplified manner. Organizations that have embraced hyperconvergence have utilized the model to help them streamline data center operations and power their digital transformation efforts.

While HCI simplifies operations, deploying the model does require some specialized expertise, and many organizations turn to a trusted partner for assistance with configuring systems, migrating workloads and other initial tasks.

The State of Hyperconverged Infrastructure

Hyperconvergence has staked its claim in the data center marketplace and continues to grow. [According to IDC](#), annual spending on converged systems exceeds \$13 billion, with a market that is expanding more quickly than the data center infrastructure market as a whole. [Gartner recently estimated](#) that as much as 20 percent of business-critical applications deployed on three-tier IT infrastructure will transition to HCI by 2020. And in a 2018 comparison of 11 different HCI vendors, [Forrester declared](#) that the hyperconvergence marketplace is "maturing swiftly."

"Solutions have evolved significantly in just a few years," the report's authors note. "An ecosystem has developed with application vendors working with [hyperconvergence] vendors to certify their applications on hyperconverged infrastructure. Business-critical applications from the likes of Microsoft, Oracle and SAP are now certified to run on an [HCI] stack."

To understand why hyperconvergence continues to make inroads with data center administrators, it's important to first understand what the model is, what features and benefits it offers and what pain points organizations are addressing with HCI.

What Is Hyperconvergence?

"Hyperconvergence" is no slippery IT marketing term; it refers to a specific set of technologies that are architected and deployed in a particular way. And yet, different vendors and industry observers emphasize different aspects of the technology in their definitions:

- **Nutanix:** "Hyperconverged infrastructure streamlines the deployment, management and scaling of data center resources by combining x86-based server and storage resources with intelligent software in a turnkey software-defined solution. Separate servers, storage networks and storage arrays can be replaced with a single hyperconverged infrastructure solution to create an agile data center that easily scales with your business."
- **Hewlett Packard Enterprise (HPE)** "Hyperconvergence, like convergence, eliminates traditional IT management issues by packaging data center services such as server, storage and network and allowing them to be managed in a single application. But unlike convergence, hyperconvergence is a software-defined infrastructure that decouples infrastructure operations from the system hardware and converges them at the hypervisor level into a single building block (thus 'hyper' converged). Hyperconverged systems leverage software-defined intelligence to break down the silos of storage and compute, and allow them to run and be managed on the same server platform, which eliminates inefficiencies and accelerates compute."
- **Cisco Systems:** "Hyperconverged infrastructure combines compute, virtualization, storage, and networking in a single cluster. Starting with as few as three nodes, users can easily scale out to match computing and storage resource needs. Hyperconvergence brings cloudlike simplicity on-premises and within a single, easily managed platform."

Taken together, these definitions paint a clear picture of how hyperconvergence differs from traditional three-tier data center architecture. The definitions also leave little doubt about the single greatest benefit of the model: simplicity. Hyperconverged infrastructure fundamentally simplifies the data center by unifying computing, storage and networking. The fact that hyperconvergence is software-defined and runs on commodity hardware simplifies deployment and management even more. And because HCI clusters can be rapidly expanded with additional nodes, data center administrators can grow their environments over time without extensive additional planning and integration.

What Is Driving HCI Adoption?

While simplified deployment and management is the primary benefit of hyperconverged infrastructure, this simplicity brings with it a number of ancillary benefits. The factors leading enterprises to adopt hyperconvergence include:

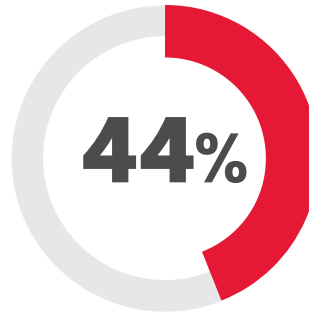
- **Hybrid cloud enablement:** The simplicity of HCI is often compared to that of the public cloud. But hyperconvergence doesn't merely create a cloudlike experience; it can also help organizations support a hybrid cloud model that combines on-premises and public cloud resources. In its 2018 comparison of different HCI vendors, Forrester noted that "almost all [hyperconvergence] vendors have forged technology and go-to-market partnerships with hyperscale public cloud providers ... they're all geared to solve hybrid cloud use cases."
- **Reduced costs:** According to survey data published in a [2018 report from Enterprise Strategy Group](#), 28 percent of IT professionals say that an "improved total cost of ownership" was a driver for their organization to deploy or consider deploying hyperconverged infrastructure. And 16 percent of respondents specifically called out reduced operating expenses as a driver. Forrester notes that storage optimization techniques such as deduplication and compression can reduce overall capital spending, and that HCI drives down operational costs in a number of ways: "Firms reduce operational costs via fewer technology silos, a minimal learning curve, rapid provisioning and efficient management of a global federated storage resource."
- **Improved scalability:** In the ESG survey, "improved scalability" led all drivers, with 38 percent of IT professionals citing the factor in their deployment or consideration of HCI solutions. This is another way that hyperconverged infrastructure mimics the public cloud; because nodes can be rapidly added to existing hyperconverged clusters, data center administrators can expand resources without the usual delays caused by cumbersome hardware configuration and integration processes.
- **Outstanding dependability:** In a 2017 report on hyperconvergence, IDC noted that the automated nature of HCI helps reduce the risk of downtime associated with management tasks such as firmware upgrades. "The scale-out, software-defined nature of HCI solutions helps eliminate the need for complex and risky forklift upgrades," the report states. "Many companies leverage hyperconverged solutions as a way to improve their disaster recovery/high-availability. ... HCI solutions also allow users to reduce the number of technology suppliers, which helps better coordinate patches and upgrades while reducing the number of support calls needed for the solution."

- **Ease of deployment:** Twenty-six percent of respondents to the ESG survey listed "ease of deployment" as a leading factor driving them to deploy or consider HCI, and another 22 percent cited "speed of deployment."

How Hyperconverged Infrastructure Drives Innovation

The predominant IT phrase of the current era is "digital transformation" — defined by industry analyst Brian Solis as "the realignment of, or new investment in, technology, business models and processes to drive new value for customers and employees and more effectively compete in an ever-changing digital economy."

The term is used with such frequency that it is derided in some quarters as a mere buzzword, and in a 2018 CDW survey, 25 percent of IT leaders admitted that they had "no idea" what



The percentage of IT professionals who believe that HCI platforms give their organizations the best chance to become more cloudlike and deliver IT as a Service¹

the phrase really means. However, real business imperatives lie behind the buzz. In that same survey, 79 percent of respondents said that digital transformation is a priority for their business, with only 10 percent saying they had no plans to pursue a digital transformation strategy. And the top two goals of digital transformation efforts — improving operational efficiency and creating a competitive advantage through improved customer experience — are specific, measurable and directly tied to a business's bottom line.

The conversation about digital transformation tends to revolve around end-user applications, customer-facing

solutions and cutting-edge Internet of Things environments. However, organizations should not discount the role of the data center in the success of digital transformation initiatives. In most cases, enterprises simply won't be able to implement new workflows with old infrastructure. And even in instances where IT shops are able to leverage legacy infrastructure to support transformative applications, IT staffers will spend much of their time managing and maintaining the aging hardware — preventing them from focusing on an organization's larger goals and likely limiting the overall success of the digital transformation initiative.

The idea that legacy infrastructure creates a roadblock on the path to digital transformation is an intuitive one, but there is also a wealth of data to support it. In 2017, the annual [Global CIO survey](#) from Logicalis Group showed that 44 percent of respondents considered legacy technology to be the chief barrier to digital transformation, with 51 percent of respondents saying they planned to adapt or replace existing infrastructure as a way to accelerate digital transformation. And, in a 2019 Infosys survey, 41 percent of respondents cited legacy infrastructure as a transformation inhibitor, making it the single greatest barrier to digital transformation.

HCI in Action

Organizations in various industries are streamlining their data center operations through hyperconverged infrastructure.



Healthcare: When [Steinberg Diagnostic Medical Imaging](#), a healthcare company based in Nevada, found that its IT infrastructure no longer supported the company's goals of providing excellent service and delivering an outstanding patient experience, it implemented a VxRail HCI appliance from Dell EMC. The solution simplified IT administration and lowered costs associated with labor, power, hardware and maintenance. It also improved performance by 50 percent, enabling the company to deliver a better patient experience.

Retail: The automotive oil change service [Jiffy Lube](#), which operates 550 locations in the U.S., was having difficulty managing its diverse data center infrastructure and regularly experienced outages to its business applications. The company created a software-defined environment with hyperconverged appliances and cloud platform software from Lenovo and Nutanix, increasing reliability and saving approximately \$100,000 in capital costs.

Government: When the [city of Redmond, Wash.](#), sought to refresh its IT infrastructure, it looked for an innovative solution that improved performance and reliability on which to run its applications and services. The city deployed a Nutanix platform to support its production virtual machine environment, as well as a second Nutanix system to replicate data to a secondary disaster recovery site. Implementing these solutions simplified management, improved performance and visibility, and enabled better scalability.

The Pivot to HCI — and Innovation

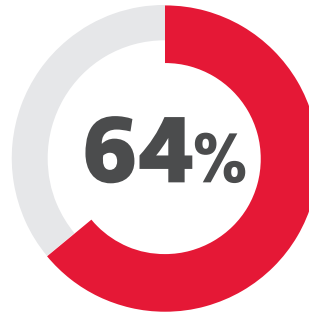
Organizations can accelerate their digital transformation goals by embracing hyperconvergence. In fact, research shows that companies aggressively pursuing digital transformation are far more likely to have already implemented hyperconverged infrastructure. In a [2018 research brief](#), ESG notes that 98 percent of companies that were identified as "transformed organizations" are using either converged or hyperconverged infrastructure, and 86 percent are using both. This compares with just 3 percent of companies identified as "legacy organizations" that have deployed both converged and hyperconverged infrastructure. Among transformed companies, convergence and hyperconvergence aren't niche environments; on average, transformed organizations are [running more than 35 percent of their applications](#) on converged or hyperconverged platforms.

Hyperconverged infrastructure helps to support digital transformation in two significant ways. First, the IT benefits

(including simplicity, scalability and reliability) help organizations to deploy and manage the game-changing applications that will lead to improved customer experience, increased revenue and other business benefits. But also, because hyperconvergence streamlines data center management, internal IT staffers can spend less time "keeping the lights on" and dedicate more of their energy toward projects that are aligned with the organization's digital transformation goals. "IT organizations leveraging CI/HCI don't have to architect or integrate any components themselves," ESG notes in its research brief. "They can instead use that time to focus on strategic, innovative projects such as Big Data or artificial intelligence (AI) to help grow the business. ... Because components are pre-qualified to work together seamlessly, CI/HCI solutions tend to be more stable and reliable, and upgrades/patches are less likely to introduce compatibility problems. The outcome of that consistent, dependable operation is that IT staff are able to focus on higher-value tasks instead of routine oversight."

Time Savings That Keep Pace with IT Evolution

Unsurprisingly, ESG also finds that the time savings and agility enabled by hyperconvergence leads to benefits related to



The percentage of IT decision-makers who say that the "need to upgrade outdated IT infrastructure" is the top factor leading to IT budget increases²

digital transformation. For instance, survey respondents who cited management improvements estimated that they spent 32 percent less time on infrastructure deployment tasks, such as installing, configuring and integrating components. And these benefits increased as organizations invested more in hyperconverged infrastructure. Organizations running more than half of their workloads on converged or hyperconverged infrastructure reported a 52 percent reduction in time spent on infrastructure deployment, compared with 30 percent for organizations with a smaller converged or hyperconverged environment. The heavy users of

convergence and hyperconvergence also reported a 43 percent time savings for systems management, compared with a 29 percent time savings for lighter users.

At technology conferences — especially in sessions centered on digital transformation — it's common to hear speakers repeat the popular quote about how technology "has never changed this quickly before, but will never change this slowly again." To prepare for this accelerated change, organizations need to modernize not just their applications and endpoints but also their data center infrastructure. For many, hyperconvergence will be an important part of that effort.

Best Practices for Deploying Hyperconverged Infrastructure

It's natural for IT managers and staffers to feel some trepidation at the prospect of fundamentally changing the architecture of their organization's data center — even if only a portion of the enterprise's workloads are going to run on the new solution, and even when the infrastructure is specifically meant to simplify operations. But fear of change shouldn't keep organizations from moving forward. Most data center teams will find that they're up to speed after just a little experience, training and research. Here's a start.

Security

The industry site [Hyperconverged.org](https://hyperconverged.org) suggests that data center administrators follow these four best practices for securing hyperconverged architecture:

- **Guard against insider threats:** Organizations should follow the "principle of least privilege," granting the least possible level of access to individuals while still allowing them to do their jobs.
- **Protect individual components:** Although hyperconvergence integrates computing, storage and networking into a single cluster, Hyperconverged.org notes that criminals are still able to attack each component separately and recommends that organizations secure each individually. To this end, some vendors offer software-defined encryption that secures data both at rest and in transit. Also, fabric protection and shields for virtual machines can add security layers to the virtualization

HCI and the Software-Defined Data Center

Hyperconverged infrastructure is a building block of the software-defined data center — a data center in which all infrastructure elements are virtualized and delivered as a service.

Although HCI does virtualize networking, storage and computing, the presence of hyperconvergence alone doesn't turn a data center into an SDDC. For a data center to be truly software-defined, it must be managed with an orchestration layer that allows for proactive monitoring, automated policy management, automated provisioning and effective capacity planning.

The orchestration and automation capabilities of the SDDC speed up the time to delivery for IT services, helping to cement the IT shop's role as a business enabler within the enterprise. For instance, self-service portals can allow authorized developers, administrators and other users to select applications and infrastructure services without having to submit a request to the IT department (which might take weeks to fulfill). In this model, users get the IT tools they need more quickly, and internal IT staff can turn their attention away from rote tasks, such as provisioning resources, and focus on more strategic projects that create business value.



components of an HCI cluster. And backup software can be used for point-in-time infrastructure restores.

- **Implement centralized security:** Traditional data center security tools, which rely on full clients installed on each endpoint, are “too cumbersome” for HCI, Hyperconverged.org writes. Instead, the site recommends centralizing security through an agentless approach.
- **Practice defense-in-depth:** Finally, organizations should apply several layers of security to their infrastructure, protecting both the hardware and software from internal and external threats.

Preparation and Migration

Migrating to hyperconverged infrastructure involves moving virtual machines from one platform to another, and preparing these VMs for the shift is often the largest task tied to an HCI implementation. Administrators should identify any existing VM snapshots, determine which of their powered-off VMs to keep and scan data stores for any VMs and disk files that aren't registered in their management tools. Each VM will need two migrations (one for storage and another for computing), which can be completed with specialized tools offered by IT vendors.

Wanted: Skills to Support Hybrid Cloud

Organizations that are deploying hyperconverged infrastructure to support a hybrid cloud model will need internal expertise or outside help. Here are the seven most in-demand skills related to hybrid cloud, according to [The Enterprisers Project](#):



Automation: Scripting and coding skills for automation are essential for supporting the programmable infrastructure of the hybrid cloud.

Source control management: The abundance of code also creates a need to effectively manage source (or version) control.

Experience with multiple environments: It's not enough to be an expert in either on-premises infrastructure or public cloud resources. IT professionals working in a hybrid cloud environment need experience (or, at least, training) in both.

Workload suitability evaluation: Deciding whether to place certain workloads on-premises or in the public cloud is an important part of managing a hybrid model over time.

Security and compliance: IT professionals must ensure that hybrid cloud environments are secure and follow the compliance rules of the organization.

Database management: The ability to understand cloud-based data warehouses is an in-demand skill.

Emerging technologies: Hybrid cloud professionals must become familiar with emerging technologies, including containers and orchestration, microservices architecture and the Internet of Things.

Preparing the physical environment is typically a less daunting task, but data center administrators still need to make sure that there is ample space for the new HCI nodes, as well as sufficient power and cooling for the infrastructure. Because hyperconverged infrastructure typically has a higher physical density than traditional platforms, HCI may generate the same amount of heat in a smaller space, requiring additional cooling.

Workload Placement and Management

While data center professionals who have never worked with hyperconverged infrastructure may be wary of the new architecture, the truth is that managing workloads for HCI doesn't require many additional skills beyond what most IT staffers are likely to already possess. If a data center already incorporates any significant amount of server virtualization — and if staffers are able to manage that current environment — they'll likely have little trouble managing hyperconverged infrastructure.

Typically, organizations find initial HCI workload placement more challenging than ongoing management. Data center administrators who lack experience with hyperconverged infrastructure may be unsure about which workloads are the best fit for hyperconvergence and may have questions about how to rightsize a cluster for a given application. One use case that results in early success for many organizations is virtual desktop infrastructure. Because virtual desktops require more memory, computing and storage as they scale out, they're a perfect fit for hyperconverged infrastructure, which incorporates all of these resources into a single, highly scalable solution.

Scaling Resources Independently

HCI nodes typically combine computing and storage resources, which raises the question: What if a cluster needs more computing power, or more storage, but not both? Adding a traditional HCI node results in “linear scaling,” with computing and storage both increasing in lockstep. However, not all workloads scale in a linear fashion. Many hyperconvergence vendors now offer compute-only and storage-only nodes, allowing data center administrators to scale out infrastructure in a more elastic manner.

Internal Expertise and External Assistance

Staff experience with virtualization is, perhaps, the most important expertise-related factor that will help ensure the success of a hyperconvergence deployment. However, many organizations have historically maintained siloed teams that separately manage networking, storage and servers. For obvious reasons, HCI is likely to significantly disrupt the organizational structure of such data centers, and staffers may need to be trained to work more effectively across these silos. Also, as hyperconvergence simplifies management, staffers may require additional training to prepare for roles that focus more on strategy and less on day-to-day infrastructure support.

A trusted external partner can help organizations that are new to hyperconvergence — both in designing and setting up a deployment and in training staff for their changing roles.

Simplify with Hyperconverged Infrastructure

To take advantage of the power of HCI, you need orchestration from CDW.

With significant experience in helping organizations of all sizes build out their data center infrastructure — coupled with longstanding partnerships with industry-leading vendors — CDW and its solution architects have the knowledge and resources to help organizations plan, deploy and manage their hyperconverged infrastructure implementations. CDW serves as a trusted partner, offering in-depth advice as organizations select solutions and devise deployment plans.

CDW's team of technology professionals takes a comprehensive approach to identifying and meeting the needs of every customer, with account managers and engineers assisting organizations at every stage. Each engagement includes five phases designed to help clients achieve their objectives efficiently and effectively. Those phases include:

- An initial discovery session to understand goals, requirements and budget
- An assessment review of the existing environment and definition of project requirements
- Detailed vendor evaluations, recommendations, future environment design and proof of concept
- Procurement, configuration and deployment of the final solution
- 24/7 telephone support and ongoing product lifecycle support

Additionally, CDW offers ongoing managed services, allowing an organization's internal IT staff to focus on strategic projects.

The CDW Approach



ASSESS

Evaluate business objectives, technology environments, and processes; identify opportunities for performance improvements and cost savings.



DESIGN

Recommend relevant technologies and services, document technical architecture, deployment plans, "measures of success," budgets and timelines.



DEPLOY

Assist with product fulfillment, configuration, broad-scale implementation, integration and training.



MANAGE

Proactively monitor systems to ensure technology is running as intended and provide support when and how you need it.

Technology trends such as hyperconverged infrastructure can be confusing. To shed light on how your organization can benefit from emerging solutions, download ["The Modern IT Infrastructure Insight Report"](#) by CDW.

To learn more about how data center and cloud technologies can shape your organization's future, visit [CDW.com/DataCenter](https://www.cdw.com/DataCenter)

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