

WHAT IS HYPER-CONVERGED INFRASTRUCTURE?



Hyper-Converged Infrastructure (HCI) is a paradigm shift in data center technologies aimed to reduce infrastructure complexity, enhance scalability and enable a truly [software-defined IT infrastructure environment](#). HCI can be described as an IT framework that involves virtualization of all hardware elements of a conventional data center environment and centralized management of the integrated infrastructure resources within a software-defined architecture. Using Commercial off-the-shelf servers, virtualization is applied to computing, storage and the wider network resources. As a result, a private data center can operate as a scalable, high-performance, reliable and always available cloudlike infrastructure. The resulting VM-centric operations make the data center more elastic to meet varying business demands, help protect data amid fault-prone infrastructure operations and ensure high IT service availability.

With the traditional converged infrastructure, the underlying elements of the virtualized system are preconfigured, prepackaged and bundled into a single virtualized system. In order to meet operational requirements of different workloads, these systems must be re-configured, optimized and protected accordingly. As a result, convergence only facilitates the purchase and upgrade cycles while the technical problems associated with the infrastructure remain unsolved. From an end-user perspective, Hyper-Converged Infrastructure offers seamless management and integration of the infrastructure components through minimal user intervention or manual efforts. Unlike the converged infrastructure that involved a single vendor offering software and hardware products, the Hyper-Converged Infrastructure relies on using compute, storage and networking devices as virtualized, software-centric and integrated commodities that may be supported by multiple vendors. The standardization and conformity of data center resources to yield a truly

homogeneous infrastructure can be considered as the [key differentiator between Converged and Hyper-Converged systems](#).

Hyperconvergence works as an innovative solution by applying the principles of virtualization and convergence to discrete elements of the infrastructure individually and not as a prepackaged or bundled product. The processing, networking, storage and other hardware resources are federated and can be provisioned, managed and configured automatically within a software-defined and virtualized environment. Software technologies can dynamically provision the functionality of the underlying infrastructure resources to different workloads and apps as required. As a result, the hardware resources are utilized to the maximum potential and organizations can align operations of the overall infrastructure with its business goals surrounding scalability, [security](#) and cost-effectiveness.

Value Propositions of a Hyper-Converged Infrastructure

Data Center Consolidation: HCI lets organizations replace monolithic storage and networking environments with consolidated infrastructure resource to make the most of their data center investments. Data center consolidation enables centralized management through automated software, reducing the complexity for IT managers and simplifying the network architecture. This capability is crucial in scaling the infrastructure effectively, allowing organizations to increase system capacity by adding nodes to the existing HCI system without applying configuration, security and management protocols for every hardware device individually.

Software-Centric Architecture: With software-defined infrastructure operations, policies that govern workload processes aren't tied to specific underlying infrastructure hardware components. As a result, the policies are not reconfigured every time the workload moves between data center storage instances or when new hardware is added. The software-centric design ensures that the policies are defined and maintained at the abstracted software level of a consolidated infrastructure instead of being tied with individual hardware products. As a result of the software-centric design, organizations can leverage automation capabilities to manage, protect and scale the infrastructure in response to varying workload requirements.

Virtualization Beyond Network Boundaries: HCI removes the barriers that emerge due to traditional virtualization methodologies. The integrated compute, storage and network systems operate as modular components that can be added to scale-out the infrastructure. Unlike the Converged Infrastructure where storage, for instance, is tied to the hardware components, the Hyper-Converged Infrastructure may distribute the storage controller functionality across the infrastructure nodes as a software service. The mechanism of software-defined storage configures the entire pool of storage resources available within a virtualized environment. As a result, the storage management functionality is simplified and can be applied to the entire infrastructure as an automated software-driven process.

Centralized Management: For infrastructure systems operating a distributed data plane, and with Virtual Machines or container-based apps running compute, storage and networking across a cluster of nodes, HCI offers a single and unified management plane. As a result, organizations don't require individual management consoles for different hardware or virtualized resources as seen in traditional converged or standard virtualized infrastructure deployments. While the nodes continue to operate as individual federated systems, the infrastructure and data management operations are standardized across the aggregated resources and controlled within a single, unified user interface.

What Does this Mean for Businesses?

Hyper-Converged Infrastructure solutions are designed to bring the economic and performance advantage to the data center. Organizations operating on-premise infrastructure struggle to optimize data center capacity and performance, especially when traditional virtualization mechanism lead to unmanageable, complex and underoptimized resource islands. With a converged infrastructure, organizations can leverage the software layer to use low cost commodity hardware while reducing concerns surrounding vendor lock-in. Centralized management and infrastructure-wide integration of system resources controlled from a single pane of glass console makes the job easier for IT security and management personnel.

With the resulting improvements in data center optimization, management and security, IT can respond to changing business needs faster. A single administrative umbrella can be used to control infrastructure scale-out, workload migration and other key IT operations that otherwise bottleneck the pace of product development and release cycles.

With these business benefits, investments in Hyper-Converged Infrastructure have increased exponentially in recent years. According to the [Worldwide Quarterly Converged Systems Tracker](#) report by the research firm International Data Corporation (IDC), investments in Hyper-Converged Infrastructure solutions increased by 69.4 percent during the last quarter of the year 2017 to reach the \$1.25 billion mark. In total, organizations spent \$3.7 billion on HCI technologies in 2017, a 64.3 percent increase from the last year. This is the fastest growing investment segment in the converged systems market that grew by 9.4 percent overall from the previous year, reaching the total of \$12.5 billion.

For organizations to thrive in the fast-growing, connected and data-driven economy, the IT infrastructure powering their products and services must offer high agility, scalability and flexibility to address fast-evolving market needs. Market trends suggest that HCI will continue to attract IT spending as organizations seek the technology solution as a next logical step toward radical improvements in virtualized, converged and software-driven infrastructure environments.