White Paper by

OVHcloud®

# Hyper-Converged Infrastructure

## A compelling solution for the complexities and high operational costs of IT infrastructure

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## EXECUTIVE SUMMARY

Hyper-Converged Infrastructure (HCI) modernizes IT environments by integrating compute, storage, and networking into a single, manageable platform. This software-defined solution reduces complexity and costs while enhancing scalability, performance, and data protection. HCI adoption has surged due to its efficiency and cost-effectiveness across various industries. This white paper explores how HCI addresses traditional IT challenges, supports digital transformation, and provides a robust foundation for emerging technologies, ultimately enabling greater IT agility, efficiency, and cost savings.

## INTRODUCTION

**HCI combines compute, storage, and networking into a single platform.**

Hyper-Converged Infrastructure (HCI) is a software-defined IT setup that virtualizes all elements of conventional hardware-defined systems. It simplifies IT environments by combining compute, storage, and networking into a single, easily managed platform. HCI reduces the complexity and costs associated with traditional systems, which often involve separate, proprietary hardware and extensive administrative efforts. It improves scalability, performance, and data protection, making it easier for organizations to adapt to changing business needs and support modern applications.

At a minimum, HCI includes virtualized computing (a hypervisor), software-defined storage, and virtualized networking. It typically runs on standard, off-the-shelf servers, making it a cost-effective choice for many businesses.

HCI adoption has been significant. **Fortune Business Insights** reported that the global HCI market was valued at approximately $9.66 billion in 2023 and is projected to grow to $61.49 billion by 2032, with a compound annual growth rate (CAGR) of 22.7% during this period. This rapid growth is driven by the increasing need for simplified, scalable, and cost-effective IT solutions across vertical markets that include healthcare, banking, financial services, IT, and telecommunications. The rise of cloud-native applications, digital transformation initiatives, and the demand for hybrid cloud environments have also contributed to the surge in HCI adoption.

# THE CHALLENGE

### How can HCI help organizations transform traditional IT landscapes?

Businesses face significant challenges in managing the complexity and high operational costs of traditional IT infrastructure models. These models often involve fragmented, proprietary hardware and software components that require specialized management and maintenance, leading to inefficiencies and elevated expenses. There is a pressing need for solutions that can streamline IT operations, improve resource utilization, and reduce costs. HCI has emerged as a potential answer to these challenges, promising to simplify data infrastructure, enhance scalability, and provide cost-effective alternatives to conventional IT models.

# THE SOLUTION

> It's a cost-effective solution with easy scalability to meet growing demands.

### Reducing complexity and costs

HCI consolidates disparate resources into a unified platform managed through a single interface, streamlining operations and simplifying management. This integration not only reduces the need for specialized IT staff but also lowers capital expenditures (CAPEX) by leveraging commodity hardware. Additionally, HCI's scalability allows businesses to incrementally add nodes to meet growing demands without the need for large upfront investments in overprovisioned resources. The software-defined nature of HCI enhances resource utilization and performance, reducing power and cooling requirements and further driving down operational expenditures (OPEX). By addressing these challenges, HCI enables organizations to achieve greater IT agility, improve efficiency, and reduce costs, making it an attractive alternative to traditional data center models.

HCI enables organizations to optimize hardware utilization, maximizing cost efficiency. A business can take a set of physical servers and put a hypervisor on top. It converges the storage and compute into one big server. They have access to an entire pool of all the storage and compute resources where the hypervisor manages workloads and containers and puts the storage where it needs to be.

The hypervisor unifies resources into one resource pool so businesses can densify or pack more virtual machines (VMs) onto each physical server and over-subscribe or allocate more resources than they would have been if they were used individually.

HCI offers multiple benefits, including scalability, cost-efficiency, simplified management, high availability, and disaster recovery. Organizations can quickly add or remove resources as needed without having to incorporate additional components such as servers, storage, and networking devices, avoiding bottlenecks created by traditional infrastructure silos. Resource pooling in HCI leads to reduced hardware costs and increased utilization by consolidating multiple applications

**Resource pooling in HCI leads to reduced hardware costs and increased utilization.**

and workloads on a single platform, thereby minimizing the need for separate components. HCI enables IT teams to focus on deploying emerging technologies rather than spending time on building and managing the underlying infrastructure. Additionally, HCI reduces the complexity of managing multiple separate hardware components, saving both time and resources, while built-in redundancy helps ensure high availability. Finally, HCI enables the rapid establishment of disaster recovery sites in any geography, enhancing organizational resilience.

### Addressing demanding workloads

HCI is an excellent choice for high-performance workloads or applications that demand substantial processing power, memory, and storage resources to operate efficiently and effectively. Some common examples of such workloads include applications requiring intense computational power for simulations, modeling, and data analysis, such as weather forecasting, climate modeling, or molecular dynamics. Machine learning and AI workloads that involve large-scale data processing, complex algorithms, and rapid processing—like natural language processing, computer vision, or recommender systems—also benefit from HCI. Additionally, video processing and rendering applications, such as video editing, 3D rendering, or game development, require high-performance graphics processing, which HCI can provide. Financial modeling and trading systems, which rely on high-speed processing and low-latency data transfer for real-time market analysis, trading, and risk management, also find HCI to be a suitable solution.

### Improving IT agility and scalability

HCI plays a crucial role in supporting digital transformation efforts, particularly for businesses aiming to enhance their IT agility and scalability. HCI is increasingly utilized in cloud-native environments and serves as a foundation for container orchestration tools like Kubernetes. It allows for the automated deployment, scaling, and management of containerized applications. For example, management planes like Kubernetes enable users to place applications and workloads on containers or VMs, with containers and HCI facilitating seamless movement across different physical machines. Users do not need to worry about which machine they deploy the application on, as automation and management through tools like Kubernetes handle it for them.

Additionally, HCI supports hybrid and multi-cloud environments, enabling organizations to integrate and manage workloads across both on-premises and cloud infrastructure or multiple cloud providers. This flexibility ensures that legacy and cloud-native applications can cohabitate within the same resource pool. Furthermore, HCI solutions can support the rapid adoption of emerging technologies, such as artificial intelligence, machine learning, and the Internet of Things (IoT), thereby driving innovation and maintaining a competitive advantage.

## Partnering with a proven cloud provider

An organization attempting to implement its own HCI faces several challenges that it will need to navigate. Vendors like VMware® and Nutanix® often require the use of approved hosts, and if organizations use unapproved hardware, they risk operating without guarantees that the software will function correctly or without warranty and support. To mitigate these challenges, organizations should consider leveraging pre-configured HCI solutions from reputable vendors, ensuring compatibility with their existing infrastructure, and providing adequate training for IT staff to manage and maintain the HCI environment effectively.

Another challenge would be the capabilities and limitations of the hypervisor used for the hyperconverged infrastructure, such as VMware, Nutanix, Proxmox®, etc. For instance, if an organization is using VMware and chooses to move to Nutanix they will most likely not be able to connect any remote data stores, vSAN clusters, or fiber network storage to the Nutanix hyperconverged infrastructure.

Partnering with an established cloud services provider like OVHcloud helps businesses avoid the pitfalls, ensuring they have access to a turnkey infrastructure that's rapidly deployed and fully software-driven, enabling them to achieve greater IT agility, efficiency, and cost savings.

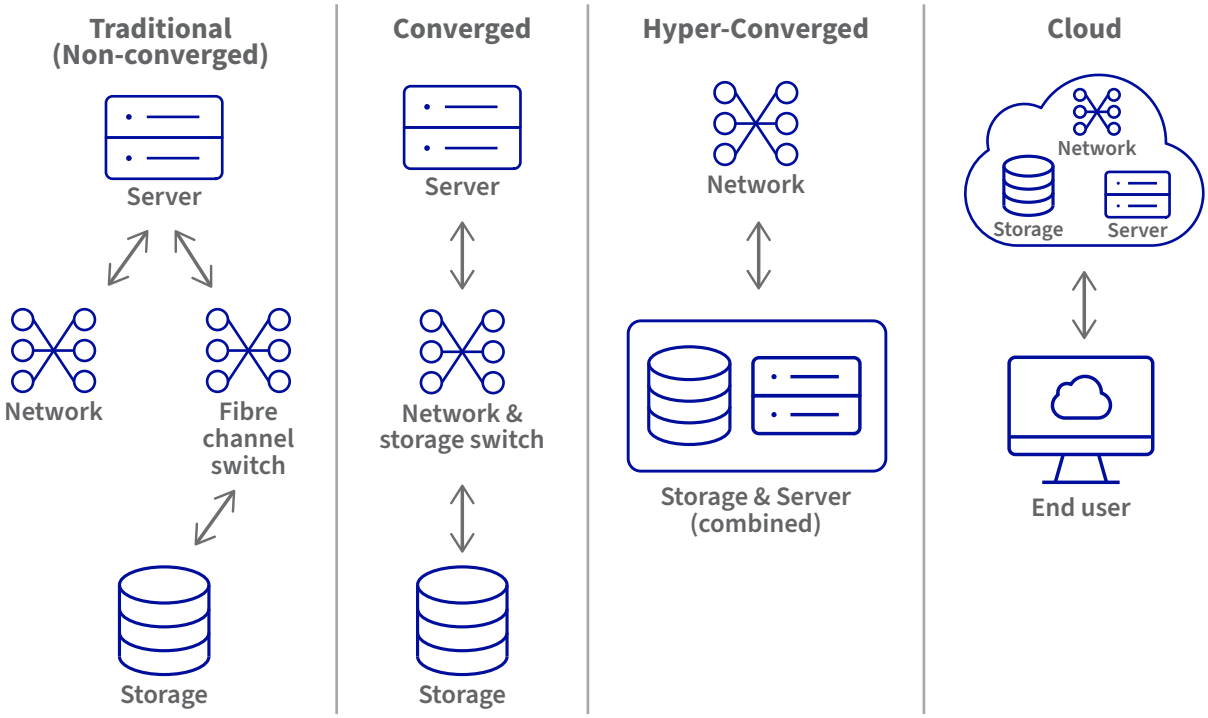
## Addendum: Definitions

**Non-converged networks** need the client or their consultants to source and integrate individual hardware components. Connected over the network, these cyberspaces run a hypervisor that empowers computer virtualization and stores info in a SAN or NAS. (Source: **Wallarm**)

**Converged infrastructure (CI)** consists of multiple components operating together as one, such as servers, storage, networking, and management software. Instead of purchasing hardware and software components from numerous sources, businesses typically acquire these systems from a single vendor. (Source: **Wallarm**)

**Hyper-Converged Infrastructures (HCI)** are software-defined infrastructures that group all computing, storage, and network features together. They offer advantages like optimizing resource usage, reducing operating costs, and increasing productivity. With OVHcloud's high-performance certified bare-metal dedicated servers, organizations can support projects under the best conditions at the lowest cost. (Source: **OVHcloud**)

Cloud computing is the delivery of computing resources (storage, RAM, CPU, etc.) over the internet and is usually billed on a pay-as-you-go basis. Companies that offer cloud computing technology are known as cloud service providers. (Source: **OVHcloud**)




(Source: **Wallarm**)

OVHcloud US is a subsidiary of OVHcloud, a global player and Europe's leading cloud provider operating more than 450,000 servers within 43 data centers across four continents. For over 20 years, the company has relied on an integrated model that provides complete control of its value chain, from the design of its servers to the construction and management of its data centers, including the orchestration of its fiber-optic network. This unique approach allows it to independently cover all the uses of its 1.6 million customers in more than 140 countries. OVHcloud now offers latest generation solutions combining performance, price predictability, and total sovereignty over their data to support their growth in complete freedom.



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