Unleash Data at the Edge With HCI

From hybrid cloud to the edge, HCI is transforming the future of IT.

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Hyperconverged infrastructure (HCI) has come a long way. Initially conceived and deployed as a platform for virtual desktop infrastructure (VDI), it's evolved into one of the key architectures of modern computing, supporting everything from databases to web applications, collaboration tools to private cloud.

Many IT organizations have subsequently come to see HCI as a technology that bridges the chasm between the private data center and the public cloud, delivering many of the benefits of the latter without some of the attendant risks.

Yet, as it continues to develop, HCI is primed to do even more.

Beyond the Digital Brick

The easiest way to understand HCI is as an IT framework that combines storage, compute, and networking resources into a single system or appliance, delivered and supported by a single vendor. Each appliance combines a hypervisor, virtualized networking, and software-defined storage into single units, or nodes, which can be clustered together to create pools of shared compute and storage resources. Each node, in effect,

becomes a digital brick that can be used to build different services and solutions, and this in turn makes HCI both simple and highly scalable. If you need more resources, you just add another brick.

Initially, the advantage of HCI lay in this simplicity—and simplicity is still a major strength today. Gartner VP analyst Mike Cisek recently described how HCI is "attractive to enterprises seeking IT management simplicity" because it "allows IT teams to deliver or add functionality more frequently through modular solutions." Yet as HCI has evolved, other inherent advantages have grown more apparent. For example, because each node is an integrated package of hardware and software, produced and delivered from a single vendor, HCI is easier to deploy than traditional on-premise infrastructure and can be monitored and managed through a single management platform.

This is just the start. Because infrastructure and storage are software-defined, HCI proves significantly easier to upgrade, and you can scale a cluster upwards or downwards just by adding or removing nodes. Meanwhile, the fact that different workloads or functions can be spread or replicated across multiple nodes results in a more resilient

platform. If there's a problem with one cluster, another can take over, meaning fault tolerance and disaster recovery come baked in.

A platform for agility

Perhaps most importantly, HCI is extremely flexible, powerful, and agile. It can handle a diverse range of workloads, even across different operating systems, and adapt and restructure rapidly to meet changing requirements. And because it treats the different resources as consumable services, it's cloud-like in its nature. Using technology like Microsoft's Azure Stack HCI solution, organizations can get the rapid, flexible deployment, high availability, and scalability of public cloud, but on a secure platform under more direct control. What's more, with core technologies and virtualization in common, it's easier to shift the workloads running on HCI to and from the public cloud.

HCI can sound inaccessible and expensive, but it's anything but. It's based around commodity network and server hardware, and removes the need for expensive and proprietary SANs. Even where the appliances themselves come with a considerable investment, firms can expect to save in the long-term through HCI's flexibility and simplified management.

The changing use cases of HCI

This combination of benefits is transforming HCI from a niche technology into a mainstream choice. As InfoWorld contributor, Paul Stringfellow, notes, "If you look at what VMware and Microsoft (especially via Azure Stack are doing)," he argues, "you can start to see a clearer picture of how the HCI market can shape into something that can drive simplicity, efficiency, and value into our business." He suggests that through "a marriage of automated and integrated software stacks with a hardware platform built to exploit these capabilities" HCI enables IT teams "to bring a new, more agile approach to deploying IT infrastructure and technology to support an organization's goals."

What does this mean for IT? Where HCI used to support VDI and a handful of other use cases with predictable requirements, it's now become a general platform for enterprise IT. In the words of Chris Kanthan, research manager in the infrastructure systems, platforms and technologies group at IDC, what "started off as a niche solution in data centers and remote offices" is now being

used "for business critical applications and even for implementation of private and hybrid clouds." This, Kanthan feels, makes HCI "a disruptive technology that IT executives must fully understand and embrace."

HCI nodes can run a single database or scale up to provide a cost-effective alternative to a full-scale data center. Using servers based on modern, multi-core Intel architectures and SSD storage, or connecting to storage through NVMe over Fabrics (NVMeOF), HCI has the performance to run cloud applications, high-end SQL, and Oracle databases, or AI and machine learning workloads, but with more flexibility and user-friendly management than traditional IT infrastructure. It's simpler to manage and easier to scale up.

Organizations are already taking advantage. A leading UK resort and hotel conference center operator now uses HCI for core enterprise applications based on large Oracle and Microsoft SQL databases. The county of San Mateo, California, piloted VDI over HCI, then shifted its heavy-duty Oracle and SQL workloads to an HCI platform.

Webquake, a leading Austrian IT services provider, has moved its colocation, backup and recovery services to Lenovo ThinkAgile MX Nodes based on Microsoft Azure Stack HCI.

"We feel very strongly that hyperconverged infrastructure is the data center architecture of the future," says Christoph Machner, Webquake cofounder and co-owner. "HCI is more flexible, more easily scalable, and simpler to manage." By adopting the ThinkAgile MX nodes and taking advantage of the integrations built into Lenovo XClarity and Windows Admin Center, the company has seen a 25% decrease in the time spent on routine admin and expects to see this lowered to 40%.

HCI and hybrid cloud

The advantages of HCI also play into hybrid cloud deployments. On the one hand, the software stacks keep adding cloud-like management capabilities, making it quicker and easier to deploy applications or development and testing system on-premise.

As Paul Stringfellow notes, Microsoft Azure Stack is designed "to allow you to bring an Azure-like environment—with an automated and orchestrated service catalog—into your own data center." On the other hand, the use of common,

core Azure technologies makes it easier to integrate these services with public cloud. The result, Stringfellow explains, is "providing automated, cloud-like delivery of services with tight integration to powerful cloud infrastructure into your organization."

The pathway to the Edge

If hybrid cloud is a powerful use case for HCI, however, then Edge computing could be its killer app. "The edge represents the next front for HCI," says Dave McCarthy, research director, Cloud and Edge Infrastructure services at ID. "It enables organizations to converge their IT, OT [Operation Technology], and CT [Communication Technology] workloads onto a single industry-standard platform, thereby providing unprecedented scaling at the edge."

Why is this crucial? Businesses and leading-edge applications are becoming increasingly reliant on data, and specifically on data being generated at the edge, whether that's from customer-facing applications, mobile devices, or IoT sensors. As pressure mounts to process, analyze, and act on this data at speed, moving all that data to a central data center only slows things down. "Currently, around 10% of enterprise-generated data is created and processed outside a traditional centralized data center or cloud," says Santhosh Rao, senior research director at Gartner. "By 2025, Gartner predicts this figure will reach 75%." He argues that as the volume and velocity of this data increases, so does the inefficiency of streaming it to a central point. Rao adds that it makes more sense "to decentralize computing power, placing it closer to the point where data is generated—in other words, to pursue edge computing."

Here Gartner believes that HCI has a central role to play. In 2018, the analyst group suggested that HCI had the potential to address the needs of edge computing, due to its operational simplicity and more robust, compact form factors. "In comparison to a

traditional three-tier architecture, HCI has a smaller form factor and occupies less rack space, consumes less power, and has lower cooling requirements," noted research VP Arun Chandrasekaran, adding that these were "all critical design decisions when architecting an edge computing infrastructure."

David Linthicum, IT thought leader and regular CIO.com and InfoWorld contributor, agrees, explaining that HCI's plug-and-play approach, resiliency, and modular scalability makes it "the most logical alternative to achieve this data-intensive computing at the edge." For Linthicum, HCI ticks a range of boxes for edge computing. You can install and configure HCI nodes in simple and repeatable ways, and—through automation—these systems can be both highly available and self-healing, minimizing support costs and improving ROI.

Already, the right platforms are coming online. For instance, Lenovo's ThinkAgile MX1021 Edge Server packs Intel Xeon D processors with 8-16 cores, up to 256GB of RAM, and up to 16TB of NVMe SSD storage into an ultra-compact,

half-width, short-depth 1U server designed to handle harsh environments. Working with Azure Stack HCI and Lenovo's XClarity systems management software, it can operate as an HCI appliance in a range of situations at the edge. What's more, with the option of Nvidia Tesla T4 processors for Edge inferencing and AI, it can bring AI capabilities to the edge where the data is being generated, enabling systems to start sorting and analyzing data much, much closer to the edge.

This has the potential to be a game changer for big data and AI, enabling businesses to start harvesting the value from their incoming data streams earlier and in a more efficient way. In an era where speed and agility could prove decisive, the ability to process large volumes of data at the edge, whatever the extent, could make the difference between a company that lags and a company that disrupts. Combine this with its hybrid cloud capabilities, and HCI is becoming not just an interesting technology but a crucial platform for cutting-edge IT.

Simplify and Accelerate Your IT Transformation With Lenovo HCI

Engineered to simplify the user experience, HCI is designed to adapt to changing IT needs while reducing complexity and cost created by silos in traditional IT.

With an open partnering strategy Lenovo is working with the leaders—Nutanix, VMware, and Microsoft—to offer certified hyperconverged infrastructure solutions powered by Intel® Xeon® Scalable processors. These solutions are pre-integrated, pre-built, and pre-tested offerings that accelerate application deployment and add robust capabilities to your data center faster. With its best in class systems management tool XClarity, Lenovo delivers a single pane of glass for centralized resource management of both hardware and firmware.

HCI as your pathway to the cloud

Hyperconverged infrastructure solutions can be an ideal foundation to realize your individual cloud strategy.

Private cloud Transform on-premise IT resources by using HCI into modern, agile services. Keep full access control and take your first steps into cloud easily, cost-effectively, and at your own pace.

Hybrid cloud Integrate on-premise HCI solutions and public cloud services in a seamless and highly scalable platform.

Multi-cloud Connect and move workloads across multiple private and public cloud platforms for greater flexibility, scale, and economics.

Taking HCI to the edge: ThinkAgile MX1021 for Azure Stack HCI

Compact and Rugged Hyper-Converged Infrastructure for the Edge
Put the power and flexibility of Azure Stack HCI anywhere with the revolutionary ThinkAgile MX1021. Small and tough enough to run business workloads reliably and safely outside the data center:
· Point-of-sale, remote offices, manufacturing, and other harsh, hot, dusty, vibration-prone, or unsecured environments

All you need for Azure Stack HCI

- A complete two-node switchless cluster powered by Intel® Xeon® D Series processors and Windows Server 2019 Datacenter Edition
- Save on OS licensing with MX1021 nodes with 8 core processors by licensing Windows Server 2019 Datacenter for only 8 cores per node
- Flexibility to add nodes as your needs grow and also to bring your own software licensing
- Specifically designed and developed by Lenovo and Microsoft for ROBO/ Edge scenarios

HCI is key to any hybrid cloud strategy, and it has proven its staying power. HCI delivery models have expanded beyond the data center and the market is projected to be worth $8 billion by 2023, and analysts are urging CEOs to understand and exploit HCI opportunities.[1]

Rugged hardware that goes anywhere

- Unique solution based on the rugged ThinkSystem SE350 server
- Operates in temperatures from 0°C to 55°C
- Protection against dust and vibration
- Compact 1U half-wide footprint with short 37.6cm depth
- Multiple mounting options including wall and ceiling

Security where you need it

- Optional self-encrypting solid-state drives means your data stays protected
- System encryption technology that can be configured to delete key on tamper or theft detection

ThinkAgile MX1021: Edge made easy

For performance reasons, you need compute and storage capabilities right where the data is generated.

With its small footprint and power efficiency, the Lenovo ThinkAgile MX1021 Edge solution allows for reliable server-class performance at many Edge locations.

[1] Gartner. February 2020. Market Insight: Tech CEOs Must Exploit Emerging Trends From Hyperconverged Infrastructures.

Microsoft Azure Stack HCI

Run workloads on your cluster and extend easily to Azure public cloud for hybrid capabilities such as backup, site recovery, storage, cloud-based monitoring, and more.

Storage Spaces Direct (S2D): State-of-the-art software-defined storage with multiple high-performance resiliency options, deduplication, compression, and many more Enterprise Grade Features.

Windows Admin Center (WAC): Easy-to-use web-based management portal, plus Lenovo's XClarity plug-in allows you to deploy and manage your hardware and firmware.

Hyper-V: Hypervisor is included in the license, and with Hyper-V you can create unlimited Windows VMs at no additional cost.

Software-Defined Networking: Features such as virtual network encryption, firewall auditing, and virtual network peering enables you to get the benefits of a highly secure software-defined network.

Learn more at www.lenovo.com/datacenter

Reliable, Modern Infrastructure for All Your Workloads

Enterprises are looking to modernize legacy infrastructure cost-effectively, while also solving data management challenges and simplifying the path to hybrid cloud.

Hyperconverged Infrastructure (HCI) addresses these challenges by using virtualized compute, storage, and networking to scale performance with capacity, increasing efficiency while decreasing operational expenditure (OpEx). HCI is flexible, scalable, and meets current and future workload needs in the data center and at the edge.

The latest generation of HCI systems can deliver outstanding results, when driven by the latest innovations in computing, storage, and transport. Intel offers a strong foundation for HCI implementations, offering technologies, partnerships, and solutions that ease adoption and development of this transformative architecture.

Grow at the speed of business with 2nd and 3rd generation Intel® Xeon® Scalable Processors.

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