2023-24 DCIG TOP 5
ENTERPRISE HYPERCONVERGED INFRASTRUCTURE (HCI) PROVIDERS

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Table of Contents

Enterprise Hyperconverged Infrastructure Providers

2023-24 DCIG TOP 5 — ENTERPRISE HCI PROVIDERS

Hitachi Vantara

Dell Technologies

Huawei Technologies Co., Ltd

Lenovo

Nutanix

*Products are listed with the licensee's product on top, followed by the other TOP 5 award recipients in alphabetical order.

SOLUTIONS EVALUATED

AIC Inc	Intel
Altos Computing	ISSQUARED
AMAX	iXsystems
ASUS	Klas
Atos	Lenovo
Cisco	Lumen
Crystal Group	NEC
DataON	Nfina
Dell Technologies	Nutanix
Fujitsu	Quanta Computer (QCT)
Gigabyte	Quantum
H3C	Sangfor Technologies
Hitachi Vantara	Scale Computing
HPE	SmartX
Huawei Technologies Co., Ltd	StarWind Software
HVE ConneXions	StoneFly
IBM	Supermicro
Ingrasys	xFusion
Inspur	Zstor

FEATURES EVALUATED

- *Deployment Capabilities*
- *Data Protection and Security*
- *Product and Performance Management*
- *Technical Support and Warranties*

IT Challenges for Medium to Large Enterprises.

To set context on why IT organizations should adopt hyperconverged infrastructure (HCI) into their operating environment, it is helpful to survey the current challenges with managing IT infrastructure for medium to large enterprises. While these challenges also concern small organizations, large enterprises experience many of these issues at a larger scale because of their many users, applications, and locations.

Information technology serves a vital role in the success of all organizations. IT departments provide essential digital services that drive or support every part of today's modern enterprise. IT also serves as the keeper of the organization's most valuable digital asset, its data. Yet, IT organizations serving large organizations experience many challenges in their backbone role of providing and safeguarding digital services. These challenges include:

Infrastructure complexity. Managing traditional technology infrastructure for large enterprises can be complex, involving a heterogeneous mix of servers, storage, networking, applications, and data protection processes across hundreds or thousands of locations. Legacy infrastructure must be managed as multiple data and management silos. IT complexity impacts the ability to manage incidents, resolve issues, and provide timely support to end users. Further, this complexity hampers the ability to respond quickly to new opportunities that may bring value to the organization.

Vendor complexity. IT complexity leads to vendor complexity for the products and services it uses. Managing multiple relationships, seeking technical support with different processes, and overseeing contract compliance across varied technologies can be challenging. Poor vendor management leads to increased costs in both time and money.

Managing costs. The average growth in IT budgets remains in the low single digits year after year.[1] This means IT departments continually battle controlling their expenses and optimizing their assets. Any new investment in IT infrastructure is carefully considered to ensure it brings multiple operational benefits and returns.

Limited resources. Limited resources, such as funding or staff shortages, impact today's enterprise organizations. IT departments may be unable to upgrade parts of their infrastructure as they would like. Staff shortages may make it difficult to properly monitor and maintain systems or explore new technologies and solutions that could benefit stakeholders.

Massive data growth. More devices and applications generating data, larger file sizes, and the pressure to keep data for longer periods has resulted in a tsunami of data growth. Data growth entails storage expenses for hardware, software, management, and maintenance. This growth impacts data management strategies for security, archiving, backup, and recovery. Scalability ties to data growth challenges as IT must ensure its infrastructure can meet the demands of growing volumes of data, new applications, and new users while maintaining performance expectations. Massive data growth compounds the challenges for creating well-organized data stores that enterprises need for AI/ML workloads.

Escalating threats. Cybercriminals constantly look for security weaknesses within large organizations. These bad actors especially favor large enterprises as targets for their valuable data and potential financial gain. Enterprise complexity compounds the challenge of defending its digital assets. Enterprises may struggle with fully complying with changing data privacy regulations with their notable penalties for non-compliance. While these threats are at play, IT organizations must still protect their data from hardware failures, natural disasters, and other unforeseen events.

Uptime and availability. Today's global economy pressures organizations to provide 24x7 availability. Any downtime can bring significant hits to revenue or costs. Not only must organizations provide 24x7 infrastructure availability, but they must also maintain backup, incident, and disaster recovery processes for outages.

Enterprise Hyperconverged Infrastructure Providers

Organizations scale out their HCI architecture by adding more nodes to expand compute, storage, and networking capacity.

IT services at the edge. Edge locations generate their share of data that needs to be processed, stored, and potentially analyzed for business insights. Globally, the edge computing market is expected to reach $206B by 2032.[2] One of the many challenges for edge computing is either no IT personnel or on-site personnel at the edge location. Take this scenario and multiply it by thousands of sites for some large enterprises. This lack of available personnel, coupled with less-than-ideal environments across dozens, hundreds, or thousands of locations, calls for edge computing solutions that are small, cost-effective, highly-available, and simple to deploy.

While the above is not a comprehensive list of current IT challenges for large enterprises, it illustrates the complex reality that IT departments face.

Notice how these challenges affect each other. For example, data growth affects management complexity, contributing to escalating threats, which can affect availability and data security. Likewise, providing solutions in one or more of these areas positively affects the other areas. HCI products address these challenges and allow organizations to adapt quickly to trends and new opportunities.

HCI Characteristics

The term 'hyperconverged infrastructure' was first popularized over a decade ago as a new paradigm for data center infrastructure. Traditionally, the three pillars of the data center architecture are compute, storage, and networking. These infrastructure stacks require time, labor, and expense to size, deploy, manage, and integrate. Further, organizations must allocate funds for specialists in these three areas. Hyperconverged infrastructures collapse these three pillars into a single system that simplifies IT infrastructure deployment and ongoing management.

It may be helpful to think of HCI as consisting of a physical appliance, usually equal to one node, that ideally contains compute, storage, and networking components coupled with a management software layer that integrates hypervisor, storage, and networking software (each of these three abstracting the underlying resources below it) to present a unified software-defined interface for managing the infrastructure stack.

IT Administrators can create logical groups of nodes they can manage from a single interface. Often these HCI nodes are deployed in rack-scale chassis systems or rack-mountable in a standard rack. Some HCI products are available in form factors such as towers or small form factor appliances for remote office and edge locations. Organizations scale out their HCI architecture by adding more nodes to expand compute, storage, and networking capacity.

The reason for the word *ideally* is that for some on-premises HCI use cases, the software-defined networking piece of the equation may be less important to the hyperconverged solution, or the networking components are already in place. Which leaves just the compute and storage piece of the equation. Thus, some providers offer HCI products designed with a focus on an integrated compute and storage solution, absent notable features for the networking piece of the HCI equation. Example use cases for these HCI products may include virtual desktop infrastructure (VDI), remote office deployments, or testing and development, mainly requiring compute and storage resources with minimal networking requirements.

The other reason for the word *ideally* is disaggregated HCI (dHCI) deployments where the storage and compute nodes are decoupled but managed together through the HCI software layer. With dHCI, organizations can scale out compute and storage capacities independently to achieve an optimal balance of these resources.

Enterprise Hyperconverged Infrastructure Providers

Many HCI vendors provide unified technical support for the hardware and software layer of the HCI deployment.

HCI Benefits

As summarized above, IT organizations face many challenges. While there is no silver bullet for meeting these issues, IT leaders look for solutions that solve problems and provide positive outcomes in many ways. HCI solutions fulfill these goals while addressing current IT challenges through:

Cost savings. By consolidating IT infrastructure onto a unified platform, enterprises reduce the physical space needed when compared to legacy approaches for infrastructure deployment. Less physical space results in a smaller footprint and decreased energy costs. Simplified management combined with automation features can lead to lower labor costs for IT administration. Depending upon the solution, organizations may discover they can eliminate some software licenses and their costs through capabilities bundled within their HCI deployment.

Administrative savings. Because HCI infrastructure combines compute, storage, and networking into a single platform, IT infrastructure becomes simpler. For distributed enterprises, HCI solutions allow one person to administer a broad set of data center services across hundreds and thousands of nodes from a single interface. Further, the design goal of HCI software interfaces intends the IT generalist to support their organization, reducing the need for specialized certifications. Many HCI solutions provide automation features, scripts, APIs, or deployment libraries to save time and money. Administrators can apply data governance policies across their HCI infrastructure to manage their data growth.

Scalability. Data organizations look for scalable solutions that can grow as needs require. HCI addresses data growth challenges through its flexibility to scale up or out by adding drives or nodes to their clusters. This scale-out flexibility avoids overprovisioning and reduces capital expenses.

Unified technical support. Many HCI vendors provide unified technical support for the hardware and software layer of the HCI deployment. Unified support results in faster resolution times, which in turn improves uptime and availability. Patch management is faster and simpler, reducing the risk of outages and bad actors looking to exploit vulnerabilities.

Data security and protection. When deployed, HCI solutions characteristically include data protection and security features. For security, HCI software often supports active directory integration, role-based access controls, and data encryption. For data protection, HCI software commonly integrates snapshots, replication, or cloud tiering. HA capabilities ensure continuous availability to end users and applications.

Flexibility. HCI solutions support a wide variety of applications and use cases. Such flexibility enables organizations to change resource allocations of compute, storage, and network as business needs may change.

Infrastructure at the edge. HCI has moved out of the data center to the farthest edges of fixed or mobile enterprise locations. The ability to provide a consolidated IT infrastructure at remote locations brings many benefits, including small footprints, remote management, high availability, scalability, and cost savings.

Simple deployments. HCI vendors commonly ship their appliances preconfigured and preintegrated with the HCI software and hypervisor of the customer's choosing. Preconfigured appliances save IT teams time as they can rapidly deploy edge infrastructure as a plug-and-play solution.

HCI products provide organizations with flexible, adaptable solutions that address today's IT challenges.

Common HCI Use Cases

IT departments can use HCI infrastructure for a wide variety of use cases spanning across enterprise locations. Common HCI use cases include:

Data center consolidation. A key use case for HCI deployments is data center consolidation. Because HCI solutions combine compute, storage, and networking into a single system, the physical footprint is smaller, and infrastructure management becomes simpler than managing a disparate three-tier architecture.

Table 1
Use-cases that DCIG TOP 5 Enterprise HCI provider's products address.

What use cases do your HCI products address? Check all that apply.

	Response percent	Response total
AI/ML	80%	4
Application files	60%	3
Archive	40%	2
Backup target	80%	4
Big data analytics	100%	5
Disaster recovery	80%	4
Capacity-focused	100%	5
Container infrastructure or application development	100%	5
Data center	100%	5
Data center virtualization	100%	5
Database and mission critical apps	100%	5
Development and testing	100%	5
Edge - Remote office/branch office (ROBO)	100%	5
Edge - Field/mobile/ruggedized	60%	3
File shares	60%	3
High performance computing (HPC)	60%	3
Hybrid cloud	100%	5
Media asset management (MAM)	20%	1
Media (streaming)	40%	2
Multi-location/distributed environments	60%	3
Performance-focused	100%	5
Private cloud	100%	5
Secondary storage	20%	1
Server virtualization	80%	4
Virtual desktop infrastructure (VDI)/ End-user computing	100%	5
Other	20%	1

Source: 2023-24 DCIG HCI Research

Server virtualization. HCI's inherent nature is virtualization. Consequently, HCI providers frequently promote server virtualization as a product use case. With server virtualization, companies can use their HCI solution in conjunction with virtualization software to enable numerous virtual machines to reside on a single HCI node.

Virtual desktops. Another popular use case involves using HCI software to provide virtual desktops to their end-users. Here the HCI solution, partnered with desktop virtualization software, enables multiple desktops to run off on an HCI node or cluster. In this way,

HCI becomes a natural fit for providing IT infrastructure at the edge because of HCI's compact footprint and remote management capabilities.

businesses can use HCI software to simplify desktop management while providing a consistent desktop experience to end-users.

Private cloud. Many organizations are repatriating their cloud storage and workloads back to on-premises storage to avoid unexpected cloud costs and for data governance reasons. Because of its single integrated system architecture, organizations can use HCI software to enable private cloud environments. Organizations can scale out their private cloud by adding more nodes. HCI software can auto-tier storage to the cloud and sometimes be deployed as a cloud instance, opening possibilities for HCI-based hybrid-cloud solutions.

Disaster recovery. HCI can serve as a second virtual data center in the event of a disaster or extended outage at a primary data center. HCI solutions allow infrastructure managers to oversee their DR environment to ensure a seamless transition for critical workloads and applications.

Edge computing. HCI becomes a natural fit for providing IT infrastructure at the edge because of HCI's compact footprint and remote management capabilities. Infrastructure managers can architect a highly available HCI solution with two small nodes with all the key data protection and security features necessary for edge computing use cases.

Testing and development. IT departments can use HCI to provide isolated environments for developing and testing software. Administrators can quickly create virtual machines and applications for developers. Organizations can simply scale the HCI test environment if more resources are needed.

The distributed enterprise. Infrastructure managers can leverage HCI for the distributed enterprise through its centralized management capabilities. HCI software can manage all their HCI instances through a single dashboard interface. High availability (HA) and disaster recovery features with HCI software ensure that applications and data remain available in the face of equipment failures. These features save time, reduce complexity, and improve IT governance.

In short, HCI products provide organizations with flexible, adaptable solutions that address today's IT challenges. Flexible and adaptable also means that IT organizations can more quickly respond to tomorrow's business requirements and opportunities. And given the pace of change in today's business world, it is these types of solutions that help IT leaders succeed in meeting the changing needs of the business.

Distinguishing Features of DCIG TOP 5 Enterprise HCI Providers

DCIG identified 38 companies offering HCI products meeting DCIG's definition of an HCI appliance. Using feature-based analysis and comparisons of defensible data derived from publicly available sources, vendors, and DCIG's own experience, DCIG's TOP 5 Enterprise HCI Providers share these characteristics that distinguish them from the other vendors DCIG evaluated.

Robust support. DCIG TOP 5 providers display robust support capabilities compared to the other evaluated solutions. Each of the DCIG TOP 5 evidence worldwide sales and support capabilities. All DCIG TOP 5 vendors provide 24x7x365 availability for trouble resolution. Each DCIG TOP 5 provider offers 4-hour response times to reported troubles, with most offering one-hour response times or better for mission-critical issues. Enterprises can utilize onsite technicians for hardware resolution, and all winners offer the opportunity for next-business-day dispatches.

Broad HCI component options. Each of the DCIG TOP 5 winners have had established HCI products since 2017 or earlier. As a result, they reflect mature product lines with a

All DCIG TOP 5 providers offer HCI product options with GPUs, compared to only half of the other evaluated providers.

broad range of configuration options. Examples include the number of CPUs and CPU cores, memory, networking speeds, and storage capacity choices within an HCI node. These options allow organizations to configure their HCI appliances best suited to their desired workloads.

Broad use-case support. Given the range of component options within their HCI offerings, DCIG TOP 5 award winners also support a wide range of use cases for their HCI products. Use cases that range from general purpose to high performance, and cross edge, core, and hybrid-cloud scenarios.

Value-added services. In addition to their HCI product offerings, DCIG TOP 5 Solution providers offer value-added services such as consulting, installation, and migration services. Value-added services help customers accelerate deployments and maximize the effectiveness of the HCI deployments for their organization.

Other Similarities Among the DCIG TOP 5 Enterprise HCI Providers

In addition to the distinguishing characteristics that all DCIG TOP 5 Enterprise HCI Providers generally share, the DCIG TOP 5 solutions also share the following product features:

Storage configurations. Each DCIG TOP 5 award winner supports All NVMe, All SSD, and Hybrid storage configurations that enterprises can choose based on cost, performance, capacity, and workload priorities.

Table 2
**Storage memory configurations for
DCIG TOP 5 Enterprise HCI provider's products.**

Considering all HCI hardware models your company offers, on a per node basis, which storage memory configurations are available on one or more models? Check all that apply. If not applicable, select NA.

		Response percent	Response total
All NVMe storage		100%	5
All SSD storage		100%	5
NVMe + SSD Storage		80%	4
SSD + HDD storage		100%	5
HCI nodes with storage class memory		60%	3
NA		0%	0

Source: 2023-24 DCIG HCI Research

Rack mountable appliances. Each TOP award winner offers appliances that IT organizations can deploy in standard rack-mountable chassis. Rack systems complement HCI deployments through space efficiency, scalability, standardization, flexibility, and ease of deployment.

VMware support. VMware is the most popular virtualization platform used within enterprise settings. Each of the DCIG TOP 5 award winners offers support for VMware hypervisors within their HCI appliances.

Dual CPU support. Dual socket HCI configurations benefit workloads through improved performance capabilities, multi-tasking, VM density, and application availability. Each DCIG TOP 5 award winner offers HCI appliances with dual CPUs.

Networking speeds. Ethernet is a standard networking feature for connecting servers and devices within the data center. The recognized HCI providers support 10, 25, and 100GbE networking speeds for high-speed communication between HCI nodes and ancillary resources. In contrast, only a third of the other providers DCIG evaluated indicated support for 25 GbE and 100GbE speeds.

GPU options. GPUs accelerate performance for AI/ML and other high-performance use cases. All DCIG TOP 5 providers offer HCI product options with GPUs, compared to only half of the other evaluated providers.

These options allows organizations to tailor their HCI deployments to their specific business needs and workloads.

Differences Between the DCIG TOP 5 Enterprise HCI Providers

DCIG TOP 5 solutions differ from one another in the following ways:

HCI software. In addition to offering support for popular HCI software platforms such as Nutanix, Microsoft, and VMware, some of the TOP 5 award winners have developed their own HCI software for virtualization use cases. These vendor-developed HCI software platforms often bring expanded or differentiated features that enterprises may find attractive.

Data Processing Units (DPUs). DPUs are utilized to offload CPU cycles and accelerate performance for data-intensive workloads. DCIG TOP 5 award winners vary in their offerings of DPUs as a configuration option within their HCI appliances.

Other form factors. In addition to rack mountable appliances, some of the HCI vendors offer enclosed HCI appliances such as towers or small-form appliances for use at remote edge locations where space is constrained. Such HCI products allow organizations to deploy IT infrastructure in closets and cabinets to provide data center services to remote users and applications.

Support for mixed node types. In the simplest HCI deployments, each node is identical in its component configurations. For many reasons, companies may have mixed HCI node configurations. Each DCIG TOP award winner provides support for mixed nodes but differs in the specific component configurations supported.

Latest generation support. DCIG TOP 5 award winners vary in the latest supported generation of CPUs, memory, storage, and card slots. This may be important for some organizations depending on the intended applications. As a general truth, the greater the performance from each rack, the better.

Hardware certifications. A myriad of hardware certifications are issued by government agencies worldwide. These certifications reflect that the products meet these agencies' standards for safety and reliability. These certifications may be important depending on the countries where an enterprise deploys its HCI solution. HCI providers vary in the certifications their products have received.

HCI and Hypervisor platforms supported. DCIG TOP 5 providers differ in the hypervisor platforms which they support. Some DCIG TOP 5 winners offer their own HCI software that includes a hypervisor for deploying virtual machines.

Warranty coverage. DCIG TOP 5 providers vary in the length of their warranties. Some offer extended or expanded warranty options beyond the standard warranty that comes with their HCI products.

Proactive support. Proactive support helps organizations reduce downtime by proactively identifying service-impacting conditions before customers become aware of these issues. DCIG TOP 5 providers differ in their proactive support options for enterprise customers.

Storage class memory. Storage class memory reduces the time required to read and write data, thus increasing performance within HCI appliances running data-intensive workloads. DCIG TOP 5 providers vary in their offerings of storage class memory as a configuration option.

Hitachi Unified Compute Platform Advisor (UCP Advisor) simplifies data center management by providing a single interface for managing its UCP systems.

DCIG TOP Enterprise HCI Provider Solution Profiles

Each of the DCIG TOP 5 Enterprise HCI Hardware Solution Profiles highlights several notable features or capabilities that make the product attractive to organizations.

Hitachi Vantara Solution Profile

Part of Hitachi Vantara's family of converged, hyperconverged, and rack-scale systems, Hitachi's Unified Compute Platform of hyperconverged products (UCP HC) helps enterprises consolidate IT infrastructure by combining compute, storage, and virtualization capabilities into a single, scalable solution. Suitable for core and edge deployments, Hitachi offers validated UCP HC appliances powered by VMware vSAN and optional validated HCI nodes for Microsoft Azure Stack HCI software. Hitachi provides ongoing support for the full HCI stack, including software, hardware, and virtualization.

Notable features that helped Hitachi Vantara earn a DCIG TOP 5 award include:

Hardware Options. Technical buyers will find Hitachi's UCP HC products suitable for a wide range of enterprise workloads and applications. The UCP HC architecture consists of an independent, x86-based server node within a 1U or 2U appliance chassis. Starting with a cluster of 2 nodes, organizations can scale UCP HC clusters up to 64 nodes. Hitachi offers UCP HC models with component options so enterprises can match configurations to workloads needs. With node selections of single or dual CPUs, Intel third-generation Xeon processors, NVIDIA GPUs, or storage class memory, enterprises can choose hybrid, all-flash, or all NVMe configurations ranging from 1 – 193TB of storage capacity.

Acquisition flexibility. Hitachi offers CAPEX, lease, and as-a-service options for enterprises to procure UCP HC solutions for their organizations. These options allow enterprises to choose the procurement method that best aligns with their financial goals.

UCP Advisor. Hitachi Unified Compute Platform Advisor (UCP Advisor) simplifies data center management by providing a single interface for managing its UCP systems. With UCP Advisor, infrastructure managers can accelerate service provisioning by automating hundreds of manual tasks. UCP Advisor offers many expanded features, such as remote monitoring, REST APIs, and analytics. UCP Advisor offers a stand-alone UI, and seamlessly integrates with VMware tools like vCenter. Additionally, IT organizations can extend the use of their legacy SAN storage by unifying their SAN management under UCP Advisor.

Extensive partner ecosystem. Organizations can leverage Hitachi's extensive partner ecosystem that builds on the benefits of a Hitachi HCI solution. This ecosystem includes technology alliances, independent software vendors, global system integrators, cloud and managed service providers, and service delivery partners. These partners ensure their offerings and applications are tested and validated to run with Hitachi Vantara products.

Broad value-added services. In addition to Hitachi Vantara's partner network, companies can also leverage Hitachi's complementary line of value-added services, including analytics, consulting, managed services, premium support services, and training services that cover edge to cloud. Tapping into Hitachi's industry vertical expertise and guidance helps organizations maximize the ROI for their HCI investments.

Enterprise Hyperconverged Infrastructure Providers

Dell's HCI portfolio covers a wide selection of HCI products optimized for VMware, Microsoft, and Nutanix HCI software.

Dell Technologies Solution Profile

Dell Technologies is a well-known provider of enterprise technology products and services. Dell's extensive line of laptops, workstations, servers, storage, networking, and cloud solutions makes Dell an attractive partner for organizations seeking one vendor for all their IT infrastructure needs. Among its many IT offerings is a portfolio of HCI products that gives organizations many options for streamlining their IT infrastructure.

Notable features that helped Dell Technologies earn a DCIG TOP 5 award include:

Broad HCI software selection. Dell's HCI portfolio covers a wide selection of HCI products optimized for VMware, Microsoft, and Nutanix HCI software. In addition, Dell offers Dell Ready Nodes, an HCI computing and storage product designed for SDS solutions such as VMware vSAN, Microsoft Storage Spaces Direct, and Dell PowerFlex.

Hardware options. Built on Dell's PowerEdge platform, enterprises can deploy Dell HCI products in rack-mount chassis systems or towers. Dell offers many of its edge HCI products in a stackable or wall-mountable appliance form. For example, Dell's VxRail VD-4000 appliances are the size of a shoebox, Network Equipment-Building System (NEBS) and Military Standard (MIL-STD) certified, and can operate in temperatures from 27F to 131F. Organizations can acquire Dell HCI products with single or dual processors (Intel Xeon or AMD EPYC); DPUs and GPUs; HDD, hybrid, all-flash, and all NVMe storage media.

VMware integration. Dell offers two HCI product families tightly integrated with VMware: VxRail, the primary HCI platform for the vast majority of VMware use cases, and vSAN Ready Nodes, which combines PowerEdge servers with vSAN for data-centric use cases. While each of these HCI families is hybrid-cloud ready, Dell also offers VMware Cloud Foundation (VCF) on VxRail that is engineered for deep VCF integration, and Dell APEX Cloud Platform that delivers consistent VMware operations across multicloud, data center, and edge environments.

Global Technical Support. Dell boasts a global network of technical support centers and resources. Dell provides global 24x7 support for all hardware, OS, and hypervisor issues. Enterprise customers can leverage Dell's community forums or expansive knowledge base of videos and articles to troubleshoot issues. Dell's ProSupport Plus services provide advanced support options, including 24/7 access to technical experts, next business day or 4-hour mission-critical onsite hardware support, and predictive analytics that identify potential issues before they impact operations.

The combination of broad HCI software options, hardware flexibility, and global support for Dell's HCI offerings, enables its customers to confidently consolidate many demanding workloads on a common platform. This drives out time, cost, and risk from managing enterprise IT infrastructure.

Enterprise Hyperconverged Infrastructure Providers

Infrastructure managers can integrate FusionCube software with public cloud platforms for hybrid-cloud resource management.

Huawei Solution Profile

Huawei offers FusionCube HCI for consolidating and simplifying IT infrastructure. Organizations can leverage FusionCube HCI across their enterprise landscape, from their core data center to remote offices with harsh conditions. Enterprise customers can procure FusionCube in FusionCube 1000 or FusionCube 500 models. Both models ship pre-integrated and are designed for fast, simple deployment.

Notable features that earn Huawei a DCIG TOP 5 award include:

FusionCube MetaVision Software. Huawei integrates FusionCube MetaVision or eDME software with FusionCube appliances. eDME enables organizations to centrally operate, manage, and monitor all their FusionCube HCI deployments wherever they may be located. MetaVision Unified management means the full stack of compute, storage, and network resources as well as expanded services like one-click deployments, disaster recovery, hardware monitoring, and health checks. FCV includes the FusionCompute hypervisor, though Huawei makes FusionCube compatible with VMware's vSphere virtualization platform and Citrix XenServer. Infrastructure managers can integrate FusionCube software with public cloud platforms for hybrid-cloud resource management.

FusionCube 1000 cabinet. Enterprise customers can deploy The FusionCube 1000 HCI appliance as a 1U or 2U rack-mounted appliance. Alternatively, Huawei makes FusionCube 1000 available in a cabinet-based form factor where all compute, storage, networking, and UPS components are integrated within a self-contained cabinet. The FusionCube 1000 cabinets are available in 8U, 24U, and 42U sizes with 2 to 11 nodes per cabinet, making them ideal for branch office deployments.

Hardware options. FusionCube 1000. Huawei offers FusionCube 1000 as optimized for virtualization or data-centric use cases. Customers may select single or dual CPU configurations with Intel Xeon or Kunpeng 920 series processors. Huawei FusionCube 1000 supports both ARM and x86 hardware in the same storage pool for unified management. GPUs, NPUs, and SmartDPUs may be leveraged to accelerate AI workloads. A minimum deployment starts with two nodes and scales out to 1024 nodes. Storage configurations include hybrid, all-flash, or all NVMe options with total storage capacity possibilities of 200TB plus per node. All FusionCube models utilize deduplication and compression techniques to maximize storage efficiency. Organizations can rely on FusionCube's synchronous replication and active-active architecture to maintain continuous availability in the event of an outage.

FusionCube 500. For remote locations, Huawei's FusionCube 500 model helps organizations provide IT infrastructure in a compact form. At only 5U height, organizations can deploy the FusionCube 500 indoors or outdoors. Two configuration models are available with either two or four nodes. If a node fails, the other node automatically actively takes over. Each model contains a maximum of 24 or 40 disks, respectively. FusionCube 500 appliances are shipped pre-integrated and designed for plug-and-play deployment.

Enterprise Hyperconverged Infrastructure Providers

Lenovo HCI products cover IT infrastructure needs from edge locations to the core data center, covering use cases from general-purpose applications to AI/ML workloads.

Lenovo Solution Profile

Lenovo offers a broad selection of enterprise IT products, including servers, storage solutions, networking equipment, and software. Recognizing the disruption of HCI and software-defined architectures to the IT status quo, Lenovo introduced the ThinkAgile brand in 2017 as a portfolio of solutions that reduce the complexity and costs created by silos in traditional IT.[3] Part of the ThinkSystem platform of servers, Lenovo's ThinkAgile line of HCI products helps organizations simplify their data center infrastructure while advancing cloud-ready architectures.

Notable features that helped Lenovo earn a DCIG TOP 5 award include:

Versatile HCI Software selections. Lenovo ships its HCI appliances pre-integrated with HCI software best suited for an organization's business needs. Enterprises can choose the Lenovo ThinkAgile HX series with Nutanix software that supports multiple hypervisors; the Lenovo ThinkAgile MX series built on Microsoft Azure Stack HCI software that natively integrates with Azure cloud services; and the Lenovo ThinkAgile VX series powered by VMware with its rich suite of virtualization management tools.

Hardware options. Lenovo makes its ThinkAgile HCI available in 1U and 2U form factor servers. Depending on the model, Lenovo HCI products come with one or two CPUs using the latest Intel or AMD processors, as well as GPU and DPU options. Minimum deployments start with three nodes for the Lenovo VX and HX series and two for the MX series. Lenovo makes optional storage arrangements of hybrid, all-flash, and all-NVMe configurations available. Lenovo HCI products cover IT infrastructure needs from edge locations to the core data center, covering use cases from general-purpose applications to AI/ML workloads. Enterprise customers can choose 3, 4, or 5-year warranties with ThinkAgile products.

End-to-end manufacturing. Lenovo serves 180 markets around the world with its technology products and services. Benefiting its customers through quality control, Lenovo owns the manufacturing and supply chain for the products that it builds. This end-to-end manufacturing ownership contributes to Lenovo's current recognition for holding world records for 462 benchmark results for its ThinkSystem servers[4] as well as earning, for the ninth consecutive year, the highest levels of reliability among all x86 hardware distributions in ITIC's most recent Global Server Hardware, Server OS Reliability Report.[5]

Lenovo TruScale IaaS. Lenovo TruScale Infrastructure-as-a-Service offers a pay-as-you-go business model for enterprise organizations. Businesses can scale their HCI solutions quickly without capital investments. Lenovo TrueScale combines infrastructure, hardware, and software as a single supplier with one point of accountability. Lenovo TrueScale includes 24x7 proactive monitoring, management, and service support.

Enterprise Hyperconverged Infrastructure Providers

Enterprise customers can even run a mixed hypervisor environment with their Nutanix clusters and use the hypervisor best suited for a given application or deployment scenario.

Nutanix Solution Profile

Nutanix is a well-established leader in enterprise hyperconverged infrastructure solutions. Nutanix HCI appliances and partnership offerings have expanded beyond its first HCI product in 2011 to numerous HCI products that cover the broadest range of use cases, from remote edge environments to multi-cloud architectures. Under the umbrella of Nutanix Cloud Platform, Nutanix software provides HCI infrastructure management (Nutanix Cloud Infrastructure) and cloud management (Nutanix Cloud Manager) for a complete HCI edge, HCI core, and cloud management solution.

Notable features that earn Nutanix a DCIG TOP 5 award include:

Nutanix Cloud Infrastructure. Nutanix has developed its own HCI software that converges compute, storage, and network into a single data center stack. Nutanix makes Nutanix Cloud Infrastructure (NCI) available as a turn-key solution on Nutanix and OEM partner appliances. Alternatively, organizations can deploy Nutanix HCI software on their own x86-based platforms with direct attached storage. NCI is compatible with popular hypervisors such as VMware vSphere, Microsoft Hyper-V, and Citrix XenServer. However, many enterprises choose to use the Nutanix AHV hypervisor that comes bundled with Nutanix appliances. Enterprise customers can even run a mixed hypervisor environment with their Nutanix clusters and use the hypervisor best suited for a given application or deployment scenario.

Nutanix hardware options. Enterprise customers can acquire pre-integrated appliance solutions bundled with Nutanix software from popular OEM server manufacturers such as HPE, Lenovo, Fujitsu, and Dell. Nutanix also offers Nutanix branded appliances (NX nodes) engineered for its NCI software. Technical buyers will find Nutanix appliance configurations cover the entire range of enterprise workload needs. Nutanix appliances come in 1U and 2U, single and multi-node configurations suitable for standard 19" and telco racks. Configuration options include dual CPUs, GPUs, Intel Optane Memory, storage capacity up to 195TB, and storage configurations for hybrid, all-flash, or all-NVME nodes. Traditional Nutanix clusters start with three nodes, but Nutanix also supports one and two-node configurations. This hardware flexibility allows businesses to address varied performance, capacity, cost, and availability requirements.

Nutanix Cloud Manager. Nutanix Cloud Clusters (NC2) runs natively on AWS and Azure, enabling organizations to transform their on-premises HCI infrastructures into hybrid-cloud environments. In addition to public cloud instances, customers can leverage Nutanix on bare metal, hosted cloud, and managed cloud services to expand their hybrid cloud solutions into multicloud infrastructures. Through Network Cloud Manager (NCM), enterprises can integrate their on-premises HCI management with their public cloud deployments. From a single interface, the NCM platform provides intelligent operations, self-service capabilities, cost governance, and data security across hybrid and multicloud environments; thus, NCM extends Nutanix management simplicity to cover even multicloud scenarios.

Inclusion and Evaluation Criteria for the DCIG TOP 5 Enterprise HCI Providers

In this report, DCIG specifically focused on HCI appliance providers possessing the following characteristics. DCIG identified eleven different solutions meeting these inclusion criteria:

- Available for commercial use as of March 31st, 2023.
- Sufficient, publicly available information available for DCIG to make an informed decision.
- Offering HCI products characterized as stand-alone or rack-mountable appliances (usually consisting of 1-4 nodes) containing compute, memory, and storage with networking capabilities.
- The HCI nodes or appliances may be networked as a combined system.
- The HCI products should include or be designed to include a software layer for managing the servers, storage, networking, and virtualization resources for applications and workloads that run within it.
- The vendor promotes itsproduct(s) as a hyperconverged solution.
- If the company's headquarters are outside the United States, it has locations in more than one country.

DCIG evaluated each of these solutions in the following areas:

1. *Deployment capabilities*. Evaluate the capabilities and options for on-premises deployment, HCI appliance configurations, and self-certifications or integrations of supported HCI software platforms.
2. *Data protection capabilities.* Evaluate solution features offering data availability, security, and protection.
3. *Product and performance management features.* Evaluate options to manage the underlying hardware and optimize it for cost and performance. Examples include dashboard views, predictive analytics, reporting features, storage optimization, networking features, quality of service features, and automation features.
4. *Technical support.* Evaluate the availability and technical support options of the solution provider. Examples include self-service documentation, support availability, response time commitments, options to open cases, escalation support, and proactive problem resolution.

Vendors of some of the solutions covered in this DCIG TOP 5 report are or have been DCIG clients. In that vein, there are some important facts to keep in mind when considering the information contained in this TOP 5 report and its merit.

- No vendor paid DCIG any fee to research this topic or arrive at predetermined conclusions.
- DCIG did not guarantee any vendor that its solution would be included in this DCIG TOP 5 report.
- DCIG did not imply or guarantee that a specific solution would receive a DCIG TOP 5 designation.
- All research is based upon publicly available information, information provided by the vendor, and/or the expertise of those evaluating the information.
- DCIG conducted no hands-on testing to validate how or if the features worked as described.

Enterprise Hyperconverged Infrastructure Providers

- No negative inferences should be drawn against any vendor or solution not covered in this DCIG TOP 5 report.
- It is a misuse of this DCIG TOP 5 report to compare solutions included in this report against solutions not included in it.

No vendor was privy to how DCIG weighted individual features. In every case, the vendor only found out the rankings of its solution after the analysis was complete. To arrive at the DCIG TOP 5 solutions included in this report, DCIG went through a seven-step process to come to the most objective conclusions possible.

1. DCIG established which features would be evaluated.
2. The features were grouped into four general categories.
3. DCIG identified solutions that met DCIG's definition of an HCI appliance.
4. A survey was created and completed for each solution. Vendors were given the opportunity to review and complete the survey.
5. DCIG weighted each feature to establish a scoring rubric.
6. DCIG evaluated each solution based on information gathered in its survey.
7. Solutions were ranked using standard scoring techniques. ∎

Sources referenced in July 2023

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