Magic Quadrant for Hyperconverged Infrastructure

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Hyperconvergence is making inroads in enterprises, as major system vendors acquire startups or bundle servers with HC software offerings. I&O leaders should focus on the capabilities and limitations of HCI software, which is offered by a wide range of server platform vendors via OEM partnerships.

Strategic Planning Assumption

By 2020, 20% of business-critical applications currently deployed on three-tier IT infrastructure will transition to hyperconverged infrastructure.

Market Definition/Description

Hyperconverged infrastructure (HCI) is a category of scale-out software-integrated infrastructure that applies a modular approach to compute, network and storage on standard hardware, leveraging distributed, horizontal building blocks under unified management. Hyperconverged infrastructure vendors either build their own appliances using common, off-the-shelf infrastructure (hardware, virtualization, operating system), or they engage with systems vendors that package the hyperconverged infrastructure vendor's software stack as an appliance. Alternatively, HCI vendors sell their software direct to end users, or through resellers and integrators for use as part of a reference architecture, or on an HCI-as-a-service basis, either on-premises or in a public cloud.

In prior years, Gartner's Magic Quadrant for Integrated Systems evaluated vendors within four classes of integrated systems: integrated infrastructure systems (IIS), integrated stack systems (ISS), hyperconverged integrated systems (HCIS) and integrated reference architectures (IRA). There are four important changes in this year's Magic Quadrant when compared to the "Magic Quadrant for Integrated Systems" published in 2016. This Magic Quadrant:

- Focuses exclusively on vendors and offerings in the hyperconverged software segment.
- Drops the system hardware requirement, which is part of the HCIS appliance model.

- Defines the market segment as hyperconverged infrastructure, allowing for software-only/bring-your-own-hardware, and as-a-service cloud delivery models.
- Limits the evaluation of integrated storage and data management capabilities to those technologies for which vendors have primary development responsibility and ownership.

We have made these changes because Gartner clients routinely compare hyperconverged integrated systems (appliances) to hyperconverged infrastructure software that is supported on a broad set of certified reference or OEM hardware partners' systems. Additionally, Gartner clients are placing increasing emphasis on public and private cloud capabilities and as-a-service procurement options.

Readers should note that HCIS forecasts and vendor market share data (see "Market Definitions and Methodology: Integrated Systems") will not correlate with this HCI Magic Quadrant and its companion Critical Capabilities document. The HCIS statistics and forecast are based upon a hardware appliance view of the market, irrespective of the developer of the underlying software-enabled capabilities. Thus, vendors with revenue and market share within the HCIS market have been excluded from this Magic Quadrant if they partner for the core technology. Likewise, vendors appearing within this report may not appear on the HCIS market share report, because they do not offer a hardware appliance under their own brand. Additionally, given the change in definition and focus for this year's Magic Quadrant, readers should make no direct comparisons to vendors or dot positions within the 2016 "Magic Quadrant for Integrated Systems."

Magic Quadrant

Figure 1. Magic Quadrant for Hyperconverged Infrastructure

Source: Gartner (February 2018)

Vendor Strengths and Cautions

Cisco

Cisco is a global provider of networking, security and other IT infrastructure. Cisco leverages Unified Computing System (UCS) as the platform for its HyperFlex-branded hyperconverged infrastructure appliance offerings. HyperFlex, introduced in April 2016, integrates UCS, UCS Manager and data and storage management software developed by Springpath, in which Cisco was an investor and the sole distribution channel. Cisco acquired Springpath in September 2017. Since March 2017, Cisco has added all-flash versions and 40 Gbps fabric networking, HyperFlex Connect (an HTML5-based web GUI), HyperFlex Edge for remote office/branch office (ROBO), and now supports up to 32 compute and converged compute/storage nodes. HyperFlex can be used for a broad range of applications, but is primarily used by enterprises for high-density, virtualized workloads; virtual desktop infrastructure (VDI); database and mission-critical applications; larger ROBO environments; and hybrid and multicloud installations with integrated CloudCenter, which supports multiple cloud offerings, including Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform and others. Cisco uses external lab validations and publishes performance benchmarks to generate leads and accelerate sales. Over the next year, Gartner expects Cisco to increase integration with a broader range of vertical-market-specific applications, increase its focus on ROBO and small or midsize business (SMB) opportunities, add support for additional hypervisors, and offer consumption-based pricing. Customers have described the quality of Cisco support as excellent.

Strengths

- Cisco is well-positioned to address internode networking challenges in hyperconverged infrastructure, which is one of the major performance constraints of HCI, especially in large-node deployments.
- Cisco leverages its leadership position in network infrastructure and its large installed base of UCS servers to drive sales of HyperFlex. The majority of prospective HyperFlex customers already have an established supplier relationship with Cisco and familiarity with its customer support.
- Cisco HyperFlex is supported by Cisco Intersight, a cloud-resident monitoring and management platform with embedded machine learning that provides predictive failure analysis, alerting and proactive problem resolution through a recommendation engine.

Cautions

- Most of Cisco's target customers will eventually have a multihypervisor infrastructure, but Cisco's current HyperFlex 2.6 release only supports VMware ESXi.
- Cisco customers have identified backup and disaster recovery as areas for improvement.
- While Cisco has designed ROBO editions of HyperFlex, the solution has been costly for smaller ROBO deployments.

DataCore

DataCore is a global provider of software-defined storage (SDS) infrastructure and storage virtualization with thousands of deployments predominantly in North America and Europe. DataCore's Hyper-converged Virtual SAN was launched in 2014, and is based on the mature, 10th-generation DataCore Virtual SAN SDS SANsymphony product. DataCore software provides a broad set of data services, including storage virtualization, data protection, synchronous and asynchronous replication, deduplication, and compression. DataCore is able to scale storage capacity independently, not only by changing the node capacity, but also by leveraging external shared block-storage arrays for both capacity expansion and data tiering. DataCore features adaptive parallel input/output (I/O) technology, which automates the use of available multicore processors to improve overall I/O throughput and response times based on workload demands. DataCore's technology is deployed and used to support a variety of workloads, including high-speed transaction workloads and databases. DataCore has a long track record of supporting latency-sensitive, business-critical enterprise applications. DataCore is a popular choice for distributed data centers and SMBs, as it only requires two nodes for a high-availability, single-site or stretched-cluster configuration. DataCore offers software-only solutions either directly or via partners, and, until recently, only provided reference architectures to help customers identify the hardware specifications needed for the most common use cases. This year, DataCore also released DataCore Cloud Replication, which is available in the Microsoft Azure Marketplace, to complement Hyper-converged Virtual SAN deployments by enabling data replication to Microsoft Azure. The latest DataCore PSP7 software release enabled support for Windows Server 2016, expanding its REST enterprise management APIs and providing support for the PersistentVolume API for Kubernetes container solutions. DataCore Hyper-converged Virtual SAN is available via a one-time, perpetual license plus annual maintenance/support fees, and is priced by storage capacity per node.

Strengths

- DataCore offers a robust set of data services and high-availability solutions starting with two-node HCI deployments.
- DataCore Hyper-converged Virtual SAN enables end users to leverage and centrally manage direct-attached storage (DAS), external storage area networks (SANs) and cloud storage.
- DataCore offers a performance-optimized data layout in its SDS architecture and has validated its performance through SPC-1 performance benchmarks.

Cautions

- Although DataCore has been in existence for more than a decade, end users primarily evaluate it on the merits of the storage virtualization product, and are often unaware of DataCore's hyperconverged product and strategy beyond SDS.
- DataCore offers a software-only HCI solution and does not provide a fully integrated appliance, which often requires end-user expertise to select and fine-tune hardware with the assistance of an integration partner.

- Some end users complain that the high frequency of DataCore software enhancement releases is disruptive to operations.

Dell EMC

Dell EMC is the enterprise-focused brand that markets the products and services of the infrastructure solutions group within Dell Technologies. Dell EMC has an expansive product line marketed as hyperconverged systems in order to meet diverse customer needs. Dell EMC's products include a turnkey appliance, VxRail, and a rack-scale software-defined solution called VxRack SDDC, both of which are co-engineered with VMware. It has a rack-scale offering called VxRack FLEX, based on ScaleIO. Dell EMC also delivers Dell EMC ScaleIO Ready Nodes, a validated server and software bundle, for ScaleIO products. Through its HCI product lines, Dell EMC addresses a broad set of use cases across midsize businesses, global enterprises and service providers for VDI, virtual server infrastructure, ROBO environments, cloud IaaS/SaaS and mission-critical business applications. Dell's acquisition of EMC resulted in a broader portfolio and more choices for customers, but also resulted in more near-term challenges for Dell EMC in managing and rationalizing that portfolio. In the past 12 months, Dell has focused on integrating the HCI products to function more effectively with others products within the portfolio, such as Avamar, CloudArray, Data Domain and RecoverPoint. VxRail is priced on a per-node basis, with base software features bundled into the appliance price. Additional capabilities such as RecoverPoint and CloudArray are priced separately beyond the base free license. For VxRail, customers have a choice of selecting an operating expenditure (opex)-based consumption model. The VxRack SDDC and VxRack Flex are priced on a rack basis. Our analysis of Dell EMC does not include vSAN Ready Nodes, which are included with other vSAN ReadyNode offerings under the evaluation of VMware, nor Dell EMC XC Series and XC Xpress, which are included under the evaluation of Nutanix.

Strengths

- Since its launch in early 2016, VxRail has seen solid market traction, with thousands of nodes deployed for a diverse set of use cases due to its turnkey appliance approach and fully integrated support model with VMware.
- VxRack SDDC is a best-in-class rack-scale solution with integrated physical and virtual networking delivered through Cisco switches and VMware NSX software, along with vSphere, vSAN and SDDC Manager.
- Since the acquisition of EMC by Dell, all the Dell EMC HCI products under the portfolio are now available on Dell EMC PowerEdge Servers, which is a mature, 14th-generation product certified across a broad set of independent software vendors (ISVs.)

Cautions

- Dell EMC has its own software release cycle for VxRail that lags VMware's software release cycle, so organizations do not get access to a new vSphere or vSAN software release immediately, but only when Dell EMC certifies and releases it.

- The ScaleIO product line, which is the basis for the VxRack Flex, lacks key enterprise features such as replication, deduplication and native compression, instead depending on external software to deliver those features.
- The VxRail Manager cannot be used to manage multiple clusters; it can only be used to manage the cluster on which it is deployed.

HPE

Hewlett Packard Enterprise's (HPE's) primary hyperconverged offering is HPE SimpliVity, which began shipping after the company's acquisition of SimpliVity in February 2017. Prior to the acquisition, SimpliVity was sold through reseller and OEM partners, not including HPE. Since completing the acquisition, HPE has doubled the number of worldwide SimpliVity customers to approximately 2,000 and released an all-flash ProLiant DL380 configuration. The SimpliVity offering is now driving 80% of HPE's HCI revenue. The HPE SimpliVity solution is managed through VMware vCenter, is based on a software-defined scale-out storage architecture and can scale from a single node to eight clustered nodes plus an additional 16 network-only nodes. It features always-on global in-line compression and deduplication data services leveraging the HPE OmniStack Accelerator Card to provide consistent performance for virtualized production workloads. The SimpliVity integrated backup solution is based on snapshot and cloning techniques leveraging independent local and remote copies of the data. Under its HyperGuarantee initiative, HPE guarantees that customers will achieve 10:1 data efficiency ratios in production systems and the ability to perform a local backup or restore of a 1 TB virtual machine (VM) in 60 seconds or less as part of the standard warranty. More than half of SimpliVity customers that replaced their traditional enterprise backup with built-in data protection reported reduced recovery point objective (RPO) and recovery time objective (RTO) for their virtualization environment. HPE offers 25 preconfigured hardware SKUs for the SimpliVity 380 product, with prices starting at $26,000. Today, HPE SimpliVity is deployed across a variety of use cases, including data center consolidation, disaster recovery and ROBO. HPE SimpliVity together with HPE Synergy and HPE OneSphere are components of HPE's hybrid IT strategy and vision.

Strengths

- HPE enhanced the perception of SimpliVity's supportability and stability by leveraging the global go-to-market reach and capabilities of HPE and its channel partners.
- SimpliVity delivers robust data services, such as in-line global compression and deduplication combined with an integrated backup solution and rapid disaster recovery capabilities for operational simplicity and cost reduction.
- The HPE ProLiant DL380 installed base and global market acceptance make SimpliVity one of the top choices as an HCI platform for existing HPE customers.

Cautions

- SimpliVity is competing for mind share and investment within a complex, overlapping portfolio of HPE hybrid IT, composable and other hyperconverged solutions. This leads to confusion among prospects and existing customers about HPE's commitment to and long-term vision for SimpliVity.
- Despite competing in the hyperconverged market for a long time, HPE SimpliVity's hypervisor general availability support is limited to VMware ESXi.
- HPE SimpliVity systems are only available as all-flash configurations, which may be less competitively priced when compared to the high-capacity hybrid solutions of HCI competitors.

HTBase

HTBase provides a composable infrastructure operating system that abstracts resources from disparate hardware and public cloud vendors, creating a homogeneous resource pool that can be centrally managed. The composable operating system and software layer enable IT organizations to run any workload on top of an intelligent infrastructure that adapts and allocates rightsized resources that bridge data centers and public clouds. This approach enables the migration of unmodified workloads to any cloud. The newly developed Composable Operating System (COS) is hardware-agnostic, and allows IT departments to build and deliver applications and packages on it. HTBase does not leverage widely recognized third-party tools, such as VMware vCenter, for virtualization management. All integration and functionality are built into COS for direct access to hosts using different hypervisors. It also includes bare metal support. The uber-hypervisor, OneCloud Hypervisor (OCH), abstracts compute and local hardware as well as public cloud servers, providing a thin common layer across all infrastructures. Maestro (part of COS) provides management and orchestration capabilities for hybrid HCIS and cloud deployments. HTBase has implemented a significant makeover of its former software-defined infrastructure, composed of three software pillars: HTVCenter, Fortis and Nephos. COS provides capacity management, storage resilience, high availability, striping, deduplication, snapshot/replication (with disaster recovery), and automation tools through RESTful APIs. Marketing has been relatively low-profile, with limited global reach and low brand awareness. However, HTBase recently announced an OEM and go-to-market partnership with Dell EMC for the composable infrastructure solution on Dell EMC PowerEdge C Series servers.

Strengths

- HTBase delivers composable on-premises and cloud resource management that allows users to implement hybrid, multicloud deployments, and to scale out resources across private and public clouds.
- If any part of the infrastructure, including cloud, suffers an outage, workloads keep running with no downtime, and automatically move back to private infrastructure or to another public cloud, if set up in advance of the outage.

- HTBase allows storage to span across multiple clouds as part of the storage pool, as well as part of failover and disaster recovery, and its hardware-agnostic capabilities eliminate hardware vendor lock-in.

Cautions

- HTBase has a low level of senior management visibility, and limited market reach, market and brand recognition, global support, channel development and OEM partnerships.
- HTBase has demonstrated inconsistent marketing and is overly dependent on a few strong references that can confirm a significant ROI.
- Major software re-engineering efforts, such as HTBase's integration of HTVCenter, Fortis and Nephos into COS, increase a product's near-term risk for reliability, availability and serviceability, and will change the user experience for existing HTBase users.

Huawei

Huawei leverages its FusionCube server, which was an early integrated infrastructure system, and is now positioned as an HCI platform for its 2017 Boundless Computing initiative. The product includes storage, Huawei's own KVM-based and Xen-based FusionSphere hypervisors, as well as support for VMware and Hyper-V. This is managed by FusionCube Center. Since April 2017, Huawei added two- to four-socket, SSD all-flash versions; large-capacity big data versions; FusionCube ROBO solutions; VDI and cloud offerings; and support for up to 256 nodes in 128 clusters, to a maximum of 4,096 nodes in total. FusionCube can be used for a broad range of applications, but is primarily used by midsize enterprises for high-density, server-virtualized workloads; VDI, database and mission-critical applications, including Oracle and SAP Hana; ROBO environments; and hybrid cloud installations. It also integrates with AWS for backup, and has planned integration with Azure and Azure Stack. Huawei's presence is limited in the U.S. market, where security remains a concern. However, FusionCube's growth has been leveraged from the company's networking business in Asia, Europe, Africa and South America. Over the next year, Gartner expects Huawei to increase integration with a broader range of vertical-market-specific applications, increase focus on ROBO opportunities, and add additional hypervisor support for Microsoft and open-source software with broader geographical support. Huawei will remain strong in China because SAP, Oracle and Microsoft are limited in investing in capacity to host the Chinese market.

Strengths

- FusionCube, while newly positioned as HCI, is now well-established and proven in Asia and EMEA across multiple verticals.
- Huawei has built a strong foundation of ecosystem partners, including Oracle, SAP, VMware, Microsoft, Red Hat and SUSE, enabling the company to penetrate new markets.
- FusionCube use cases for cloud ROBO and VDI leverage Huawei's installed base of network infrastructure.

Cautions

- Huawei has limited market presence, third-party support, and certification for Huawei's FusionCube and related products in North America, although through 2017 Huawei has extended its support to include Microsoft and VMware.
- Huawei's presentations and roadmaps are not always consistent with the vendor's ability to deliver promised features and functions.
- Some customers have described FusionCube as lacking in storage functions, such as deduplication, backup and recovery tool integration, and inconsistent management capabilities.

Microsoft

For HCI, Microsoft leverages its strong and growing Windows Server OS offering, particularly with the refresh to the Windows Server 2016 upgrade, which includes Storage Spaces, a storage virtualization tool positioned as Storage Spaces Direct for the HCI market. This large installed base gives Microsoft the potential to convert a small percentage of the relatively untapped installed base of the Windows Server market to Storage Spaces Direct. This conversion in turn gives Microsoft a larger percentage of the overall HCI market. Even with a low success rate, Microsoft could drive, dilute and encapsulate the HCI market by tens of thousands of units. Other Microsoft products integrating with this upgrade and direction include Hyper-V Hypervisor and virtualization plug-ins with containers, Systems Center for overall management, and Azure and Azure Stack for cloud delivery and integration. Microsoft is new to the HCI market, launching in October 2016. The monetization and separation of Microsoft's HCI is a challenge as, like OSS, its HCI platforms are offered free with the broader upgrade. But with such a large Window Server base and Azure Cloud migration effort, Microsoft HCI cannot be ignored. Unlike OSS, support for the HCI offering is tied to Windows Server and Azure efforts. In its 2018 release, Microsoft will strengthen its data deduplication capabilities with Resilient File System (ReFS) and Mirror-accelerated parity volumes. This is tied to simplified HCI management with Systems Center and improved resilience, hyperscale and storage replicas, and an expanded ecosystem, including Linux container support. Microsoft should be considered for all general-purpose infrastructure tied to Windows Server and Azure, in particular for business-critical, cloud and ROBO use cases. In percentage terms, few Microsoft customers have deployed its HCI. Feedback is very nascent and dependent on the 2018 release. Our research indicates thousands of customers are engaged in its HCI initiative, so momentum is building. Over the next year, Gartner expects Microsoft to increase its Windows Server and HCI migration with a broader range of integrated applications; an increased focus on cloud, mission-critical and ROBO opportunities; and additional Azure support and integration.

Strengths

- Microsoft's HCI success is built on the sheer size of the Windows Server installed base, where even a small addressable market adoption for Storage Spaces Direct represents significant success in the HCI on-premises market.

- With Azure momentum, Microsoft can target HCI for on-premises and off-premises, spanning both. It can also transition clients from IaaS/PaaS/SaaS to unified management with Microsoft's System Center.
- With HCI, Azure and Office 365, Microsoft has shifted from asset/license procurement to software rental models, allowing HCI/Storage Spaces to compete with OSS alternatives, tying support to Microsoft's Software Assurance licensing program.

Cautions

- Microsoft is migrating many existing Windows applications to Azure, but cloud-native applications, particularly those using a container-based architecture, have been slower to move to Azure. Docker, Kubernetes and Mesos drive that space, and limit Microsoft's development of new applications built on Windows Server and HCI.
- Microsoft's decision to limit Storage Spaces Direct availability to Windows Server 2016 Datacenter Edition makes the offering too costly for scaled-down implementations. Clients should check their Windows Server 2016 upgrades and Software Assurance programs to determine the packaging of Storage Spaces Direct in the distribution.
- Microsoft's biggest competitor on execution is its own installed base that has delayed Windows Server 2003, 2008 and 2012 upgrades to Server 2016, thus limiting HCI Storage Spaces Direct adoption.

Nutanix

Nutanix is among the leaders in hyperconvergence with over 7,800 customers. Nutanix has excelled in two important dimensions: (1) overcoming I&O leaders' initial fears of investing in a relatively new market player; and (2) raising confidence levels in the product's maturity and performance to continually add scale and diversify deployments. While the appliance segment of the market where Nutanix created its momentum is still a necessary and important offering, the hyperconverged infrastructure market has expanded to include hybrid cloud infrastructure with the presence of VMware and Microsoft engaged with large customer bases. Nutanix deployments are mostly in large, centralized data centers, rather than distributed, smaller sites, such as ROBOs, edge and SMBs. The vendor's "land and expand" strategy is still in an early phase, and management's focus is on large global accounts. Against the stiff competition of data center vendors such as Dell EMC, Cisco and HPE, which can underprice it, Nutanix has positioned itself as having a best-of-breed strategy with software-defined HCI that is intelligence-based, multihypervisor and multicloud with unified management. Nutanix has partnered with a set of system vendors as OEMs (Dell EMC, Fujitsu, IBM and Lenovo) and self-certified on others (Cisco and HPE) to reduce, although not eliminate, friction. OEMs, however, are notoriously unreliable, and HPE and Cisco are aggressively promoting their own offerings. Nutanix must continue to maintain software differentiation to avoid competing in a low-margin business with heavyweights. To create differentiation from other hyperconvergence offerings, Nutanix has made cloud its management, consumption and deployment strategy, with an IaaS-friendly environment as an alternative to public clouds (called Xi Cloud Services). It has also launched a pay-per-use rental model (Go) that enables users to scale up

and scale down nodes in a system with a six-month commitment. Meanwhile, Nutanix's native hypervisor has been gradually making gains, with over 25% of customer shipments using Acropolis hypervisor (AHV). Ultimately, the success of Nutanix will depend on its ability to transcend Mode 1 workloads and silos to deliver agile Mode 2 applications through its cloud framework (Calm) with improved network segmentation and security, interoperability and APIs. Balancing these continued investments, while striving to increase margins and ASPs to achieve profitability, remains a challenge.

Strengths

- Nutanix has proven user acceptance and high customer satisfaction, resulting in repeat sales and high node counts (100+) in large global enterprise accounts.
- Nutanix delivers a robust management and self-service interface in Prism, AHV, Calm and a supporting cloud service through Xi Cloud Services (such as high availability/disaster recovery) with integrated automation and system intelligence.
- Nutanix offers flexibility in hypervisor choice with growing adoption of AHV, based on KVM, as customers seek a lower-cost alternative to VMware ESXi.

Cautions

- Nutanix needs to demonstrate greater product breadth, particularly in the low end, to support its come-from-behind effort to broaden its appeal to ROBOs, departments, edge and SMBs.
- Nutanix lacks the traditional infrastructure incumbency that enables competitors to fit seamlessly into many IT data center and distributed plans.
- Nutanix lags in the perception of initial market price competitiveness, pressuring many users into exception-based discounts in contract negotiations.

Pivot3

Pivot3 offers the vSTAC and Acuity hyperconverged infrastructure IT solutions, as well as video surveillance infrastructure solutions based on vSTAC technology. Pivot3 began shipping hyperconverged infrastructure solutions in 2008 and reports 1,900 customers as of 30 April 2017. Pivot3 launched the Acuity solution in April 2017, leveraging storage technology from its NexGen acquisition. Acuity is designed to support mixed workloads in data centers and provides policy-based management controls to prioritize high-value applications. Pivot3 recently added data archiving and encryption for data at rest. Pivot3 has established itself as a leading supplier of infrastructure appliances for the video surveillance and VDI markets, sold both direct and through Tier-1 systems vendors and application-specific appliance suppliers. The company has also focused on ROBO and the Internet of Things (IoT). However, with the Acuity platform, it is targeting consolidation of virtualized workloads in data centers. Pivot3 has its greatest market penetration in government (including defense), transportation, high tech and healthcare. Pivot3 has increased investment in marketing resources to support regional partner development and lead generation. The vendor makes extensive use of proofs of concept (POCs) as an effective tool to improve closure rates on sales. Pivot3 used a portion of the $55 million investment round from March 2016 to enable

the acquisition of NexGen and develop the Acuity offering. In addition, Pivot3 has stated that it will use the additional capital to increase marketing and lead generation activities across a broader range of geographies and vertical markets. It will also leverage the installed base of vSTAC customers to increase Acuity data center sales outside the historic vSTAC use cases of video surveillance and VDI. Pivot3 offers single-SKU appliance-based pricing, as well as software-only, enterprise license agreement (ELA), perpetual license and consumption-based pricing models.

Strengths

- Customers have praised Pivot3's pre- and post-sales support and ease of use.
- The Acuity product line enables the vendor to support a broader range of customer workloads, and provides a common infrastructure for both throughput-sensitive and latency-sensitive workloads.
- Pivot3's partnerships with global system vendors enable Pivot3 to sell, service and support solutions globally, and enables customers to utilize Pivot3 technology, while preserving relationships with several server vendors.

Cautions

- Customers should evaluate the depth of Pivot3 OEM partner relationships, as some Pivot3 partners offer multiple and sometimes competing offerings that could impact the long-term relationship.
- While customers desire integration with public cloud providers to enable recovery and application portability to the cloud, Pivot3 is late to market with these capabilities.
- Customers have identified API integration, logistics and reporting as areas for improvement.

Scale Computing

Scale Computing's hyperconverged infrastructure offering, HC3, is designed for midsize organizations with limited IT resources and expertise. Launched in 2012, HC3 has 2,500 customers spanning multiple verticals. Scale Computing's primary differentiator is its focus on organizations requiring a turnkey, full-featured, consolidated IT infrastructure platform on a tight budget. Scale Computing is now delivered on a broad range of HC3 hardware models, and allows customers to mix and match different nodes in a high-availability cluster that scales from three to eight HC3 nodes, with the ability to centrally manage up to 25 clusters using HC3's web-based user interface. The HC3 product is based on the HyperCore operating system, which includes a fully integrated, KVM-based hypervisor and scale-out single storage pool featuring snapshots, cloning, thin provisioning and automated tiering data services. Recently, HC3 added more hardware models for high-capacity and performance needs, introduced disaster recovery as a service (DRaaS) capabilities, and released a software-only HC3 product for OEM and global-channel-partner enablement. Scale Computing also announced a Nonvolatile Memory Express (NVMe)-based HC3 appliance to improve the performance of applications requiring super-low latencies. The vendor opened a European headquarters and launched a new channel program focused on partnering with

top value-added distributors throughout Europe, Africa and the Middle East. In addition, Scale Computing signed a number of partnerships with ISVs to provide turnkey solutions for specific use cases. Recently, the vendor signed a partnership agreement with Google Cloud Platform to enable a hybrid cloud experience for the HC3 product line. In 2017, Scale Computing signed a global partnership with Lenovo to provide HC3-enabled appliances on Lenovo hardware. Until 2017, Scale Computing was primarily deployed in midmarket environments, replacing entire stacks of servers, switches and SAN storage. Recently, it has also been gaining traction in distributed enterprises, ROBOs and retail, addressing requirements for integrated, all-in-one appliances with single-vendor support, where organizations desire a lower-cost alternative. Scale Computing-branded appliances are available as a one-time license with additional support that can be extended up to five years.

Strengths

- Scale Computing provides a built-in hypervisor, and allows mixing and matching of hardware configurations.
- End users praise the product's ease of installation, management and support experience.
- Scale Computing offers built-in and flexible DRaaS capabilities with continuous replication, robust failover and fail-back, as well as single-node disaster recovery site support.

Cautions

- HC3 hypervisor support is limited to its internally developed hypervisor, based on KVM, making it less attractive for customers that have chosen VMware or Microsoft hypervisors as part of their stack.
- Since the majority of Scale Computing deployments are in North America, its support infrastructure in EMEA and Asia may be less mature and responsive.
- Scale Computing's HCI lacks visibility among enterprises of all sizes, thus limiting adoption.

Stratoscale

Stratoscale offers a software-based, hyperconverged solution, providing customers with flexible hardware options. Its hyperconverged software, Symphony, bridges a service-driven hybrid cloud ecosystem, delivering on-premises platforms while maintaining compatibility with public cloud. The vendor shifted its focus to provide AWS-compatible services and APIs in 2016. Symphony delivers an AWS-compatible region, giving customers the ability to dynamically move workloads between on-premises Stratoscale infrastructures and AWS based on a predefined quota and policies. Symphony does not manage outside of the Symphony cluster, but it offers extensive APIs to manage nodes. Symphony supports migration of VMs from vSphere, Hyper-V or other KVM-based hypervisors. Symphony is available on an annual subscription per-node basis that includes 24/7 dedicated support, maintenance and product upgrades. Stratoscale markets reference architectures with system providers including Cisco, Dell EMC, HPE, Lenovo and Supermicro. Stratoscale primarily addresses midsize to large enterprises and service providers for data center modernization, building hybrid cloud platforms, container deployment and cloud migration (lift and shift). Stratoscale has been successful in the technology providers, pharmaceuticals, MSPs and

media/entertainment markets and is expanding into other segments, including financial services and manufacturing. Sales teams are supported by solution architects to ensure business and IT alignment, and to provide support, education and training. In 2018, Stratoscale plans to invest more in R&D, expand its sales teams geographically, add more services from AWS, and extend its partnership with Google Cloud and Microsoft Azure.

Strengths

- Stratoscale provides hardware-neutral solutions, enabling flexible and cost-optimized HCI platforms while avoiding system vendor lock-in.
- Symphony embraces the vision of providing a multitenant hybrid cloud platform, partnering with the leading cloud provider, Amazon.
- Stratoscale has extended its offerings to address Mode 2 workloads, scale-out microservice applications and DevOps by adding a container service (Kubernetes as a Service) and self-service consumption of cloud services.

Cautions

- Some organizations that have made significant investments in vSphere or Hyper-V licenses and training will resist migration to a KVM-based hypervisor.
- Some IT leaders question Stratoscale's long-term viability given the competition with well-established public cloud options, such as VMware Cloud on AWS (VMC) or Azure Stack from Microsoft.
- Stratoscale's sales and support capabilities vary geographically, while the vendor attempts to expand market reach.

VMware

VMware vSAN, which is integrated in the kernel of the vSphere hypervisor, is an SDS product that serves as the core foundation of VMware's hyperconverged infrastructure software strategy. VMware offers a comprehensive management suite, vCenter, and a network virtualization product, NSX, to round out its software-defined data center portfolio. VMware leverages its software assets to deliver hyperconverged products that can be deployed on certified hardware components, as vSAN ReadyNode, turnkey appliances or as a rack-scale solution. New capabilities in version 6.6 include support for Intel Optane NVMe SSDs, plug-ins for Docker and Kubernetes, software-based clusterwide data-at-rest encryption, and availability of vSAN under the new software-defined data center offering, VMware Cloud Foundation. VMware vSAN is deployed for a broad range of use cases across both midsize businesses and global enterprises for VDI, virtual server infrastructure, ROBO environments and Tier 1 applications. While VMware has made rapid strides in the hyperconverged market segment, it still faces challenges due to lukewarm go-to-market support from hardware OEMs beyond Dell. The announcement by VMware and EMC of the VxRail appliance family in 2016 as "jointly engineered hyperconverged infrastructure appliances (HCIA) for VMware environments" was a key move in creating a turnkey customer experience. VMware offers several

licensing options for the vSAN product. VMware vSAN software is available in standard, advanced or enterprise editions, where the pricing is as a perpetual software on a per-CPU basis. VMware has a bundled per-VM pricing model for ROBO environments that includes both the vSphere and vSAN licenses together, and a per-desktop pricing model for VDI environments on a concurrent-user basis for named users within organizations.

Strengths

- VMware offers the broadest set of hyperconverged solutions — either as a turnkey software appliance, as a rack-scale software-defined data center solution (VMware Cloud Foundation) or as HCIaaS — to meet the diverse performance, scalability, security and total cost of ownership (TCO) needs of organizations.
- VMware offers a set of well-integrated software products in vSphere, vSAN and vCenter, which makes management and support simple for virtualization administrators, obviating the need to learn new GUIs or complex storage abstracts.
- VMware has kept the product competitive through an aggressive software release cycle to provide advanced data services and enhancements, such as software encryption that eliminates the need for expensive, self-encrypting drives, and stretched clusters that can tolerate site failures.

Cautions

- Data reduction features such as deduplication, compression and erasure coding are not available as part of the standard edition or the hybrid configuration. Organizations requiring data reduction capabilities must license advanced or enterprise editions and purchase all-flash hardware, raising the TCO of the solution.
- Several customers have reported problems with stability and performance of vSAN, even when they have selected hardware components from its certified compatibility list, which indicates a lack of rigor in its validation and certification process. However, the problems have occurred with significantly less frequency with vSAN ReadyNodes.
- The choice of VMware as a hyperconverged vendor limits the choice at every layer across compute, storage and management in the on-premises data center. While VMware enables consumption of its HCI product through multiple cloud providers such as IBM and OVH, VMware cloud on AWS is the only one that is fully operated, managed and supported as a hybrid cloud service by VMware.

Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant may change over time. A vendor's appearance in a Magic Quadrant one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. It may be a reflection of a change in the market and, therefore, changed evaluation criteria, or of a change of focus by that vendor.

Added

Not applicable.

Dropped

Not applicable.

Inclusion and Exclusion Criteria

To qualify for inclusion in the hyperconverged infrastructure Magic Quadrant, vendors need to meet the following criteria.

Functional Criteria

Included HCI vendors must:

- Provide a software stack that includes software-defined compute, storage, and, optionally, networking with integrated software services and management.
- Deliver the solution as a hardware appliance, as software-only for use on certified, reference-architecture, or use as-a-service in on-premises or public cloud infrastructure.
- Provide a solution that utilizes local DAS storage, rather than shared storage, such as a SAN and/or network-attached storage (NAS). HCI products must provide a mechanism to pool DAS into logical, abstracted virtual storage.
- Develop the storage and data management services integrated in the offering, not resell a white-label solution produced by another company in an OEM relationship.

Business Criteria

Eligible HCI vendors must:

- Provide evidence of a minimum of 50 production customers brought to revenue in each of at least two of the major geographies (Americas, EMEA and Asia/Pacific).
- Deliver complete Level 1 (call center/service desk) and Level 2 (escalation) support to facilitate quick and easy problem resolution. However, Level 3 (engineering) support can be delivered separately, based on vendors' engineering partnerships.
- Have achieved $10 million in bookings from HCI solutions for the 12 months preceding 30 April 2017.
- Deliver solutions in at least three of the use cases identified in the Critical Capabilities research.

Integrated systems that fall into either the integrated infrastructure systems or integrated stack systems categories are no longer eligible for inclusion in this Magic Quadrant:

- Integrated infrastructure systems are server, storage and network hardware integrated to provide shared compute infrastructure. Examples include Dell EMC VxBlock Systems and Hewlett Packard Enterprise (HPE) ConvergedSystem 700.
- Integrated stack systems are server, storage and network hardware integrated with application software to provide appliance or appliance-like functionality. Examples include Oracle Exadata Database Machine and Teradata.

Honorable Mentions

Several vendors did not meet one or more of the inclusion criteria for this revised Magic Quadrant. However, they deserve honorable mentions and consideration by organizations seeking the benefits of hyperconverged infrastructure software.

Fujitsu

Fujitsu is a global server and storage provider offering hyperconverged integrated systems based upon HCI software from Microsoft, Nutanix and VMware.

Hitachi

Hitachi is a global server and storage provider offering hyperconverged integrated systems based upon HCI software from VMware.

Lenovo

Lenovo is a global server, storage and networking provider offering a broad portfolio of HCIS appliances based upon HCI software from Microsoft, Nutanix and VMware, and reference architectures with Maxta, Pivot3, Scale Computing, StorMagic, Stratoscale and others. Lenovo has become a partner of growing importance for many HCI software vendors, because it has global reach, supply chain and manufacturing capabilities, and no legacy HCI software investments to protect.

New H3C Group

New H3C Group is a China-headquartered supplier of IT solutions, including HCI, and the exclusive provider of HPE server and storage products in China. Its hyperconverged infrastructure products have been sold almost exclusively in the Asia/Pacific region.

Red Hat

Red Hat is a U.S.-headquartered, global open-source software developer and supplier of open-source software solutions and support. Red Hat offers hyperconverged infrastructure integrating Red Hat Virtualization and Red Hat Gluster Storage, targeting ROBO requirements, edge computing and microdata centers supporting IoT edge applications.

Sangfor

Sangfor is a China-headquartered provider of network security, network optimization and virtualization solutions. Although the company is expanding geographically, Sangfor's hyperconverged infrastructure products have been sold almost exclusively in the Asia/Pacific region.

StarWind Software

StarWind Software is a developer of storage virtualization software that delivers hyperconverged infrastructure solutions primarily targeted at remote and branch offices of medium and large enterprises.

Evaluation Criteria

Ability to Execute

Gartner analysts evaluate technology providers on the quality and efficacy of the processes, systems, methods or procedures that enable IT provider performance to be competitive, efficient and effective, and to positively impact revenue, retention and reputation. Ultimately, technology providers are judged on their ability and success in capitalizing on their vision.

Product or Service: Core goods and services offered by the technology provider that compete in/serve the defined market. This includes current product/service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

Overall Viability: Includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood of the individual business unit to continue to invest in the product, continue offering the product and advancing the state of the art within the organization's portfolio of products. The growing proportion of startups in the industry requires validation of business models and investment risk.

Sales Execution/Pricing: The vendor's capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel.

Market Responsiveness/Record: Ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the vendor's history of responsiveness. The dynamics in the market require increasing flexibility.

Marketing Execution: The clarity, quality, creativity and efficacy of programs designed to deliver the vendor's message in order to influence the market, promote the brand and business, increase awareness of the products and establish a positive identification with the product/brand and

organization in the minds of buyers. This mind share can be driven by a combination of publicity, promotional, thought leadership, word-of-mouth and sales activities.

Customer Experience: Relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programs (and the quality thereof), availability of user groups, service-level agreements and so on. Conservative buyers will consider references critical in this emerging market.

Operations: The ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product or Service	High
Overall Viability	High
Sales Execution/Pricing	Medium
Market Responsiveness/Record	High
Marketing Execution	Medium
Customer Experience	High
Operations	Low

Source: Gartner (February 2018)

Completeness of Vision

Gartner analysts evaluate technology providers on their ability to convincingly articulate logical statements about current and future market direction, innovation, customer needs and competitive forces, and how well they map to the Gartner position. Ultimately, technology providers are rated on their understanding of how market forces can be exploited to create opportunity for the provider.

Market Understanding: Ability of the vendor to understand buyers' needs and translate these needs into products and services. Vendors that show the highest degree of vision will listen and understand buyers' wants and needs, and can shape or enhance those wants with their added vision. This is a relatively new market and continues to evolve.

Marketing Strategy: A clear, differentiated set of messages consistently communicated throughout the organization, externalized through the website, advertising, customer programs and positioning statements. The constant stream of new entrants puts pressure on positioning and the ability to differentiate.

Sales Strategy: The strategy for selling product that uses the appropriate network of direct and indirect sales, marketing, service and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy: A vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature set as they map to current and future requirements. Strong strategy is required for product differentiation.

Business Model: The soundness and logic of a technology provider's underlying business proposition.

Vertical/Industry Strategy: The technology provider's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments.

Innovation: Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes. Emerging technologies must be addressed and integrated.

Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries, as appropriate for that geography and market.

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	High
Marketing Strategy	Medium
Sales Strategy	Medium
Offering (Product) Strategy	High
Business Model	Medium
Vertical/Industry Strategy	Medium
Innovation	High
Geographic Strategy	Medium

Source: Gartner (February 2018)

Quadrant Descriptions

Leaders

Market Leaders will typically be able to execute strongly across multiple geographies, verticals, use cases and deployment models. They will have a support and channel organization that ensures a high-quality customer experience regardless of whether the solution is purchased directly or through resellers, integration partners or OEMs.

Challengers

Challengers are typically vendors whose achievements, while significant, are based upon a narrower subset of the market, having gaps in geographic coverage, product portfolios and use cases. These vendors have the potential to establish themselves across the broader, global market, but have not yet done so.

Visionaries

Visionaries are typically vendors that are focusing on strong innovation and product differentiation, with the potential to significantly disrupt the market if execution improves. These may be smaller vendors with limited reach or achievement to date, or larger vendors with innovation programs that are still unproven.

Niche Players

Niche Players are typically vendors with market programs focused on a limited set of geographies, deployment models, customer segments or use cases. These vendors have met the inclusion criteria and may address their specific market category effectively.

Context

All hyperconverged integrated systems include hyperconverged infrastructure software, but HCI software is not limited to a systems (hardware appliance) deployment model. That said, for now, hardware-appliance deployments (HCIS) continue to outpace software-only/bring-your-own server, reference architectures, cloud and as-a-service deployments. The advantages of software-only deployments, which include the avoidance of hardware vendor lock-in, are at least somewhat offset by the added complexity of the support model and the inability of software-only vendors to test and certify the myriad of configuration options that customers may choose. Hardware-vendor optionality can be achieved in some cases, as HCI software solutions (for example, from Nutanix, Pivot3 and VMware) are available as HCIS appliances through multiple vendors. However, the support model becomes more complicated if users choose multiple HCIS vendors for the same HCI software. Thus, we see many HCI customers elect to obtain the HCI product as an appliance based upon a prior relationship with a preferred server vendor.

One limitation of the typical HCIS appliance model is that compute, storage and networking do not scale in tandem for all workloads. To compete across the broadest range of workloads, some vendors are beginning to (or will soon) offer compute-only and storage-only nodes. Users should conduct a POC to carefully evaluate the compute, storage and networking requirements of their workloads running on HCI, and should also estimate the component growth requirements to determine the need for unbalanced scaling.

Although there are multiple 100-node+ deployments today, most HCI implementations can be measured in tens of nodes or fewer. As HCI becomes more broadly adopted across a broader range of nonhomogeneous workloads, requirements will increase for HCI to operate more autonomously, including the capability to automatically provision, rebalance, adapt to meet quality of services requirements, detect anomalies, and prevent failures and data loss. When HCI is deployed at large scale, these capabilities will be both increasingly necessary and key points of vendor differentiation.

One of the attractions of HCI is the potential to create a cloudlike provisioning model, while maintaining physical control of IT assets and data on-premises in the data center, remote site or branch office. Over the next few years, cloud deployment models will become increasingly important to meet both short-term scale-up/scale-down requirements and backup and disaster recovery requirements. An important question for users is whether HCI is a stepping stone to the cloud or a "foreseeable future" resting place for applications.

The adoption of HCI-based solutions continues to grow, but outside of smaller organizations, HCI is unlikely to become a full-service platform for IT services across all workloads. Customers should evaluate HCI solutions, and select vendors and products not because HCI or that vendor is rapidly growing, but because it fits with their particular use case, growth expectations and application-architecture direction. HCI is likely to become yet another silo to manage, so integration with higher-level management frameworks (including cloud management platforms) becomes key to supporting an already overtaxed operations staff.

Market Overview

HCI is a market that has significant overlap with the hyperconverged integrated systems submarket of integrated systems. The two, however, cannot be equated, as HCI includes flexible deployment and sourcing models that extend to cloud, on-premises-as-a-service, bring-your-own-hardware, reference architectures, and OEM or branded appliances. At one extreme, vendors that offer multiple HCIS solutions may not develop any of their own HCI software. Conversely, HCI software vendors may partner with multiple hardware, software and cloud providers to deliver their solutions to market.

Within the market, Gartner has witnessed multiple acquisitions, including SimpliVity by HPE, Springpath by Cisco, and VMware and EMC by Dell. At the same time, HCI vendors have expanded their deployment options to include cloud providers Amazon and Google, while Microsoft, with its own cloud solution, has entered the HCI market with one deployment model for Windows Server 2016.

HCI's wide variety of delivery, deployment and pricing models (appliance-based, term-license, enterprise-license, as-a-service and cloud) leads to complexity in vendor revenue recognition. Therefore, sizing revenue, unit volume and market share for HCI is a near impossibility. Users evaluating vendor claims of HCI revenue or unit market share position should interpret those claims as HCIS, rather than HCI, regardless of how vendors have labeled the market in which they compete.

Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Charting the Shifting Trends in Hyperconvergence: From HCIS to HCI (and Back Again?)"

"New Generations of Integrated Systems Will Apply AI and Emerge as Self-Organizing Systems of Intelligence"

"Market Share Analysis: Data Center Hardware Integrated Systems, Worldwide, 2Q17"

"What I&O Leaders Believe About Hyperconverged Workload Expansion"

"How Markets and Vendors Are Evaluated in Gartner Magic Quadrants"

Evidence

This Magic Quadrant is based upon vendors' written responses to an extensive Gartner survey, vendor presentations, reference customer surveys, Gartner interviews with vendor partners and competitors, Gartner client inquiries, and independent validation of vendor claims through the assessment of third-party resources.

Evaluation Criteria Definitions

Ability to Execute

Product/Service: Core goods and services offered by the vendor for the defined market. This includes current product/service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

Overall Viability: Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit will continue investing in the product, will continue offering the product and will advance the state of the art within the organization's portfolio of products.

Sales Execution/Pricing: The vendor's capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel.

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Market Understanding: Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen to and understand buyers' wants and needs, and can shape or enhance those with their added vision.

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Sales Strategy: The strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service, and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy: The vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature sets as they map to current and future requirements.

Business Model: The soundness and logic of the vendor's underlying business proposition.

Vertical/Industry Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

Innovation: Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.

Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries as appropriate for that geography and market.

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