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The Forrester Wave™: Hyperconverged Infrastructure, Q3 2018

The 11 Providers That Matter Most And How They Stack Up

by Naveen Chhabra
September 25, 2018

Why Read This Report

In our 36-criterion evaluation of software-based hyperconverged infrastructure (HCI) providers, we identified the 11 most significant ones — Cisco, DataCore, Hewlett Packard Enterprise (HPE), Huawei, Maxta, NetApp, Nutanix, Pivot3, Scale Computing, Stratoscale, and VMware — and researched, analyzed, and scored them. This report details our findings about how well each vendor scored on the criteria and where they stand in relation to each other. Infrastructure and operations (I&O) professionals can use this evaluation to select the right partner for their needs.

Key Takeaways

Nutanix, VMware, HPE, And Cisco Lead The Pack
Forrester's research uncovered a market in which Nutanix, VMware, HPE, and Cisco are Leaders; Pivot3, Scale Computing, Maxta, NetApp, and Stratoscale are Strong Performers; and Huawei and DataCore are Contenders.

I&O Pros Are Looking For Reliability, Scalability, And Ease Of Operation
The HCI market is growing because more I&O professionals see hyperconverged infrastructure as a way to address their top challenges. This market growth is in large part due to the fact that I&O pros increasingly trust HCI providers to act as strategic partners, advising them on top infrastructure-related decisions.

Reliability, Scalability, And Ease Of Operation Are Key Differentiators
As previous-generation technology becomes outdated and less effective, improved scalability, reliability and ease of operation will dictate which providers lead the pack. Vendors that provide a reliable, scalable infrastructure that I&O pros can easily manage themselves will position their firms to deliver successfully to their customers.

The Forrester Wave™: Hyperconverged Infrastructure, Q3 2018

The 11 Providers That Matter Most And How They Stack Up

by Naveen Chhabra
with Glenn O'Donnell, Amanda Lipson, and Bill Nagel
September 25, 2018

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Hyperconvergence Has Evolved Rapidly To Reach The Mainstream

Flexible, integrated compute and storage infrastructure is central to a firm's ability to do business in a marketplace shifting with changing customer expectations. In its heyday, virtualization offered flexibility but soon turned into just another silo — something we see today in every data center. Increasing levels of virtualization created more complexity across data centers than anticipated or desired. Hyperconverged infrastructure solves this problem. Factors boosting the HCI market include:

› **A growing ecosystem of certified business-critical applications.** The HCI marketplace is maturing swiftly; solutions have evolved significantly in just a few years. An ecosystem has developed with application vendors working with HCI vendors to certify their applications on hyperconverged infrastructure. Business-critical applications from the likes of Microsoft, Oracle, and SAP are now certified to run on an HCI stack.[1] Many infrastructure management application vendors are adopting HCI and offering solutions as appliances.[2]

› **Enabling on-premises IaaS and hybrid cloud.** All HCI offerings serve as a foundation for on-premises infrastructure-as-a-service (IaaS) by unifying and integrating core technology infrastructure services: compute and storage. Customers can consume vendor solutions via REST APIs and tie them into their own processes to build a private cloud. To extend the private cloud, almost all HCI vendors have forged technology and go-to-market partnerships with hyperscale public cloud providers.[3] While their points of view and solutions differ, they're all geared to solve hybrid cloud use cases. The HCI market is making significant progress.

› **A lower cost of operation that accelerates deployment.** Customers we interviewed highlighted the reduced cost of operation as a significant driver in their adoption of HCI, with cost benefits for both capital and operational expenditures. Storage optimization techniques like deduplication and compression reduce overall capital spending and are a cost-efficient way to deploy capacity for general-purpose IaaS environments.[4] Firms reduce operational costs via fewer technology silos, a minimal learning curve, rapid provisioning, and efficient management of a global federated storage resource.

› **Less complex operation to enable quick onboarding.** Most HCI vendors embed their operational interface within a hypervisor — primarily the VMware stack.[5] This is a great enabler for administrators who have spent years attuned to managing virtual infrastructure. Now, they can manage storage operations using the same interface.

› **Scalable infrastructure.** You need scalable infrastructure regardless of the location, size, scale, and scope of your deployment. Infrastructure scalability is intertwined with reliability; HCI systems tend to be more reliable as the system scales out. While the law of diminishing returns kicks in at some point, firms can achieve greater scale than they would otherwise get. Such scalability is ideal for business applications, whether they're homegrown or standard applications and databases from independent software vendors.

› **Technology that is more dependable than HCI predecessors.** Vendors are developing algorithms that increase the reliability of systems to a level far higher than was possible in disparate compute and storage silos. I&O pros now have better levers like erasure coding, scale-out deployments, spread-out data placement, and nondisruptive rolling upgrades that increase the reliability of their HCI systems.

Hyperconverged Infrastructure Evaluation Overview

To assess the state of the hyperconverged infrastructure market and see how the vendors stack up against each other, Forrester evaluated the strengths and weaknesses of top vendors of software-based HCI. After examining past research, user needs assessments, and vendor and expert interviews, we developed a comprehensive set of evaluation criteria. We evaluated vendors against 36 criteria, which we grouped into three high-level categories:

› **Current offering.** Each vendor's position on the vertical axis of the Forrester Wave™ graphic indicates the strength of its current offering. Key criteria for these solutions include storage services, manageability, scalability, hybrid cloud enablement and ease of use.

› **Strategy.** Placement on the horizontal axis indicates the strength of the vendors' strategies. We evaluated each vendor's vision and road map, pricing options, research and development, customer feedback on account management, and implementation and operational support.

› **Market presence.** Represented by the size of the markers on the graphic, our market presence scores reflect each vendor's go-to-market partnerships, engagement with resellers, and partnerships with other technology ecosystem vendors in the data center infrastructure market.

Evaluated Vendors And Inclusion Criteria

Forrester included 11 vendors in the assessment: Cisco, DataCore, HPE, Huawei, Maxta, NetApp, Nutanix, Pivot3, Scale Computing, Stratoscale, and VMware (see Figure 1). Each of these vendors has:

› **Currently available HCI software.** Forrester required that the evaluated version of each product be available for general purchase, not in beta or restricted availability. We applied the same policy to features and point upgrades, including only currently shipping features. This stricture had significant effects on products that, while they have impressive technology road maps and may score better in the future, don't have the required features in production today. Forrester evaluated only software capabilities, as many vendor solutions are either available as bundled appliances or software that runs on multiple hardware platforms. As a result, we excluded hardware offerings from Dell EMC, HPE, Fujitsu, Lenovo, and SuperMicro that participate in the HCI appliance market from this evaluation.[6]

› **Hyperconverged functions offered on industry-standard infrastructure.** The evaluation covers hyperconverged functions on industry-standard infrastructure, not on proprietary hardware infrastructure.

› **Referenceable customers.** Forrester required that vendors supply at least three reference customers that use the product version we evaluated. The Forrester team conducted calls with each client to gather input about the vendors and their offerings.

› **The ability to demonstrate the product.** An integral part of the Forrester Wave evaluation is a product demo, which we record for reference. We specify a minimum set of tasks that the vendor must perform. For HCI vendors, this encompassed critical operational tasks, including initial setup, creating a virtual machine (VM), integrated operations management for compute and storage, adding capacity, scaling operations, setting up replication, data protection, quality of service (QoS) policies, performance management, hybrid cloud environment, and shutting down a node to prove the resilience of the system. We encouraged vendors to show additional features beyond the required script.

FIGURE 1 Evaluated Vendors And Product Information

Vendor	Product evaluated	Product version evaluated
Cisco	HyperFlex	3.5
DataCore	Hypercoverged Virtual SAN	10.0 PSP7
HPE	SimpliVity	3.7.5
Huawei	FusionCube	3.1
Maxta	Maxta MxSP Hyperconvergence Software	3.4
NetApp	NetApp HCI	1.3
Nutanix	Enterprise Cloud OS	AOS 5.8
Pivot3	Acuity	10.4
Scale Computing	HC3	8
Stratoscale	Symphony	4.2.7
VMware	vSAN	6.7

Vendor Profiles

We intend this evaluation of the hyperconverged infrastructure market to be a starting point only and encourage clients to view detailed product evaluations and adapt criteria weightings to fit their individual needs through the Forrester Wave Excel-based vendor comparison tool (see Figure 2 and see Figure 3). Click the link at the beginning of this report on Forrester.com to download the tool.

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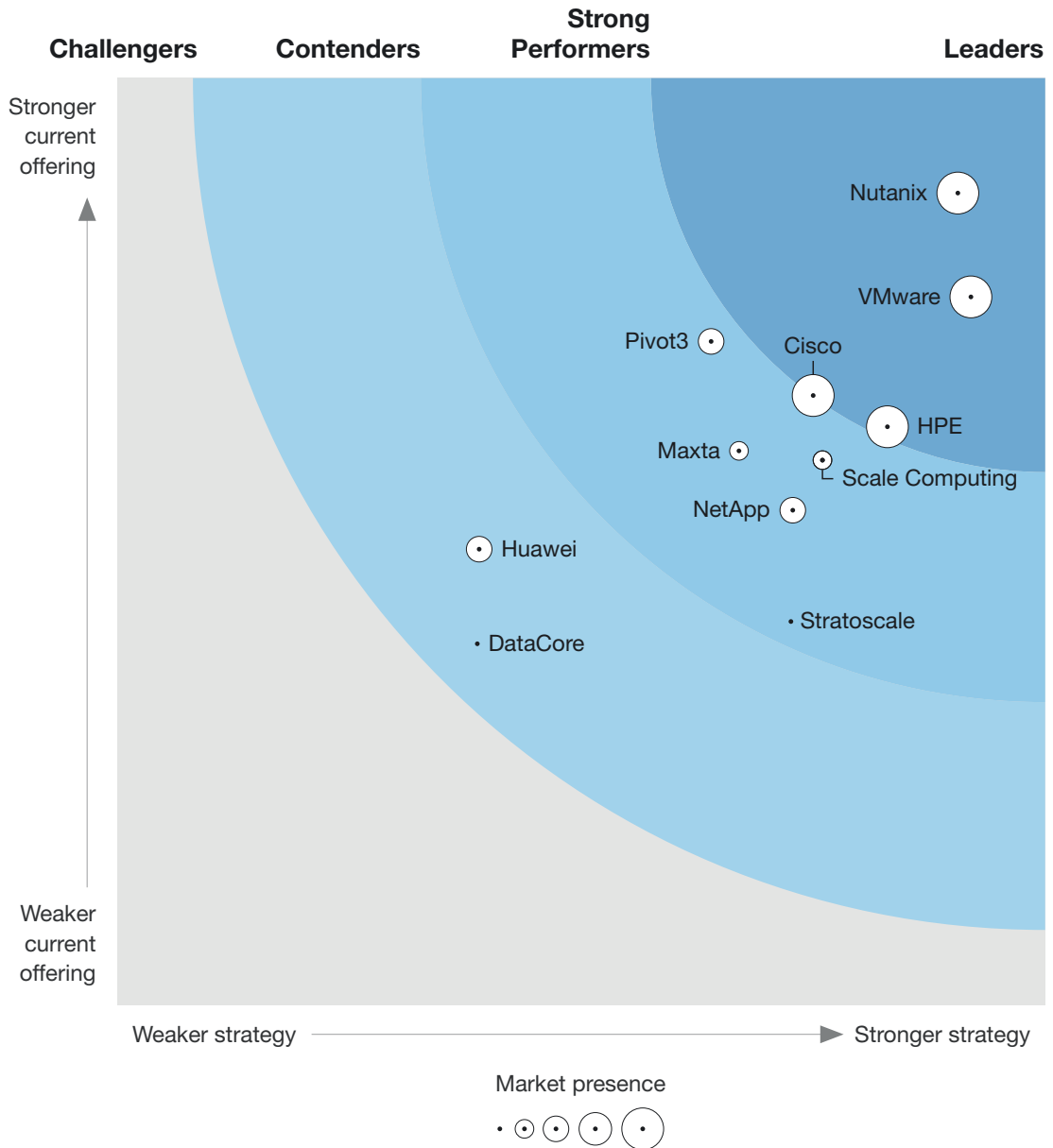FIGURE 2 Forrester Wave™: Hyperconverged Infrastructure, Q3 2018

THE FORRESTER WAVE™

Hyperconverged Infrastructure

Q3 2018

FIGURE 3 Forrester Wave™: Hyperconverged Infrastructure Scorecard, Q3 2018

	Forrester's weighting	Cisco	DataCore	HPE	Huawei	Maxta	NetApp	Nutanix	Pivot3	Scale Computing	Stratoscale	VMware
Current offering	50%	3.29	1.95	3.12	2.46	2.99	2.67	4.38	3.58	2.94	2.07	3.82
Platform support	25%	1.80	1.60	1.20	1.70	4.30	1.40	3.90	3.70	3.30	3.30	3.30
Solution scalability	20%	2.50	1.75	3.00	3.50	1.75	1.75	4.00	4.00	5.00	2.50	5.00
Storage functions	25%	4.40	1.45	3.20	1.90	3.60	2.90	4.80	3.40	2.20	0.90	2.60
Manageability and ease of operations	20%	4.20	2.20	4.60	1.80	1.80	4.20	5.00	3.00	1.80	1.60	4.20
Professional services and consulting	10%	4.00	4.00	5.00	5.00	3.00	4.00	4.00	4.00	2.00	2.00	5.00
Strategy	50%	3.75	1.94	4.15	1.95	3.35	3.64	4.53	3.20	3.80	3.63	4.60
Product strategy	50%	5.00	1.00	5.00	1.00	4.20	3.80	5.00	3.00	4.20	5.00	5.00
Corporate strategy	25%	2.00	0.75	3.00	3.00	2.00	2.75	4.50	3.00	3.00	1.50	4.00
Customer feedback	25%	3.00	5.00	3.60	2.80	3.00	4.20	3.60	3.80	3.80	3.00	4.40
Market presence	0%	4.50	1.00	4.40	2.10	1.50	2.30	4.60	2.40	1.35	0.55	4.50
Installed base	50%	5.00	0.00	3.80	2.20	1.00	1.60	4.20	1.80	2.20	0.60	5.00
Technology partners	50%	4.00	2.00	5.00	2.00	2.00	3.00	5.00	3.00	0.50	0.50	4.00

All scores are based on a scale of 0 (weak) to 5 (strong).

Leaders

› **Nutanix.** Nutanix has maintained its position atop the HCI market with its innovation, R&D investment, strong sales momentum, partnerships, and acquisition of new customers from all segments and geographies. The vendor launched its IPO soon after our last evaluation in 2016 and has since more than doubled its headcount and multiplied its million-dollar and repeat clients. Nutanix's simplified management and nondisruptive capacity expansion stand out. It switched from solely offering an appliance to a solution with a software-only stack for certified hardware platforms, a strategy that has delivered results.[7] Nutanix is on a mission to make hybrid cloud a reality, partnering with Google Cloud Platform to integrate public cloud services with its on-premises

infrastructure.[8] Nutanix acquired tech vendors like Calm, Minjar, and Netsil to enable it to attract new buyers like application developers, IT operations, and hybrid cloud architects. Nutanix has a clear, impressive road map for its product lines.

The company aggressively pursues its mission with all technology developments; some customers raised concerns that they may fall victim to another full-stack vendor. Nutanix has been humble, and customers expect it to behave the same way in the future. The vendor should strive to improve its QoS capability.

› **VMware.** VMware vSAN is a software-defined, hardware-agnostic HCI solution integrated into the vSphere hypervisor. All VMware hypervisors now include vSAN bits; clients just need to activate the HCI function. VMware goes to market with server vendor partners, each certifying its platform and calling it a vSAN ReadyNode. vSAN has rapidly added features over the past three years and now has a rich feature set to go with its tight integration into the VMware stack. VMware has an engineering-centric partnership with Amazon Web Services (AWS) to enable hybrid cloud, including VMware vSAN as a service, which is available in multiple AWS regions in North America and Europe. VMware dedicates a large R&D team to vSAN development and integration with applications from its ecosystem partner vendors. Based on its architecture, licensing and go-to-market strategy, VMware has gained significant market momentum in a very short time.

As VMware vSAN works only with its own vSphere hypervisor, customers have limited options in situations where they prefer or need to use other hypervisors.

› **HPE.** HPE standardized its HCI solution on the SimpliVity stack it acquired in 2017. HPE leveraged the market acceptance of its servers and further pushed the envelope by limiting new sales of the SimpliVity solution to its ProLiant DL and Apollo servers. That's a significant change from SimpliVity's prior stance of certifying its stack for multiple server manufacturers. HPE's strong sales and support machinery gives SimpliVity much more market traction than prior to the acquisition. HPE SimpliVity offers a rich set of global multisite data management functions anchored by an always-on global deduplication and compression architecture and includes a comprehensive set of backup/recovery and clones with disaster recovery (DR) capabilities and LAN/WAN optimization. Paired with HPE OneSphere, HPE SimpliVity can deliver a hybrid cloud platform. It supports Microsoft Hyper-V and VMware ESXi hypervisors. It manages globally deployed clusters and ensures that the sync operation moves only missing blocks of data to the recovery site infrastructure. Its RapidDR module automates recovery workflow for VM instantiation at the recovery location. RapidDR appears not to have improved in the 18 months since acquisition.

As is typical with such acquisitions, innovation tends to stall — and that's what has happened with the SimpliVity offering since its acquisition. We expect HPE to continue to push innovation as it fully assimilates HPE SimpliVity into its overall portfolio.

› **Cisco.** Cisco built on its exclusive R&D partnership with Springpath by acquiring the firm, resulting in the HyperFlex HCI product. Post-acquisition, Cisco made significant additions like support for other hypervisors, containers, stretched cluster capability for mission-critical applications, and logical availability zones, contributing to a highly reliable system. Cisco partners with Google Cloud Platform and is on its way to giving developers access to a common set of services. It also added certified GPUs on its HyperFlex platform. It developed Cisco Intersight, a software-as-a-service cloud management platform that provides a central dashboard of HyperFlex deployments, centralized reporting, and predictive insights. Clients can execute operations tasks like installation, upgrades, and active management of several HyperFlex clusters spread across multiple data centers, enabling customers to save costs and improve operational efficiency. One significant benefit for clients is that they get a single vendor for hardware and software support. However, some reference clients also pointed to the need for Cisco TAC to improve support quality.

Cisco has great inherent strengths in networking and has added that to the HyperFlex stack, but the vendor will improve the strength of its offering by adding a QoS capability that operates at the storage layer. It should advance its use of call-home data to offer predictive recommendations rather than just performing analytics and reporting.

Strong Performers

› **Pivot3.** Built on a platform originally tailored for video surveillance applications that demand effective and efficient storage management, Pivot3 has been delivering HCI for broader enterprise requirements for a few years. Pivot3 can deliver consistent and predictable flash performance using NVMe flash and supports both cache and persistent storage tiers. Its Acuity Cloud Edition simplifies the use of public cloud for backup and recovery by running Pivot3 Acuity software as an Amazon machine image on AWS. It integrates with the Pivot3 management application and enables single-pane-of-glass management of on-premises and cloud deployments. It allows administrators to easily schedule and manage data protection to and from private and public clouds. Pivot3 sells appliances and software to clients and has white-label hardware partnerships with firms like Lenovo. Pivot3 customers give high ratings for its product, solution, focus, and customer service, all of which the company achieves by focusing on fundamentals.

Pivot3 was one of the first vendors to implement storage QoS in its HCI solution; the QoS should evolve to address growing enterprise requirements.

› **Scale Computing.** Scale Computing's solution, Scale HC3, is built on the KVM hypervisor and sold either as an appliance priced per node or as a software solution through OEMs like Lenovo and managed service providers. It has proven to be a sound choice for small and medium-size businesses, edge environments, remote office and branch office (ROBO) users, retailers, and distributed enterprises. While the vendor has focused on these deployments and use cases, firms have also deployed its solution to build large single clusters. Individual nodes or clusters can be connected by replication and used together for remote availability. Data is compressed

in line for WAN replication. Deduplication is automated and performed post-process to minimize performance impact. The solution offers easy installation, data services, and streamlined management. Scale Computing has a smaller revenue base, but its installed base is large in relation to its revenues.

Scale Computing can improve its solution interface by pulling operational metrics together and making it easier to use and by extending its technology partnerships and ecosystem. It can also improve historical reporting in dashboards to help users manage operations easily.

› **Maxta.** Maxta's hyperconvergence solution is available only as a perpetual software license and a term license with the option to choose a hardware vendor. It supports VMware and RHEV virtualization technologies as well as Red Hat OpenShift Container Platform on the same instance with supported hypervisors. It can be hosted in the AWS public cloud to enable data replication and disaster recovery in EC2. Customers can toggle compression and deduplication based on the application's performance and capacity needs. It offers synchronous replication across geographic regions through stretch cluster. Maxta does not support erasure coding today but is working to enable it on its platform; it doesn't support self-encrypting devices and is looking to partner with key-based encryption vendors. Maxta has one of the simplest licensing options in the industry, so customers know what they're getting and can better plan their budgets. Maxta OEMs its software to Lenovo, which takes it to market in China and other geographies.

Maxta can improve its offerings by planning and prioritizing support for storage and manageability functions, including publicly available REST APIs, data protection, QoS, and performance management.

› **NetApp.** NetApp is one of the most recent entrants into the HCI space, having acquired SolidFire in 2016. It continues to sell SolidFire as a standalone offering but also used the technology to get into the HCI market. NetApp HCI is available only as an appliance. Its solution architecture is quite different from others in the industry, enabling easy, independent scale-out of compute and storage nodes. Customers benefit from an architecture that can scale much larger. Coming from the SolidFire Element OS, NetApp now has one of the most comprehensive storage QoS systems. Built on a credit system, it accommodates sudden application spikes in infrastructure demand. While NetApp can enable support of public and hybrid clouds using the rest of its portfolio solutions, it has yet to integrate that with NetApp HCI. NetApp has leveraged its position in storage infrastructure to drive sales of NetApp HCI. NetApp has leveraged its existing IP and that obtained from SolidFire to get service provider partners on board for its HCI offering.

One limitation of NetApp's architecture: It starts with a pricier minimum configuration of six nodes, making it tough for clients to consider the vendor for smaller remote branch office deployments. NetApp is considering changes to support deployments with fewer nodes. It supports the solution on certified hardware vendors like Dell, Quanta, and SuperMicro and will introduce NVMe support very soon. NetApp's solution does not support erasure coding.

› **Stratoscale.** Stratoscale developed key HCI solution capabilities, including underlying storage functions and hypervisor integration; it offers infrastructure and stack management via an intuitive, easy-to-use web portal. It's now on a mission to host on-premises AWS-compatible services on its HCI. Stratoscale doesn't appear to focus on storage services like deduplication and compression, as its target application developer users typically don't demand them. Stratoscale is looking to serve developers that want to build new applications using AWS services but do so on-premises. Stratoscale will always lag AWS's rapid release of new functionality, so it needs the same rigor and pace of development as AWS to deliver updates to its on-premises solution and not fall behind. It's a great enabler for developers who want AWS services on-premises to manage costs, security, and compliance per their organization's policies.

Contenders

› **Huawei.** Huawei offers FusionCube, which supports FusionSphere, KVM, and VMware hypervisors and includes Huawei's proprietary hypervisor FusionSphere and its proprietary software-defined storage FusionStorage. FusionCube has gained significant traction with existing Huawei enterprise customers, including those in the telco industry in mainland China, Southeast Asia, EMEA, and Latin America. It comes as a packaged solution that is vertically integrated with Huawei's own infrastructure. Huawei partners with enterprise software vendors like Oracle and SAP to certify their applications on FusionCube.

Huawei can improve by developing key storage functionality like compression, deduplication, performance, and policy management that enterprises seek as they deploy business-critical applications. It needs to enhance its support services; customers highlighted support quality issues. The solution interface is easy to navigate and operate but appears to be disjointed based on the use cases that it performs and serves. Huawei claims to invest more than 14% of revenues in R&D, but this investment is not apparent in developments to its HCI solution.

› **DataCore.** DataCore served the storage virtualization use case for years, consolidating and managing storage arrays into a single autotiered pool. Its HCI offering, Hyperconverged Virtual SAN, leverages existing software assets and offers the unique ability to pool existing storage area network (SAN) capacity into an HCI deployment. It can scale compute and storage independently by using external storage for capacity and tiering. It's only available as software and is licensed by storage capacity. DataCore supports one of the smallest configurations, requiring only two nodes for a cluster — ideal for ROBO deployments. It performs compression and deduplication as a post-process, which has its own pros and cons. DataCore has fully functional public-facing REST and PowerShell APIs that users and partners can leverage to manage DataCore instances, integrate them into existing workflows, and automate those processes. Its users continue to benefit from operational simplicity by using the familiar vCenter console. One of DataCore's strengths is helping its clients through all life-cycle stages — presales, sales, and support — and migrating customers from SAN to HCI without disruption.

DataCore customers still need to get into the weeds of storage operations. The vendor will benefit by further automating and abstracting storage-focused operational tasks that clients want vendor technology to manage for them. It needs to boost its partner program to include partners from beyond its technology ecosystem by expanding it to other technologies from the likes of security vendors. For those not intimately familiar with DataCore offerings, its key value messaging may be confusing, but it essentially revolves around maximizing the availability, performance, and utilization of current and future storage assets.

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Supplemental Material

Online Resource

The online version of Figure 2 is an Excel-based vendor comparison tool that provides detailed product evaluations and customizable rankings. Click the link at the beginning of this report on Forrester.com to download the tool.

Data Sources Used In This Forrester Wave

Forrester used a combination of four data sources to assess the strengths and weaknesses of each solution. We evaluated the vendors participating in this Forrester Wave, in part, using materials that they provided to us by September 14, 2018.

> › **Vendor surveys.** Forrester surveyed vendors on their capabilities as they relate to the evaluation criteria. Once we analyzed the completed vendor surveys, we conducted vendor calls where necessary to gather details of vendor qualifications.

> › **Product demos.** We asked vendors to conduct demonstrations of their products' functionality. We used findings from these product demos to validate details of each vendor's product capabilities.

> › **Customer reference calls.** To validate product and vendor qualifications, Forrester also conducted reference calls with at least three of each vendor's current customers.

The Forrester Wave Methodology

We conduct primary research to develop a list of vendors that meet our criteria for evaluation in this market. From that initial pool of vendors, we narrow our final list. We choose these vendors based on 1) product fit; 2) customer success; and 3) Forrester client demand. We eliminate vendors that have limited customer references and products that don't fit the scope of our evaluation. Vendors marked as incomplete participants met our defined inclusion criteria but declined to participate or contributed only partially to the evaluation.

After examining past research, user needs assessments, and vendor and expert interviews, we develop the initial evaluation criteria. To evaluate the vendors and their products against our set of criteria, we gather details of product qualifications through a combination of lab evaluations, questionnaires, demos, and/or discussions with client references. We send evaluations to the vendors for their review, and we adjust the evaluations to provide the most accurate view of vendor offerings and strategies.

We set default weightings to reflect our analysis of the needs of large user companies — and/or other scenarios as outlined in the Forrester Wave evaluation — and then score the vendors based on a clearly defined scale. We intend these default weightings to serve only as a starting point and encourage readers to adapt the weightings to fit their individual needs through the Excel-based tool. The final scores generate the graphical depiction of the market based on current offering, strategy, and market presence. Forrester intends to update vendor evaluations regularly as product capabilities and vendor strategies evolve. Vendors marked as incomplete participants met our defined inclusion criteria but declined to participate in or contributed only partially to the evaluation. For more information on the methodology that every Forrester Wave follows, please visit The Forrester Wave™ Methodology Guide on our website.

Integrity Policy

We conduct all our research, including Forrester Wave evaluations, in accordance with the Integrity Policy posted on our website.

Endnotes

[1] Source: "Nutanix Enterprise Cloud OS Hyperconvergence-Based Solution Certified for SAP HANA," Nutanix press release, August 29, 2018 (https://www.nutanix.com/press-releases/2018/08/29/nutanix-enterprise-cloud-os-hyperconvergence-based-solution-certified-sap-hana/).

[2] In addition to the business application, support from infrastructure management applications is required to operate the hyperconverged infrastructure. Veeam announced an appliance with Cisco HyperFlex. Source: Veeam (https://www.veeam.com/cisco-storage-solutions.html) and "Veeam Availability on Cisco's HyperFlex to Deliver HA Solution," Storage Newsletter, September 5, 2018 (https://www.storagenewsletter.com/2018/09/05/veeam-availability-on-ciscos-hyperflex-to-deliver-ha-solution/).

[3] Different HCI vendors have different strategies to serve hybrid cloud use cases. Source: Nan Boden, "Cisco and Google partner on a new open hybrid cloud solution spanning on-premises environments and Google Cloud Platform," The Keyword, October 25, 2017 (https://www.blog.google/products/google-cloud/cisco-and-google-partner-open-hybrid-cloud/); Kaustubh Das, "Cisco UCS and HyperFlex for AI/ML Workloads in the Data Center," Cisco Blogs, March 29, 2018 (https://blogs.cisco.com/datacenter/cisco-ucs-and-hyperflex-for-ai-ml-workloads-in-the-data-center); "Pivot3 Expands its Intelligent Hybrid Cloud with Workload Mobility and Disaster Recovery to AWS, Azure and Google Cloud," Pivot3 press release, May 22, 2018 (https://pivot3.com/press-release/pivot3-expands-intelligent-hybrid-cloud-workload-mobility-disaster-recovery-aws-azure-google-cloud/); "Nutanix Teams Up with Google Cloud to Fuse Cloud Environments for Enterprise Apps," Nutanix press release, June 28, 2017 (https://www.nutanix.com/press-releases/2017/06/28/nutanix-teams-google-cloud-fuse-cloud-environments-enterprise-apps/); Dorothy Norris, "Building a Hybrid Cloud Environment Using Amazon Cloud," Stratoscale blog, June 19, 2017 (https://www.stratoscale.com/blog/cloud/building-hybrid-cloud-environment-using-amazon-cloud/); and Amazon Web Services (https://aws.amazon.com/vmware/).

[4] One multibillion-dollar retail firm reduced its capital outlay by more than 25%.

[5] A few HCI vendors such as Nutanix, Scale Computing, and Stratoscale have leveraged open source hypervisors to create their own version. See the Forrester report "Now Tech: Hyperconverged Infrastructure, Q3 2018."

[6] Vendors like Cisco, Dell, and HPE have a portfolio of offerings that includes both the hardware gear and software stack for an HCI solution. Cisco has its UCS server offering and HyperFlex software. Dell has its VxRail server line for HCI; VMware is pushing the envelope on software enhancements. Likewise, HPE has its DL360 and DL380 line of servers and HPE SimpliVity, the software behind HCI. As this Forrester Wave evaluation focuses on software capabilities, we included HyperFlex (formerly Springpath), VMware vSAN, and HPE SimpliVity.

[7] At the time of publication, Nutanix has not completely switched to a software-only model; it has a trail of customers to which it still offers appliances. However, Nutanix plans to phase out the appliance model and shift completely to software-only. Source: "The Software Path," Nutanix, November 30, 2017 (https://www.nutanix.com/2017/11/30/the-software-path/) and "Software-Centric Disclosure," Nutanix (https://s21.q4cdn.com/380967694/files/doc_downloads/SOFTWARE-CENTRIC-DISCLOSURE_FINAL-(1).pdf).

[8] Solving the hybrid cloud puzzle isn't as easy as it sounds. Nutanix has announced plans to launch its own version of hybrid cloud, called Xi. It has yet to publicly announce the general availability of the Xi platform. Source: Nutanix (https://www.nutanix.com/products/xi-cloud-services/).

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