What Matrix

WHATMATRIX LANDSCAPE REPORT

SOFTWARE DEFINED STORAGE AND HYPERCONVERGED INFRASTRUCTURE 2018

Highlights

Key Takeaways

SDS/HCI has gained in maturity. Almost every platform in the comparison with an active development cycle has crossed the 70% score barrier. These platforms now have a baseline of native capabilities that are comparable to traditional enterprise storage platforms, and sometimes even go beyond. SDS/HCI customer base numbers are also still rising across the board and the 15,000 customer-mark for a single technology has already been breached.

SDS/HCI itself has become transformative. Already new architecture types have appeared that challenge the very definition of SDS/HCI. This can be considered a step forward as existing SDS/HCI architectures are exhibiting some foundational limitations and weak-spots that need to be addressed. It also forces vendors to rethink their implementation of the SDS/HCI concept and re-embrace the key principle of simplicity.

"Best" is in the eye of the beholder. It becomes increasingly important for end-user organizations to identify exactly what benefits they are looking for during early pre-procurement stages. Although many SDS/HCI solutions seem very similar at first glance, they often have their own particular set of pros and cons that can also differ depending on the unique situation and goals.

Future Outlook

Hybrid cloud is the next step. Most SDS/HCI platforms have evolved to a stage where they qualify for adoption in a private cloud ecosystem. Many vendors have now targeted full-featured hybrid-cloud scenarios as the logical next step. In order to bridge the gap between private and public clouds and to provide a seamless experience at the same time, SDS/HCI solutions need to be able to be fully deployed on top of native public cloud infrastructures.

Focus on demanding enterprise application workloads. With a proven install base for workloads that have low and medium requirements, SDS/HCI vendors will start to expand their horizon by supporting modern high-demanding enterprise workloads. In order to prove that they can meet even the most rigorous requirements, they will formally validate their solution whenever possible.

Increased competition will cause more casualties. Now that all of the established enterprise vendors have adopted their 'weapon of choice' either by acquisition or internal development, the SDS/HCI war is likely to heat up. Existing SDS/HCI platforms have to battle on multiple fronts: against their brethren, against modernized traditional enterprise storage offerings (don't discard these just yet!), and against new start-ups that have the opportunity to re-image the SDS/HCI concept from the ground up. In this overcrowded arena casualties seem to be unavoidable.

About WhatMatrix

WhatMatrix: better technology decisions for your business

The community is changing the consultancy landscape with a new (crowdsourced-powered) trust model, delivering accountable analysis through respected industry experts, combining it with an open community curation (OCC) model that ensures impartiality.

WhatMatrix is challenging traditional comparison sites and classic IT analysts, by providing in-depth, community-validated and "always online" technology comparisons & landscape reports to its users – free of charge.

WhatMatrix provides unbiased analysis in an industry segment that is dominated by comparison sites collecting user-reviews, an increasingly unreliable approach that omits any technical analysis.

The Old

wait for annual reports

"oblique" evaluation criteria

"pay-to-play" vendors, entry criteria

evaluations "behind closed doors"

rankings based on user-reviews only

(most product review sites)

VS

WhatMatrix

"always-online" comparisons + reports

fully disclosed taxonomy and weights

free listings (inclusive of relevant newcomers)

Named owners + Open Community Curation

all comparisons based on technical analysis

(100+ evaluation points)

WhatMatrix Platform & Community

WhatMatrix Landscape Reports provide a comprehensive point-in-time snapshot analysis of a technology area and its leading solutions, complementing the depth of always-online comparisons. These reports include key industry trends, top-level assessments of vendor capabilities, and supporting information that enable the reader to make well-informed product evaluations and purchase decisions.

WhatMatrix significantly reduces the time and cost spent on researching suitable technologies to solve today's business challenges. Visitors and comparisons have grown exponentially since launch, indicating that IT professionals are looking for unbiased, current and free information.

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The SDS & HCI Landscape: Market Analysis and Platform Comparison (2018)
By WhatMatrix SDS & HCI Industry Expert

Herman Rutten

Lead Category Consultant [SDS & HCI]

Herman has almost 20 years of IT experience, spanning a wide range of roles and technologies related to IT infrastructure. As a highly accredited technical consultant and a solutions architect, he has accumulated vast design as well as hands-on experience with regard to the virtualization, storage and data protection space. Herman also holds a Bachelor degree in Business Administration, granting him the ability to look at an organization's challenges from both a top-down and a bottom-up perspective.

Scope of Report

This report is based on an analysis of the WhatMatrix Category "Software Defined Storage and Hyperconverged Infrastructure". In it, we provide in-depth technical evaluations of leading SDS & HCI solutions.

Definition of Software Defined Storage

The concept of 'Software Defined Storage', often abbreviated as SDS, has still not been standardized in spite of the SDS market being in existence for nearly two decades now. It has received increased attention in the last 6 to 7 years, reflecting the growing need of organizations to address rising storage-related challenges. Within the same timespan Hyperconverged Infrastructure (HCI) - which builds upon the SDS foundation - also emerged. Today there are many SDS & HCI providers, each with different specializations and approaches to software defined storage.

At the most fundamental level, every SDS solution follows three basic rules:

Rule #1:   The software is designed to run on commodity server hardware and makes use of the available resources therein.

Rule #2:   The solution aggregates physical storage capacity from separate systems into a single shared storage pool.

Rule #3:   The solution offers a broad set of storage functionality (services) comparable to traditional hardware-based shared storage systems.

Although on occasion solutions bend the ruleset by having a proprietary component inside, they are still considered by many as members of the Software Defined Storage family. Beyond the basic functionality, SDS solutions provide a variety of advanced capabilities that depend on the vendor's focus areas and intended use cases. However, almost every SDS solution has been developed with end-user simplicity in mind that traverses the entire operational lifecycle, from initial provisioning, gradual expansions and recurring maintenance, all whilst guaranteeing uptime and data availability. SDS thus enables end-users without in-depth storage know-how to leverage powerful storage capabilities to fulfill the changing needs of today's digital business.

Definition of Hyperconverged Infrastructure

The concept of a 'Hyperconverged Infrastructure', often abbreviated as HCI, has been around for more than 5 years now. When HCI became the new industry buzz-word, HCI was often used as a synonym for SDS, which started to blur the lines. Fundamentally, HCI is best described as one of the methods to acquire Software Defined Storage (SDS) solutions. Whereas pure SDS has a software-only approach in the sense that the storage software can be leveraged with any server- and storage hardware that meets the minimum requirements, and thus providing maximum flexibility, HCI pre-packages the SDS software and the commodity server hardware needed to build the SDS solution into a single offering. This way end-users can choose from pre-defined optimized building blocks that are prepped before shipping so they are ready-to-go once they arrive at the organization's doorstep. HCI expands on the notion of simplicity by having a turnkey delivery approach as well as providing close-to-zero administration benefits. In essence, HCI attempts to match the speed of today's digital business.

SDS & HCI Focus Areas

This report assesses current market participants and offerings as of October 5th 2018. The SDS & HCI evaluation assesses solution capabilities in seven areas. These areas reflect typical IT challenges that organizations concentrate on when considering SDS & HCI platforms. These include:

- **Design & Deploy**. Aspects pertaining to designing, evaluating and deploying the storage solution

- **Workload Support**. Capabilities that enable IT to leverage the storage solution against a set or all of the intended use-cases

- **Server Support**. Enablement of end-users to choose server hardware components that meet their organizational standards as well as short- and long-term compute requirements

- **Storage Support**. Enablement of end-users to choose a combination of storage hardware components that meet their performance and capacity requirements

- **Data Availability**. Features that provide protection against hardware failures, data corruption and entire site outages

- **Data Services**. Features that provide storage efficiency, performance optimization, data portability, file serving, as well as capabilities that ensure compliance and safeguard information

- **Management**. Single-pane-of-glass administration, performance monitoring, task automation, self-service options, support features, self-healing and predictive analysis capabilities

A discussion of the top vendors in each of these areas is included in the Focus Areas section of this report.

SDS & HCI Landscape Overview 2018

The following is a list of the vendors included in this Landscape Report along with the product versions that were evaluated. The color in the right-most column is used consistently throughout this report to identify respective vendors.

As previously stated, WhatMatrix Landscape Reports are point-in-time snapshots. We do not attempt to include or assess future product roadmaps for each vendor. Our focus is on current features and capabilities that are generally available.

Vendor and Platform Listing

color code

Vendor	Product	Release	Edition(s)	Website	
CISCO	HyperFlex	3.5	-	https://www.cisco.com/c/en/us/products/hyperconverged-infrastructure	
DATACORE	SANsymphony	10.0P7U2	-	https://www.datacore.com/products/software-defined-storage/	
Datrium	DVX	4.0.3.0	-	https://www.datrium.com/products/on-prem-dvx/	
DELL EMC	VxFlex OS	2.6	Enterprise	https://www.dellemc.com/en-sg/solutions/software-defined/	
DELL EMC	VxRail	4.5.225	-	https://www.dellemc.com/en-us/converged-infrastructure/vxrail/	
Hewlett Packard Enterprise	SimpliVity	3.7.5	380	https://www.hpe.com/us/en/product-catalog/convergedsystems/hyper-converged	
Hewlett Packard Enterprise	StoreVirtual VSA	12.7	-	https://www.hpe.com/nl/en/storage/storevirtual.html	
Microsoft	Storage Spaces Direct	2.0	Datacenter	https://docs.microsoft.com/en-us/windows-server/storage/storage-spaces/storage-spaces-direct-overview	
NetApp	HCI	1.3	-	https://www.netapp.com/us/products/converged-systems/hyper-converged-infrastructure.aspx	
NUTANIX	Enterprise Cloud Platform	5.9	Ultimate	https://www.nutanix.com/	
Pivot3	Acuity	10.4	Datacenter	https://pivot3.com/product/datacenter/	
vmware	vSAN	6.7	Enterprise	https://www.vmware.com/nl/products/vsan.html	

The table below provides additional information for each vendor based on publicly available information. Measures include number of employees, monthly website traffic, and annual revenues.

Vendor	Employees	Monthly Web Visitors	Annual Revenues
Cisco	74,200	36,430,000*	49.3B*
DataCore	250	41,464	67.3M
Datrium	200	41,225	50M
Dell EMC	145,000	1,430,000*	78.7B*
Hewlett Packard Enterprise	66,000	10,410,089*	28.9B*
Microsoft	131,000	746,998,300*	110.3B*
NetApp	10,300	1,636,457*	5.9B*
Nutanix	4,000	703,364	1.1B
Pivot3	300	18,689	60.5M
VMware	21,700	15,891,574*	7.9B*

*Total visits to vendor website and annual revenues include more than SDS/HCI product lines

Industry Timeline

The following is a timeline indicating when each commercial SDS & HCI product was introduced to the market. In some cases, this does not correspond to when the company was founded or incorporated.

CISCO

Hewlett Packard Enterprise **HC380**

NetApp®

Da trium®

Pivot**3**

Hewlett Packard Enterprise **SimpliVity**

DELL EMC
VxFlex OS (Scale IO)

Hewlett Packard Enterprise **HC250**

vmware®

Hewlett Packard Enterprise **VSA**

NUTANIX

DATACORE

2018

2017

2016

2014   2015

2012   2013

2011

■■ **Microsoft**®

DELL EMC
VXRail

Market Dynamics

This section provides an overview of how the SDS/HCI market is moving forward, based on the changes that were observed over the past 22 months by constantly tracking the platforms that are part of the WhatMatrix SDS&HCI category.
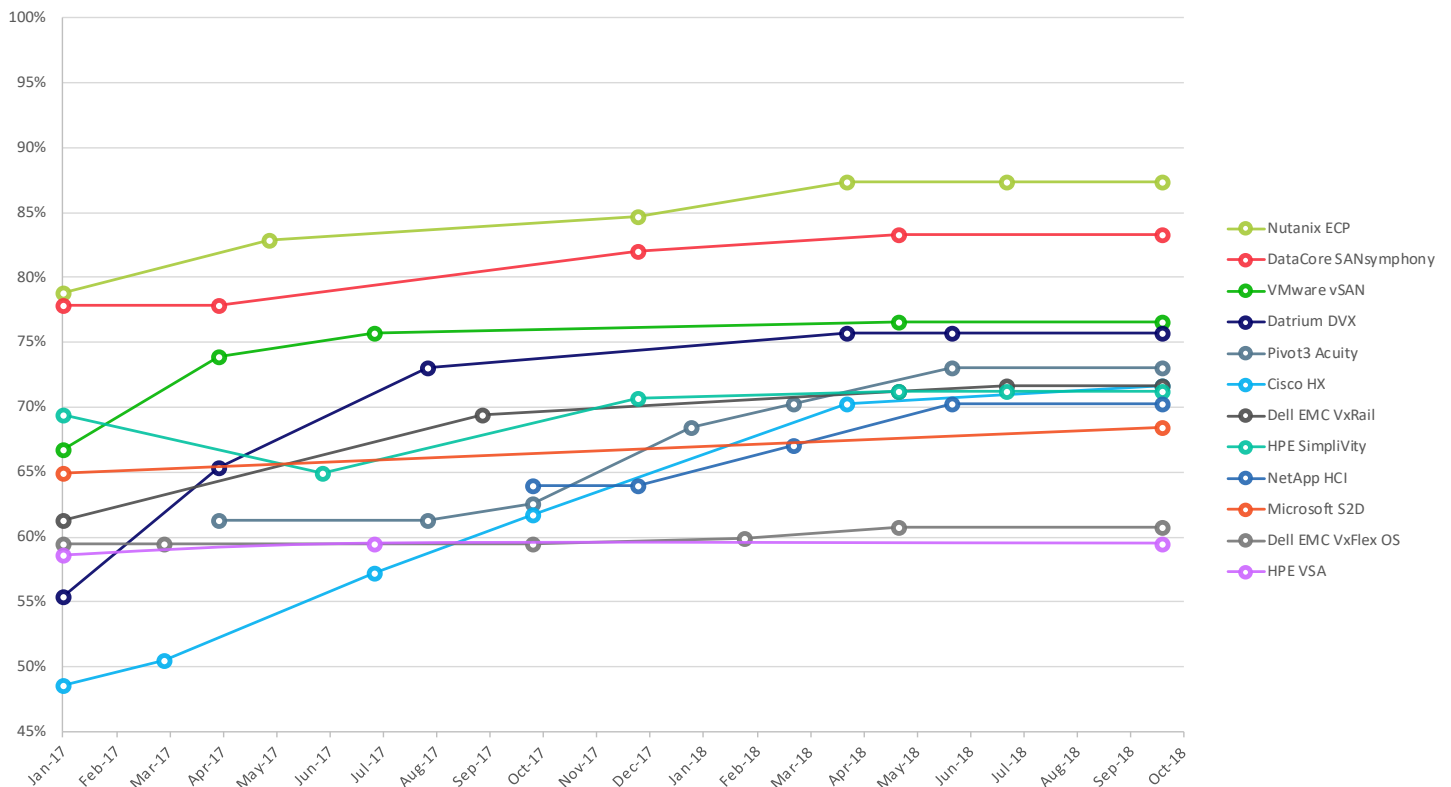
The table below shows the modifications that were made to the comparison's platform listing since the previous SDS/HCI Landscape Report (snapshot date: January 2017).

Platforms Added	Platforms Dropped
DataCore SANsymphony	Atlantis HyperScale (out-of-business)
Datrium DVX	Atlantis USX (out-of-business)
NetApp HCI	HPE Hyperconverged 250 (end-of-life)
Pivot3 Acuity	HPE Hyperconverged 380 (end-of-life)

The following graph provides insight as to how all platforms that are currently included in the WhatMatrix SDS/HCI category have evolved over time. All known historic versions of a platform were re-scored against present evaluation criteria to maintain consistency throughout. Top performers are Cisco HyperFlex, Datrium DVX and Pivot3 Acuity. These platforms have made remarkable progress in the past 22 months. Overall SDS/HCI maturity has increased as most platforms have been able to achieve at least a fair share of enterprise-grade capabilities. Many of the included SDS/HCI platforms are now graded above 70%.

The 70%-mark also clearly identifies the stragglers in our group. Both Dell EMC VxFlex OS and HPE VSA seem to be on their way out in favor of other platforms in the respective vendor portfolios. Microsoft

WhatMatrix Score History by Platform

Storage Spaces Direct (S2D) on the other hand just had its first major update in two years with the release of Windows Server 2019, but has been seemingly unable to make the comeback that was expected.

When compared to last year's landscape report, the pace of innovation is slowing, simmering down from an average of 2.5 releases per year that bring significant improvements, to about 2 releases a year.

Number of Software Releases Jan 2017 - Oct 2018

When compared to last year's landscape report, the pace of innovation is slowing, simmering down from an average of 2.5 releases per year that bring significant improvements, to about 2 releases a year. This is likely an indication that most SDS/HCI platforms have reached a maturity level where they have moved well beyond base functionality and are hitting a proverbial roadblock. From this point onwards innovation is more difficult to attain and needs to be planned more carefully, in part to guarantee the overall stability of the solution.

Customer Base

Obtaining public information on actual customer numbers continues to be a challenge. From its inception the SDS/HCI market has always been populated by a great number of start-up companies and frequently sees the launch of an all-new platform. Furthermore SDS/HCI platforms have always had to battle an already overcrowded market filled with traditional enterprise storage players and solutions. As a consequence, the individual customer base tends to be rather low during the first months or even years, because it takes time before customers start to adopt contemporary technology.

It makes sense that during this time period vendors are hesitant to share customer numbers unless it is absolutely necessary, for example when potential investors demand them. Only when reaching a solid baseline or when companies decide to go public in order to sell stock, does it get more common to share customer numbers.

Of the vendors included in the WhatMatrix SDS/HCI comparison line-up Cisco, HPE, Nutanix and VMware have published customer numbers frequently over the past few years. The diagram below depicts the published customer numbers for these platforms over the course of time.

Throughout 2017 and 2018 both Nutanix and VMware have been very successful in expanding their customer base and are well ahead of the pack. With the 10,000 customer barrier breached by both companies, the sharp rise in customer numbers shows no sign of slowing down. Although Cisco HyperFlex and HPE SimpliVity are lagging far behind in comparison, they do show a steady increase in customer numbers as well. All this seems to be an indication that end-user organizations have broadly accepted SDS & HCI and are willing to adopt the technology for production use cases and running enterprise workloads on top of it.

Key Trends

The overall observation of the last couple of years is that SDS/HCI platform functionality is getting both deeper and broader in scope. The ultimate aim is not only to rival the functionality provided by long establish traditional shared storage solutions, but to surpass them altogether. The years 2017 and 2018 are no exception. There were a lot of compelling new capabilities introduced for the very first time, as well as other capabilities being widely adopted by SDS/HCI vendors. At the same time, though, some capabilities are clearly (still) struggling to gain momentum, whereas some potential capabilities simply did not see the light of day.

Here is a list with trend highlights for 2017/2018:

MAKING A DEBUT

- Meshed architectures
- NVMe in hybrid and all-flash compositions
- Erasure Coding without compromise
- Native end-to-end encryption

FAST ADOPTION RATE

- Support for Hyper-V
- Support for containers and container orchestration platforms
- Native backup/restore features
- Native software-based encryption

STRUGGLING FORWARD

- Support for large-scale storage clusters
- Multi-cloud deployment model
- Storage QoS Guarantees
- Complete native predictive analytics with automated responses

MISSING IN ACTION

- Cloud-inspired purchase models (pay-per-use subscriptions)
- Adoption of an all-encompassing storage performance industry benchmark
- Profiling tools for deduplication benefits

MAKING A DEBUT

Meshed architectures. Meshed architectures combine the flexibility that comes with the dual-layer approach present in traditional storage architectures with the simplicity and scalability that comes with SDS/HCI. The aim is to independently scale compute and storage resources without losing the scale-out advantages of the individual layers. NetApp HCI and Datrium DVX are good examples in this respect.

NVMe in hybrid and all-flash compositions. NVMe is an interface specification developed specifically for NAND flash and next-generation SSDs. This interface leverages existing PCIe technology to efficiently support the growing bandwidth needs of enterprise and client systems. Depending on the specific workload characteristics, tests show NVMe being 2x-6x as fast as SATA, effectively removing a data transfer bottleneck for flash devices. 2018 saw many SDS/HCI platforms actively adopting NVMe as the new caching tier in both their hybrid and all-flash solutions. Vendors, like Cisco, took this even a step further by also introducing All-NVMe configurations.

Erasure Coding without compromise. Although Erasure Coding has already been widely adopted among SDS/HCI platforms, as it is a huge space saver when compared to Replicas, it usually comes at a severe performance penalty. As a consequence, in practice, leveraging Erasure Coding has only been possible in use-cases where performance isn't a priority. This is now starting to change as some new platforms have appeared that have chosen to incorporate Erasure Coding in their core architecture design, fully discarding inefficient Replicas whilst maintaining a high degree of performance. Pivot3 Acuity and Datrium DVX are good examples in this respect.

Native end-to-end encryption. The focus of many SDS/HCI platforms is still data-at-rest encryption and as such do not natively offer support for encryption for data-in-transit. Although most platforms have 3rd party alliances for delivering end-to-end encryption, these services tend to negate the efficiencies of data deduplication and data compression. That is why the first few SDS/HCI vendors have started to incorporate end-to-end encryption services in their platform core architecture design. Datrium DVX is a good example in this respect.

FAST ADOPTION RATE

Support for Hyper-V. Almost every new SDS/HCI platform starts out with exclusively support for the VMware vSphere hypervisor and, in many instances, it stays that way for a very long time. This means that Hyper-V support has been rather scarce. However, all this changed when, in the first half of 2018, Cisco as well as HPE added Hyper-V support for their respective SDS/HCI platforms.

Support for containers and container orchestration platforms. During 2017 multiple SDS/HCI platforms started to offer driver support for persistent storage in Docker containers. It didn't take long for many of these platforms to extend their support to the Kubernetes container orchestration platform. Things are moving fast here, as the first few platform vendors have already started their journey towards a fully-integrated container eco-system. Cisco HyperFlex is a good example in this respect.

Native backup/restore features. Offering Backup/Restore features that have been fully integrated into the platform has seemingly become the norm for new platform arrivals. However, this still leaves existing platforms that initially chose to rely entirely on 1st or 3rd party vendor support. Some of these vendors have now actively started to work on remedying the situation. A good example of this is VMware vSAN in this respect.

Native software-based encryption. 2017/2018 saw an increased focus on security and compliance from the entire IT industry. This first led to more SDS/HCI platforms offering support for self-encrypting drives (SEDs). The second wave, however, clearly shows SDS/HCI platforms adding compliancy-validated encryption capabilities to their software. Good examples in this respect are Nutanix ECP and VMware vSAN.

STRUGGLING FORWARD

Support for large-scale storage clusters. Although SDS/HCI vendors have implemented amazing functionality over the last few years, they still haven't made giant leaps with regard to scalability. On average the maximum storage cluster size is still about 16 storage nodes, and stretched clusters often cannot move beyond a 32 node-setup. This raises the question whether vendors are just being careful or that many SDS/HCI core architectures simply do not allow for massive scale-out?

Multi-cloud deployment model. Today public clouds are mostly leveraged as a remote repository for backup data. Save for one early adopter (VMware on AWS) none of the SDS/HCI vendors have so far put their software-based storage controllers in native public cloud environments. The benefits are clear, as this would allow for full-blown DR-scenarios where public cloud is leveraged as a true second data center. Moreover, in the future this would pave the way for migrating entirely to public cloud without losing the added-value of the adopted storage technology.

Storage QoS Guarantees. Nowadays end-user organizations are mixing performance-intensive mission-critical, critical and non-critical workloads in SDS/HCI storage environments, and although technology has evolved, performance still remains limited in supply. Thus it becomes increasingly important to be able to guarantee that performance requirements for crucial workloads are met at all times. With a few noteworthy exceptions (NetApp, Pivot3 and Microsoft), SDS/HCI vendors in general are either not leveraging any Storage QoS capabilities at all, or are merely providing configuration settings that limit performance.

Complete native predictive analytics with automated responses. With Machine Learning / Artificial Intelligence (ML/AI) finding its way into every layer and crevice of IT, this also provides many opportunities for leveraging it in all stages of the storage management life-cycle. We've only seen the first steps in that direction though, mostly visible in hardware health monitoring and self-healing capabilities.

MISSING IN ACTION

Cloud-inspired purchase models (pay-per-use subscriptions). This is a trend we already mentioned last year, but still holds true. Although most SDS/HCI vendors aim to bring many of the public cloud benefits to the datacenter, at the same time the commercial model has, strangely enough, remained very traditional. Most vendors still only have buy-and-maintain options available instead of offering pay-per-use options. And where these are available, they are only accessible for service providers and not for end-user organizations.

Adoption of an all-encompassing storage performance industry benchmark. End-user organizations that would like to compare apples with apples, are still looking for a solid way to do so today. Although there are many benchmarking tools available, only the one catered for VDI-specific use-cases (LoginVSI) has achieved industry-wide adoption. There was a flicker of light when many of the leading storage vendors joined forces to create a benchmarking tool specifically tuned to SDS/HCI. The resulting TPC Express Benchmark HCI (TPCx-HCI) was officially released in September 2017. However, now - a full year later - still no results have been published.

Profiling tools for deduplication benefits. With all-flash fast on its way to becoming the 'de facto standard' in storage compositions, data reduction techniques are evolving into key ingredients that can keep storage costs within acceptable margins. As such, deduplication and compression are now often default variables in storage designs. However, the benefit of dedupe and compression largely depends on the specific data set characteristics of an end-user organization and can, therefore, vary considerably. In order to create some peace of mind some vendors have started to provide some basic "guarantees", however end-user organizations would really benefit from a profiling tool that is able to scan their data and calculate the expected savings upfront.

Vendor and Platform Profiles

This section provides an overview of each storage platform, including how vendors describe themselves, WhatMatrix's assessment of their performance against our focus area criteria, as well as our thoughts and impressions. Each profile includes a spider plot of their ratings in each of the capability areas described in the Scope of Report section above. This is intended as an easy to understand visual, showing areas of relative strength and weakness.

Cisco HyperFlex

Founded in 1984, Cisco Systems is based in San Jose, California, United States. Early in 2016 Cisco exclusively partnered with SDS startup SpringPath to bring about the HyperFlex HCI platform. In September 2016 Cisco officially completed the acquisition of SpringPath in order to solidify the platform's core technology. The current product is HyperFlex v3.5.

What the Vendor Says

HyperFlex provides unification of compute, storage, and networking with cloud management. The HyperFlex Data Platform is a high-performance, extensible distributed file system that supports multiple hypervisors with a wide range of enterprise-grade data management and optimization services. HyperFlex is engineered on the Cisco UCS platform. It is part of a datacenter architecture that supports traditional, converged, and hyperconverged systems with common policies and infrastructure management.

Observations

Cisco's acquisition of SpringPath late 2016 was a clear endorsement of its product capabilities and approach. SpringPath was one of the SDS start-ups that decided to build a distributed filesystem architecture entirely from scratch to guarantee a solid foundation for performance and scalability.

Recent HyperFlex workload and cloud innovations show Cisco's dedication to expand well beyond its own boundaries, making HyperFlex an interesting product and not just for Cisco shops.
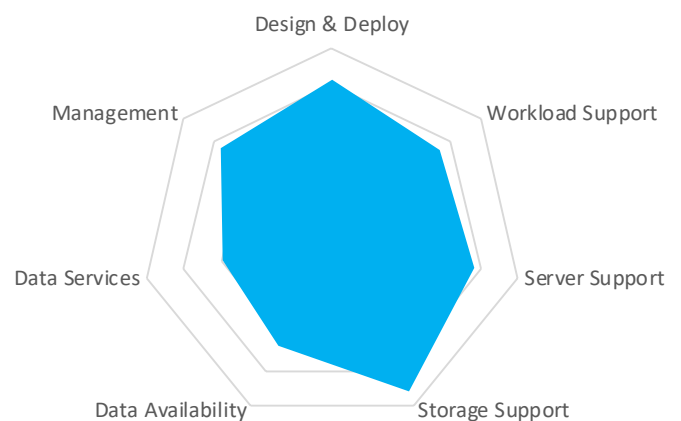
WhatMatrix Assessment

HyperFlex is a solid overall performer, strengthened by Cisco in all areas with each new release. It receives good grades for most areas and is starting to become particularly strong when it comes to supporting modern enterprise application workloads. The 3.5 release alone adds improved support for Kubernetes, AI/ML and the SAP Data Hub.

Not surprising given its parentage, HyperFlex has strong Cisco ties, but doesn't stop there. Citrix, NVIDIA and Google are among the close partnerships that Cisco is currently investing in.

While the platform does provide a decent set of data services, Storage Quality of Service (QoS) and File Services are still unaccounted for. The same can be said about data availability, where up till now HyperFlex hasn't provided native backup/restore capabilities. Apart from this the only missing piece in Workload Support is the lack of connectivity for bare metal platforms.

Cisco HyperFlex v3.5

DataCore SANsymphony

Founded in 1998, DataCore is headquartered in Fort Lauderdale, Florida, United States. Their current SDS offering is SANsymphony v10.0 PSP7 U2, which is the company's only product next to Hyperconverged Virtual SAN, which also fits the SDS classification and is built on the SANsymphony foundation.

What the Vendor Says

DataCore SANsymphony is an enterprise-class platform that provides a high-performance, highly available, and agile storage infrastructure with the lowest Total Cost of Ownership (TCO).

SANsymphony infrastructure software takes isolated storage devices, sometimes spread between different locations, and places them under one common set of enterprise-wide services. It pools their collective resources, managing them centrally and uniformly despite the differences and incompatibilities among manufacturers, models and generations of equipment in use.

Observations

Despite having a lot going for it as well as having an extensive track record and broad customer base, DataCore is still a relatively small company that appears to suffer from a lack of brand awareness. SANsymphony's strong suit is undoubtedly the extended flexibility and with it the numerous use-cases that the platform can serve. However, these strong points could also prove to be its Achilles' heel if customers instead are looking for best-of-breed platforms to suit just one or two particular use-cases.
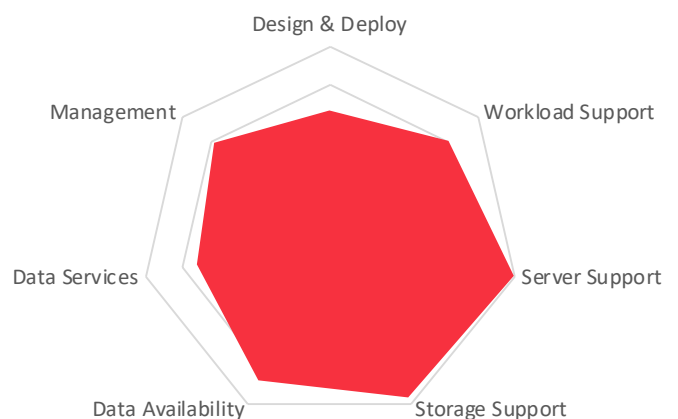
WhatMatrix Assessment

SANsymphony has long held a top spot in our SDS/HCI leaderboard. SANsymphony can be regarded as pure SDS, providing extreme flexibility when it comes to server- and storage hardware choice.

The product supports all major hypervisors as well as a wide range of bare metal platforms. Furthermore, the product can be deployed in a single layer or a dual layer fashion. In the latter case SANsymphony exclusively serves storage to external compute hosts.

With the obvious exception of Microsoft Storage Spaces Direct, SANsymphony is about the only SDS platform that has been built on top of the Windows Server OS. This explains the tight integration and why it is able to leverage native Windows functionality such as its File Services and Data Efficiency features. Although there aren't really many big caveats, the lack of true native capabilities means that some of the features can only be considered mediocre when stacked up against the competition.

DataCore SANsymphony v10.0 P7U2

Radar chart with axes: Design & Deploy, Workload Support, Server Support, Storage Support, Data Availability, Data Services, Management

Datrium DVX

Founded in 2012, Datrium is headquartered in Sunnyvale, California, United States. Their storage offering is aptly named Distributed Virtual Everything (DVX), which has been the company's sole product to date. The first iteration of the platform was released at the start of 2016. The current product version is v4.0.3.0.

What the Vendor Says

Datrium DVX is Open Converged Infrastructure (OCI), a new breed of convergence with two tiers. It blends the mission critical scale of SAN with the simplicity of HCI, and combines low latency All-Flash Array (AFA) performance with cost-effective invisible backup. Datrium DVX maintains the control you have on-premises while gaining the agility of the public cloud. It provides primary data in local host flash, simple at scale, always-on efficiency and security, and integrated backup and disaster recovery with optional cloud DR.

At the heart of Datrium DVX is powerful DVX Software that simplifies management, scales the system with improving performance, and simplifies all cloud data management including scalable local, remote and cloud backup, and delivers the economics only available from a new breed of convergence.

Observations

By taking a completely different approach to SDS/HCI, Datrium DVX has been an intriguing addition to the comparison to say the least. We do admire the start-up's out-of-the-box mentality, but are also aware that it requires end-users to re-think what they nowadays consider to be normal and innovative, which could get quite confusing. However, in the end it's up to the market to decide which architecture they like best.
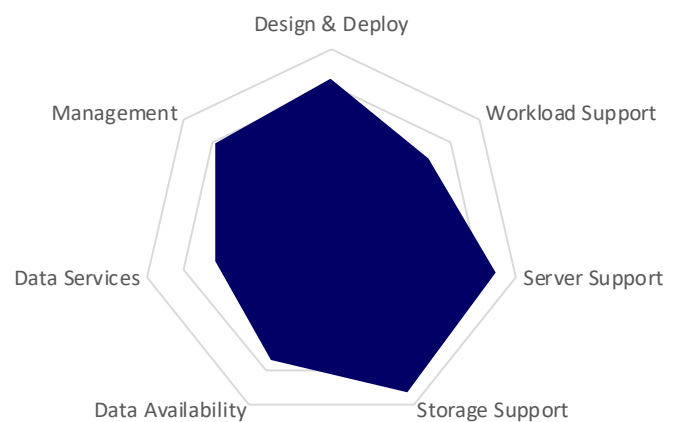
WhatMatrix Assessment

Datrium DVX is a relatively new offering that distinguishes itself by its core foundational choices. Datrium DVX can be best described as a mesh between traditional enterprise storage robustness, SDS flexibility and HCI simplicity, using the best each architecture has to offer.

The product is deployed purely in a dual layer fashion. This means that Datrium DVX storage nodes exclusively serve storage to separate compute hosts. However, to allow for synergy Datrium has moved the storage intelligence all the way up to the compute hosts by providing a driver in each host that leverages local flash drives to keep data always close to the source. The distributed approach leads to massive performance. Datrium DVX has been maturing quite rapidly when you consider the growing feature set, but being a relatively fresh product means Datrium DVX at present does not encompass some of the advanced capabilities already found elsewhere, such as Stretched Clustering, QoS mechanisms and File Services.

Datrium DVX v4.0.3.0

Radar chart with axes: Design & Deploy, Workload Support, Server Support, Storage Support, Data Availability, Data Services, Management

Dell EMC is the result of a 2016 merger between Dell and EMC. The company is headquartered in Hopkinton, Massachusetts, United States. Halfway through 2013 EMC acquired the SDS start-up ScaleIO and, with it, their Elastic Converged Storage (ECS) solution. In 2018 the ScaleIO product family was re-branded to VxFlex OS (SDS) and VxFlex Ready Node (HCI) respectively. The current product version is VxFlex OS v2.6.

What the Vendor Says

Dell EMC VxFlex OS is scale-out software-defined storage (SDS) purpose built to help IT organizations transform their block storage infrastructure at their own pace. It enables customers to operate their datacenter with the efficiency of a web-scale company, regardless of the size of their organization, in the most efficient and cost effective way possible.
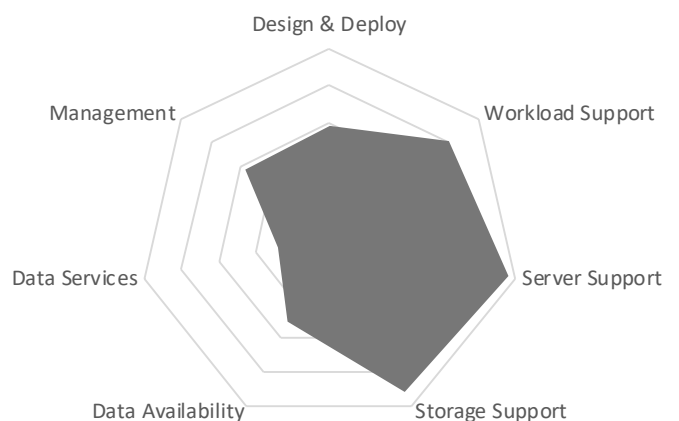
Observations

Because Dell EMC is a storage company by heart and has a portfolio that runs both wide and deep, there is a natural tension as to which products are favored to receive attention and which ones are not. In May 2017 Dell EMC announced ScaleIO 3.0, dubbed ScaleIO.Next, a new major version that would address most, if not all, of the observed gaps. The worldwide release that was originally slated for the second half of 2017, curiously enough, never happened. With no serious platform innovation happening since 2016, Dell EMC seems to have left VxFlex OS - as well as its end-users - stuck in limbo, with an uncertain future ahead. We can only wait and see what fate ultimately lies in store for this once great software defined storage solution.

WhatMatrix Assessment

VxFlex OS, or rather ScaleIO, was developed with three things in mind: massive scale, extreme performance and unparalleled flexibility. Up until today this is reflected in the WhatMatrix scores. The product can be considered pure SDS, as it is hardware agnostic except for the x86 requirement. Furthermore, the solution can be deployed in either a single layer or a dual layer fashion. All major hypervisors are supported, as well as many bare metal platforms and even containers.

While VxFlex OS certainly shows considerable strength in some areas, it is seriously lacking in others. First of all there are hardly any data services available. By today's standards it is rare to find a solution that does not sport any data efficiency features like deduplication and compression. Secondly, the data availability area hasn't matured much over the years. VxFlex OS still depends on other products to provide remote replication and backup/restore capabilities, and support for stretched clustering also remains absent.

Dell EMC VxFlex OS Enterprise v2.6

Dell EMC VxRail

Dell EMC is the result of a 2016 merger between Dell and EMC. The company is headquartered in Hopkinton, Massachusetts, United States. VxRail is the follow-up to EVO:RAIL, and became generally available in February 2016. At first the HCI solution was brought to market by VCE, a venture between VMware, Cisco and EMC. After the merger VxRail soon became part of the Dell EMC portfolio and the company instantly switched from Quanta to Dell server hardware. The current product version is v4.5.225.

What the Vendor Says

As the only fully integrated, preconfigured, and pre-tested VMware hyper-converged infrastructure appliance family on the market, VxRail dramatically simplifies IT operations, accelerates time to market, and delivers incredible return on investment. Powered by VMware vSAN and Dell EMC PowerEdge servers, VxRail delivers continuous innovation with future-proof performance, predictably transforms with next-gen simplicity, and creates certainty with hardened security advancements. VxRail meets any HCI use case, including support for the most demanding workloads and applications.
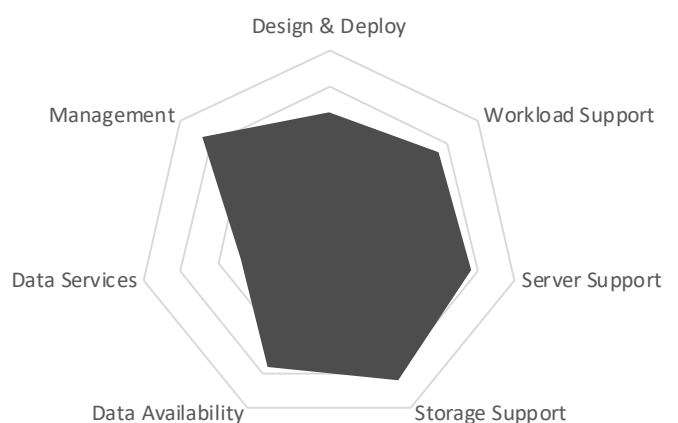
Observations

VMware learned a lot from its EVO:RAIL outing and put these findings to good use when developing VxRail. The product feels solid throughout, but could still up its game by adding missing features. The fact that Dell (servers), EMC (storage) and VMware (virtualization) have strong ties should speed up innovation and integration cycles. In addition Dell EMC could benefit from the existing vSphere customer base.

WhatMatrix Assessment

VxRail provides pre-defined building blocks that are optimized for vSAN, and focuses on simplifying management during the entire lifecycle. In short VxRail Manager helps to deploy, update, monitor and maintain the solution stack. VxRail has done a good job covering at least five of the WhatMatrix Focus areas, and, together with vSAN, it has been able to accumulate an impressive customer base of over 15,000 organizations.

However, from an innovation standpoint VxRail always seems to be a step behind its software-only counterpart. Although vSAN v6.7 has been out for some time now, VxRail is still running vSAN v6.6.1. The lag means that the latest capabilities introduced since vSAN v6.7 are still out of reach for VxRail end-users. On top of that VxRail - as well as vSAN - still lack some native Data Services and Data Availability features. Despite the fact that most of these are currently being covered by other products in VMware's portfolio, they can surely be improved upon since they don't really integrate with vSAN. If VMworld 2018 was any indication, VMware is aware of this and already hard at work to close at least some of these gaps over the course of the next year.

Dell EMC VxRail v4.5.225

Radar chart with axes: Design & Deploy, Workload Support, Server Support, Storage Support, Data Availability, Data Services, Management

Hewlett Packard Enterprise (HPE) was founded late 2015 as part of splitting off the Hewlett-Packard company, and is headquartered in Palo Alto, California, United States. HPE acquired SimpliVity in January 2017 to bolster its SDS/HCI portfolio. By validating SimpliVity to run on HPE ProLiant server hardware, the HPE SimpliVity 380 platform was born. In July 2018 the SimpliVity product family saw its first expansion with the HPE SimpliVity 2600, which introduced a small form-factor as well as a software-only approach to deduplication/compression. The current software version for both HPE SimpliVity 380 and 2600 is v3.7.5.

What the Vendor Says

HPE SimpliVity combines IT infrastructure and advanced data services into a single, integrated all-flash solution at a fraction of the cost of traditional and public cloud offerings. With HPE SimpliVity an organization gains VM management and mobility, built-in backup and DR, and game-changing data efficiency. HPE SimpliVity is engineered specifically to run virtualized applications for a variety of workloads and is simple enough to be executed by almost anyone.
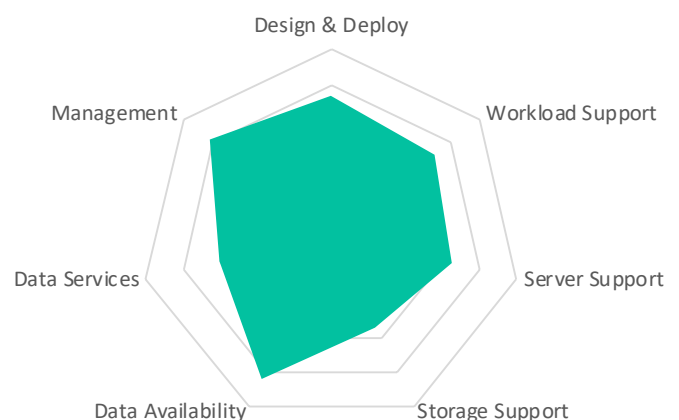
Observations

HPE has clearly positioned SimpliVity as their primary SDS/HCI platform, after having declared both Hyper Converged offerings (HC250, HC380) end-of-life and having all but halted the innovation cycle of its software-only offering, HPE StoreVirtual VSA. Nevertheless, there's still the natural tension within HPE's storage portfolio that needs to be considered. There's traditional enterprise storage led by 3PAR, SDS/HCI led by SimpliVity, and a Composable Infrastructure platform labeled Synergy.

WhatMatrix Assessment

HPE SimpliVity does many things well, but really excels in the Data Availability area, which has been a core driver since the platform's inception. HPE SimpliVity was one of the first HCI platforms on the enterprise market to provide mature integrated backup capabilities. It is also one of the few companies to devise its own disaster recovery and orchestration platform for vSphere environments, called RapidDR. Since HPE SimpliVity's primary focus has been on the virtualization admin, it is also a platform that is quite easily to manage and operate.

In contrast HPE SimpliVity's score for Data Services is below average, mainly due to the absence of Storage QoS and File Services. Because HPE SimpliVity exclusively focuses on virtualization platforms and all-flash, the product also obtains only average scores in Design & Deploy and Storage Support.

HPE SimpliVity 380 v3.7.5

HPE StoreVirtual VSA

Hewlett Packard Enterprise (HPE) was founded late 2015 as part of splitting off the Hewlett-Packard company, and is headquartered in Palo Alto, California, United States. Before the separation, however, Hewlett-Packard already had a long track record in enterprise storage. In 2008 HP acquired Lefthand Networks and, with that company's core technology, developed a software-only storage solution named StoreVirtual Virtual Storage Appliance (VSA) that was released to the public in the second half of 2012.

What the Vendor Says

HPE StoreVirtual VSA uses scale-out, distributed clustering to provide a pool of storage with enterprise storage features and simple management at reduced cost. Versatile and reliable, the HPE StoreVirtual family provides affordable storage for a virtualized infrastructure. HPE StoreVirtual VSA transforms a server's internal or direct-attached storage into a scalable, shared storage array, without dedicated storage. Software-defined storage controller software enables end-users to run enterprise-class storage features on the same set of hardware that also runs the application workload.
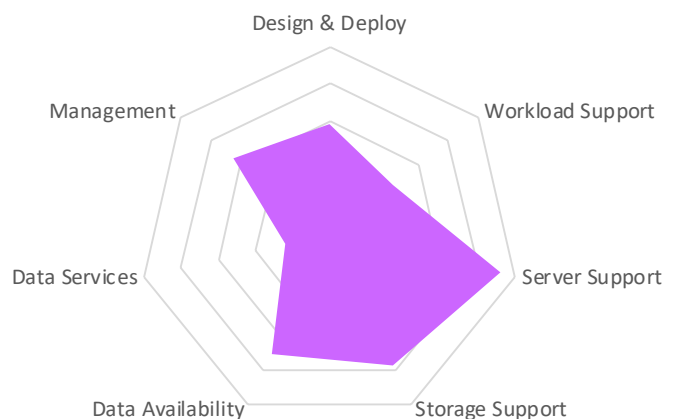
Observations

Now that HPE has positioned SimpliVity as their flagship SDS/HCI platform going forward, HPE StoreVirtual VSA seems to slowly approach the end of its product lifecycle. Both of HPE's StoreVirtual VSA-based HCI offerings (HC250, HC380) received an end-of-life announcement late February 2018. Seeing that HPE has all but halted the innovation cycle of its software-only platform, also points in that very direction.

WhatMatrix Assessment

For a long time HPE StoreVirtual VSA was among the frontrunners of SDS. By today's SDS/HCI standards, however, HPE StoreVirtual VSA has become quite an under-achiever. Despite providing flexible server and storage support, as well as a good set of Data Availability capabilities, the bad definitely starts to outweigh the good.

HPE StoreVirtual VSA is seriously lacking in the Data Services department, with native Deduplication/ Compression, Storage QoS, Data Encryption and File Services features being non-existent. While the platform has been validated for the latest versions of vSphere and Hyper-V, the storage platform technology itself has not seen any real innovation in over two years now. This also means that, for instance, there's no official support for emerging workloads such as containers.

HPE StoreVirtual VSA v12.7

Microsoft Storage Spaces Direct

Microsoft was founded in 1975 and is based in Redmond, Washinghton, United States. Microsoft introduced its first storage product, Storage Spaces, in Windows Server 2012. Having learned from customer experiences and having kept track of the overall SDS/HCI architecture evolution, Microsoft released its subsequent storage product, Storage Spaces Direct (often abbreviated to S2D), to market in October 2016 as an integral part of Windows Server 2016 Datacenter. The second iteration of Storage Spaces Direct just arrived with the release of Windows Server 2019. This version is therefore dubbed v2.0.

What the Vendor Says

Microsoft Storage Spaces Direct uses industry-standard servers with local-attached drives to create highly available, highly scalable software-defined storage at a fraction of the cost of traditional SAN or NAS arrays. Its converged or hyper-converged architecture radically simplifies procurement and deployment, while features such as caching, storage tiers, and erasure coding, together with the latest hardware innovations such as RDMA networking and NVMe drives, deliver unrivaled efficiency and performance.

Observations

Microsoft Storage Spaces Direct was a big improvement over Storage Spaces. However, since its initial release Microsoft's storage platform has not evolved as much as one would hope. Although Microsoft Windows Server 2019 does bring some new and improvement capabilities to the table, the product still lags behind in terms of innovation. The company's public cloud-first strategy could be part of the reasons why.
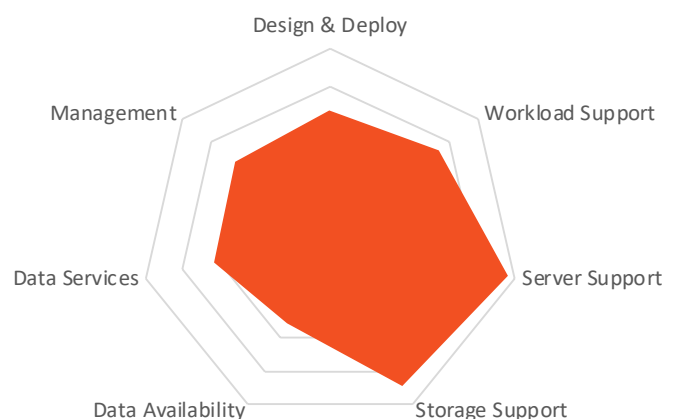
WhatMatrix Assessment

With Storage Spaces Direct Microsoft conformed to the standard that was set by leading SDS/HCI platform vendors. Because of the software-only approach, the product does especially well in the Server Support and Storage Support departments by providing flexibility and choice to end-users. Because the product in part integrates with the Microsoft technology stack and is highly programmable, S2D also manages to deliver at least a basic set of capabilities in most other focus areas.

At the same time Storage Spaces Direct still shows room for improvement in multiple areas. The product particularly falls short in Data Availability and Data Services. S2D does not have any native snapshot capabilities and there are still no stretched clustering options. Although Microsoft now supports the operating system's deduplication capabilities for the ReFS filesystem, they are certainly not the strongest around. Lastly, because S2D is completely tied to the Microsoft stack, it offers less maneuverability.

Microsoft S2D v2.0

Radar chart with axes: Design & Deploy, Workload Support, Server Support, Storage Support, Data Availability, Data Services, Management.

NetApp HCI

Founded in 1992, NetApp is based in Sunnyvale, California, United States. NetApp officially completed its acquisition of SolidFire in February 2016 and chose to leverage the already cultivated SDS solution as the core of a to-be-built HCI platform. NetApp HCI was released in October 2017. The current version is v1.3.

What the Vendor Says

NetApp HCI is the cornerstone of a private cloud strategy and provides a hyper converged solution capable of transforming and empowering the organization so you can move faster, drive operational efficiency, and reduce costs. NetApp HCI easily runs multiple applications with the predictable performance that are demanded by the enterprise and customers. The platform scales compute and storage resources independently so you never use more than you need. NetApp HCI can be deployed in minutes with a turnkey cloud infrastructure that eliminates the complex management of traditional three-tier architectures.
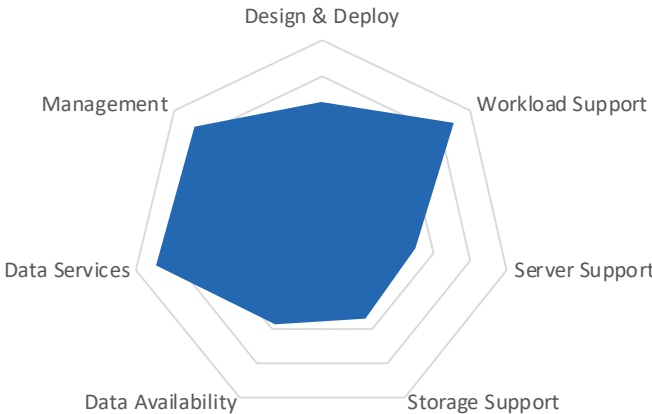
Observations

NetApp HCI is a relatively new kid on the block, but is powered by a 10th generation SDS solution and has made some rapid improvements between its inception and today. Although the architecture breaks with the traditional rules concerning SDS/HCI, at the same time it brings different advantages to the table, offering end-users extra choice. Furthermore, it is interesting to see how NetApp will position its HCI solution in the long term when compared to FAS, its long-standing enterprise storage platform.

WhatMatrix Assessment

NetApp HCI is the youngest platform in the current comparison lineup and can be best described as a mesh between SDS flexibility and HCI simplicity, using the best these two architectures have to offer and, by doing so, avoiding some of the disadvantages of each.

The product is deployed purely in a dual layer fashion. This means that SolidFire storage nodes exclusively serve storage to a separate layer of compute hosts. Unity is the driving force behind NetApp HCI, and is provided by an intelligent deployment engine that combines several products from NetApp's technology stack into a single manageable platform. NetApp HCI is particularly strong in the Data Services area, because it incorporates NetApp ONTAP Select for delivering file services. Relative weak spots of the platform are currently Storage Support, Server Support and Data Availability. There are no hybrid (SSD+HDD) configurations and there are only select node configurations to choose from. In the Data Availability section the platform lacks Stretched Clustering support and, at this time, does not have a way to intelligently tackle block and rack failures.

NetApp HCI v1.3

Nutanix Enterprise Cloud Platform

Nutanix was founded early 2009 and is based in San Jose, California, United States. The company began to ship its first Hyperconverged Infrastructure (HCI) solutions in 2011. It has several times rebranded its storage platform name due to strategic roadmap decisions that broadened the scope and depth of the product. Since 2016 the solution is called Enterprise Cloud Platform (ECP), referring to the platform's evolution from an intelligent scale-out storage product to a hybrid cloud ecosystem where Nutanix is also responsible for co-developing many surrounding offerings. The current version of the core platform is v5.9.

What the Vendor Says

The Nutanix Enterprise Cloud Platform (ECP) eliminates the need for traditional SAN and NAS solutions by employing a highly distributed software architecture. It delivers a rich set of software-defined services that are entirely VM-centric, including snapshots, high availability, disaster recovery, deduplication and more.

Nutanix Acropolis combines compute, storage, networking, virtualization, and much needed data protection and security capabilities into a hyperconverged solution that powers your enterprise cloud. Eliminate storage silos, expensive virtualization technology, and dedicated management. Achieve operational agility while retaining your ability to choose your hardware and virtualization technology.
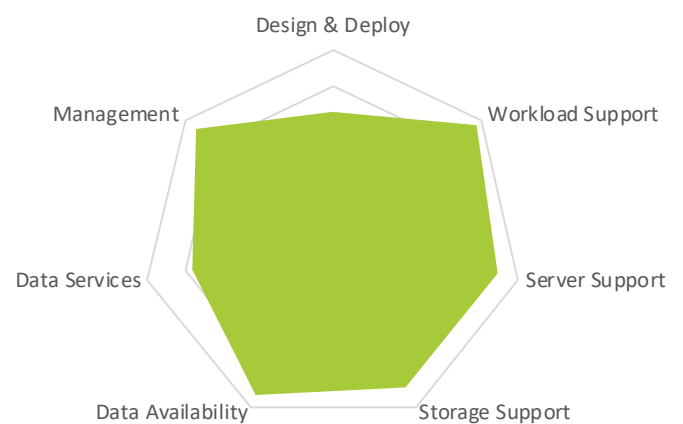
Observations

Up till now Nutanix has made good on its vision and promise of delivering a private cloud ecosystem. However, as Nutanix continues to add functionality to ECP's already impressive array of capabilities, the solution is bound to get even more complex and that could ultimately also hurt innovation speed. If so, it stands to reason whether, at some point, Nutanix will shift its focus entirely to its own hypervisor, AHV.

WhatMatrix Assessment

In the previous landscape report Nutanix ECP already claimed the number 1 position and this is still true in today's overall leaderboard. The platform performs very well in most focus areas, showing its rich set of storage and data services.

There is a drawback to this though. Yes, Nutanix ECP is able to meet many different use-cases, but each requires specific design choices in order to reach an optimal end-state. This is not limited to choosing the right building blocks and the right software edition, but extends to the use (or non-use) of some of its core data protection and data efficiency mechanisms. In addition, the end-user's hypervisor choice prohibits the use of some advanced functionality as these are only available on Nutanix's own hypervisor, Acroplis Hypervisor (AHV).

Nutanix ECP Ultimate v5.9

Pivot3 Acuity

Founded in 2002, Pivot3 is based in Austin, Texas, United States. Pivot3 is one of the few companies that pioneered the HCI realm long before HCI became a term and a hype. Early 2016 Pivot3 acquired external storage system company NexGen Storage and, with it, its mature N5 operating system that leveraged strong storage QoS capabilities. Pivot3 successfully combined the N5 OS with its own vSTAC OS into a new software stack called Acuity. Pivot launched the Acuity Datacenter appliances in April 2017. The company unified the code base for all its appliances in July 2018 by also levering Acuity for its highly-performant video surveillance appliances. The current product version is v10.4.

What the Vendor Says

Optimized to streamline IT operations, the Pivot3 Acuity Datacenter Series is architected for performance, scale and simplicity with NVMe flash and policy-based intelligence for confidently supporting multiple application workloads on-premises and the flexibility to easily integrate with public clouds.

With Pivot3 Acuity IT can confidently consolidate a broader set of workloads on a single infrastructure platform and deliver guaranteed performance to the applications that power the business.

Observations

Pivot3 has a long track record when it comes to HCI. The company has been delivering video surveillance storage and processing appliances since 2008, continuously refining its HCI platform along the way. Pivot3's recent strategic choice to build its product portfolio on a single code base, shows a clear path for Acuity and future roadmaps. Pivot3 Acuity Datacenter is quite innovative and should be able to appeal to many.
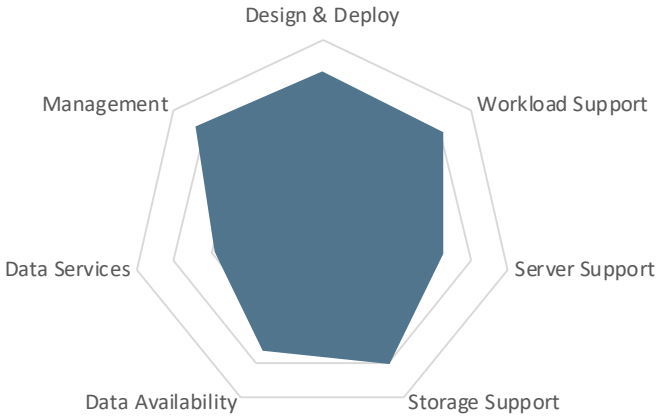
WhatMatrix Assessment

Pivot3 Acuity's technology architecture differs from others in that each storage cluster has two Accelerator nodes that leverage NVMe PCIe for buffering and mirroring writes. The Acuity Datacenter platform has been primary designed for hosting virtualized enterprise workloads. Overall Pivot3 Acuity is a capable platform that performs quite well in multiple areas, but really excels with two market-leading features: a performance guaranteeing QoS system and a highly-efficient patented Erasure Coding algorithm.

In some areas Pivot3 Acuity can still improve its set of capabilities. With regard to Data Services the storage platform currently does not sport any integrated features for Data Encryption and File Services. In addition, Acuity does not (yet) support stretched cluster configurations for enhancing Data Availability.

Pivot3 Acuity Datacenter v10.4

Design & Deploy · Workload Support · Server Support · Storage Support · Data Availability · Data Services · Management

VMware vSAN

VMware was founded in 1998 and is based in Palo Alto, California, United States. VMware introduced its first storage product, Virtual SAN, in 2014 as part of the vSphere v5.5 hypervisor software. Virtual SAN was later rebranded to vSAN. In 2015 VMware released major updates in the second iteration of its SDS product. Close to the end of 2016 the third iteration was released. The current version is vSAN v6.7.

What the Vendor Says

VMware vSAN helps organizations evolve their datacenter without risk, control IT costs and scale to address tomorrow's business needs. VMware vSAN 6.7 delivers flash-optimized, secure shared storage with the simplicity of an experience native to VMware vSphere for all your critical virtualized workloads. vSAN 6.7 runs on industry-standard x86 servers and components that help lower TCO by up to 50% versus traditional storage. It delivers the agility to easily scale IT with a comprehensive suite of software solutions and offers the first native software-based, FIPS 140-2 validated HCI encryption.
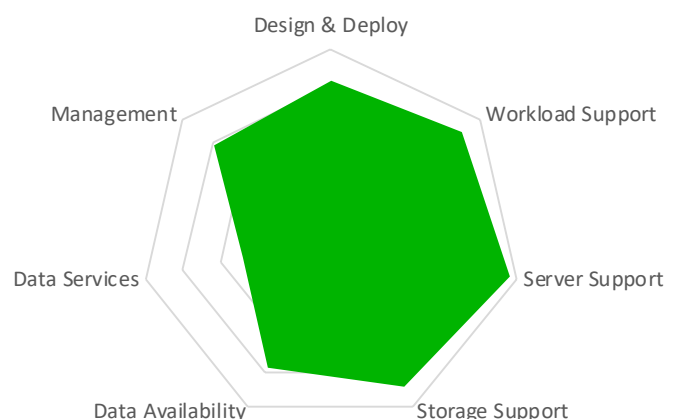
Observations

VMware vSAN is an integral part of both the VMware Software Defined Datacenter (SDDC) and the VMware Cloud Foundation. This means that vSAN makes perfect sense for end-users that plan on building a hybrid cloud stack that is 100% based on VMware technology. At VMworld, August 2018, VMware also demonstrated that it is actively working on closing the File Services and Backup/Restore gaps.

WhatMatrix Assessment

With vSAN, VMware aims to deliver an enterprise storage solution that can be governed by VMware vSphere administrators. Because of the software-only approach, the product performs admirably in the Server Support and Storage Support departments by providing flexibility and choice to end-users. A high degree of manageability is attained by having all operational storage tasks performed through easy-to-understand policies and interfaces. Also vSAN has been integrated well in other parts of the VMware SDDC stack.

Although VMware vSAN has most Data Services covered, some of these, such as Deduplication and Storage QoS, are relatively limited in functionality and/or scope. The existing constraints need to be considered when designing a complete solution. In addition vSAN 6.7 does not natively provide File Services and Backup/Restore functionality as of yet. Lastly, because vSAN is completely tied to the VMware hypervisor, it offers less maneuverability to end-users, both operationally (upgrades) and tactically.

VMware vSAN Enterprise v6.7

Design & Deploy, Workload Support, Server Support, Storage Support, Data Availability, Data Services, Management

Platform Comparison

As of October 2018, the SDS & HCI category comparison evaluates vendor products across a total of 115 features spanning the seven focus areas described in the Scope of Report section above.

Landscape Matrix

The Landscape Matrix visualizes the technical ranking of all evaluated platforms in the technology landscape.

The y-axis represents the overall technical capability determined by the "total score" generated by all technical evaluation features in the comparison matrix. (Higher=Better)

The x-axis visualizes leadership in listed focus areas i.e. in subset(s) of evaluation features that focus on a certain use case (specialty).

SDS & HCI Landscape Matrix 2018

Evaluation Data

This table summarizes the scores generated by the evaluation, including score by focus area and total score.

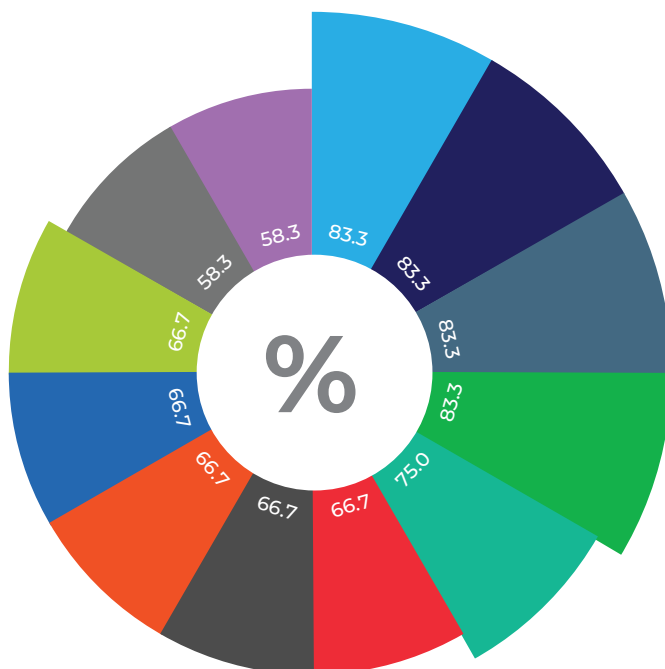| Vendor Platform	Design & Deploy	Workload Support	Server Support	Storage Support	Data Availability	Data Services	Manage-ment	Overall
Cisco HyperFlex v3.5	83.3%	73.1%	76.9%	92.3%	65.5%	58.7%	75.0%	**71.6%**
DataCore SANsymphony v10.0 P7U2	66.7%	80.8%	100.0%	96.2%	86.2%	71.7%	78.6%	**83.3%**
Datrium DVX v4.0.3.0	83.3%	65.4%	88.5%	92.3%	74.1%	63.0%	78.6%	**75.7%**
Dell EMC VxFlex OS Enterprise v2.6	58.3%	80.8%	96.2%	92.3%	50.0%	28.3%	57.1%	**60.8%**
Dell EMC VxRail v4.5.225	66.7%	73.1%	76.9%	84.6%	75.9%	47.8%	85.7%	**71.6%**
HPE SimpliVity 380 v3.7.5	75.0%	69.2%	65.4%	53.8%	84.5%	60.9%	82.1%	**71.2%**
HPE StoreVirtual VSA v12.7	58.3%	42.3%	92.3%	76.9%	70.7%	23.9%	64.3%	**59.5%**
Microsoft S2D Datacenter v2.0	66.7%	73.1%	96.2%	88.5%	51.7%	63.0%	64.3%	**68.5%**
NetApp HCI v1.3	66.7%	88.5%	50.0%	53.8%	56.9%	89.1%	85.7%	**70.3%**
Nutanix ECP Ultimate v5.9	66.7%	96.2%	88.5%	88.5%	93.1%	76.1%	92.9%	**87.4%**
Pivot3 Acuity Datacenter v10.4	83.3%	80.8%	65.4%	80.8%	72.4%	58.7%	85.7%	**73.0%**
VMware vSAN Enterprise v6.7	83.3%	88.5%	96.2%	88.5%	77.6%	47.8%	78.6%	**76.6%**

Design & Deploy

The Design & Deploy focus area measures the design, evaluation and deployment aspects pertaining the storage platform. Evaluation criteria include:

- Consolidation scope with regard to IT Infrastructure layers

- Supported network topology

- Overall design complexity with regard to a complete solution build

- Ability to validate real-world performance based on reliable sources

- Ability to evaluate the solution

- Deployment flexibility and speed provided by the solution

Top Performers

#1 – (tie) Cisco HyperFlex, Datrium DVX, Pivot3 Acuity, VMware vSAN

Pie chart values: 83.3, 83.3, 83.3, 83.3, 75.0, 66.7, 66.7, 66.7, 66.7, 66.7, 58.3, 58.3

- Cisco HyperFlex v3.5
- Datrium DVX v4.0.3.0
- Pivot3 Acuity Datacenter v10.4
- VMware vSAN Enterprise v6.7
- HPE Simplivity 380 v3.7.5
- DataCore SANsymphony v10.0 P7U2
- Dell EMC VxRail v4.5.225
- Microsoft S2D Datacenter v2.0
- NetApp HCI v1.3
- Nutanix ECP Ultimate v5.9
- Dell EMC VxFlex OS Enterprise v2.6
- HPE StoreVirtual VSA v12.7

Workload Support

The Workload Support focus area measures the width and depth of support for multiple workloads, both virtual and physical. Evaluation criteria include:
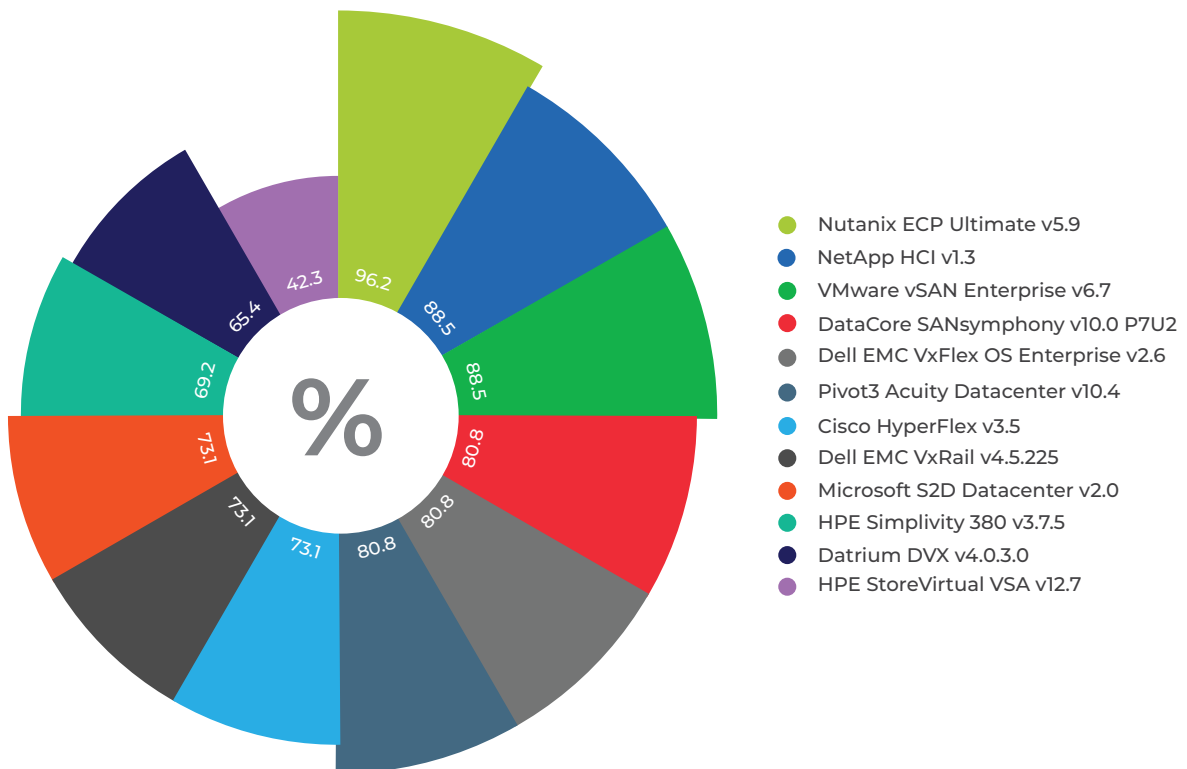
· Support for server virtualization platforms

· Support for desktop virtualization platforms

· Support for bare metal platforms

· Support for containers and container orchestration platforms

Top Performers

#1 – Nutanix ECP Ultimate

#2 – (tie) NetApp HCI, VMware vSAN

- Nutanix ECP Ultimate v5.9
- NetApp HCI v1.3
- VMware vSAN Enterprise v6.7
- DataCore SANsymphony v10.0 P7U2
- Dell EMC VxFlex OS Enterprise v2.6
- Pivot3 Acuity Datacenter v10.4
- Cisco HyperFlex v3.5
- Dell EMC VxRail v4.5.225
- Microsoft S2D Datacenter v2.0
- HPE Simplivity 380 v3.7.5
- Datrium DVX v4.0.3.0
- HPE StoreVirtual VSA v12.7

Chart values: 96.2, 88.5, 88.5, 80.8, 80.8, 80.8, 73.1, 73.1, 73.1, 69.2, 65.4, 42.3
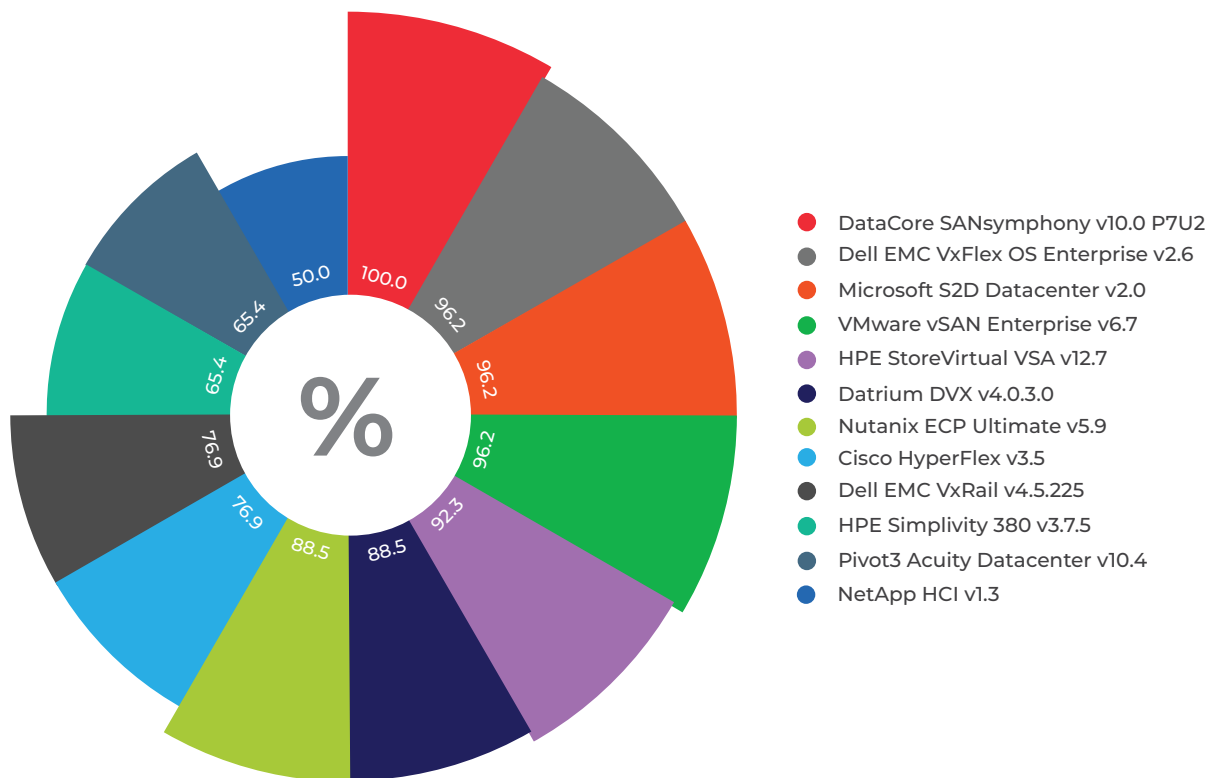
Server Support

The Server Support focus area measures the width and depth of server hardware support, including vendors, models and all relevant internal hardware components, as well as solution scalability, in order to evaluate how much the solutions can be tailored to specific environment requirements. Evaluation criteria include:

- Choice of server hardware vendors
- Choice of server hardware models (each often optimized for certain workloads)
- Ability to choose processors, memory, storage, network and graphical processing units
- Ability to scale resources within each server (scale-up)
- Ability to scale the resources by adding extra servers (scale-out)
- Maximum scalability for scale-out

Top Performers

#1 – DataCore SANsymphony

#2 – (tie) Dell EMC VxFlex OS Enterprise, Microsoft S2D, VMware vSAN

Values shown on chart: 100.0, 96.2, 96.2, 96.2, 92.3, 88.5, 88.5, 76.9, 76.9, 65.4, 65.4, 50.0

- ● DataCore SANsymphony v10.0 P7U2
- ● Dell EMC VxFlex OS Enterprise v2.6
- ● Microsoft S2D Datacenter v2.0
- ● VMware vSAN Enterprise v6.7
- ● HPE StoreVirtual VSA v12.7
- ● Datrium DVX v4.0.3.0
- ● Nutanix ECP Ultimate v5.9
- ● Cisco HyperFlex v3.5
- ● Dell EMC VxRail v4.5.225
- ● HPE Simplivity 380 v3.7.5
- ● Pivot3 Acuity Datacenter v10.4
- ● NetApp HCI v1.3

Storage Support

The Storage Support focus area measures storage architecture properties as well as the width and depth of storage hardware support. Evaluation criteria include:
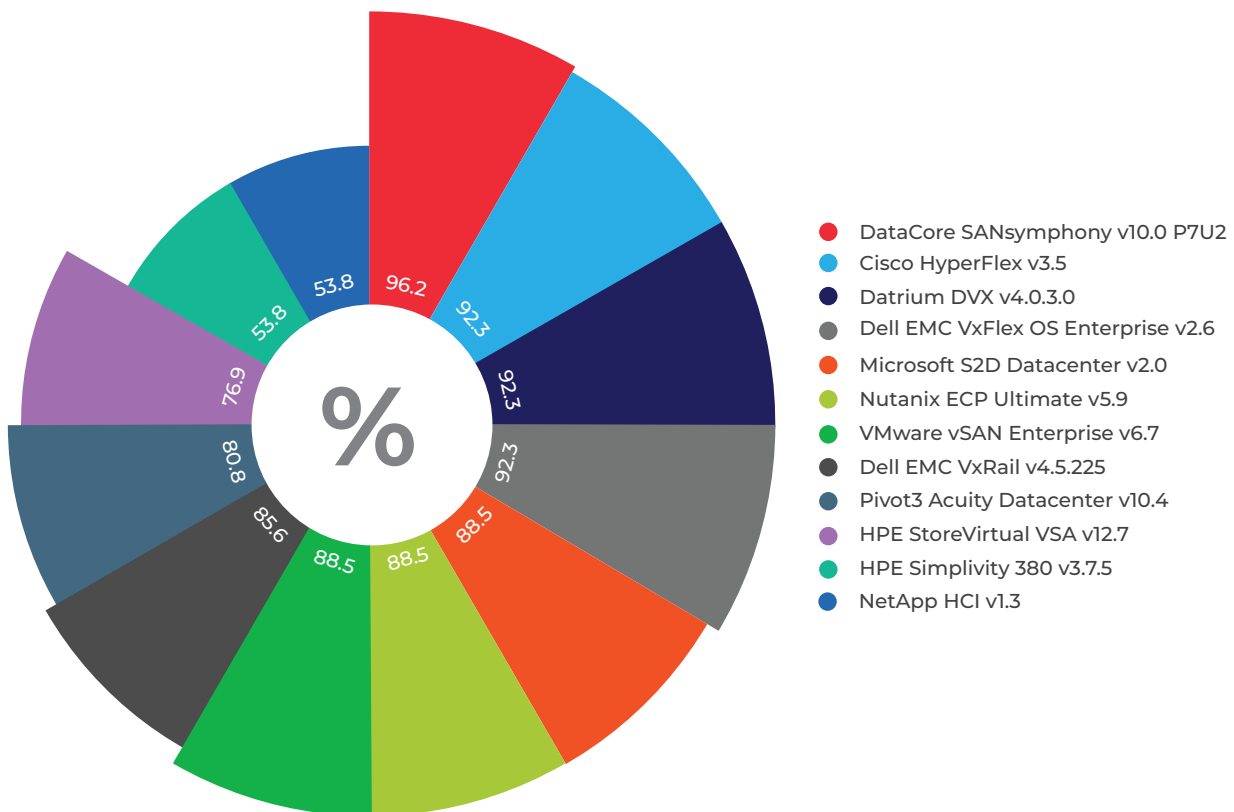
- Approach to storage layout and data locality
- Available storage types
- Available storage compositions
- Ability to leverage memory
- Ability to leverage flash storage devices
- Ability to leverage magnetic storage devices

Top Performers

#1 – DataCore SANsymphony

#2 – (tie) Cisco HyperFlex, Datrium DVX, Dell EMC VxFlex OS Enterprise

%

- DataCore SANsymphony v10.0 P7U2 — 96.2
- Cisco HyperFlex v3.5 — 92.3
- Datrium DVX v4.0.3.0 — 92.3
- Dell EMC VxFlex OS Enterprise v2.6 — 92.3
- Microsoft S2D Datacenter v2.0 — 88.5
- Nutanix ECP Ultimate v5.9 — 88.5
- VMware vSAN Enterprise v6.7 — 88.5
- Dell EMC VxRail v4.5.225 — 85.6
- Pivot3 Acuity Datacenter v10.4 — 80.8
- HPE StoreVirtual VSA v12.7 — 76.9
- HPE Simplivity 380 v3.7.5 — 53.8
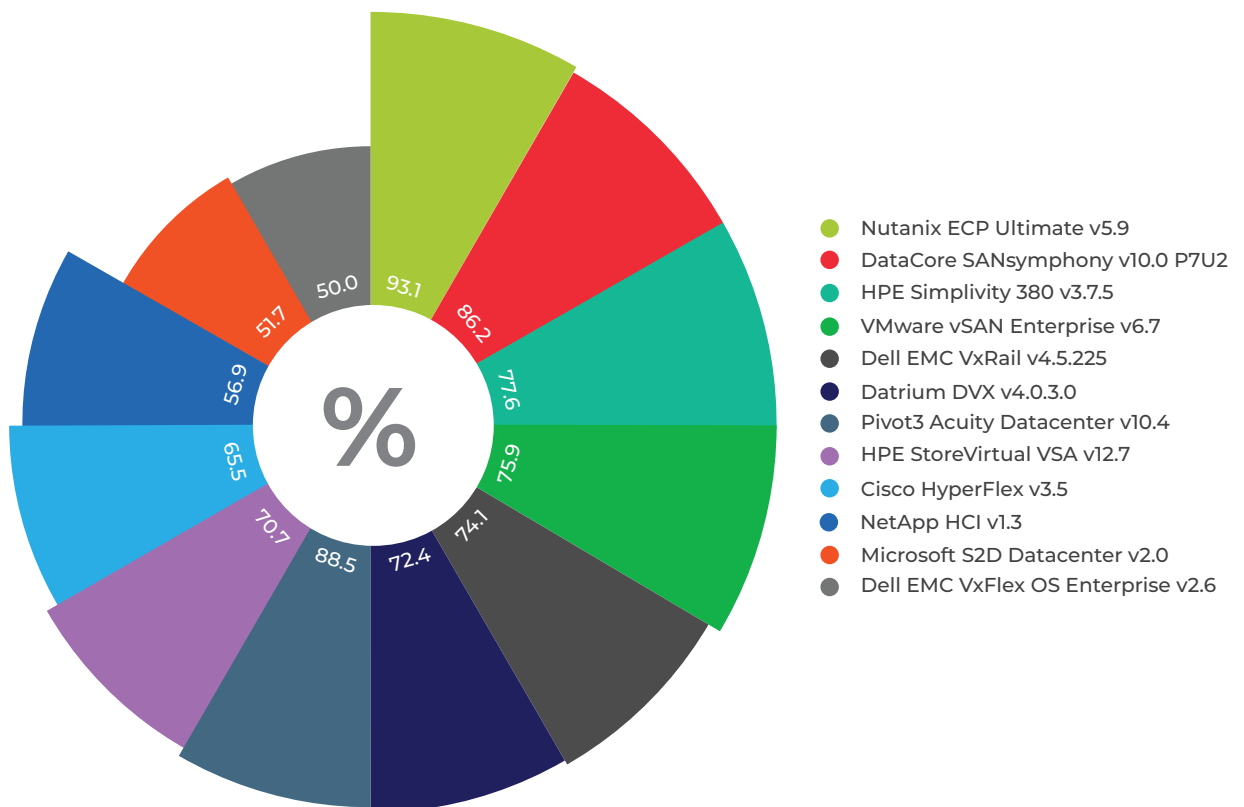- NetApp HCI v1.3 — 53.8

Data Availability

The Data Availability focus area measures how well the storage solution is able to maintain continuity by incorporating robustness, preventing data loss and recovering from different failure scenarios. Evaluation criteria include:

- Capabilities to generate multiple copies of unique data and keeping protection overhead low

- Ability to recover from disk, node, block and rack failures

- Ability to create and maintain snapshots and backups

- Ability to create and maintain off-site data copies

- Ability to leverage public cloud in data protection scenarios

- Support for stretched cluster configurations

Top Performers

#1 – Nutanix ECP Ultimate

#2 – DataCore SANsymphony

#3 – HPE SimpliVity 380

Chart values:
- 93.1
- 86.2
- 77.6
- 75.9
- 74.1
- 72.4
- 88.5
- 70.7
- 65.5
- 56.9
- 51.7
- 50.0

Legend:
- Nutanix ECP Ultimate v5.9
- DataCore SANsymphony v10.0 P7U2
- HPE Simplivity 380 v3.7.5
- VMware vSAN Enterprise v6.7
- Dell EMC VxRail v4.5.225
- Datrium DVX v4.0.3.0
- Pivot3 Acuity Datacenter v10.4
- HPE StoreVirtual VSA v12.7
- Cisco HyperFlex v3.5
- NetApp HCI v1.3
- Microsoft S2D Datacenter v2.0
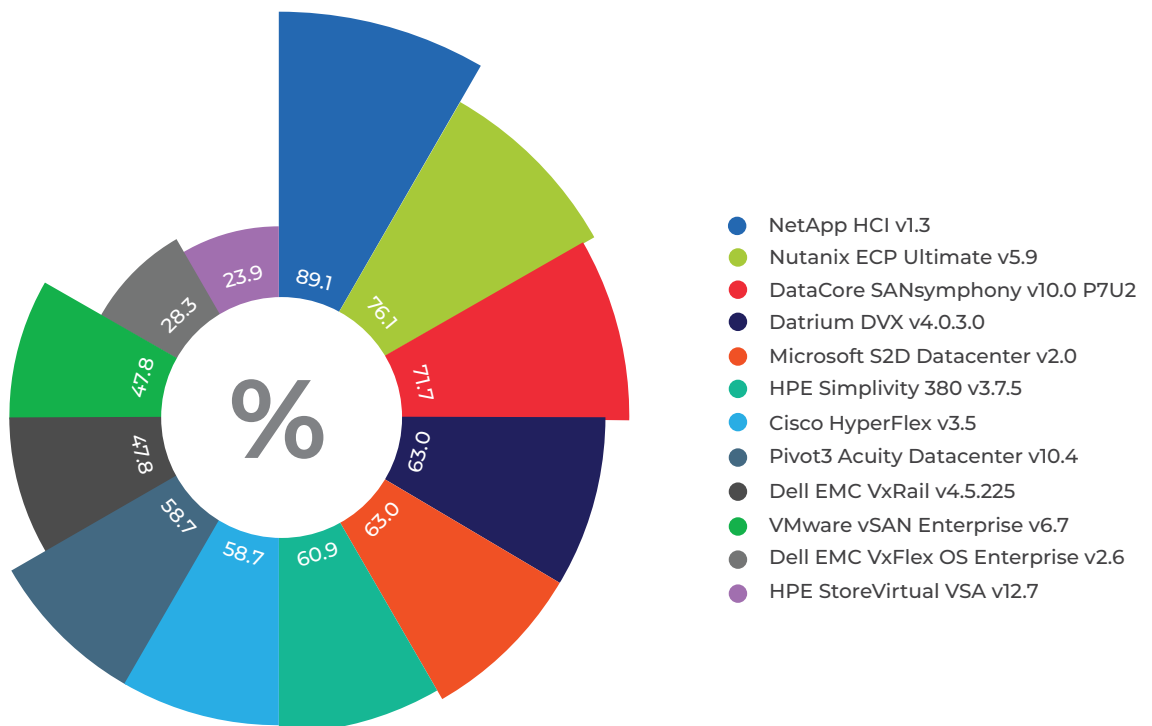- Dell EMC VxFlex OS Enterprise v2.6

Data Services

The Data Services focus area measures the scope and depth of features that represent value-adds such as storage resource optimization, provisioning of end-user services, and capabilities that enhance the security posture of an organization. Evaluation criteria include:

- Capabilities to reduce the size of data that needs to be physically stored

- Capabilities to evenly rebalance data across resources after extending or shrinking the solution

- Capabilities to encrypt data when it traverses the network and when it is stored

- Ability to guarantee and/or limit the performance to workloads

- Ability to natively deliver file services to end-users

- Support for migrating to another virtualization platform

Top Performers

#1 – NetApp HCI

#2 – Nutanix ECP Ultimate

#3 – DataCore SANsymphony

Values shown on chart: 89.1, 76.1, 71.7, 63.0, 63.0, 60.9, 58.7, 58.7, 47.8, 47.8, 28.3, 23.9

- NetApp HCI v1.3
- Nutanix ECP Ultimate v5.9
- DataCore SANsymphony v10.0 P7U2
- Datrium DVX v4.0.3.0
- Microsoft S2D Datacenter v2.0
- HPE Simplivity 380 v3.7.5
- Cisco HyperFlex v3.5
- Pivot3 Acuity Datacenter v10.4
- Dell EMC VxRail v4.5.225
- VMware vSAN Enterprise v6.7
- Dell EMC VxFlex OS Enterprise v2.6
- HPE StoreVirtual VSA v12.7

Management

The Management focus area measures how well the storage solution can be managed both during daily operations and throughout its entire lifecycle. Evaluation criteria include:
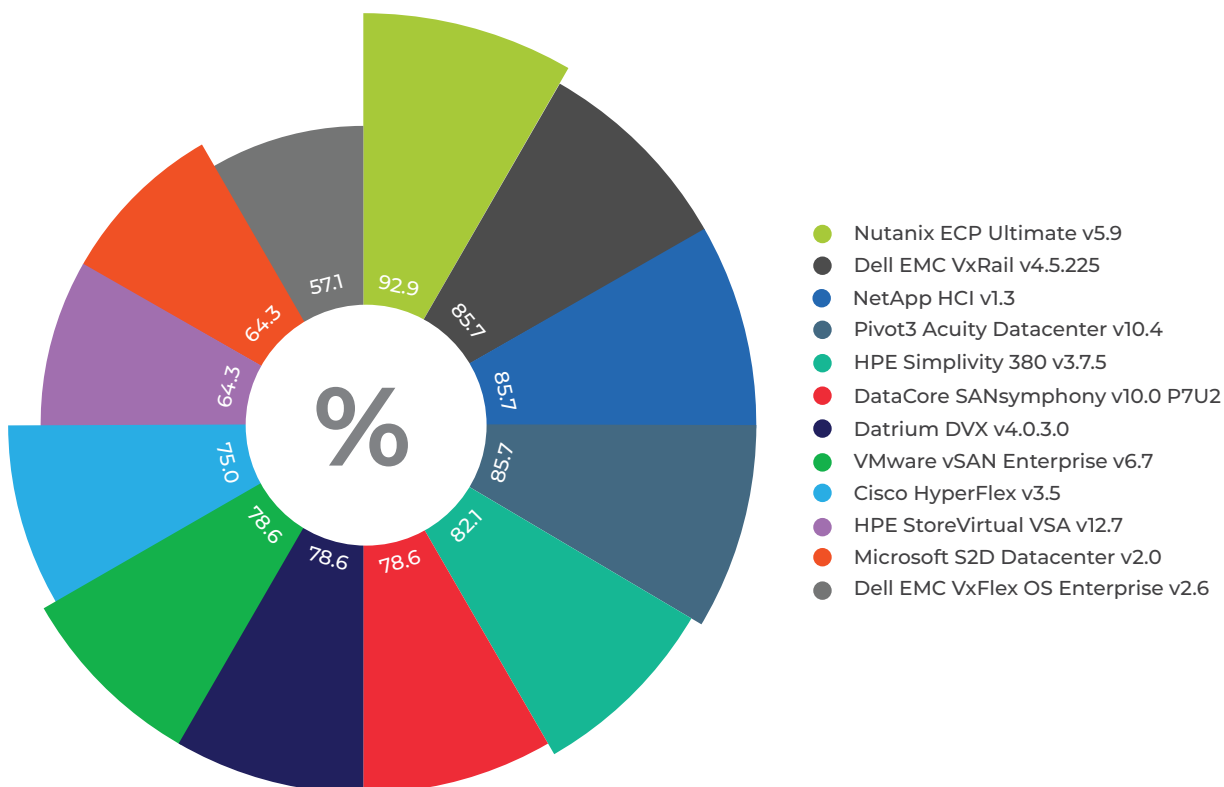
- Ability to integrate with existing management interfaces
- Support for managing multiple sites from a single interface
- Enablement of storage management by non-storage professionals
- Capabilities to provide self-services for end-users
- Capabilities for proactive health diagnosis and taking action (self-healing)
- Ability to automate the entire workflow for software and hardware updates

Top Performers

#1 – Nutanix ECP Ultimate

#2 – (tie) Dell EMC VxRail, NetApp HCI, Pivot3 Acuity

%

Chart values: 92.9, 85.7, 85.7, 85.7, 82.1, 78.6, 78.6, 78.6, 75.0, 64.3, 64.3, 57.1

Legend:
- Nutanix ECP Ultimate v5.9
- Dell EMC VxRail v4.5.225
- NetApp HCI v1.3
- Pivot3 Acuity Datacenter v10.4
- HPE Simplivity 380 v3.7.5
- DataCore SANsymphony v10.0 P7U2
- Datrium DVX v4.0.3.0
- VMware vSAN Enterprise v6.7
- Cisco HyperFlex v3.5
- HPE StoreVirtual VSA v12.7
- Microsoft S2D Datacenter v2.0
- Dell EMC VxFlex OS Enterprise v2.6

The Online SDS & HCI Comparison

Combine the insight of this landscape report with the currency of our online comparison & explore the power of use cases – select a link to jump directly to the latest leaders for a given scenario. See the best products for (focus area) :

✔ DESIGN & DEPLOY	✔ WORKLOAD SUPPORT
✔ SERVER SUPPORT	✔ STORAGE SUPPORT
✔ DATA AVAILABILITY	✔ DATA SERVICES
✔ MANAGEMENT	

See the following **knowledgebase** article for help on use cases

WhatMatrix
All Technology
Categories

WhatMatrix covers an increasing number of technology areas. This table shows the existing WhatMatrix technology categories (online comparisons and assets) as of Oct 2018.

Click the link to open the comparison:

WhatMatrix Technology Categories & Consultant(s)

Click 🌐 to visit the site

AppVirtGURU

Application Virtualization 🌐

Yannick Arens

Data Protection 🌐

Ephraim Baron (lead), Ronald van Vugt

Cloud Management Platforms 🌐

Ajay Walia

Enterprise Mobility Management (EMM) 🌐

Viktor van den Berg

Disaster Recovery Solutions (incl "DRaaS") 🌐

Herman Rutten (lead), Romain Serre

SDS & HCI 🌐

AppVirtGURU

App Layering 🌐

Roman Macek (lead), Gica Livada

Virtualization Platforms 🌐

MLG Blockchain

Blockchain for Enterprise 🌐

TeamRGE

GPU's EUC Datacenter 🌐

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SOFTWARE DEFINED STORAGE AND HYPERCONVERGED INFRASTRUCTURE 2018

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