Picking the Best Approach for Hyperconverged Success

From large enterprise data centers to small organizations and remote offices, hyperconvergence is transforming IT. It's a buyer's market: Choices abound, but sifting through the options can be confusing and time-consuming. This paper provides an overview of two of the most popular approaches and helps IT professionals make the best choice for their environment.

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Today, IT professionals are focused on assessing the benefits of hyperconverged infrastructure (HCI) as a strategic part of infrastructure modernization or technology refresh programs, or as an infrastructure option for new projects.

HCI treats storage, compute and networking as integrated pools of resources. Management is centered on the VM rather than managing individual components such as storage LUNs (logical unit numbers). By integrating compute, storage, storage networking and virtualization hypervisor—typically including a unified management framework—HCI offers lower capital expense, faster deployment, less complexity and easier scalability than legacy infrastructure. As a result, HCI sales are soaring: Gartner says the HCI market will approach $2 billion by the end of 2016—a jump of 79% from the previous year—and will reach nearly $5 billion by 2019. In fact, Gartner says HCI is rapidly gaining on sales of other forms of integrated systems.[1]

But even after IT professionals commit to HCI—whether in the form of a pre-integrated appliance or through a more do-it-yourself approach using an HCI reference architecture—selecting the right HCI vendor requires care. There are more than a dozen HCI vendors, together offering countless configurations to sort through in order to find the best solution for a customer's workloads.

Decision-makers need to assess HCI solutions across a range of factors—not least among them up-front cost and total cost of ownership. Each solution offers its own mix of features and functionality, but the most salient differences are found in core software elements of management, data efficiency, fault tolerance and data protection.

Two of the most-often evaluated options are HCI appliances from SimpliVity and solutions based on VMware's VSAN storage framework for HCI workloads. This paper takes a closer look at these two options across a range of factors, including what each offers for disaster recovery, a vital requirement for HCI in all

1   "Gartner Says Hyperconverged Integrated Systems Will Be Mainstream in Five Years," Gartner, May 2016

environments. The paper also provides insight into how to get the most out of your HCI solution.

What to look for in an HCI solution

First, organizations should determine the different workloads they want to move to HCI platforms—such as tier-one applications, desktop virtualization, remote office/branch office (ROBO) and application development and testing. Then, it's time to build a list of must-have features. But just making a list of features isn't enough. Be sure to break down requirements that will meet your needs both now and in the future. For instance, consider the following:

- **Resilience:** How well does the solution architecture protect against data loss or unavailability due to planned or unplanned downtime? How does it handle the risk of a drive, component or node failure?

- **Data efficiency:** What are the guaranteed and typical data efficiency ratios? What is the CPU overhead associated with leveraging this feature? Are data deduplication and compression provided on a global basis? Can the service be used all the time, or must it be turned on selectively depending on the properties of specific workloads?

- **Data protection:** Are backup and disaster recovery (DR) integrated into the standard solution or are third-party solutions required? Do the data protection capabilities leverage the solution's data efficiency services? What kind of recovery point objectives (RPOs) and recovery time objectives (RTOs) can this solution help your business achieve?

- **Disaster recovery automation:** Can you achieve single-click, policy-based, automated DR with the solution?

- **Integration and delivery model:** Is it a pre-integrated, turnkey solution or a do-it-yourself integration? Does the solution require multiple pieces of software to deliver the necessary functionality? For instance, is backup integrated with replication, or is replication a separate module with its own management interface?

- **Management:** Does the solution provide a global, centralized management platform for all sites and functions? Does it require disparate interfaces for storage, data management and replication?

Overview of SimpliVity HCI and VSAN-based HCI

The two vendors this paper examines—SimpliVity and VMware—are considered leading options for buyers looking for reliable and reputable HCI solutions.

VMware, founded in 1998, is considered the market leader in virtualization hypervisors. Its flagship hypervisor platform, vSphere, has been widely adopted for virtualizing servers, storage and desktops, although its market share has been reduced in recent years by strong competitive efforts from Microsoft, Citrix and numerous others. In 2004, VMware became a subsidiary of storage giant EMC, which in turn was acquired by Dell in 2016.

VMware's strategy for hyperconvergence centers on a software-defined model built upon the vSphere hypervisor, VSAN storage software platform and vCenter management platform for vSphere environments.

VMware offers VSAN-based HCI solutions in three ways:

- **VxRail** is an integrated appliance built on Dell servers. It is available through VCE, formerly a joint venture of EMC, Cisco and VMware, and today a part of Dell EMC.

- **Virtual SAN Ready Nodes** are offered by VMware's OEM server partners. VSAN Ready Nodes use VSAN as the HCI software platform and typically run on commodity-class x86 servers that are precertified for HCI workloads.

- **Do-It-Yourself Approach.** In this model, VSAN is purchased as a licensed software extension to vSphere, and the customer builds the appliance by selecting servers on the VMware Hardware Compatibility List.

SimpliVity, founded in 2009, is considered a pioneer in the development of HCI appliances for a wide range of virtualized workloads. It has been funded by an array of blue chip venture capital firms, including Accel Partners, Charles River Ventures, DFJ, Kleiner Perkins Caufield & Byers, Meritech and others. SimpliVity's strategy for HCI solutions is based on the principle of extremely tight integration of all IT functions and data services for virtualized workloads. This approach is designed to speed deployment; improve data protection, resilience and performance; reduce management complexity; and speed time to economic value in the form of lower total cost of ownership and improved return on investment.

SimpliVity offers its hyperconverged solution in two ways:

1. **OmniCube,** SimpliVity's family of HCI-optimized appliances, integrates multiple core data center functions into a single high-performance server, and is built on a server that SimpliVity OEMs from Dell.

2. The SimpliVity solution is also sold under the **OmniStack** name and integrates with servers from Cisco, Dell and Lenovo. In this case, the server is purchased from a channel partner and the solution is delivered as an integrated turnkey solution to the end user.

Both SimpliVity options include hypervisor, compute, storage, storage networking, backup, replication, deduplication, WAN optimization and more. The appliances are configured in a compact form factor that is ideally suited both for traditional data centers and ROBO environments where space, cooling, power and IT support resources are at a premium.

The company's core technology is based on the OmniStack Data Virtualization Platform, a globally aware file system and object store that facilitates shared resource pools across multiple sites. The solution includes the OmniStack Accelerator Card, a PCIe card that speeds performance by offloading CPU-intensive data efficiency functions, including global inline deduplication, compression and data optimization at ingest. This reduces I/O and storage capacity requirements since duplicate writes are not written to disk. Additionally, this approach reduces bandwidth requirements for remote replication since duplicate data is not sent over the WAN.

Matching up SimpliVity and VMware

First, SimpliVity and VMware offer very different packaging. SimpliVity offers a broad and flexible range of turnkey appliance solutions. By contrast, VSAN customers must choose between purchasing an appliance-based version such as EMC's VxRAIL or build their own VSAN implementations from separate hardware and software components. The latter requires considerable care to use correct versions of software, hardware, firmware, drivers and other components that stick to vendors' support matrices and guidelines.

SimpliVity HCI appliances and VMware VSAN-based solutions differ in other specific ways, including:

- **Hypervisors:** VSAN-based HCI works only with vSphere hypervisors. While vSphere remains the single most popular hypervisor, it now comprises less than half of all hypervisor installations, according to multiple market research firms. SimpliVity's HCI solution is architected to be hypervisor-agnostic, giving customers greater freedom of choice.

- **Resilience:** VSAN offers two grades of resilience: FTT=1 and FTT=2 (Failures to Tolerate). VSAN FTT=1 configurations require a minimum of three nodes, and will lose data if two drives simultaneously fail. VSAN FTT=2 provides a higher level of resiliency that can tolerate two simultaneous drive failures, but these configurations require a minimum of five nodes, and reduce effective storage capacity by an additional 50%. In comparison, SimpliVity appliances can withstand as many as three simultaneous drive failures, without experiencing data loss, with just two nodes. This is because SimpliVity's architecture provides resiliency with support for RAIN (redundant array of independent nodes) and RAID. SimpliVity also supports single-node configurations for small ROBO deployments.

- **Data efficiency:** VSAN data deduplication is bounded by disk groups, which are limited to seven capacity drives each. By contrast, SimpliVity offers in-line global deduplication and compression at data ingest; there are no disk group limitations. In addition, VSAN data efficiency comes at the expense of CPU overhead. SimpliVity offloads these duties onto purpose-built hardware with its OmniStack Accelerator Card in order to free up compute cycles for business-critical applications. SimpliVity guarantees data efficiency across primary and backup storage of 90% or 10:1 (30:1 to 40:1 is typical). VMware does not publish typical data efficiency rates and does not guarantee data efficiency rates in production environments.

- **Data protection:** SimpliVity's data architecture includes built-in backup and replication and integrates them with the data efficiency services of the core platform. This not only removes the need for add-on data protection solutions, but it also eliminates the overhead of repeated hydration and dehydration of data as it moves in and out of different components in the infrastructure. SimpliVity guarantees local backup or restore of a 1TB virtual machine (VM) in no more than 60 seconds. In the case of VSAN, customers must deploy and manage add-on products for backup and replication, whether from VMware or third parties. Since data protection software is not integrated into the core platform, VSAN does not integrate backup or replication with deduplication and compression. VMware has also not published any guaranteed backup or restore time frames for production environments.

- **Integrated design for easier service and support:** Both VMware and SimpliVity provide a single point of support, but the SimpliVity solution is engineered for tight integration, enabling smooth deployment and service. VSAN-based solutions that use software and hardware components from multiple vendors would involve separate support contracts with each vendor.

	VMware VSAN	SimpliVity OmniStack
Hypervisor support	vSphere only	Hypervisor-agnostic
Resilience	FTT=1 requires at least three nodes; will lose data if two drives fail simultaneously. FTT=2 can withstand failure of two drives, but requires at least five nodes. Storage capacity is reduced by 50%.	Withstands up to three simultaneous drive failures without data loss; only requires two nodes.
Data efficiency	Near-line data deduplication. Bounded by disk groups, limited to seven capacity drives each. Does not publish typical data efficiency rates.	Inline global deduplication and compression at ingest. No disk group limitations. 30:1 to 40:1 data efficiency is typical across primary and backup storage, with 10:1 data efficiency guaranteed.
Data protection	Available through add-on products for backup and replication. Does not integrate backup or replication with deduplication and compression.	Built-in data protection with integrated backup and replication, eliminating need for third-party data protection solutions.
Integrated design	Available as an appliance or by integrating hardware and software components at the customer's site.	Available as an appliance or a pre-integrated turnkey solution.

Comparing automated DR functionality for SimpliVity and VSAN

As IT professionals increasingly use HCI solutions for a wide range of workloads both in data centers and in enterprise departments and remote locations, the need to ensure always-available operation becomes paramount. The average cost of a data center service interruption is now nearly $750,000, up more than 38% since 2010, and the average duration of a service interruption is 95 minutes. It's easy to imagine the devastating impact a 95-minute service interruption can have on many organizations.[2]

In order to enable full business continuity in the event of an unplanned service interruption, decision-makers need to pay close attention to DR. In this case, SimpliVity and VMware are the only hyperconverged vendors to offer fully integrated DR

automation functionality that can help to reduce downtime and minimize the impact of a site outage.

VMware vCenter Site Recovery Manager (SRM), the DR add-on for VSAN-based HCI solutions, integrates with vSphere through vCenter Server and relies on vSphere replication technology. As a result, the replication engine used by SRM does not integrate with the core data efficiency functions of VSAN.

By contrast, SimpliVity's DR solution—RapidDR—has been designed as part of the foundational architecture, tightly integrated into the full HCI solution stack and seamlessly integrated with the SimpliVity OmniStack Data Virtualization Platform. With SimpliVity's global deduplication, only unique blocks of data are replicated from the primary site to the recovery site. Changed blocks that already exist at the recovery site are not replicated, even when VMs are failed over for the first time and when they are failed back.

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2   "2016 Cost of Data Center Outages Report," Ponemon Institute, January 2016

Although these solutions differ in their approach to integration with core data protection and data efficiency functions, both offer simplified management of DR. SRM offers a rich feature set that includes automated failover of virtual machines in the event of an outage, as well as the ability to conduct failover testing in order to ensure readiness for a DR event. SimpliVity's VM-centric approach to management makes setup easy, with just a few steps to configure a recovery plan. Automated recovery of VMs and desired settings at the DR site are achieved with a single click with RapidDR.

The RapidDR solution is easier to set up and implement. Setup of SRM typically requires either a SQL or Oracle database at the source site and destination site, which may mandate the availability and attention of a dedicated database administrator. Fully implementing SRM is said to take at least a day and, depending upon the size and complexity of the organization, perhaps up to a week. RapidDR typically can be fully implemented in less than two hours.

Summary

HCI solutions are now becoming a staple for all modernized IT infrastructure, from the largest data centers to the remote office. HCI's many benefits have transformed the technology from "next big thing" status to a "must-have," underpinning a more agile, scalable, manageable, cost-efficient and resilient infrastructure.

VSAN's presence within VMware installations makes it a natural option for vSphere-based HCI solutions. However, its limitations in areas such as resilience, data efficiency, backup and disaster recovery are important for customers to understand. By comparison, the SimpliVity HCI appliances offer faster time to value and lower total cost of ownership through enhanced data efficiency, more robust built-in data protection and superior resilience.

For more information on SimpliVity's family of HCI solutions, please visit:
www.simplivity.com
www.simplivity.com/disaster-recovery