



Can Hyper Converge System Replace SAN

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Abstract: Storage Area Network and Hyper Converge System are the domains which deal with various storage management. A hyperconverged infrastructure is challenging the data center model of standalone servers networked to a scale-up storage array. which seems to solve many provisioning problems and act as little islands of capability for ERP, SharePoint, VDI & also act platform for utility computing, grid computing, shared services, SOA or the cloud. A Storage Area Network (SAN) is a secure high-speed data transfer network that provides access to consolidated block-level storage. An SAN makes a network of storage devices accessible to multiple servers. SAN devices appear to servers as attached drives, eliminating traditional network bottlenecks. Virtual storage area networks (virtual SAN, server SAN or SAN-free storage) use locally attached flash and hard disk drive storage.

Keywords: HCI,SAN

I. INTRODUCTION

At the highest, most abstract level, hyper convergence can be understood to be the combination (or convergence) of many potentially disparate platforms into a single platform. In relation to the physical hardware, this means placing compute (CPU and memory) and storage (Spinning Disk and Solid-State Drives [SSDs]) into a single server. From a software perspective, this means that at the very least, all components of the system are managed from a common interface. Depending on the offering, this may be a custom user interface built by the manufacturer, or it could be an add-on or extension to the existing hypervisor management software. Remember from that the hypervisor is the software that allows multiple Virtual Machines (VMs) to run on a single piece of physical hardware. A commonly understood definition of hyper convergence states that it is “a platform that pools direct attached storage and eliminates the need for a storage array.” While this is true, it doesn’t tell the whole story. Physical hardware is an important piece of the puzzle, but the grander picture of hyper convergence is really focused on the simplified management of the data center infrastructure. Hyper convergence aims to eliminate silos of management.

A Storage Area Network (SAN) is a specialized, high-speed network that provides block-level network access to storage. SANs are typically composed of hosts, switches, storage elements, and storage devices that are interconnected using a variety of technologies, topologies, and protocols. SANs may also span multiple sites. A SAN presents storage devices to a host such that the storage appears to be locally attached. This simplified presentation of storage to a host is accomplished through the use of different types of virtualization. A new generation of hyperconverged infrastructure is challenging the data center model of standalone servers networked to a scale-up storage array. Virtual storage area networks (virtual SAN, server SAN or SAN-free storage) use locally attached flash and hard disk drive storage.

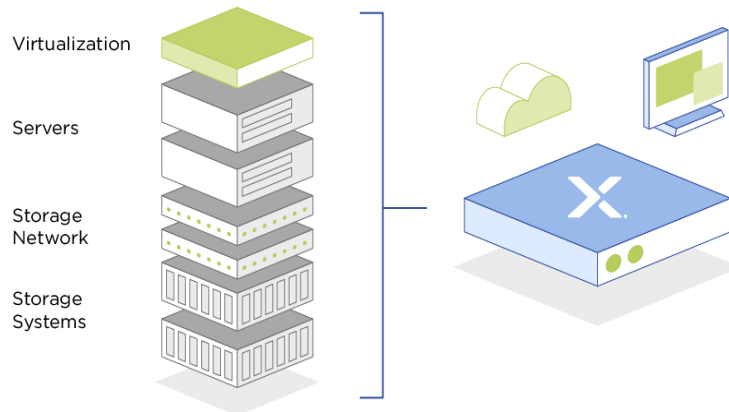
This hyperconverged trend dovetails with virtualization, where traditional storage such as Fibre Channel or iSCSI is problematic, said David Friedlander, senior director of product marketing at Panzura, a cloud storage company. "Traditional SANs were bad for virtualization,". SANs were designed for environments where you know what to expect from I/O patterns, but virtual environments are characterized by random I/O, and arrays are quickly overwhelmed. Flash has alleviated the problem, but increasingly, Friedlander said, "the storage industry is moving away from monolithic storage arrays."

II RELATED WORK

A. What is Hyper converge system?

Hyper converged platforms include a hypervisor for virtualized computing, software-defined storage, and virtualized networking, and they typically run on standard, off-the-shelf servers. Multiple nodes can be clustered together to create pools of shared compute and storage resources, designed for convenient consumption.

Hyper Converged Infrastructure (HCI) combines common data centre hardware using locally attached storage resources with intelligent software to create flexible building blocks that replace legacy infrastructure consisting of separate servers, storage networks, and storage arrays. Benefits include lower TCO, increased performance, and greater productivity within IT teams.

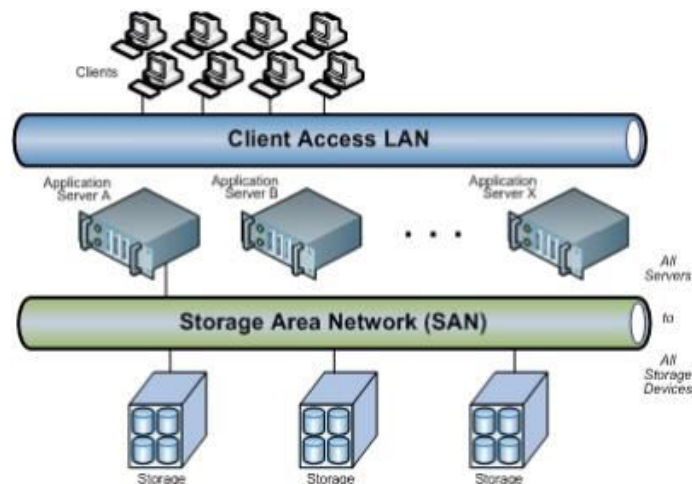
B. How does hyper converged infrastructure work:

Fig(a). hyper converged infrastructure

HCI converges the entire datacenter stack, including compute, storage, storage networking, and virtualization. Complex and expensive legacy infrastructure is replaced by a platform running on turnkey, industry-standard servers that enable enterprises to start small and scale one node at a time. Software running on each server node distributes all operating functions across the cluster for superior performance and resilience.

C. What Is a Storage Area Network (SAN)?

Storage Area Networks (SANs) are the most common storage networking architecture used by enterprises for business-critical applications that need to deliver high throughput and low latency. A rapidly growing portion of SAN deployments leverages all-flash storage to gain its high performance, consistent low latency, and lower total cost when compared to spinning disk. By storing data in centralized shared storage, SANs enable organizations to apply consistent methodologies and tools for security, data protection, and disaster recovery.



Fig(b). Storage Area Network

D. The most common SAN protocols are:

- **Fibre Channel Protocol (FCP).** The most widely used SAN or block protocol, deployed in 70% to 80% of the total SAN market. FCP uses Fibre Channel transport protocols with embedded SCSI commands.
- **Internet Small Computer System Interface (iSCSI).** The next largest SAN or block protocol, with approximately 10% to 15% of the market. iSCSI encapsulates SCSI commands inside an Ethernet frame and then uses an IP Ethernet network for transport.
- **Fibre Channel over Ethernet (FCoE).** FCoE is less than 5% of the SAN market place. It is similar to iSCSI, since it encapsulates an FC frame inside an Ethernet datagram. Then like iSCSI, it uses an IP Ethernet network for transport.
- **Non-Volatile Memory Express over Fibre Channel (FC-NVMe).** NVMe is an interface protocol for accessing flash storage via a PCI Express (PCIe) bus. Unlike traditional all-flash architectures, which are limited to a



single, serial command queue, NVMe supports tens of thousands of parallel queues, each with the ability to support tens of thousands of concurrent commands.

E. SAN vs Hyper convergence:

Two major issues I considered when looking at potential vendors was our old fiber SAN switches and our many segmented Cisco UCS gears. If we went with a traditional stack, we'd need another SAN/Cisco UCS admin to help with upgrades and maintenance of the fiber switches, our other storages, and UCS hardware, which would've increased our cost. In addition, we were having some backup issues. I really wanted to move away from the silo storage administration. That led me to hyper convergence. Since I had some VMware VSAN experience, at that time I knew its limitations: if you bought the all-flash system, you could not deduce and compress it, so you needed at least three nodes per page. It was still relatively new when it came to VSAN, and after reading a few Gartner reports, with such a young technology, I was simply not comfortable trusting the data of my company.

III. CONCLUSION

This paper discusses about the SAN and HCI has brought virtualization and IT strategies to a new level. Data centres are undergoing a deep paradigm shift from a hardware-centric to an application-centric approach which leverages on software defined architectures, while IT is more and more being delivered as services rather than assets or products. a world of possibilities within a box capable of running your highest workloads better than your traditional SAN/host design, and each vendor will present you solutions starting from entry-level HDD appliances to high-end all-flash HCI appliances. Therefore, there is more to gain by switching to HCI than staying put with a traditional SAN—not only is it easier to scale out with HCI, but you can also spread the data across multiple nodes for higher redundancy.

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