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Introducing vSAN Max

VMware Storage

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The [introduction of the vSAN Express Storage Architecture™](#) (ESA) in VMware vSAN 8 just one year ago marked a monumental advance in VMware's hyperconverged solution. For the past year, we have [highlighted](#) just how extraordinary it is in its ability to process and store data faster and more efficiently than ever before. As impressive as that is, perhaps the most powerful aspect of the ESA is its ability to unlock new capabilities for our customers.

It is the power of the Express Storage Architecture that leads us to the introduction of vSAN Max™: VMware's new disaggregated storage offering that provides Petabyte-scale centralized shared storage for your vSphere clusters. Let's look at what vSAN Max is, and how it will deliver new capabilities, cost savings, and flexibility to your workloads running on VMware vSphere.



Why Disaggregation?

The adoption of virtualization many years ago brought a traditional three-tier architecture to the masses. The term "three-tier" represents the three essential elements of this architecture: 1.) Physical hosts providing the compute resources, 2.) A specialized, dedicated storage fabric providing connectivity to the centralized shared storage, and 3.) A storage array providing shared storage to the hosts.

This type of architecture was a relatively simple way to provide resilient shared storage but is subject to several indelible shortcomings. Since many of these architectures typically used a dual controller head-unit sending the data to enclosures of disks, they inherently have challenges in scaling up and out in performance and capacity, as the I/O paths funneled this data through redundant controllers. Growing compute resources could eventually overrun the once-correctly sized storage array, and presented limited options for accommodating this growth. Most of these shared storage solutions are also built using proprietary hardware using custom software to deliver data services, which typically meant the solution must be deployed in every location of every topology to make those capabilities commonly available. Not only do costs make this very challenging to achieve, but the technical barriers to running those same proprietary services in the cloud are either unavailable or costly to achieve. Finally, these architectures often required highly specialized subject matter expertise that slowed down the ability to provision workloads and expand resources needed by the organization.

The introduction of hyperconverged infrastructures (HCI) and vSAN aimed to solve this challenge. By **aggregating compute and storage resources into one location using commodity hardware**, one could break free from the limitations of scaling resources as growth occurred. vSAN provided storage as a resource of the cluster, just like compute and memory. It has proven to be an extremely powerful architecture that has made vSAN the industry-leading HCI solution that can run on-premises, at the

edge, and in the cloud.

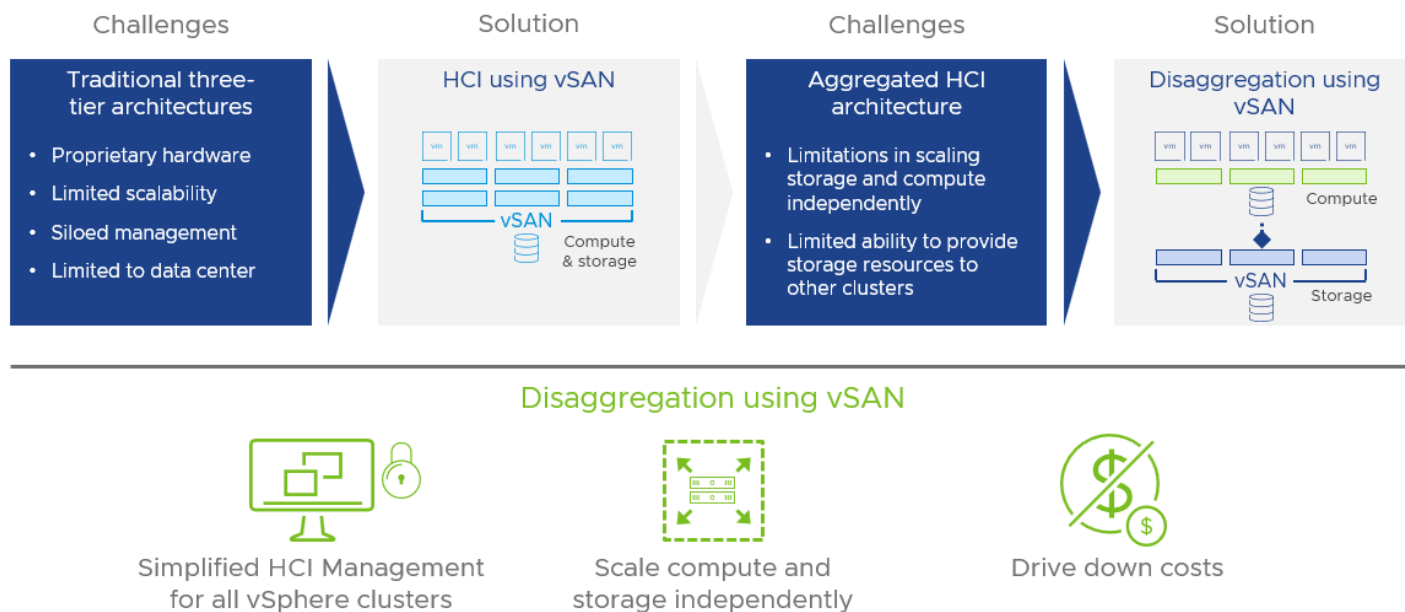


Figure 1. The rationale for disaggregation as an option for your environment.

But many of our customers sought the ability to enjoy the benefits of HCI with its simplified management, incremental scalability, and use of commodity hardware, they also wanted more agility in scaling storage and compute resources independently. This is where the concept of disaggregation comes into play. **Storage resources are disaggregated from compute resources but achieved in such a way that it maintains the capabilities and benefits of HCI while providing the desired flexibility of centralized shared storage.**

Disaggregated Scale Out Storage Done the Right Way

Many have attempted the idea of offering scale-out storage for vSphere clusters. This is a much more challenging problem than it appears. Distributed systems offer extraordinary benefits but must be built in a highly sophisticated way to accommodate its distributed nature and the benefits it provides. For example, there are enormous complexities around spanning a clustered file system across discrete nodes. But vSAN approached distributed storage in a different way, using a [novel approach that is analogous to an object store](#). With over a decade of improvements in the robustness and resilience of its control paths, and a next-generation redesign of its data path with the introduction of the ESA, it set the stage for VMware to deliver a highly scalable, distributed storage solution built into the hypervisor, available using commodity hardware.

Simply put, **vSAN Max is a distributed scale-out storage system for vSphere clusters.** It is powered by the vSAN ESA, so it offers the capabilities that are a part of the ESA, but serves as a storage-only cluster. It uses vSAN's native protocol and data path for cross-cluster communication, which preserves the management experience and provides the highest levels of performance and flexibility for a distributed storage system.

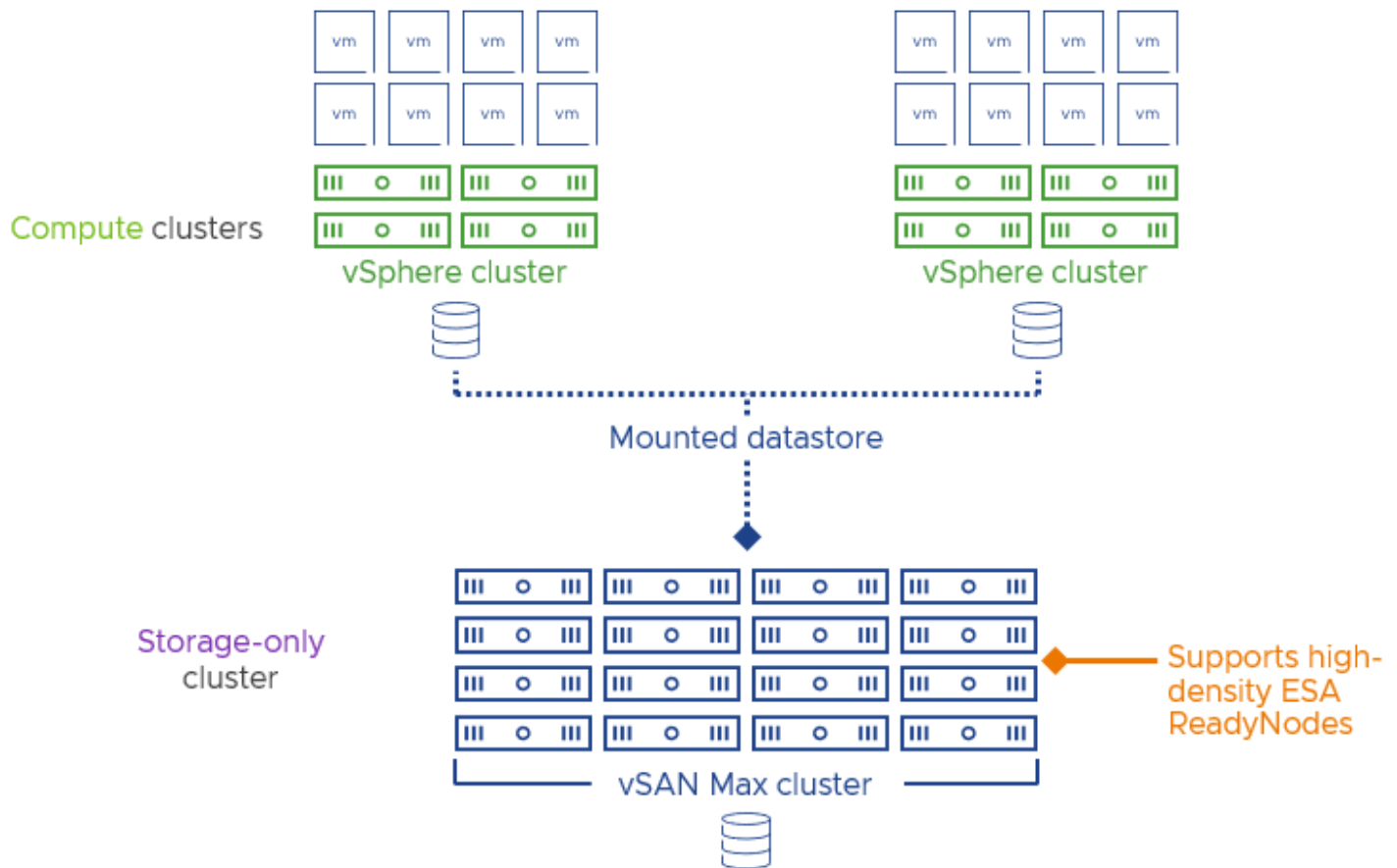


Figure 2. vSAN Max cluster providing storage to vSphere clusters.

Performance and capacity can scale in an extraordinarily powerful and easy way. A 24-host vSAN Max cluster can deliver up to 8.6 Petabytes (PB) of capacity, and provide up to 3.4 million IOPS. Simply add nodes or add storage devices to each node to meet the capacity and performance demands of your organization. This gives you the ability to scale your storage resources independently from your compute resources.

Do you want to build a site-resilient stretched storage solution? vSAN Max supports stretched cluster topologies and even vSAN Fault Domains as well.

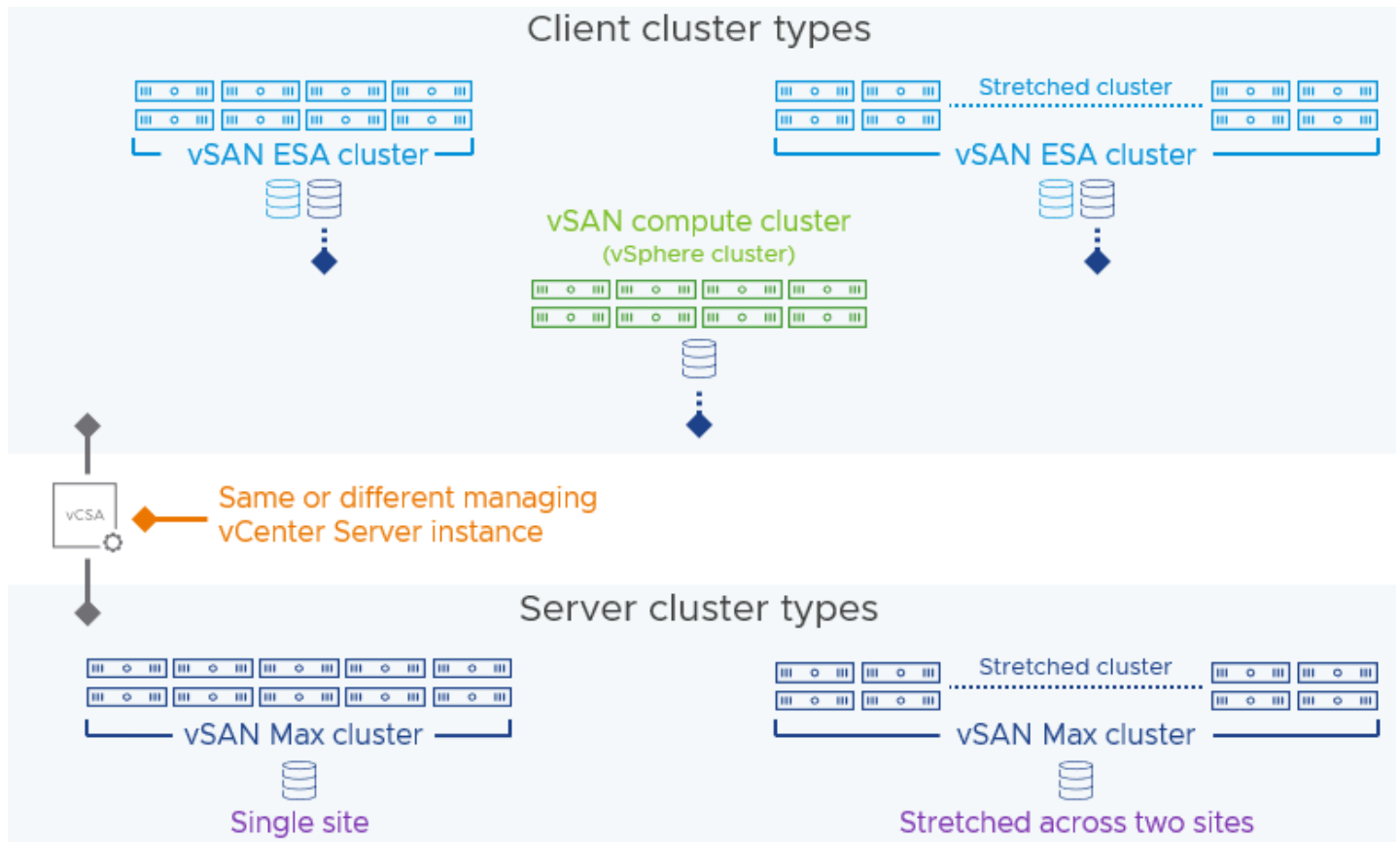


Figure 3. Multiple client cluster types and multiple vSAN Max cluster types.

What about Data-at-Rest Encryption, vSAN File Services, vSAN iSCSI services, or partner-powered S3-compatible object stores? Yes, vSAN Max can do that too! But that's not all. The capabilities that make the ESA easy to use, fast, efficient, and resilient are found not just in vSAN HCI clusters, but vSAN Max clusters. From [automated default storage policy management](#) to [high-performance native snapshots](#), vSAN Max provides centralized shared storage with the same look and feel you might already be familiar with. If you are familiar with vCenter Server, you know vSAN. And if you know vSAN, you know vSAN Max.

The Power of Choice

How is vSAN Max different than vSAN HCI Mesh? To help understand the answer, let's look at the comparison in Figure 4.

- **Traditional HCI.** On the left we see traditional HCI provided by a vSAN HCI cluster, where compute and storage resources are aggregated in the same hosts that comprise the vSAN HCI cluster.
- **Cross-Cluster Capacity Sharing.** This represents the cross-cluster capacity sharing capabilities between vSAN HCI clusters. While the capabilities still exist within vSAN HCI clusters, the name "HCI Mesh" does not, and can be thought of as "*cross-cluster capacity sharing using vSAN HCI clusters.*" It continues to be an option for those who have stranded capacity or unique data services in one vSAN HCI cluster and wish to use it for VMs residing in another vSAN HCI cluster. This option will also allow compute clusters to mount the datastore of a vSAN cluster, but for a centralized shared storage solution, vSAN Max will be the best way to achieve supreme levels of scalability and flexibility.
- **Disaggregated Storage.** This is VMware's fully disaggregated topology using a vSAN Max storage cluster providing resources to one or more vSphere clusters. vSAN Max is incorporated as a first-class citizen in vCenter Server, where deployment, connectivity, and monitoring are all easy and intuitive throughout vCenter Server.

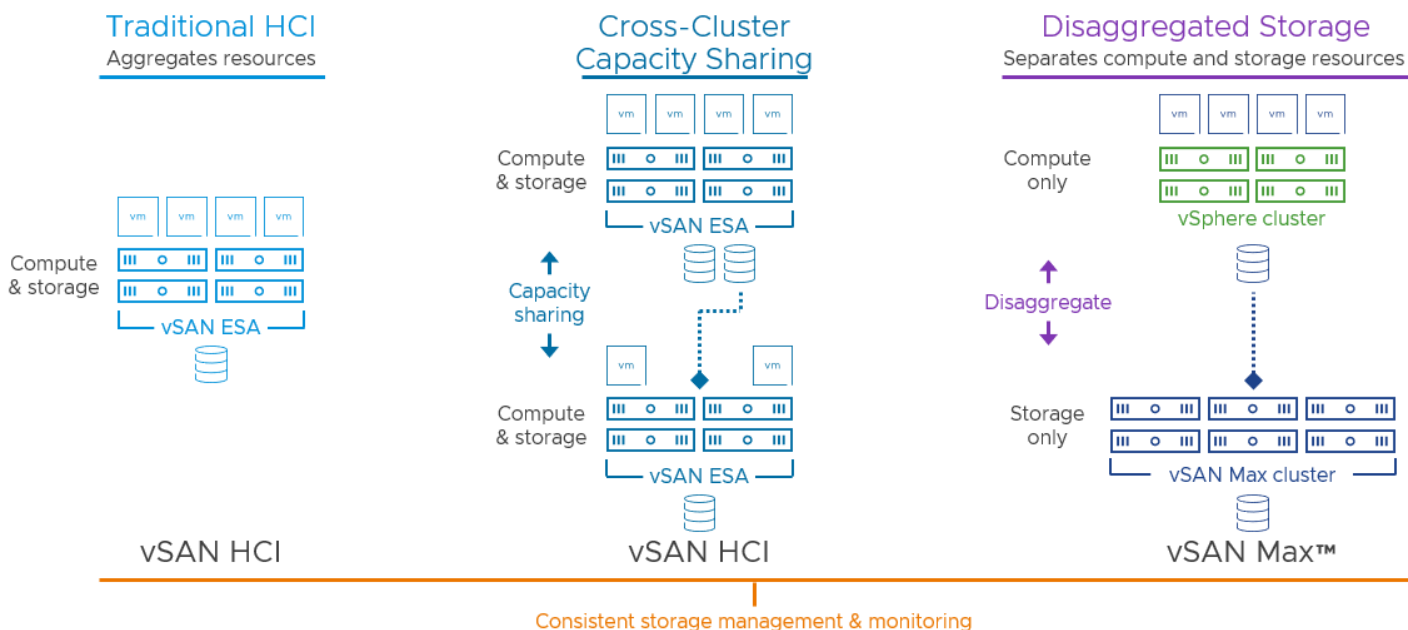


Figure 4. Comparing vSAN HCI, cross-cluster capacity sharing, and disaggregated storage using vSAN Max.

Does VMware prefer one over the other? No! This is about choice and flexibility to tailor systems to the specific needs of your organization. **We believe aggregated vSAN HCI clusters and disaggregated vSAN Max clusters can provide a powerful combination for your enterprise needs** - whether it be at the core, the edge, or the cloud.

Who is it for?

vSAN Max is an ideal shared storage solution for any environment running vSphere clusters. It can help address all of the common use cases that you may be serving using storage arrays yet it provides the incremental scalability, performance, and management capabilities that are associated with HCI.

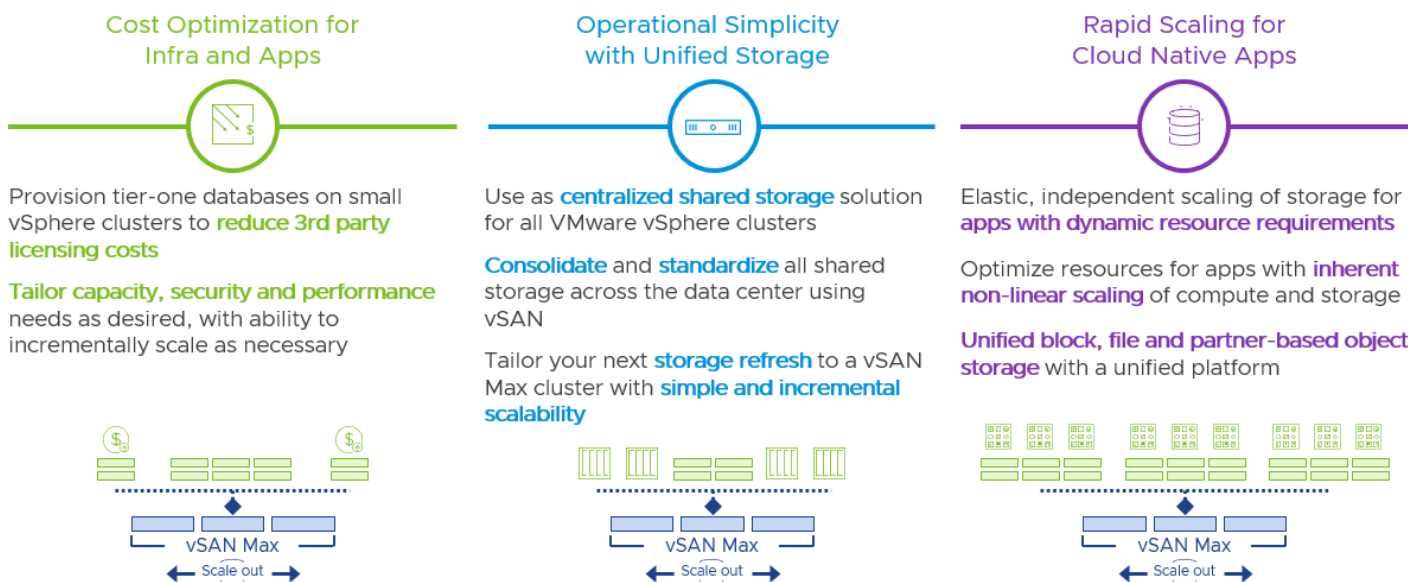


Figure 5. Common use cases for vSAN Max.

Learning More

We'll be elaborating in upcoming posts about the unique capabilities and possibilities of vSAN Max. For answers to common questions about vSAN Max, see the "[vSAN Max and Disaggregated Storage](#)" section of our [vSAN FAQs](#). For guidance on design, sizing, and operations, see the document "[vSAN Max Design and Operational Guidance](#)." To make learning about vSAN Max easy, all future topics on vSAN Max will be simul-posted on our dedicated [vSAN Max landing page](#) for your convenience.

For more information on the availability of vSAN Max, see the post: "[vSAN Max is Now Available.](#)"

Summary

The vSAN Express Storage Architecture introduced an all-new way to process and store data. vSAN Max uses the ESA to provide a fully distributed, elastic, shared storage solution for all your vSphere clusters. vSAN HCI clusters and vSAN Max disaggregated storage clusters are an incredibly powerful combination designed to meet all your needs in the data center and beyond.

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