

VMware Virtual SAN

SAP Applications

Hyper-Converged Infrastructure for Business Critical Applications

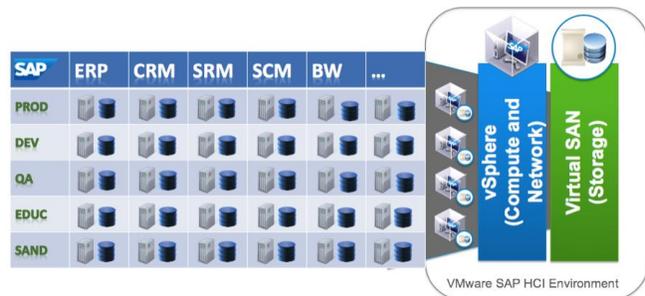
Customers deploying Business Critical Applications (BCAs) have requirements such as stringent SLAs, sustained high performance, and continued application availability. It is a major challenge for organizations to manage data storage in these environments. Common issues in using traditional storage solutions for BCAs include inadequate performance, storage inefficiency, difficulty to scale, complex management, and high deployment and operating costs.

VMware, the market leader in Hyper-Converged Infrastructure (HCI), enables low cost and high performance next-generation HCI solutions through the proven VMware Hyper-Converged Software (VMware HCS) stack. The natively integrated VMware HCS combines radically simple VMware Virtual SAN™ storage, the market-leading vSphere hypervisor, and the vCenter Server unified management solution all on the broadest and deepest set of HCI deployment options.

Virtual SAN is enterprise-class storage that is uniquely embedded in the hypervisor. Virtual SAN delivers flash-optimized, high-performance hyper-converged storage for any virtualized application at a fraction of the cost of traditional, purpose-built storage and other less-efficient HCI solutions. VMware has completed extensive technical validation to demonstrate Virtual SAN as an ideal storage platform for a variety of BCAs. A recent Virtual SAN customer survey also revealed that more than 60% of customers run their BCAs on Virtual SAN today, making BCA the most common use case.

Why Virtual SAN for SAP Landscapes?

Customers wanting to modernize their existing complex SAP environments can leverage Virtual SAN, running on both VMware and SAP certified x86 servers, to eliminate traditional IT silos of compute, storage, and networking. All intelligence and management moves into a single software stack, allowing a VM- and application-centric policy-based control and automation. This brings better security, higher performance, operational simplicity, and cost-effectiveness into SAP application environments.



Multiple SAP landscapes can be easily migrated from aged, bare-metal configurations to a modern, dynamic and consolidated hyper-converged infrastructure based on Virtual SAN.

Radically Simple Storage	Elastic Scalability, High Performance	Lower Storage TCO
<ul style="list-style-type: none"> • Two clicks to enable • Single pane of glass management • Policy-driven • Self-tuning • Integrated with VMware stack • Same one-stop support process as with vSphere • Ready for any SAP workloads 	<ul style="list-style-type: none"> • Built on high-performance standard x86 servers • Embedded in vSphere kernel with direct I/O path • Fast and flexible SAP deployments • > 6M IOPS per cluster • Scale from 2 to 64 nodes • Granular and linear scaling for SAP applications 	<ul style="list-style-type: none"> • Server-side economics • No large upfront investments, grow-as-you-go • Easy to operate with powerful automation • No specialized skillset required • Reliable and standard x86 hardware • SAP application-specifically sized buildings blocks

The benefits of running SAP applications on Virtual SAN include acceleration of legacy application migration, transformation of classic SAP applications to SAP HANA, lower CAPEX and OPEX, simple one-stop support process, high resiliency, improved availability, and many more.



Storage Policies Instead of Fixed, Static Storage Configurations

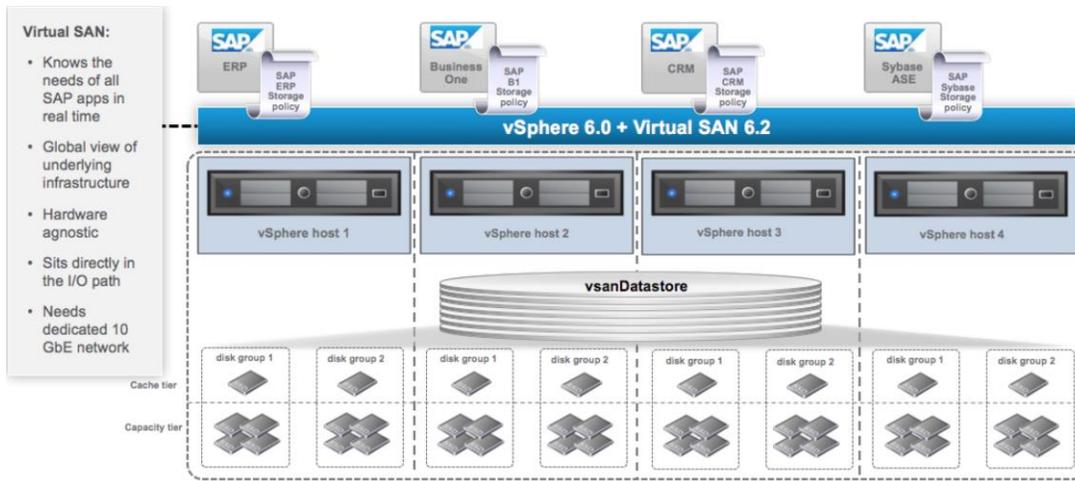
As a Software-Defined Storage (SDS) solution, Virtual SAN transforms the storage management paradigm via vSphere Storage Policy Based Management (SPBM). SPBM is the foundation of the SDS control plane and enables administrators to overcome upfront storage provisioning challenges such as capacity planning, differentiated service levels and managing capacity headroom. The storage classes of services for VMs become logical entities controlled entirely by software and interpreted through policies. Designing and making adjustments to these policies are flexible and real time, enabling automation of the provisioning process at scale while at the same time dynamically defining individual service levels for different SAP applications.

With SPBM, Virtual SAN allows administrators to adapt to ongoing changes of specific application requirements. Policies become the control mechanism for automating the monitoring process and ensuring compliance of storage service levels throughout the lifecycle of the application. This control plane is programmable via public APIs, enabling creation, consumption, and enforcement of policies through scripting and cloud automation tools.



High-Level Architecture

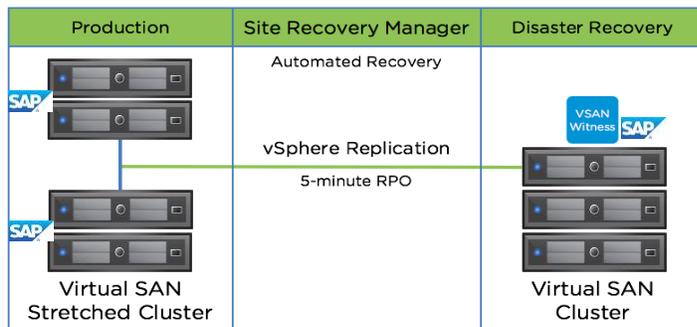
To ensure continued data protection and availability of SAP applications during planned or unplanned down time, a minimum of four nodes are recommended for the Virtual SAN Cluster.



A typical configuration includes two or more disk groups per node. Custom storage policies can be created for different SAP applications to satisfy performance, resource commitment, failure tolerance, checksum protection, and quality of service requirements in an application-centric way.

For business critical applications, an all-flash configuration is recommended for performance consistency and predictable latency. Virtual SAN 6.2 introduces a set of space efficiency features including near-line deduplication and compression, and Erasure Coding with RAID-5/6 support. Together, these features can reduce data capacity consumption by as much as 10x, significantly closing the gap of cost per GB between flash and 10K RPM drives while delivering a much better IOPS/GB performance. Virtual SAN is optimized for modern all-flash storage; minimal compute overhead and performance loss is incurred when these space efficiency features are turned on.

Virtual SAN Stretched Clusters and VMware Site Recovery Manager



For higher levels of SAP application availability across three sites, consider the use of a Virtual SAN stretched cluster with VMware Site Recovery Manager™. For example, two SAP production locations 100 kilometers apart could each house one half of a stretched cluster to protect against the failure of either location. A third location farther away hosts a second Virtual SAN cluster to supply compute, storage, and network resources for recovered virtual machines, as well as, any workloads that run on a regular basis at the disaster recovery site.

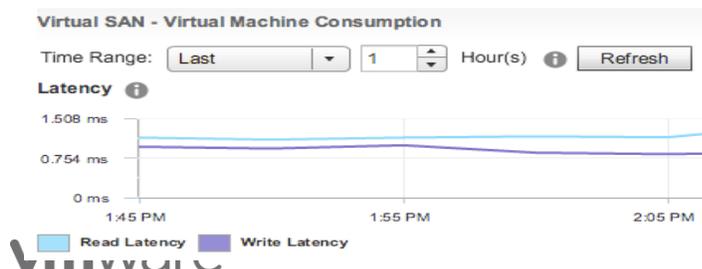
A Virtual SAN Stretched Cluster requires a “witness”, which is vSphere running in a virtual machine. The witness serves as a tie-breaker in certain situations such as loss of network connectivity between the two locations that make up a stretched cluster. The witness cannot be located within the same site as the stretched cluster so the disaster recovery site is the natural place to host this virtual machine appliance. Other SAP workloads running at a disaster recovery site might include test and development, QE, reporting, and so on.

Since stretched clusters essentially utilize synchronous replication between the two locations, an RPO of zero is achieved. That means no loss of data if one of the locations in the stretched cluster is offline. VMware vSphere High Availability automates the recovery of virtual machines affected by an outage at either location in the stretched cluster. Recovery time for these virtual machines is typically measured in minutes.

Replication from the stretched cluster to the disaster recovery site is facilitated by VMware vSphere® Replication™. Per-virtual machine replication RPOs between two Virtual SAN clusters can be as low as five minutes. Site Recovery Manager automates the failover and fail-back processes between the stretched cluster and the disaster recovery site.

Built-in Health Checks and Performance Statistics

Virtual SAN has built-in Health Service and Performance Service in the native vSphere Web Client to assist with day-0 deployment and day-2 operations. The Health Service feature monitors items such as network connectivity, cluster health, disk capacity, component metadata, and compliance with the VMware Compatibility Guide. These configuration items are automatically checked once per hour by default. If a problem is detected, an alert is raised proactively informing administrators of the issue.



Multiple performance metrics are available in the vSphere Web Client including throughput, IOPS, and latency. It is possible to look at data on various levels such as the Virtual SAN datastore, host, virtual machine, and virtual disk (VMDK) levels. The time range for these metrics can be set to the last x number of hours or a custom date and time range.

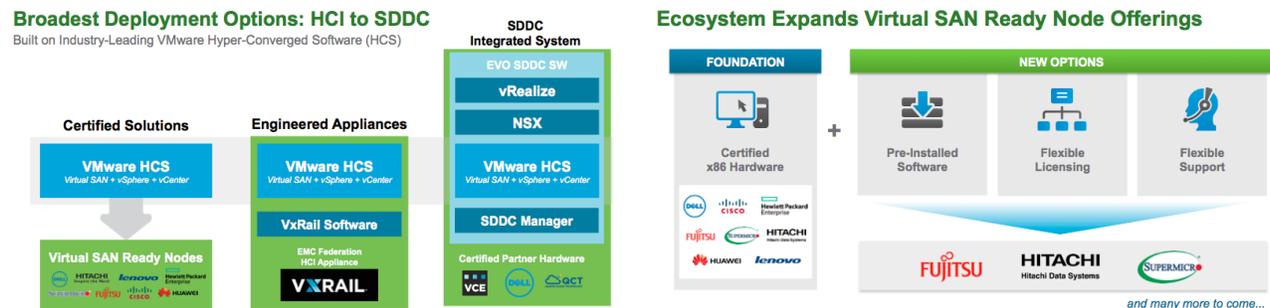
Virtual SAN Sizing for SAP Workloads

It is important to properly size the Virtual SAN configuration based on the capacity and performance requirements of SAP application workloads. When these requirements are not known, VMware recommends using the [VMware Virtual SAN Assessment](#) tool to analyze the SAP environment. Based on data collected during the assessment, the tool identifies all of the virtual machines that are suitable candidates for Virtual SAN and the best-fit architecture. Subsequently, the Virtual SAN cluster sizing recommendations can be automatically imported into the [Virtual SAN TCO and Sizing Calculator](#) for validation and recommended Ready Node configuration.

SAP also provides the [SAP Quick Sizer](#) tool to help perform SAP application sizing. The tool translates business requirements into technical requirements, ensuring that all the needed hardware components are used to build a balanced system. SAP's comprehensive sizing methodology results in proposals of the right combination of processing performance measured in SAP Application Performance Standard (SAPS), amount of disk space, disk I/O, and main memory. Factoring in a small virtualization overhead and Virtual SAN resource consumption, compute resources in a Virtual SAN based HCI system can be accurately sized against the desired SAPS requirement. SAPS numbers can also be used to translate into IOPS for different workloads such as OLTP or OLAP. Together, Virtual SAN Assessment and SAP Quick Sizer provide a systematic way of designing and sizing a Virtual SAN based HCI configuration that satisfies SAP application performance and capacity requirements. More importantly, Virtual SAN allows simple online scale-up and scale-out cluster expansion to meet increasing demands of dynamic SAP application environments.

Deployment Options

VMware HCS offers the industry's most flexible deployment options, including certified solutions, engineered appliances, and EVO SDDC integrated systems.



The Virtual SAN Ready Node program uniquely delivers the broadest set of certified hardware from all leading server vendors. This is a key driver behind Virtual SAN's rapid customer adoption and market leadership position. Partners can enable customers to design VMware HCS-based HCI systems with maximum flexibility of hardware, pre-installed software, licensing and support.

When considering hardware configurations for SAP applications, the recommended approach is to select from the large set of available Virtual SAN Ready Nodes, which are pre-configured with VMware HCS and validated to ensure compatibility. Additionally, it is necessary to validate that the servers used are also SAP supported.

Production Support

Virtual SAN is embedded in the vSphere hypervisor and is therefore fully supported in production for SAP applications, like SAP Business One and SAP NetWeaver based products, which are currently supported on vSphere as of SAP note 1492000 and 2161991.



Furthermore, VMware provides the one-stop support experience to customers running SAP applications on Virtual SAN. To escalate Virtual SAN related issues in these SAP environments, simply collect a VMware performance snapshot as described in SAP note 1158363 and vSphere support bundles. Next open a ticket directly with VMware and we will ensure the simplest and fastest route to resolution for the business critical SAP applications.

Summary

VMware Virtual SAN, vSphere, and vCenter Server® collectively power the best Hyper-Converged Infrastructure solutions for running and managing business critical applications that require predictable performance and high availability. The integration of Virtual SAN with vSphere simplifies administration with a single software stack and automation through storage policy-based management. Business-critical workloads such as SAP applications can benefit from shared storage without the cost and complexity of dedicated storage hardware. Virtual SAN Stretched Cluster provides the highest level of protection, coupled with vSphere SRM offering a comprehensive multisite DR solution. The health and performance levels of a Virtual SAN datastore are constantly monitored to lower risk before, during, and after a disaster recovery.

New Virtual SAN storage efficiency features drastically reduce TCO of all-flash configurations that offer consistent performance and predictable latency. Tools are available to help design and size a Virtual SAN cluster to satisfy the most demanding SAP applications. If more capacity is needed, it is simple to expand using a scale up or scale out approach without incurring any downtime. SAP applications are fully supported on Virtual SAN in production, with the industry's broadest deployment options available.

Learn More

- [VMware Virtual SAN](#)
- [SAP on VMware Virtual SAN](#)
- [VMware Virtual SAN 6.2 Design and Sizing Guide](#)
- [Virtual SAN Ready Nodes](#)
- [Virtual Blocks Blog](#)
- [VMware Success Stories](#)

