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VMware vSAN

Licensing, pricing and packaging

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Introduction

Hyperconverged infrastructure (HCI) converges compute and storage resources on industry-standard x86 servers, and uses software to abstract and pool cluster resources with unified management software. HCI transforms data centers by simplifying operations through automation, and lowering TCO by leveraging industry standard servers and scaling incrementally.

VMware's industry-leading HCI software stack consists of VMware vSphere® for compute virtualization, VMware vSAN™, vSphere integrated storage, and VMware vCenter® for virtual infrastructure management. VMware HCI is configurable and seamlessly integrates with VMware NSX® to provide more secure network virtualization and/or VMware vRealize® Suite for advanced hybrid cloud management capabilities. HCI can be extended to the public cloud as VMware-powered HCI has integrated services with six of the largest cloud providers: Amazon, Microsoft, Google Cloud, Alibaba, Oracle and IBM. Hundreds of public cloud providers also offer HCI as a service, including Rackspace, CenturyLink and OVH.

VMware vSAN enables customers to prime their business for growth through seamless evolution, leading flexibility, and hybrid cloud capabilities. vSAN is integrated with vSphere and requires no new tools. The industry-leading ecosystem of vSAN empowers customers to run HCI on certified solutions with their preferred vendor, and hybrid cloud capabilities provide customers consistent operations from edge to core to cloud, with intrinsic security throughout.

VMware provides the broadest choice of consumption options for HCI, including VxRail, a fully integrated HCI appliance from Dell EMC tailored for ease of deployment, and more than 500 precertified vSAN ReadyNodes from all major server vendors for complete flexibility in aligning with a customer's vendor preferences and experiences. VMware also offers a fully managed, on-premises infrastructure as a service (IaaS) with VMware Cloud™ on Dell EMC. Partners also offer IaaS, such as VMware Cloud Foundation™ on HPE Synergy with HPE GreenLake.

Licensing overview

VMware vSAN can be licensed on per CPU, per concurrent user in 10 or 100 license packs for virtual desktop infrastructure (VDI), and per virtual machine (VM) in 25-VM license packs for remote office/branch office (ROBO) implementations. All editions can be licensed on these three metrics except for vSAN Enterprise Plus, which is only available on a per-CPU license. For more details, see the [Virtual desktop infrastructure section](#) and the [Remote office/branch office section](#) of this white paper.

For any software offering that VMware licenses on a per-CPU basis, VMware requires one license for up to 32 physical cores. If a CPU has more than 32 cores, additional CPU licenses will be required. For more details, [read this FAQ](#).

Packaging overview

vSAN license editions include Standard, Advanced, Enterprise and Enterprise Plus. Table 1 shows the features included with each edition.

Edition	Standard	Advanced	Enterprise	Enterprise Plus
vSAN 7 U3				
Storage policy-based management	•	•	•	•
Virtual distributed switch	•	•	•	•
Rack awareness	•	•	•	•
Software checksum	•	•	•	•
All-flash hardware	•	•	•	•
iSCSI target service	•	•	•	•
Quality of service (QoS) – IOPS limit	•	•	•	•
Cloud native storage (CNS) control plane	•	•	•	•
vSphere container storage interface (CSI) driver	•	•	•	•
Shared witness	•	•	•	•
Deduplication and compression		•	•	•

Edition	Standard	Advanced	Enterprise	Enterprise Plus
RAID-5/6 erasure coding		•	•	•
VMware vRealize Operations™ within vCenter		•	•	•
Data-at-rest and data-in-transit encryption			•	•
Stretched cluster with local failure protection	• ¹	• ¹	•	•
File services			•	•
VMware HCI Mesh™ ²			•	•
Data Persistence platform for modern stateful services			•	•
vRealize Operations 8 Advanced ³				•

Table 1: License editions and product features.

¹ Two-node clusters only.

² Cross-cluster capacity sharing.

³ Refer to the [vRealize Operations datasheet](#) for details of vRealize Operations Advanced features.

Notes:

- The deduplication and compression and RAID-5/6 erasure coding features require an all-flash vSAN configuration. These features are not supported with hybrid vSAN configurations.
- vSAN Standard, Advanced and Enterprise are licensed per CPU (socket), per VDI, or per VM. vSAN Enterprise Plus is licensed per CPU only. These four vSAN editions are available as standalone licenses and are not included with vSphere. Mixed workloads (server and desktop) should be run on a vSAN cluster with per-CPU vSAN licensing.
- A vSphere host that is not contributing local storage to a vSAN datastore can be a member of the vSAN cluster and utilize the vSAN datastore. Even though a host is not contributing storage, the host must be licensed for vSAN.
- Customers can upgrade or downgrade license key versions in the VMware CustomerConnect™ portal by following the instructions in this [VMware knowledge base article](#). Edition downgrades are not supported.
- The complete list of features contained in a vSAN version is located on the [Cloud Platform Tech Zone](#).

vSAN 7.0 U2 introduced notable feature enhancements to VMware HCI Mesh and file services:

- VMware HCI Mesh now allows vSAN clusters to share storage capacity with compute clusters, or non-HCI vSphere clusters. Customers can now adopt HCI without needing to replace existing servers, scale compute and storage independently and precisely to meet application needs, and optimize resource utilization across clusters, all while maintaining the operational simplicity of HCI.
- To license a VMware HCI Mesh deployment for just vSAN clusters or for vSAN clusters sharing storage capacity with compute clusters, vSAN Enterprise or Enterprise Plus licenses and any edition of vSphere licenses are required for the vSAN cluster. vSphere licenses are required on the vSAN cluster to maintain a unified HCI management control plane. Note that the compute clusters require vSphere licenses but do not require vSAN licenses.
- File services now simplify backup of file shares with an API that will allow backup and recovery software vendors to integrate with vSAN file services. This API will make the backup software aware of vSAN file shares, enabling them to track the new data created and only backup the incremental data created since the last backup. In addition, VMware has added scalability enhancements to files: customers can now enable file shares on two-node vSAN deployments, making it a great option to replace low-end network-attached storage (NAS) filers in ROBO settings.

vSAN 7.0 U1 introduced new features and feature enhancements for file services:

- The Data Persistence platform provides a framework for VMware partners that offer modern stateful services, such as object storage and NoSQL databases, to integrate with the underlying virtual infrastructure. The integration allows customers to run stateful services with high-velocity scaling, simplified IT operations and optimized TCO.
- Developers can provision and scale services on demand with a Kubernetes API.
- Admins can rapidly deploy services and monitor the health and capacity of services from vCenter while easily keeping the services up and running during infrastructure maintenance and upgrades.
- Customers can deploy a stateful service alongside traditional applications on a regular vSAN cluster with the vSAN-SNA (vSAN Support for Shared Nothing Architecture) policy, or deploy it on a dedicated vSAN cluster with vSAN Direct Configuration™, a technology enabling direct access to the underlying direct-attached hardware that can be optimized for application needs. Both options benefit from optimal storage efficiency for modern stateful services by leveraging service-level replication, as well as unified management of services in vCenter.
- Each partner must develop their own plug-in for VMware customers to receive the benefits of the vSAN Data Persistence platform. The platform is not operational until the partner solution running on top is operational. vSphere Enterprise Plus, VMware Tanzu® Standard, and VMware NSX-T™ Advanced or above are required to use the Data Persistence platform. The Data Persistence platform is available in vSAN Enterprise and Enterprise Plus only.
- VMware HCI Mesh brings together multiple independent vSAN clusters for a native, cross-cluster architecture that disaggregates resources and enables utilization of stranded capacity. VMware HCI Mesh is available with vSAN Enterprise and Enterprise Plus.
- Data-in-transit encryption delivers over-the-wire encryption for data between the vSAN nodes using native encryption with vSAN and is simple to implement with no key management server (KMS) required. Data-in-transit encryption is available in vSAN Enterprise and Enterprise Plus.
- Shared witness enables multiple two-node vSAN deployments to share a common witness instance, with up to 64 clusters max per single shared witness host, reducing resources required for ROBO deployments. Shared witness is available in all vSAN editions.
- File services now support the SMB protocols in addition to NFS protocols. vSAN file services also add critical capabilities that make it enterprise ready, with Active Directory integration and Kerberos support. File services are only available in vSAN Enterprise and Enterprise Plus.

vSAN 7.0 introduced file services. A file service is a layer that sits on top of vSAN to provide file shares. It currently supports NFSv3 and NFSv4.1 file shares. A vSAN file service comprises of the vSAN Distributed File System, which provides the underlying scalable file system by aggregating vSAN objects, a storage services platform that provides resilient file server endpoints, and a control plane for deployment, management and monitoring. File shares are integrated into the existing vSAN storage policy-based management and on a per-share basis. vSAN file service brings in the capability to host NFS file shares directly on the vSAN cluster.

vSAN 6.7 U3 included two major changes in vSAN licensing model. vSAN added a fourth edition, vSAN Enterprise Plus, which is a bundle of vSAN Enterprise and vRealize Operations Advanced features. This release also added the CNS control plane and the vSphere CSI driver features, which are included in all the vSAN editions.

vSAN 6.6 introduced vSAN data-at-rest encryption, which requires an external KMS that provides the primary encryption key. This key is used to encrypt other keys in the cluster. While VMware does not provide a KMS solution, vSAN encryption is certified to work with enterprise-grade key management servers. Please note that KMS vendors may have an additional licensing requirement. Different KMS vendors offer different license options; please check with the KMS vendor for further details. For a list of certified KMS vendors, refer to the [VMware compatibility guide](#).

Upgrades

Customers who would like to upgrade an existing vSAN license edition to a higher edition to enable additional functionality can purchase upgrades. For example, an organization that utilizes vSAN Advanced can purchase an upgrade to vSAN Enterprise to enable a stretched cluster architecture. Consult with your preferred reseller to get the current list of available upgrades and pricing.

Note: Availability, pricing and packaging can change at any time without warning. It is always best to consult with your preferred reseller to get current pricing and packaging options for any VMware solution.

Virtual desktop infrastructure

vSAN for Desktop licensing is available for customers using vSAN exclusively for VDI. This includes third-party VDI solutions in addition to VMware Horizon®. While this license option limits the use of vSAN to VDI workloads only, vSAN for Desktop provides unique pricing and packaging options to help further reduce the cost of VDI while enabling the benefits and performance of a distributed storage platform. vSAN for Desktop is available in Standard, Advanced and Enterprise editions. It is priced per concurrent user (CCU) in a virtual desktop environment and sold in packs of 10 and 100 licenses.

vSAN Advanced CCU licenses are now included in the following Horizon bundles: Horizon Advanced Term, Horizon Enterprise Term, and Horizon Universal Subscription. Note that vSAN Advanced CCU licenses are not included in any of the Horizon perpetual bundles. More information on Horizon bundles can be found in the [Horizon Subscription feature comparison matrix](#) and [Horizon Perpetual and Term feature comparison matrix](#).

Remote office/branch office

vSAN is an excellent solution for ROBO implementations, as described in the [vSAN remote office deployment](#) solution overview. vSAN for ROBO licenses are priced per VM and sold in packages of 25 licenses. A 25-pack of licenses can be shared across multiple locations; for example, five remote offices each running five VMs. This approach provides deployment flexibility and helps minimize the cost of smaller infrastructures commonly found at remote offices.

Each remote office is limited to a maximum of 25 VMs under the vSAN for ROBO licensing model. If more than 25 VMs are running at a remote office, vSAN Standard, Advanced or Enterprise per CPU licensing must be used. Any number of hosts can be licensed with vSAN for ROBO Standard, Advanced or Enterprise as long as the number of VMs running on a vSAN cluster at a single location is 25 or less.

It is possible to start with vSAN for ROBO licenses and then switch to vSAN Standard, Advanced or Enterprise per CPU licenses without disruption when a remote office grows beyond 25 VMs. The definition of a remote office or branch office is any remote physical location other than a primary data center. It is important to note there is no upgrade/conversion path from vSAN for ROBO per-VM licenses to vSAN Standard, Advanced, Enterprise and Enterprise Plus per-CPU licenses.

Two-node architecture

Another important item to discuss is the deployment of a two-host architecture, which is supported and common in remote office implementations. A two-host, or two-node, architecture consists of two physical vSphere hosts in a cluster running vSAN. More details on two-node vSAN architecture can be found on the [Cloud Platform Tech Zone](#). The example in Figure 1 shows a main data center and three remote offices. Each remote office has a two-node vSAN cluster, and a witness host for each cluster runs at the main data center.

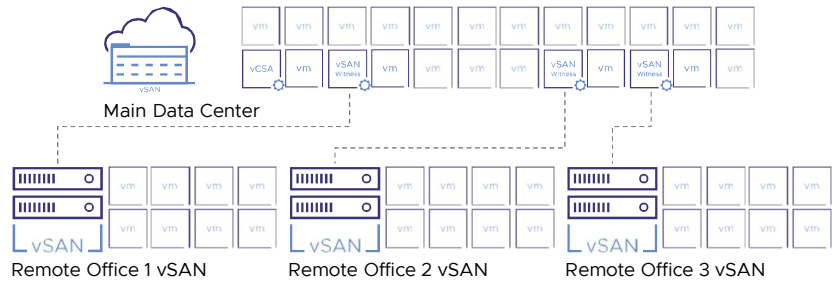


Figure 1: vSAN ROBO deployment.

The vSAN witness appliance is deployed from an OVA file and includes an embedded license. There is no need to purchase a vSphere license for the vSAN witness host when a vSAN witness appliance is used. If the vSAN witness host is a physical machine, a vSphere license for this host is required. Figure 2 shows the selection of the vSphere license for the witness host virtual appliance.

Licenses			
License	License Key	Product	Usage
License 1	NH2HM-XXXXX-XXXXX-XXXXX-28DNP	VMware vSphere 6 for Vi...	2 CPUs
VSOM Ent Plus	4JZJ6-	VMware vSphere with O...	0 CPUs

Figure 2: vSAN witness license.

When using vSphere Essentials bundles

vSphere Essentials Kit or vSphere Essentials Plus Kit licensing limits the number of hosts managed by vCenter Server® for Essentials™ to three:

- When using a physical host as the vSAN witness host, it is considered a host by the Essentials licensing bundle.
- When using the vSAN witness appliance as the vSAN witness host, it is not considered a host by the Essentials licensing bundle. This is because VM workloads are not supported nor allowed to run on the vSAN witness appliance.

Here is an example of a supported configuration:

- One physical host is at the main data center and managed by vCenter Server that is licensed with vCenter Server for Essentials.
- Two physical hosts at a remote office are running a two-node vSAN configuration managed by the same vCenter Server.
- The vSAN witness appliance deployed at the main data center is used as a vSAN witness host for the two-node vSAN configuration.
- The vSAN witness appliance must be added to vCenter prior to the third physical host being added to vCenter.
- A warning message will be generated when attempting to add the vSAN witness appliance as a vSAN witness host after the three physical hosts have been added.

Note: The order of operation is important; vCenter does not recognize the vSAN witness appliance as a virtual host until after it is added to vCenter.

Stretched cluster with local failure protection

Two-host vSAN clusters can be deployed as a stretched cluster with any vSAN license edition. More details on two-node vSAN architecture can be found on the [Cloud Platform Tech Zone](#).

The stretched cluster feature for cluster configurations with three or more hosts is available with vSAN Enterprise and Enterprise Plus.

The vSAN stretched cluster feature in vSAN Enterprise for ROBO is allowed for the following configurations:

- A stretched cluster within a ROBO site may be used when no more than 25 total powered-on VMs are running on the vSAN stretched cluster.
- A stretched cluster across two ROBO sites may be used when no more than 25 total powered-on VMs are running across the two ROBO sites and ensure that, in case of a site failure, the surviving ROBO site will have no more than 25 total powered-on VMs.

The vSAN stretched cluster feature in vSAN Enterprise for ROBO is not allowed for a stretched cluster configuration between a ROBO site and a site such as a primary data center. This scenario would require a traditional vSAN Enterprise license. Mixing ROBO and per-CPU traditional licensing is not possible because:

- A ROBO license may not be used in a site that is not categorized as ROBO. Stretching a vSAN cluster using a ROBO license might lead to ROBO-licensed VMs migrating to a non-ROBO site that is not compliant.
- A vSAN cluster may not use mixed licensing because a single vSAN license is applied to each vSAN cluster. Stretching between a data center and a ROBO site would require mixing per-CPU licenses in the data center with per-VM licenses in the ROBO site.

Therefore, it is recommended that customers use traditional per-CPU vSAN Enterprise licensing for this scenario.

VMware HCI Kit bundles

New licensing and packaging options were introduced with vSAN. VMware HCI Kit™ bundles simplify the purchase of vSphere and vSAN licenses. There are five data center kits with per-CPU licensing and two ROBO kits with per-VM licensing:

- VMware HCI Kit Essentials (per 6 CPUs) includes vSphere Essentials plus and vSAN Standard.
- VMware HCI Kit Standard (per CPU) includes vSphere Standard and vSAN Standard.
- VMware HCI Kit Advanced (per CPU) includes vSphere Enterprise Plus and vSAN Advanced.
- VMware HCI Kit Enterprise (per CPU) includes vSphere Enterprise Plus and vSAN Enterprise.
- VMware HCI Kit with Operations Management™ (per CPU) includes vSphere Enterprise Plus, vSAN Enterprise, and vRealize Operations Advanced.
- VMware HCI Kit ROBO Standard (per 25 VMs) includes vSphere ROBO Enterprise and vSAN ROBO Standard.
- VMware HCI Kit ROBO Advanced (per 25 VMs) includes vSphere ROBO Enterprise and vSAN ROBO Advanced.

Note: A maximum of one ROBO pack can be deployed per remote office site. A ROBO license pack can be split across sites; for example, five remote office sites with five VMs each would require only one ROBO license pack. VMware HCI Kit Essentials is the only bundle that comes with vCenter Server for Essentials (vSphere Essentials Plus Kit contains vCenter Server for Essentials).

Licensing scenarios

This section contains several example vSAN implementation scenarios and vSAN licensing for these scenarios. All scenarios utilize hosts that have two populated CPU sockets and CPUs with less than 32 physical cores unless otherwise noted.

Scenario 1: 16-host all-flash vSAN cluster for server workloads requiring data-at-rest encryption.

32 vSAN Enterprise licenses are needed. Data-at-rest encryption is a feature included only in the Enterprise edition of vSAN.

Scenario 2: 8-host all-flash vSAN cluster virtual desktops with 180 concurrent users.

vSAN for Desktop Advanced or Enterprise licenses (two CCU 100 packs) would likely be the best choice, although it is possible to license this cluster with vSAN for Desktop Standard licenses. Standard license editions also support the use of all-flash hardware. However, Advanced and Enterprise licenses enable the use of deduplication, compression and erasure coding. These vSAN space efficiency features typically provide a considerable reduction in the cost per usable gigabyte of capacity.

Scenario 3: 20-host hybrid vSAN configuration running a combination of desktop workloads and server workloads other than the servers supporting virtual desktops in a primary data center.

40 vSAN Standard per-CPU licenses are required to properly license this cluster. Even though there are some virtual desktops running in this cluster, vSAN for Desktop licensing cannot be used as there are also non-desktop workloads present.

Note: While it is possible to mix server and virtual desktop workloads in a vSAN cluster, VMware recommends a dedicated cluster for larger virtual desktop deployments.

Scenario 4: 2-host all-flash vSAN cluster running 10 VMs in a remote office.

There are less than 25 VMs running at this office, which means vSAN for ROBO Standard licenses can be used. vSAN for ROBO Advanced licenses would enable deduplication, compression and erasure coding features. vSAN for ROBO Enterprise licenses would enable data-at-rest encryption and stretched cluster with local failure protection features.

Scenario 5: 3-host all-flash vSAN cluster at a remote office running 30 VMs.

vSAN for ROBO licenses cannot be used in this scenario because the number of VMs is more than 25. Six vSAN Standard per-CPU licenses are needed as there are three hosts each with two CPUs. vSAN Advanced licenses would enable deduplication, compression and erasure coding as this is an all-flash configuration. However, a minimum of four hosts are required for erasure coding.

Scenario 6: Three remote offices each with a two-host hybrid vSAN cluster. The first remote office is running 10 VMs. The second remote office is running 12 VMs. The third remote office is running 28 VMs.

A 25 pack of vSAN for ROBO Standard licenses would cover the first and second remote offices. The third remote office would require four vSAN Standard licenses as there are more than 25 VMs running at this location.

Scenario 7: Remote office licensed with vSAN for ROBO Standard (per-VM 25 pack) originally running 20 server VMs on three physical hosts. The number of VMs has grown to 30.

vSAN for ROBO licenses enable up to 25 VMs to be licensed at a single remote office location. In this scenario, the number of VMs at the remote office has grown beyond the limit. The vSAN for ROBO licenses must be replaced with per-CPU licenses (vSAN Standard, Advanced or Enterprise). There is no upgrade path or conversion from vSAN for ROBO to vSAN per-CPU licenses. The vSAN for ROBO licenses can be repurposed for another remote office location with 25 VMs or less.

Scenario 8: 12-host vSAN stretched cluster with six hosts at a primary location and six hosts at a secondary location. A vSAN witness host (virtual appliance) is deployed at a third location.

This scenario requires 24 vSAN Enterprise per-CPU licenses. The witness virtual appliance includes a vSAN license.

Scenario 9: 1 host plus 1 host plus a witness (two-node cluster) across three rooms in the same building with a maximum of 25 VMs.

This scenario requires either one vSAN Standard for ROBO (per-VM 25 pack) license or four vSAN Standard per-CPU licenses.

Scenario 10: 1 host plus 1 host plus a witness (two-node cluster) across physical sites with a maximum of 25 VMs.

This scenario requires either one vSAN Standard for ROBO (per-VM 25 pack) license or four vSAN Standard per-CPU licenses. The customer does not require Enterprise licenses for a two-node cluster stretched across two physical sites.

Scenario 11: 3 hosts plus 3 hosts plus a witness (stretched cluster) across three rooms in the same building with a maximum of 25 VMs.

This scenario requires either one vSAN Enterprise for ROBO (per-VM 25 pack) license or 12 vSAN Enterprise per-CPU licenses. The stretched cluster feature is only available in vSAN Enterprise. Learn more about the vSAN stretched cluster feature in vSAN Enterprise for ROBO in the Stretched cluster with local failure protection section.

Scenario 12: 3 hosts plus 3 hosts plus a witness (stretched cluster) across physical sites with a maximum of 25 VMs.

This scenario requires either one vSAN Enterprise for ROBO (per-VM 25 pack) license or 12 vSAN Enterprise per-CPU licenses. The stretched cluster feature is only available in vSAN Enterprise. Learn more about the vSAN stretched cluster feature in vSAN Enterprise for ROBO in the Stretched cluster with local failure protection section.

Summary

- vSAN works with any edition of vSphere (main editions, Acceleration Kit bundles, Essentials Kit bundles, vSphere Scale-Out™, ROBO, Desktop).
- vSAN Standard, Advanced, Enterprise and Enterprise Plus licenses are per-CPU (socket) licenses. All hosts in the cluster must be licensed.
- All-flash vSAN configurations are supported with the Standard license. Deduplication, compression and erasure coding require Advanced, Enterprise or Enterprise Plus licenses.
- Data-at-rest encryption requires Enterprise and Enterprise Plus licenses.
- A two-host vSAN cluster with a witness host can be deployed with any license edition, whether the physical hosts are at the same site or different sites.
- Stretched clusters with three or more physical hosts plus a witness host require vSAN Enterprise or Enterprise Plus licensing.
- vSphere and vSphere with Operations Management™ licenses do not include vSAN.
- vSAN for Desktop licenses are per-CCU licenses available in a pack of 10 and 100.
- vSAN for ROBO license are per-VM licenses available in a pack of 25.
- vSAN for ROBO licenses can be spread across multiple remote offices.
- Only one vSAN for ROBO Standard, Advanced or Enterprise license (25 pack) can be used at a remote office. Running more than 25 VMs at a single remote office location disqualifies the use of vSAN for ROBO licensing at that location.
- vSAN for Desktop licenses can only be used to run virtual desktop workloads.

