

VMware vSAN on Dell PowerEdge Servers

Dell vSAN

Getting Started Guide

Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

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About this document

This document provides the guidelines and instructions to be followed when deploying VMware vSAN on Dell PowerEdge servers. It also provides the supported configurations and the required information for building a vSAN ReadyNode or scaling an existing vSAN ReadyNode. This getting started guide provides details about Dell vSAN Original Storage Architecture (OSA) and Express Storage Architecture (ESA) ready nodes that are introduced from vSphere 8.0.

Introduction to VMware vSAN

VMware vSAN is a Hyper-Converged Infrastructure (HCI), software-defined storage platform that is integrated with VMware vSphere. vSAN aggregates locally attached disk from the hosts participating in the vSphere cluster, creating a distributed shared vSAN datastore. vSAN is the first policy-driven storage solution from VMware that is designed for simplifying storage provisioning and management in vSphere environments. In order to achieve fault tolerance and performance, the virtual machines that are deployed on a vSAN datastore use VM level storage policy. For more information about vSAN, see [VMware vSAN product page](#).

With the release of vSphere 8.0, VMware introduced two powerful storage architectures for hyper-converged infrastructure (HCI):

- vSAN Original Storage Architecture (OSA)
- vSAN Express Storage Architecture (ESA)

vSAN Original Storage Architecture

vSAN OSA is a proven, flexible solution built on a two-tier architecture that includes:

- Dedicated cache and capacity devices
- Disk groups that optimize performance through caching and provide scalable storage capacity
- Support for a wide range of legacy storage devices, making it ideal for diverse environments

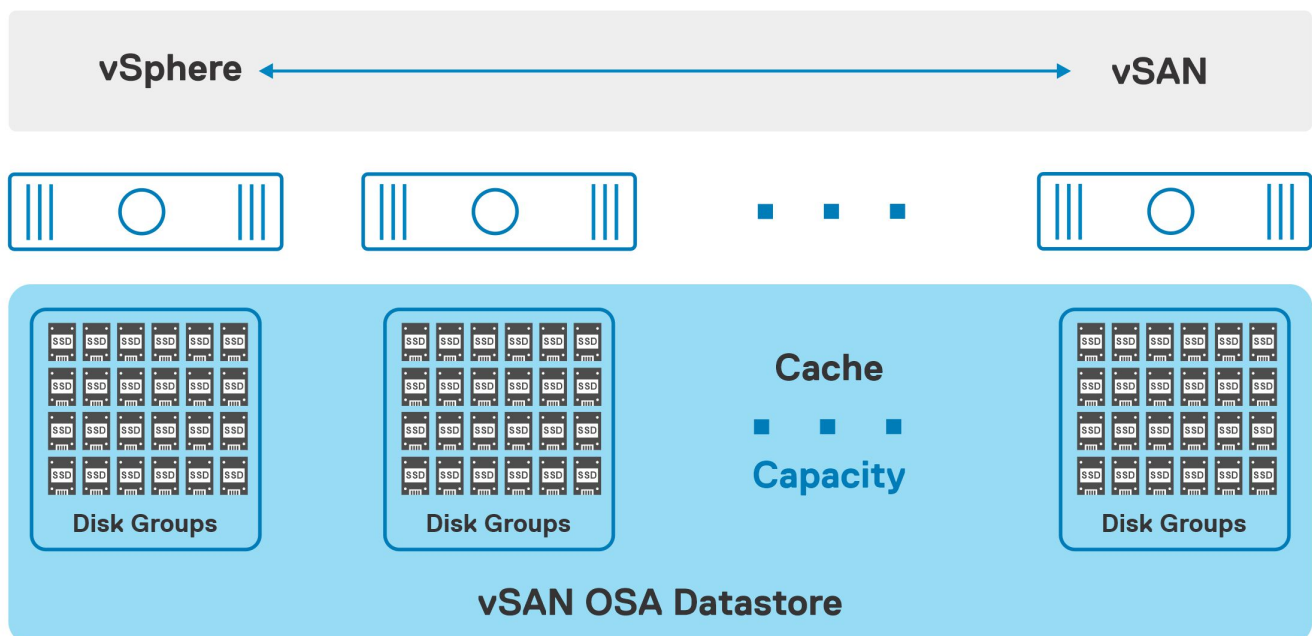


Figure 1. vSAN OSA Datastore

You can deploy vSAN in two configurations:

- **All-Flash:** Uses flash devices for both cache and capacity layers, delivering high-speed performance
- **Hybrid:** Combines flash for caching with magnetic disks for capacity, offering a cost-effective balance of performance and storage

To build your vSAN HCI cluster, you have two options:

- Select from the list of Dell vSAN Ready Nodes
- Build your own based on certified components

vSAN also includes enterprise-grade features such as:

- Storage policy-based management for granular control
- Data-at-rest encryption to protect sensitive information
- Stretched cluster support for enhanced availability
- End-to-end checksums to ensure data integrity

vSAN Express Storage Architecture

With the launch of vSphere 8.0, VMware introduced **vSAN Express Storage Architecture (ESA)**—a next-generation storage architecture designed to deliver exceptional performance and efficiency for modern workloads.

vSAN ESA is an optional alternative to the traditional vSAN architecture, offering:

- Optimized performance through a redesigned data path
- Improved resource efficiency for faster operations and reduced overhead
- Enhanced scalability and resilience, ideal for demanding enterprise environments

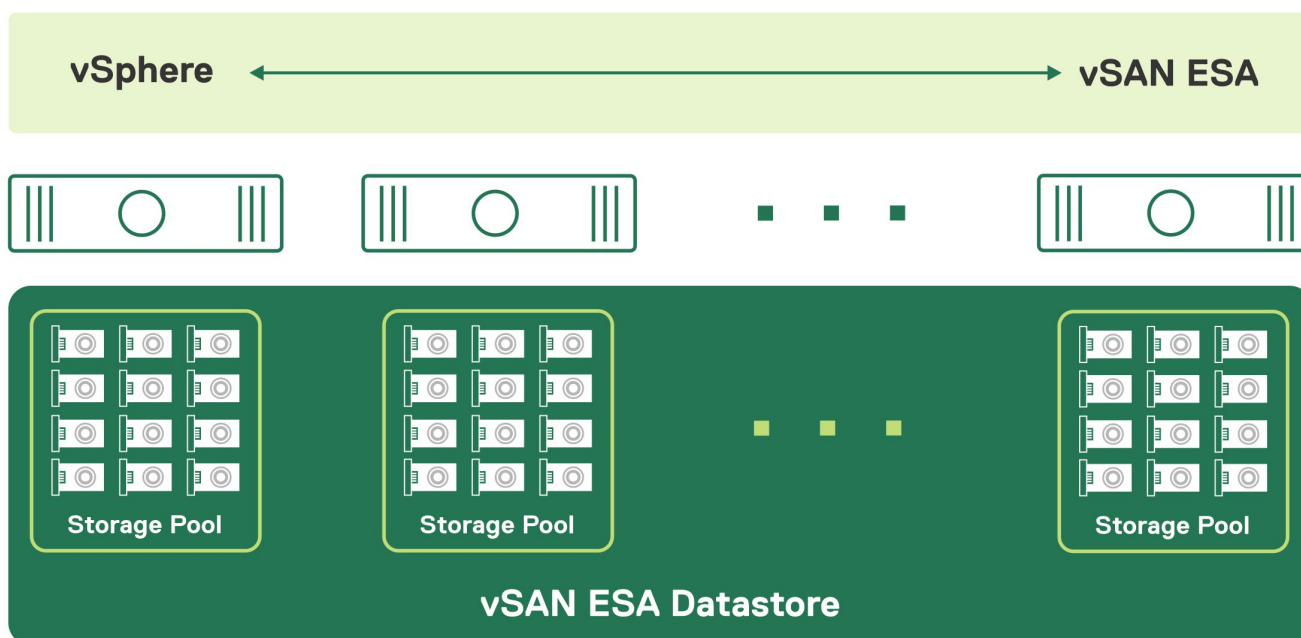


Figure 2. vSAN ESA Datastore

- Flexible architecture using single tier in vSAN 8
- Optimized for high-performance NVMe based flash devices
- Replace the concept of disk groups with Storage pool. All devices contribute to performance and capacity

This architecture is built to take full advantage of high-performance hardware, including NVMe-based storage devices, and is tailored for environments that require speed, simplicity, and robust data services. For more information about vSAN ESA, see [VMware Cloud Foundation \(VCF\) Blog](#).

Dell vSAN ReadyNode—Original Storage Architecture

Dell offers a range of **vSAN Ready Nodes (vSRNs)** designed specifically for VMware's **Original Storage Architecture (OSA)**. These pre-certified hardware configurations are jointly validated by Dell and VMware, making them a reliable choice for deploying hyper-converged infrastructure (HCI) in enterprise environments.

- **Certified and Predefined:** Each vSRN is built on Dell PowerEdge servers and includes pre-configured components such as processors, memory, storage controllers, SSDs, and HDDs—all certified to run specific versions of VMware vSAN.
- **Optimized for Automation:** Ideal for large-scale data centers, vSRNs serve as hyper-converged building blocks that simplify deployment and streamline operations.
- **Flexible Performance Profiles:** Dell offers multiple ReadyNode profiles to meet diverse workload requirements, including high-performance NVMe configurations.

Configuration options

Dell vSRNs are available in two main profiles:

- **All-Flash (AF):** Uses only SSDs (SAS, SATA, or NVMe) for both cache and capacity tiers, delivering high-speed performance.
- **Hybrid (HY):** Combines SSDs for caching with HDDs for capacity, offering a cost-effective balance of performance and storage.

 **NOTE:** Profiles are designed based on specific performance and design considerations. For details, refer to the vSAN Hardware Quick Reference Guide.

Drive replacement guidelines

- Drives in both cache and capacity tiers can be replaced with models offering higher capacity, performance, or endurance—provided they are listed in the VMware Compatibility Guide (VCG).
- Dell recommends maintaining a homogeneous vSAN cluster to ensure consistent performance.
- Replacing a capacity-tier drive with a larger one will increase the overall vSAN storage size.
- NVMe-based All-Flash configurations are available for workloads requiring maximum throughput and low latency.

 **NOTE:** If replacing a drive with a different model, ensure compatibility and be aware that performance may vary.

For more information, see [Broadcom Compatibility Guide for Dell](#), [ESXi-vSAN versioning](#), and [VMware blog](#).

Dell vSAN ReadyNode—Express Storage Architecture

With the introduction of **vSphere 8.0**, VMware launched the **vSAN Express Storage Architecture (ESA)**—a modern, high-performance alternative to the traditional vSAN architecture. Dell supports this innovation with a range of **vSAN Ready Nodes** purpose-built for ESA.

Key highlights of Dell ESA Ready Nodes

- **Certified for ESA:** Dell's ESA Ready Nodes are listed in the Broadcom Compatibility Guide. Select:
 - Category: vSAN Express Storage Architecture (ESA)
 - Vendor: Dell
 - Choose the ReadyNode profile and server model that best fits your workload needs
- **Simplified Storage Design:** Unlike OSA, ESA uses a **single-tier storage pool**—eliminating the need for separate cache and capacity devices. This streamlined approach boosts performance and simplifies management.
- **Predefined & Certified Components:** Each ESA Ready Node includes certified hardware such as processors, memory, storage controllers, and NVMe drives—all optimized for ESA.

 **NOTE:** vSAN ESA support is limited to the server model which is listed in [vSAN ReadyNodes—Broadcom Compatibility Guide](#). Building your own vSAN ESA cluster is not supported.

Branded and Certified PowerEdge vSAN Nodes

All vSAN Ready Nodes offered by Dell are Certified by VMware, ensuring they meet VMware's standards for compatibility and performance. However, not all Certified vSAN Ready Nodes are Dell-branded. For our most popular platforms, Dell adds an extra layer of value by branding these nodes within the Dell portfolio. This topic explains the differences between branded and Certified vSAN Ready Nodes.

Certified vSAN Ready Nodes

- Fully validated by VMware to ensure compatibility and performance.
- Available across a wide range of Dell PowerEdge servers.
- Designed to help build a reliable and efficient vSAN environment, simplifying deployment and management.

Dell branded vSAN Ready Nodes

A subset of Certified nodes enhanced with Dell-specific features:

- [Identity Module \(IDM\)](#) added to the iDRAC, enabling smooth integration with OpenManage Enterprise Integration for VMware vCenter (OMEVV) and supporting vSphere Lifecycle Manager (vLCM) for simplified updates and automation. For more information, see [Phenomenal Power: Automating Dell vSAN Ready Nodes](#).
- Dell Service Tag (Express Service Code) included, ensuring that support calls are routed directly to Dell's vSAN Ready Node support team for faster resolution.

Table 1. Branded and Certified PowerEdge vSAN Nodes

Branded ESA	Branded OSA	Certified ESA	Certified OSA
R650, R660	R650, R660	R650, R660	R650, R660, R650xs
R750, R760	R750, R760	R750, R760, R750xa R760xa	R750, R760, R750xa R760xa, R750xs
R6515, R6615	R6515, R6615	R6515, R6615	R6515, R6615
R7515, R7615	R7515, R7615	R7515, R7615	R7515, R7615
		R6525, R6625	R6525, R6625
R7625	R7625	R7525, R7625	R7525, R7625
	T350		
MX760c	MX750c, MX760c	MX750c	MX750c, MX760c
		XR4510C, XR4520C	XR4510C, XR4520C
		XR7620, XR5610	XR11, XR12, C6520, C6620
R770, R670		R770, R670	
R7715, R7725, R6715		R7715, R7725, R6715, R6725	

User-defined vSAN OSA cluster or build your own configurations

A **user-defined vSAN cluster**, also known as a **"build your own" configuration**, allows you to create a customized vSAN deployment using certified hardware and software components. This option is available **only for vSAN Original Storage Architecture (OSA)**.

You can deploy vSAN by using one of the following:

- Dell vSAN ReadyNodes: Pre-certified configurations jointly validated by Dell and VMware
- User-defined configurations: Select individual components such as server model, CPU, memory, storage controllers, NICs, SSDs/HDDs, and compatible software versions from the VMware Compatibility Guide (VCG)

Dell recommends using ReadyNodes for simplicity and reliability, but also supports custom builds if all components meet certification requirements. When selecting cache and capacity drives, ensure they meet the required **endurance and performance categories** listed in the VCG. For best practices and sizing guidance, see [vSAN Design and Sizing Guide](#).

Support limitations for User-defined vSAN OSA cluster

User-defined vSAN cluster has the following limitations:

- **Processor Requirements:** For systems using Intel Granite Rapids processors, Intel Sub-NUMA Cluster (SNC), LLC Prefetch, and Low Latency Optimization (LOM) must be enabled in the BIOS.
- **Upgrade Path:** Upgrades to VMware ESXi or vSAN 9.0 are only supported from ESXi 8.x. Direct upgrades from ESXi 7.x or earlier are not supported.
- **Controller Compatibility:** Dell recommends using HBA330, HBA345, HBA350, or HBA355 controllers for 14G PowerEdge systems or newer.

 **NOTE:** H7xx RAID controllers are not supported for vSAN on 14G or later systems.

- **Operating System Consistency:** Mixed OS versions within a vSAN cluster are not supported.
- **Drive Encryption:** SED drives with hardware encryption enabled are not supported. However, they can be used if encryption is disabled.
- **Drive Format:** 4Kn drives are not supported in vSAN environments.
- **Boot Devices:** Dell supports various boot options including iSDM-based SD cards, BOSS controllers, onboard SATA, and rear drives.

 **NOTE:** iSDM is not recommended for vSphere 7.x and above due to write endurance concerns, though it remains supported for existing customers.

For more information, see *VMware vSphere ESXi 8.x on Dell PowerEdge Systems Getting Started Guide* and *VMware vSphere 7.x on Dell PowerEdge Systems Getting Started Guide* at [Virtualization solutions](#).

vSAN firmware catalog

The **VMware vSAN Firmware Catalog** is designed to help customers maintain a consistent and supported firmware state across their vSAN clusters. When used alongside **Dell-customized VMware ESXi ISO images**, it ensures that all firmware and driver versions are aligned with VMware and Dell certification standards.

Key benefits

- **Certified Firmware Versions:** Lists supported firmware for all vSAN components specific to Dell vSAN Ready Nodes.
- **Simplified Lifecycle Management:** Helps achieve a desired and validated cluster state with minimal manual effort.
- **Supports Both OSA and ESA:** Applies to Dell Ready Nodes for both Original Storage Architecture (OSA) and Express Storage Architecture (ESA)—as long as the server model is listed in the [Broadcom Compatability Guide](#).

 **NOTE:** This catalog is intended only for Dell vSAN Ready Nodes listed on the VMware Hardware Compatibility List (HCL). For non-vSAN ESXi use cases, refer to the separate [firmware catalog released for Dell VMware ESXi](#).

For more details, see:

- [Firmware Catalog for Dell vSAN Ready Nodes](#)
- [Firmware catalog for Dell customized VMware ESXi images](#)

Getting help

Contacting Dell

Dell provides several online and telephone-based support and service options. Availability varies by country, region, and product, and some services may not be available in your area.

To contact Dell for sales, technical assistance, or customer service issues, see [Contact Dell](#). If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or the product catalog.

Documentation resources

This section provides information about the documentation resources.

Table 2. Documentation resources for vSAN

If you need information about
Virtualization solutions
Dell vSAN ReadyNodes
vSAN Express Storage Architecture (ESA)
VMware vSAN Documentation
vSAN Design Guide
Dell vSAN OSA Broadcom Compatibility Guide
Dell vSAN ESA Broadcom Compatibility Guide
Build numbers and versions of VMware vSAN
VxRail with vSAN Express Storage Architecture (ESA)
Migrating to the Express Storage Architecture in vSAN 8
vSAN ESA ReadyNode Hardware Guidance
vSAN Hardware Quick Reference Guide
What You Can (and Cannot) Change in a vSAN ReadyNode
VMware vSAN upgrade best practices
vSAN upgrade requirements
 NOTE: There is no upgrade for vSAN ESA from vSAN 7.x branch to 8.0 as it is introduced from vSphere 8.0.
VMware Resource Center

Table 3. Technical support resources

If you need information about
Dell Support page
Dell.com/services
Knowledge base
Communities.vmware.com/community/vmtn/vsan