



# vSAN ESA with VMware Cloud on AWS: Technical Deep Dive

## Table of contents

vSAN ESA with VMware Cloud on AWS: Technical Deep Dive .....	3
Introduction .....	3
vSAN Express Storage Architecture Overview .....	4
vSAN ESA Implementation Details on VMware Cloud on AWS .....	5
Prerequisites and Limitations .....	5
Supported Scenarios .....	5
vSAN ESA Benefits with VMware Cloud on AWS .....	6
Capacity .....	6
Compression .....	7
Performance .....	7
Less Impact Of a Disk Failure .....	8
Summary .....	9

## vSAN ESA with VMware Cloud on AWS: Technical Deep Dive

### Introduction

With version 1.24 of VMware Cloud on AWS SDDC vSAN Express Storage Architecture (ESA) has been released. It may not be initially available to all customers or in all Regions or Availability Zones and customers are encouraged to engage with the VMware team to understand its availability and enable the feature.

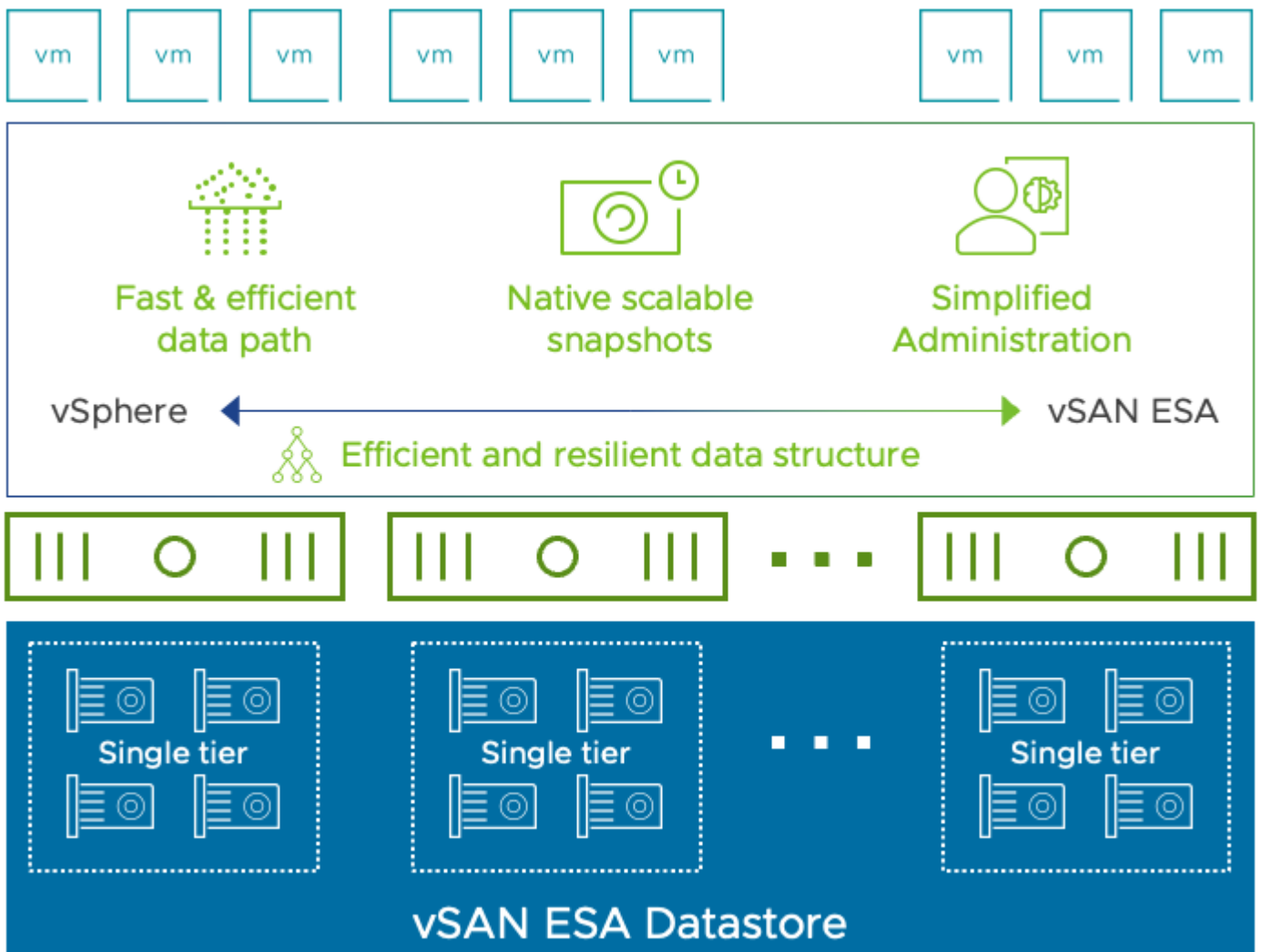
When deploying a new SDDC or a new cluster with the i4i host type you can now choose between the “original” (OSA) or “express” (ESA) vSAN storage architecture. Let us look at the capabilities, supported use cases, deployment scenarios, and benefits of vSAN ESA on VMware Cloud on AWS.

## vSAN Express Storage Architecture Overview

vSAN ESA was introduced with vSphere 8 and enhanced in the vSAN 8 U1 and U2 updates. It is designed to utilize the full capabilities of modern hardware and delivers high performance and scalability

vSAN ESA leverages single-tier storage architecture utilizing high-performance NVMe devices opposite to two-tier vSAN Original Storage architecture (OSA) where cache and capacity tiers are separate. Using a single-tier architecture increases the overall capacity available and narrows the impact of drive failures.

With other improvements including a new log-structured file system, improved compression technique, redesigned encryption process and native snapshots vSAN ESA provides lower TCO, faster, more reliable storage architecture with improved capacity and performance without compromise. You can find a comprehensive review of new Express Storage Architecture features and benefits on the [vSAN Express Storage Architecture \(ESA\) Techzone](#) page.



## vSAN ESA Implementation Details on VMware Cloud on AWS

### Prerequisites and Limitations

Clusters with new vSAN architecture are supported with i4i.metal host type only.

- vSAN ESA makes its first appearance with VMware Cloud on AWS 1.24. With this release, we support the following use cases:
- New SDDC deployment (both the primary and secondary clusters),

Combining OSA and ESA deployment in the same SDDC,

We are looking to make vSAN ESA available for existing SDDC in the future.

vSAN OSA to ESA cluster conversion or vSAN in-place upgrade capabilities are on the roadmap and not available now.

### Supported Scenarios

The list below represents a list of supported vSAN ESA deployment scenarios for 1.24 SDDCs:

- Greenfield SDDC, Primary vSAN ESA Cluster 3 host onwards
- Multi-cluster deployment for existing 1.24 SDDCs:
  - 1st cluster OSA + 2nd Cluster ESA
  - 1st Cluster ESA + 2nd Cluster OSA
  - 1st & 2nd Cluster both ESA

## < Create Software-Defined Data Center (SDDC)

▼ 1. SDDC Properties Give your SDDC a name, choose a size, and specify the AWS region where it will be created.

<b>SDDC Name</b>	VSAN ESA SDDC
<b>AWS Region</b>	US West (Oregon) ▼
<b>Deployment</b>	<input type="radio"/> Single Host <input checked="" type="radio"/> Multi-Host <input type="radio"/> Stretched Cluster <span style="float: right; font-size: 0.8em;"> ⓘ</span>
<b>Host Type</b>	i4i (Local SSD) ▼ ⓘ
<b>vSAN ESA</b> ⓘ	<input checked="" type="checkbox"/> Enable
<b>Number of Hosts</b>	3 ▼
<b>Host Capacity</b>	2 Sockets, 64 Cores, 1 TiB RAM, 27.28 TiB Storage
<b>Total Capacity</b>	6 Sockets, 192 Cores, 3 TiB RAM, 81.85 TiB Storage

[SHOW ADVANCED CONFIGURATION](#)

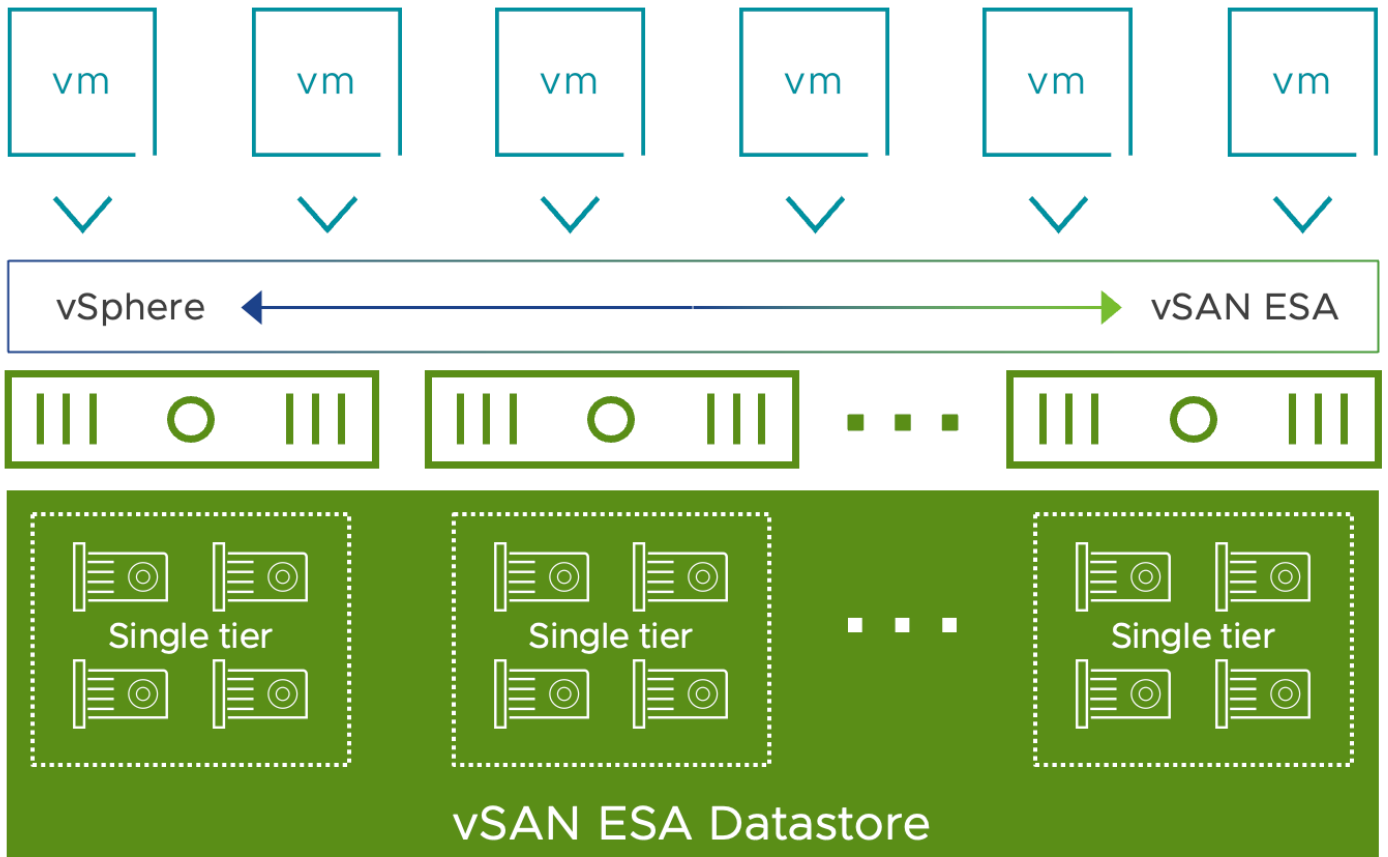
NEXT

## vSAN ESA Benefits with VMware Cloud on AWS

With vSAN Express Storage Architecture on i4i hosts VMware Cloud on AWS customers are getting instant capacity benefits and storage performance increase compared to vSAN Original Storage Architecture.

### Capacity

vSAN ESA removes the need for dedicated cache devices making the capacity of all NVMe drives usable by the vSAN datastore.



Let us illustrate the capacity gains by example: when deploying a vSAN ESA cluster with i4i nodes customers would get 27.28 TiB (8 disks\*3.41 TiB ) raw capacity, compared to 20.46 TiB (6 disks\* 3.41 TiB) using traditional vSAN OSA with 2 disk groups effectively claiming 2 disks for cache on each host i4i giving impressive 33% increase for raw capacity available.

The table below contains raw capacity calculations for the vSAN ESA cluster supported in VMware Cloud on AWS SDDCs.



which data belongs to which snapshot. This speeds up snapshot operations which are one of the most intensive yet frequent activities and makes it much more efficient compared to traditional vSAN OSA architecture. You can find more details in the article: [Scalable, High-Performance Native Snapshots in the vSAN Express Storage Architecture](#).

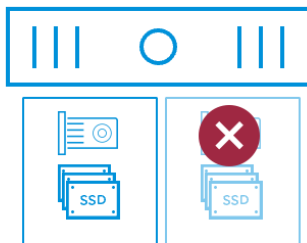
Data at rest encryption is enabled by default on each VMware Cloud on AWS SDDC cluster and can't be turned off. For vSAN ESA this data service similar to compression is performed on an ESXi host level before writing data to disks thus making less impact on the performance when compared to the OSA. More details on encryption improvements can be found in the article: [Cluster Level Encryption with the vSAN Express Storage Architecture](#).

### Less Impact Of a Disk Failure

Using a single-tier architecture increases the overall capacity available and narrows the impact of drive failures. Eliminating the vSAN OSA disk group concept where a failing cache drive led to the failure of the whole group narrows the failure domain in vSAN ESA to a discrete disk reducing the amount of data affected in case of the error.

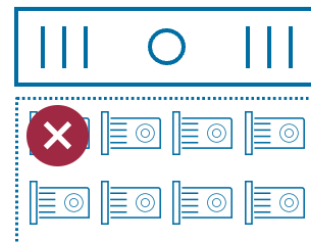
### vSAN Original Storage Architecture

i4i failure example



### vSAN Express Storage Architecture

i4i failure example





## Summary

vSAN Express Storage Architecture is one of the key features introduced with the new 1.24 release of VMware Cloud on AWS.

Supported on primary and secondary clusters running on i4i hosts customers could gain immediate benefits from modern vSAN architecture getting more capacity and performance and lowering TCO.

With better compression, native snapshots and encryption which requires less overhead, vSAN ESA is a no-brainer choice for customers running workloads on VMware Cloud on AWS.

