vSAN iSCSI Target Usage Guide

Recommendations for vSAN in VMware Cloud Foundation 9.1

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vmware by Broadcom

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Introduction

The vSAN iSCSI Target service is a cluster-based service in vSAN that gives users the ability to provision volumes that are used for the purpose of attaching as block volumes within a guest. Compared to other data services in vSAN, it is not widely used but aims to help address specific application requirements. For example, legacy workloads and applications that may require mounting a block volume for tasks such as application-level clustering. Since vSAN stores data in a unique object-style format, it requires an additional service to present data as a block-based volume.

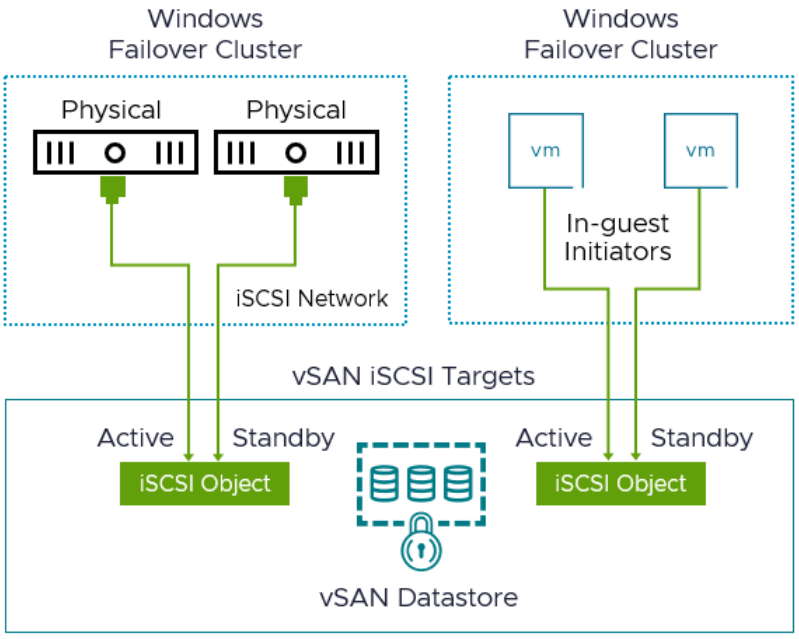

Figure. An example of WSFC systems connecting to an iSCSI target.

While advancements in vSAN such as the support for SCSI-3 persistent reservations (SCSI3-PR) result in a better way to address some of these conditions, the iSCSI Target service can be useful in many ways. This documentation provides information relevant to the use and administration of the iSCSI Target service.

Note that the iSCSI Target service is NOT intended to serve as block-based storage for ESXi hosts. This type of configuration is unsupported. For more information on limitations and support, see KB article 326884

Guidance – Availability

Storage Policies

Much like VMs that reside on a vSAN datastore, storage policies define the level of resilience that is prescribed to an iSCSI volume. All the typical resilience settings are available to iSCSI volumes regardless of the topology – single site vSAN clusters, vSAN stretched clusters, etc. For vSAN in VCF 9.1, storage policies will be fully managed and control using vSAN Auto-RAID. For more information, see the post: "Auto-RAID in VMware vSAN for VCF 9.1 - Comprehensive System-Managed Data Resilience."

Multipathing

Multi-Path IO (MPIO) is supported by the vSAN iSCSI Target Service. Every target has an owner, and initial connections will be redirected using iSCSI redirects to the owner's path. In the event of a failure, reconnection attempts will be redirected to the new iSCSI LUN target owner. An initiator can connect to any host but will always be redirected to the current active host.

Guidance – Performance

Storage Policies

Each iSCSI Target can be assigned a storage policy. In vSAN for VCF 9.1, the new Auto-RAID feature will ensure that these (and all other objects stored on the vSAN datastore) have the optimal resilience setting based on the characteristics of the cluster.

Multiple Targets

iSCSI Targets have a limited maximum queue depth, and it is recommended to utilize more targets to increase performance. Note that a given target will only be active for a single host so deploying more targets will lead to an evener usage of paths for performance balancing. You can see the I/O owning Host from within the UI. It should be noted that iSCSI utilizes more compute overhead, and because of added pathing will add additional latency and overhead compared to running Virtual Machine disks directly on the VSAN datastore. If performance is a concern, iSCSI should only be used when native VSAN is not an option.

Guidance – Security

Network segments and VLANs

iSCSI storage traffic is transmitted in an unencrypted format across the LAN. Using VLANs to isolate iSCSI traffic on a network will help ensure that this type of traffic remains within its own broadcast domain, and logical security boundary.

Encryption and Authentication

The Challenge Handshake Authentication Protocol (CHAP) verifies identity using a hashed transmission. The target initiates the challenge. Both parties know the secret key. It periodically repeats the challenge to guard against replay attacks. CHAP is supported by the vSAN iSCSI Target service. bidirectional CHAP is supported.

Guidance – Applications

iSCSI Volumes versus SCSI3-PR

vSAN supports SCSI3 persistent reservations, or SCSI3-PR. Application-level clustering services like Windows Server Failover Clusters (WSFC) need to share a disk to determine ownership across the application cluster. This feature allows for **VMs running WSFC to use a shared VMDK on a vSAN datastore**. This simplifies design and administration, reduces performance overhead, offers full interoperability with vSAN features, and provides a consistent experience. WSFC running on physical servers should continue to use vSAN iSCSI services to achieve a shared quorum disk.

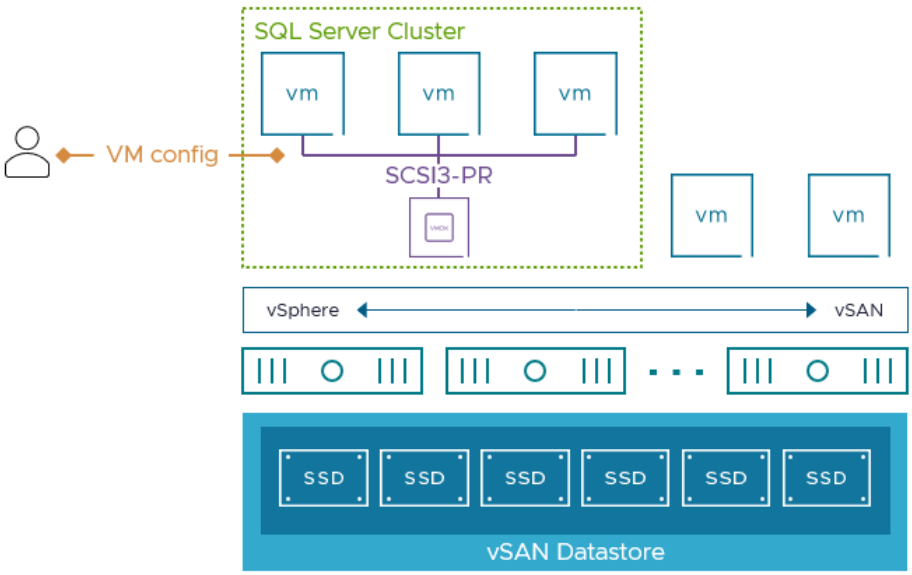

Figure. WSFC workloads using SCSI-PR instead of iSCSI volumes for a shared quorum disk.

For application clustering with virtualized applications (such as WSFC, and Oracle RAC) that require a quorum disk, **it is highly recommended to use native VMDKs instead of iSCSI volumes.** Oracle RAC can use native VMDKs using the multiwriter flag, and WSFC can use a native VMDK using SCSI3 persistent reservations. In vSAN for VCF 9.1, these shared VMDKs can be expanded without any application downtime through a new "hot-extend" capability. For more information, see the post: "Expand Shared VMDKs with Clustered Applications in VMware vSAN for VCF 9.1."

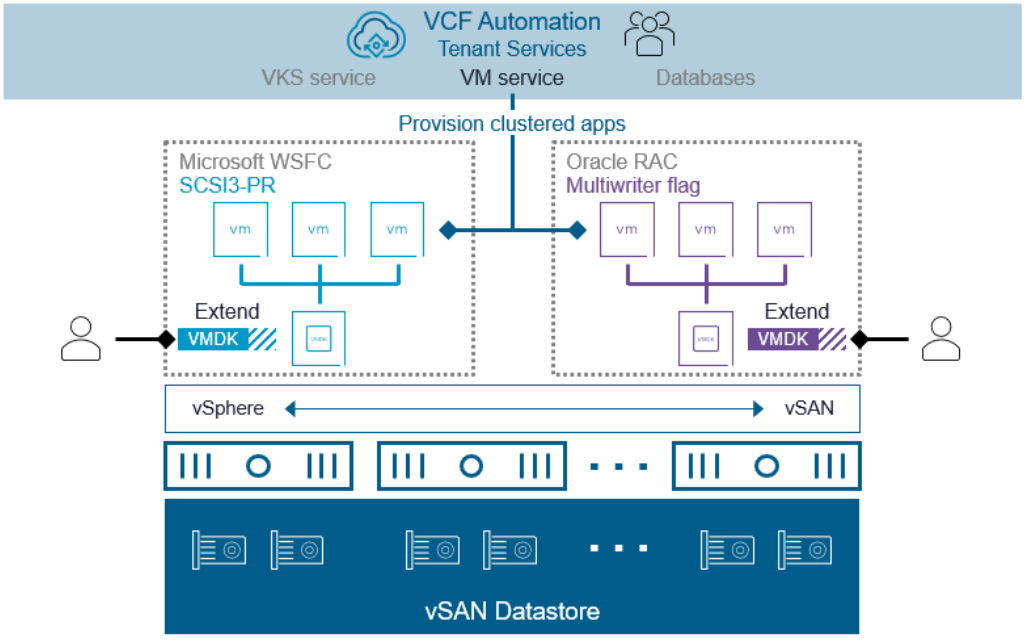

Figure. WSFC and Oracle RAC using shared VMDKs with hot-add capabilities in vSAN for VCF 9.1.

Interoperability and Limitations

KB article 326884 details limitations, support, and configuration maximums, and should be referred to as the source of truth for these types interoperability and support considerations.

Summary

vSAN iSCSI services offers a way for you to accommodate legacy systems that use a block volume. While it has limited use with most modern environments, it can help you bridge the gap with older critical systems that remain an important part of your infrastructure.

Additional Resources

The following are a collection of useful links that relate to vSAN iSCSI target services.

Blog: "Application Versus Infrastructure-Level High Availability with vSAN in VMware Cloud Foundation" This helps provide a comparison between resilience using application layer versus the infrastructure layer.

Performance Recommendations for vSAN ESA. This is a collection of recommendations to help achieve the highest levels of performance in a vSAN ESA cluster. Many of these same recommendations apply to vSAN storage clusters.

vSAN Proof of Concept (PoC) Performance Testing. This is a collection of recommendations that will guide users to test the performance of a vSAN cluster. While it is currently written for the OSA, many of the testing methods used are also applicable to the ESA.

Design and Sizing for vSAN ESA clusters. This post offers some nice guidance on using the vSAN Sizer for the ESA that summarizes some key points that can be found in the VMware vSAN Design Guide.

vSAN Network Design Guide. This network design guide applies to environments running vSAN 8 and later.

vSAN technical blogs. Stay up to date on the most recently published technical information about vSAN. These posts are created by the vSAN Technical Marketing team.

VMware Resource Center. The location for design guides, operations guides and other technical white papers on vSAN. These assets are created by the vSAN Technical Marketing and Product Enablement teams.

Official vSAN documentation. The location for all "how to" documentation on vSAN.

About the Author

Pete Koehler is a Product Marketing Engineer in the VCF division at Broadcom. With a primary focus on vSAN, Pete covers topics such as design and sizing, operations, performance, troubleshooting, and integration with other products and platforms.