NetApp

Configure vVols datastores

VSC, VASA Provider, and SRA 9.7

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You can use VASA Provider for ONTAP to create and manage VMware Virtual Volumes (vVols). You can provision, edit, mount, and delete a vVols datastore. You can also add storage to the vVols datastore or remove storage from the vVols datastore. to provide greater flexibility. You can provision and manage every virtual machine and the related VMDK.

A vVols datastore consists of one or more FlexVol volumes within a storage container (also called "backing storage"). A virtual machine can be spread across one vVols datastore or multiple vVols datastores.

While you can create a vVols datastore that has multiple FlexVol volumes, all of the FlexVol volumes within the storage container must use the same protocol (NFS, iSCSI, or FCP) and the same storage virtual machines (SVMs).

You do not require detailed knowledge of the underlying storage. For example, you do not have to identify a specific FlexVol volume to contain the storage. After you add FlexVol volumes to the vVols datastore, the storage container manages the storage requirements and prevents any situations during VM provisioning where VMare provisioned to a backing volume with no capacity.

> ℹ️ It is a good practice to include multiple FlexVol volumes in a vVols datastore for performance and flexibility. Because FlexVol volumes have LUN count restrictions that limit the number of virtual machines, including multiple FlexVol volumes allows you to store more virtual machines in your vVols datastore.

As part of the setup process, you must specify a storage capability profile for the vVols datastore that you are creating. You can select one or more VASA Provider storage capability profiles for a vVols datastore. You can also specify a default storage capability profile for any vVols datastores that are automatically created in that storage container.

VASA Provider creates different types of vVols during virtual machine provisioning or VMDK creation, as required.

- **Config**

  VMware vSphere uses this vVols datastore to store configuration information.

  In SAN (block) implementations, the storage is a 4 GB LUN.

  In an NFS implementation, this is a directory containing VM config files such as the vmx file and pointers to other vVols datastores.

- **Data**

  This vVols contains operating system information and user files.

  In SAN implementations, this is a LUN that is the size of the virtual disk.

  In an NFS implementation, this is a file that is the size of the virtual disk.

- **Swap**

  This vVols is created when the virtual machine is powered on and is deleted when the virtual machine is

powered off.

In SAN implementations, this is a LUN that is the size of the virtual memory.

In an NFS implementation, this is a file that is the size of the virtual memory.

- **Memory**

This vVols is created if the memory snapshots option is selected when creating VM snapshot.

In SAN implementations, this is a LUN that is the size of the virtual memory.

In an NFS implementation, this is a file that is the size of the virtual memory.

Configure replication for vVols datastore

You can configure replication for your vVols datastore using the virtual appliance for VSC, VASA Provider, and SRA. The main aim of vVols replication is to protect critical virtual machines during disaster recovery using VMware Site Recovery Manager (SRM).

However, to configure vVols replication for your virtual appliance for VSC, VASA Provider, and SRA, VASA Provider capability and vVols replication must be enabled. VASA Provider is enabled by default in the virtual appliance for VSC, VASA Provider, and SRA. The Array Based Replication is performed at the FlexVol level. Each vVols datastore is mapped to a storage container that consists of one or more FlexVol volumes. The FlexVol volumes should be pre-configured with SnapMirror from ONTAP.
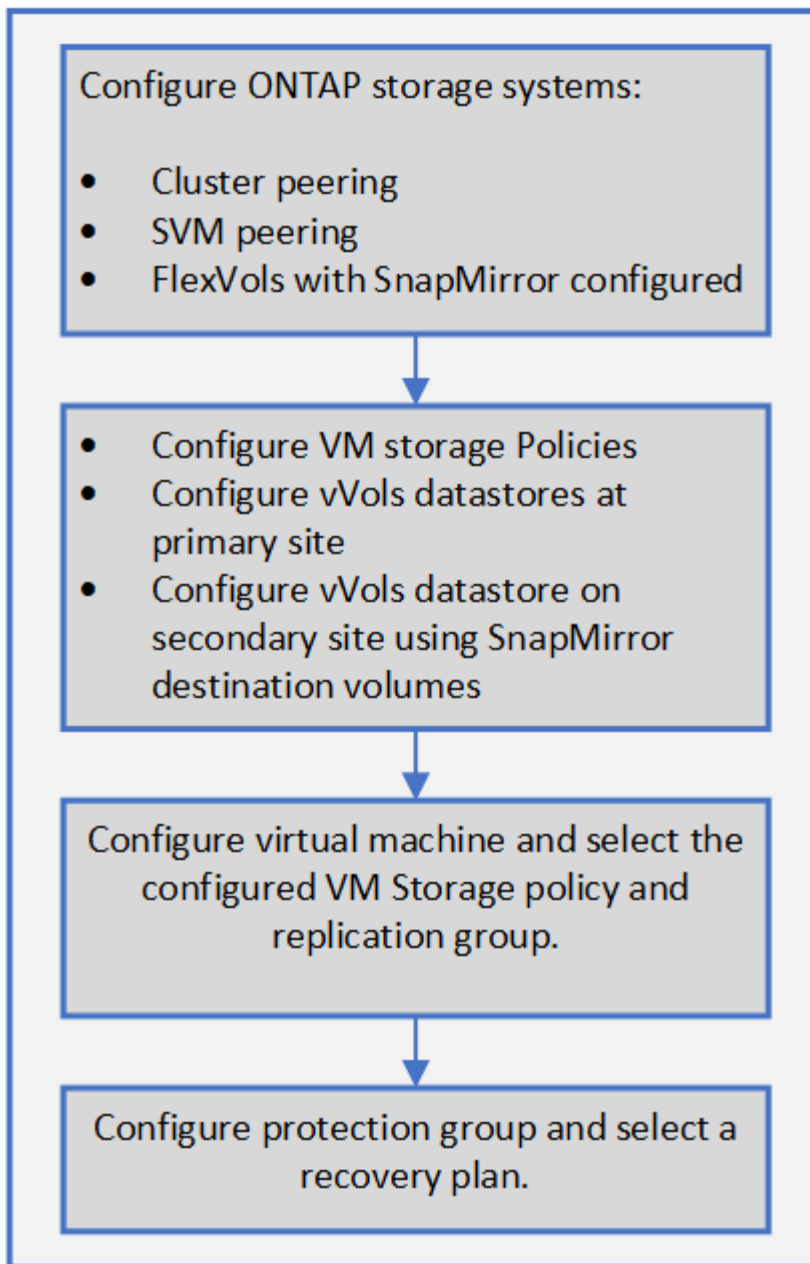
> (i) You should not configure a mix of protected and unprotected virtual machines in a single vVols datastore. A reprotect operation after failover will cause unprotected virtual machines to be deleted. Ensure that all virtual machines in a vVols datastore are protected when using replication.

Replication groups are created during vVols datastore create workflow for each FlexVol volume. To use vVols replication, you will need to create VM Storage Policies that include replication status and schedule along with storage capability profile. A Replication group includes virtual machines that are replicated as part of disaster recovery to the target site. You can configure replication groups with protection groups and recovery plans using SRM console, for DR workflows.

> (i) If you are using disaster recovery for vVols datastore, then you do not need to configure Storage Replication Adapter (SRA) separately as VASA Provider capability is enhanced to have vVols replication.

Configure ONTAP storage systems:

- Cluster peering
- SVM peering
- FlexVols with SnapMirror configured

- Configure VM storage Policies
- Configure vVols datastores at primary site
- Configure vVols datastore on secondary site using SnapMirror destination volumes

Configure virtual machine and select the configured VM Storage policy and replication group.

Configure protection group and select a recovery plan.

Provision vVols datastores

You can provision a vVols datastore using the **Provision Datastore** wizard only if VASA Provider is enabled in your virtual appliance for VSC, VASA Provider, and SRA.

Before you begin

- You should ensure that the subnet details of all the networks to which the ESXi hosted is connected is entered in the `Kaminoprefs.xml`.

  See **Enabling datastore mounting across different subnets** section in *VSC 9.7 Deployment and Setup Guide*.

- You should configure similar replication policy and schedule on the datastores at both the source and target sites for reverse replication to be successful.

About this task

The **Provision datastore** menu enables you to specify a storage capability profile for the datastore, which helps in specifying consistent service level objectives (SLOs) and simplifies the provisioning process. You can specify a storage capability profile only if you have enabled VASA Provider.

FlexVol volumes that are used as backing storage are displayed on the vVol dashboard only if they are running ONTAP 9.5 or later. You should not use the vCenter Server **New Datastore** wizard to provision vVols datastores.

- You must use cluster credentials to create vVols datastores.

  You cannot use SVM credentials to create vVols datastores.

- VASA Provider does not support the cloning of a virtual machine that is hosted on the vVols datastore of one protocol to another datastore with a different protocol.

- You should have completed cluster pairing and SVM pairing both on the source and destination sites.

Steps

1. From the vSphere Client home page, click **Hosts and Clusters**.

2. In the navigation pane, select the datacenter on which you want to provision the datastore.

3. Specify the hosts on which you want to mount the datastore.

To make the datastore available to…	Do this…
All of the hosts in a datacenter	Right-click a datacenter, and then select **NetApp VSC › Provision Datastore**.
All of the hosts in a cluster	Right-click a cluster, and then select **NetApp VSC › Provision Datastore**.
A single host	Right-click a host, and then select **NetApp VSC › Provision Datastore**.

4. Complete the fields in the **New Datastore** dialog box to create the datastore.

   Most of the fields in the dialog box are self-explanatory. The following table describes some of the fields for which you might require guidance.

Section	Description
General	The **General** section of the **New Datastore** dialog box provides options to enter the location, name, description, type, and protocol for the new datastore. The vVols datastore type is used to configure a vVols datastore. (i) If you are provisioning iSCSI vVols datastore for vVols replication, then before creating vVols datastore at the target site, you need to perform SnapMirror update and cluster rediscovery.
Storage system	This section enables you to select whether you want the vVols datastore to have either replication enabled or disabled. Only asynchronous type replication profile is allowed for this release. You can then select one or more storage capability profiles listed. The system recommended values of paired **Storage system** and **Storage VM** are populated automatically. The recommended values are populated only if they are paired in ONTAP. You can modify these values if required. (i) While creating FlexVol volumes in ONTAP, you should ensure to create them with the attributes you wish to select in the storage capability profile. Both read write and data protection FlexVol volumes should have similar attributes. After FlexVol volumes are created and SnapMirror is initialized in ONTAP, you should run a storage rediscovery in VSC to be able to see the new volumes.
Storage attributes	You should select the schedule for SnapMirror and the required FlexVol volume from the existing list. This schedule should be similar to the one selected in the VM Storage Policies page. The user should have created FlexVol volumes on ONTAP with SnapMirror that are listed. You can select the default storage capability profile to be used for creating vVols using the **Default storage capability profile** option.

5. In the **Summary** section, click **Finish**.

A Replication group is created in the backend when a vVols datastore is configured.

Monitor vVols datastores and virtual machines using the vVol dashboard

You can monitor the performance and view the top five SAN VMware Virtual Volumes (vVols) datastores in your vCenter Server based on the parameters that you select by using the vVol dashboard of the virtual appliance for Virtual Storage Console (VSC), VASA Provider, and Storage Replication Adapter (SRA).

Before you begin

- You should have enabled OnCommand API Services 2.1 or later if you are using ONTAP 9.6 or earlier.

  You do not require to register OnCommand API Services with VASA Provider to get the details of SAN vVols datastore or SAN vVols VM datastore report for ONTAP 9.7.

  NetApp Support

- You should be using ONTAP 9.3 or later for your storage system.

vVol dashboard data requirements

About this task

The IOPS data that is provided by ONTAP is rounded off and displayed on the vVol dashboard. There might be a difference between the actual IOPS value that is provided by ONTAP and the IOPS value that is displayed on the vVol dashboard.

ⓘ
- If you are registering OnCommand API Services for the first time, then you can view all of the performance metrics data for SAN vVols datastores on the vVol dashboard only after 15 to 30 minutes.

- The vVol dashboard data is refreshed periodically, at an interval of 10 minutes.

- If you have added, modified, or deleted a storage system from your vCenter Server instance, then you might not notice any change in the data on the vVols dashboard for some time.

  This is because OnCommand API Services takes time to obtain updated metrics from ONTAP.

- The Total IOPS value that is displayed in the **Overview** portlet of the vVol dashboard is not a cumulative value of the Read IOPS value and Write IOPS value.

  Read IOPS, Write IOPS, and Total IOPS are separate metrics that are provided by OnCommand API Services. If there is a difference between the Total IOPS value and the cumulative IOPS value (Read IOPS value + Write IOPS value) provided by OnCommand API Services, then the same difference is observed in the IOPS values on the vVol dashboard.

Steps

1. From the vSphere Client home page, click **Virtual Storage Console**.

2. Select the required vCenter Server using the **vCenter server** drop-down menu to view the datastores.

3. Click **vVol Dashboard**.

   The **Datastores** portlet provides the following details:

   ◦ The number of vVols datastores that are managed by VASA Provider in your vCenter Server instance

   ◦ The top five vVols datastores based on resource usage and performance parameters You can change the listing of the datastores based on the space utilized, IOPS, or latency and in the order required.

4. View the details of the virtual machines using the **Virtual Machines** portlet.

   The **Virtual Machines** portlet provides the following details:

   ◦ Number of virtual machines using ONTAP datastores in your vCenter Server

   ◦ Top five virtual machines based on IOPS, latency, throughput, committed capacity, uptime, and logical space You can customize how the top five virtual machines are listed in the vVol dashboard.

vVol dashboard data requirements

You must verify some important requirements of the vVol dashboard to display dynamic details of the VMware Virtual Volumes (vVols) datastores and virtual machines.

The following table presents an overview of what you should verify if the vVol dashboard does not display the performance metrics for the provisioned SAN vVols datastores and virtual machines.

Considerations	Description

First-time deployment of OnCommand API Services	• If you are having ONTAP clusters 9.6 or earlier, then you are using OnCommand API Services 2.1 or later.
	
	  You do not require OnCommand API Services to be registered with VASA Provider if you are using ONTAP 9.7 and later.
	
	• You must have followed the installation instructions that are provided in the *OnCommand API Services Installation and Setup guide* after downloading and installing OnCommand API Services from the NetApp Support Site.
	
	• Each VASA Provider instance must have a dedicated OnCommand API Services instance.
	
	  OnCommand API Services must not be shared among multiple VASA Provider instances or vCenter Servers.
	
	• OnCommand API Services is running and accessible.

Considerations	Description
Storage system	• You are using ONTAP 9.3 or later. • You are using appropriate credentials for the storage system. • Your storage system is active and accessible. • The virtual machine that you selected must be using at least one vVols datastore, and I/O operations are executing on the disk of the virtual machine.