Manage storage VMs

Cloud Manager

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A storage VM is a virtual machine running within ONTAP that provides storage and data services to your clients. You might know this as an *SVM* or a *vserver*. Cloud Volumes ONTAP is configured with one storage VM by default, but some configurations support additional storage VMs.

Supported number of storage VMs

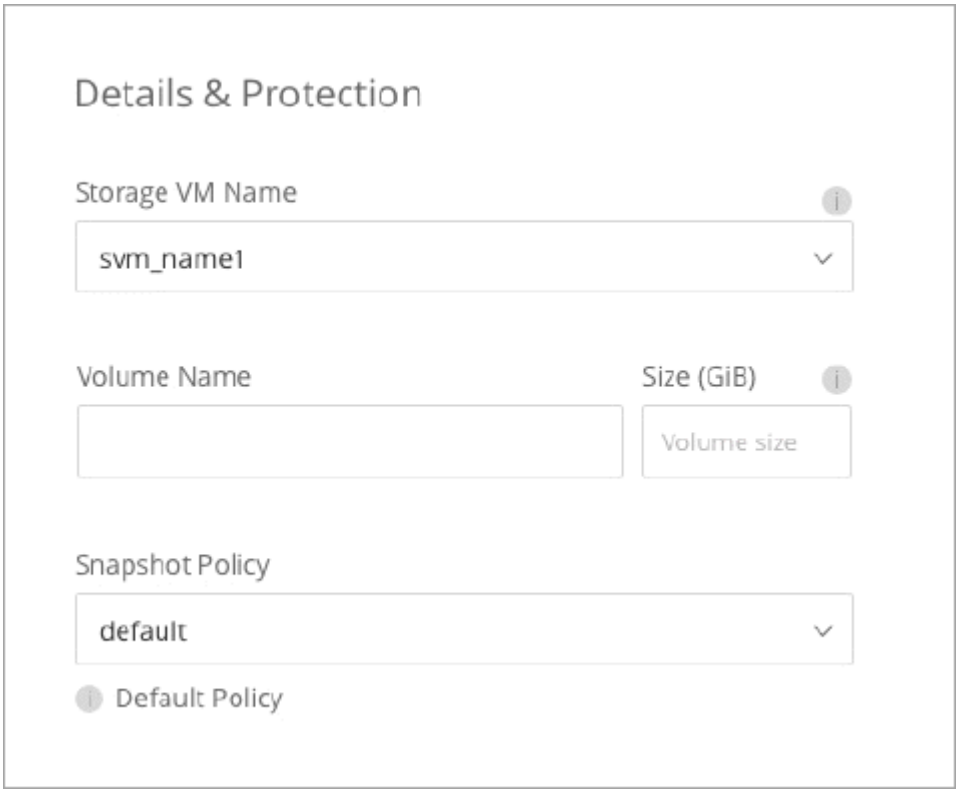
Cloud Volumes ONTAP 9.7 and 9.8 support multiple storage VMs in AWS with certain configurations and an add-on license. View the number of supported storage VMs in AWS. Contact your account team to obtain an SVM add-on license.

All other Cloud Volumes ONTAP configurations support one data-serving storage VM and one destination storage VM used for disaster recovery. You can activate the destination storage VM for data access if there's an outage on the source storage VM.

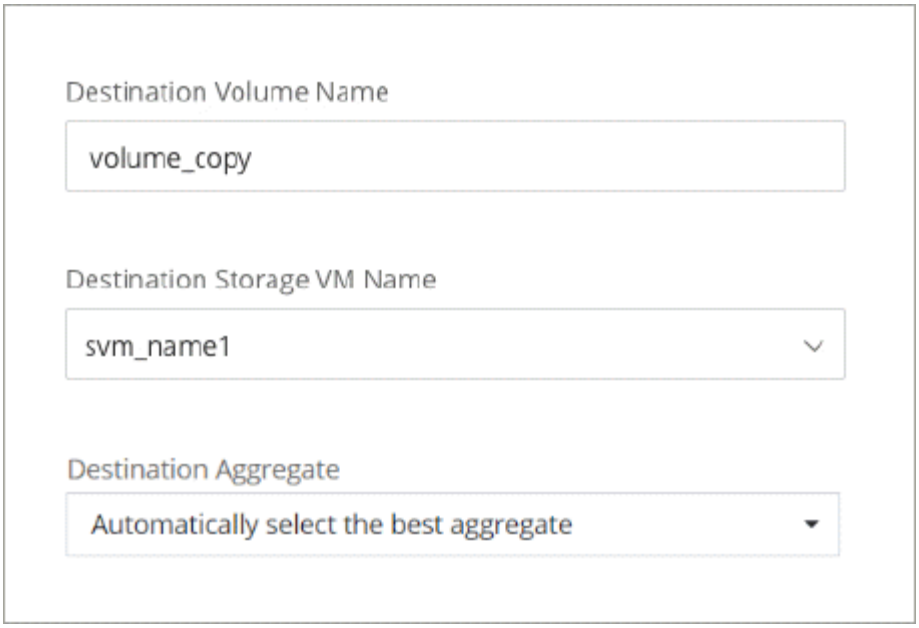
Work with storage VMs in Cloud Manager

Cloud Manager supports any additional storage VMs that you create from System Manager or the CLI.

For example, the following image shows how you can choose a storage VM when you create a volume.



And the following image shows how you can choose a storage VM when replicating a volume to another system.



Create data-serving storage VMs for Cloud Volumes ONTAP in AWS

As noted above, multiple storage VMs are supported with Cloud Volumes ONTAP in AWS. To create additional storage VMs, you need to allocate IP addresses in AWS and then run ONTAP commands based on your Cloud Volumes ONTAP configuration.

Verify limits for your configuration

Each EC2 instance supports a maximum number of private IPv4 addresses per network interface. You need to verify the limit before you allocate IP addresses in AWS for the new storage VM.

Steps

1. Go the Storage limits section in the Cloud Volumes ONTAP Release Notes.
2. Identify the maximum number of IP addresses per interface for your instance type.
3. Make note of this number because you'll need it in the next section when you allocate IP addresses in AWS.

Allocate IP addresses in AWS

Private IPv4 addresses must be assigned to port e0a in AWS before you create LIFs for the new storage VM.

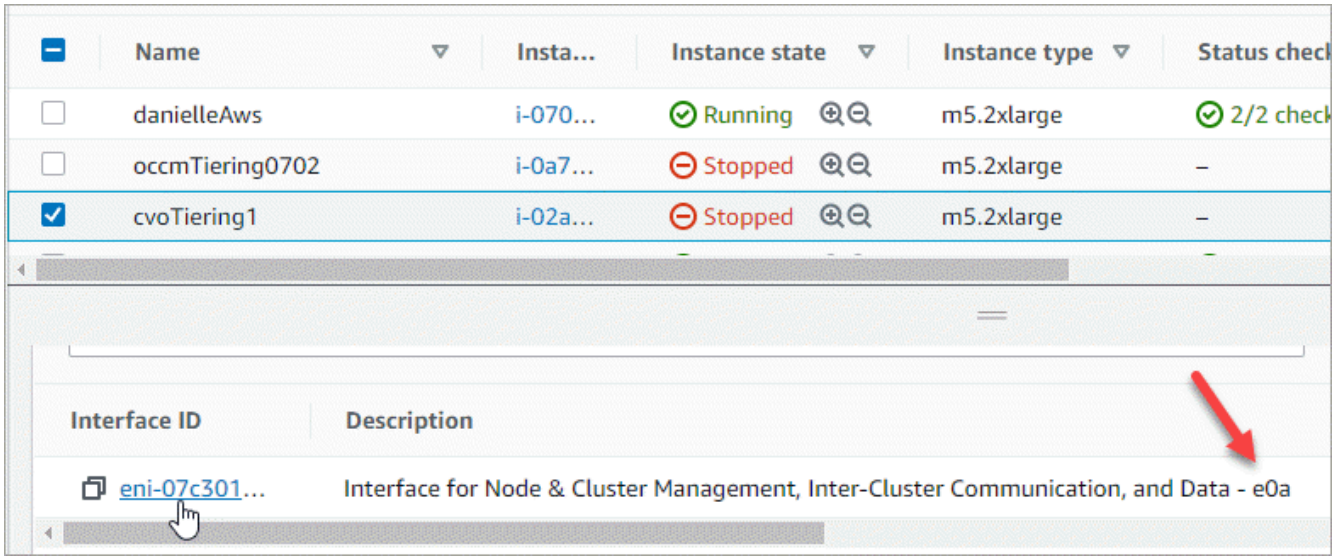
Note that an optional management LIF for a storage VM requires a private IP address on a single node system and on an HA pair in a single AZ. This management LIF provides a connection to management tools like SnapCenter.

Steps

1. Log in to AWS and open the EC2 service.
2. Select the Cloud Volumes ONTAP instance and click **Networking**.

   If you're creating a storage VM on an HA pair, select node 1.

3. Scroll down to **Network interfaces** and click the **Interface ID** for port e0a.



4. Select the network interface and click **Actions > Manage IP addresses**.
5. Expand the list of IP addresses for e0a.
6. Verify the IP addresses:
   a. Count the number of allocated IP addresses to confirm that the port has room for additional IPs.

      You should have identified the maximum number of supported IP addresses per interface in the previous section of this page.

   b. Optional: Go to the CLI for Cloud Volumes ONTAP and run **network interface show** to confirm that each of these IP addresses are in use.

      If an IP address isn't in use, then you can use it with the new storage VM.

7. Back in the AWS Console, click **Assign new IP address** to assign additional IP addresses based on the amount that you need for the new storage VM.
   - Single node system: One unused secondary private IP is required.

     An optional secondary private IP is required if you want to create a management LIF on the storage VM.

   - HA pair in a single AZ: One unused secondary private IP is required on node 1.

     An optional secondary private IP is required if you want to create a management LIF on the storage VM.

   - HA pair in multiple AZs: One unused secondary private IP is required on each node.
8. If you're allocating the IP address on an HA pair in a single AZ, enable **Allow secondary private IPv4 addresses to be reassigned**.
9. Click **Save**.
10. If you have an HA pair in multiple AZs, then you'll need to repeat these steps for node 2.

Create a storage VM on a single node system

These steps create a new storage VM on a single node system. One private IP address is required to create a NAS LIF and another optional private IP address is needed if you want to create a management LIF.

Steps

1. Create the storage VM and a route to the storage VM.

```
vserver create -rootvolume-security-style mixed -rootvolume root_svm_2
-snapshot-policy default -vserver svm_2 -aggregate aggr1
```

```
network route create -destination 0.0.0.0/0 -vserver svm_2 -gateway
subnet_gateway
```

2. Create a NAS LIF.

```
network interface create -auto-revert true -vserver svm_2 -service
-policy default-data-files -home-port e0a -address private_ip_x -netmask
node1Mask -lif ip_nas_2 -home-node cvo-node
```

   Where *private_ip_x* is an unused secondary private IP on e0a.

3. Optional: Create a storage VM management LIF.

```
network interface create -auto-revert true -vserver svm_2 -service
-policy default-management -home-port e0a -address private_ip_y -netmask
node1Mask -lif ip_svm_mgmt_2 -home-node cvo-node
```

   Where *private_ip_y* is another unused secondary private IP on e0a.

Create a storage VM on an HA pair in a single AZ

These steps create a new storage VM on an HA pair in a single AZ. One private IP address is required to create a NAS LIF and another optional private IP address is needed if you want to create a management LIF.

Both of these LIFs get allocated on node 1. The private IP addresses can move between nodes if failures occur.

Steps

1. Create the storage VM and a route to the storage VM.

```
vserver create -rootvolume-security-style mixed -rootvolume root_svm_2
-snapshot-policy default -vserver svm_2 -aggregate aggr1
```

```
network route create -destination 0.0.0.0/0 -vserver svm_2 -gateway
subnet_gateway
```

2. Create a NAS LIF on node 1.

```
network interface create -auto-revert true -vserver svm_2 -service
-policy default-data-files -home-port e0a -address private_ip_x -netmask
node1Mask -lif ip_nas_2 -home-node cvo-node1
```

Where *private_ip_x* is an unused secondary private IP on e0a of cvo-node1. This IP address can be relocated to the e0a of cvo-node2 in case of takeover because the service policy default-data-files indicates that IPs can migrate to the partner node.

3. Optional: Create a storage VM management LIF on node 1.

```
network interface create -auto-revert true -vserver svm_2 -service
-policy default-management -home-port e0a -address private_ip_y -netmask
node1Mask -lif ip_svm_mgmt_2 -home-node cvo-node1
```

Where *private_ip_y* is another unused secondary private IP on e0a.

Create a storage VM on an HA pair in multiple AZs

These steps create a new storage VM on an HA pair in multiple AZs.

A *floating* IP address is required for a NAS LIF and is optional for a management LIF. These floating IP addresses don’t require you to allocate private IPs in AWS. Instead, the floating IPs are automatically configured in the AWS route table to point to a specific node’s ENI in the same VPC.

In order for floating IPs to work with ONTAP, a private IP address must be configured on every storage VM on each node. This is reflected in the steps below where an iSCSI LIF is created on node 1 and on node 2.

Steps

1. Create the storage VM and a route to the storage VM.

```
vserver create -rootvolume-security-style mixed -rootvolume root_svm_2
-snapshot-policy default -vserver svm_2 -aggregate aggr1
```

```
network route create -destination 0.0.0.0/0 -vserver svm_2 -gateway
subnet_gateway
```

2. Create a NAS LIF on node 1.

```
network interface create -auto-revert true -vserver svm_2 -service
-policy default-data-files -home-port e0a -address floating_ip -netmask
node1Mask -lif ip_nas_floating_2 -home-node cvo-node1
```

- The floating IP address must be outside of the CIDR blocks for all VPCs in the AWS region in which you deploy the HA configuration. 192.168.209.27 is an example floating IP address. Learn more about choosing a floating IP address.
- `-service-policy default-data-files` indicates that IPs can migrate to the partner node.

3. Optional: Create a storage VM management LIF on node 1.

```
network interface create -auto-revert true -vserver svm_2 -service
-policy default-management -home-port e0a -address floating_ip -netmask
node1Mask -lif ip_svm_mgmt_2 -home-node cvo-node1
```

4. Create an iSCSI LIF on node 1.

```
network interface create -vserver svm_2 -service-policy default-data-
blocks -home-port e0a -address private_ip -netmask nodei1Mask -lif
ip_node1_iscsi_2 -home-node cvo-node1
```

- This iSCSI LIF is required to support LIF migration of the floating IPs in the storage VM. It doesn't have to be an iSCSI LIF, but it can't be configured to migrate between nodes.
- `-service-policy default-data-block` indicates that an IP address does not migrate between nodes.
- *private_ip* is an unused secondary private IP address on eth0 (e0a) of cvo_node1.

5. Create an iSCSI LIF on node 2.

```
network interface create -vserver svm_2 -service-policy default-data-
blocks -home-port e0a -address private_ip -netmaskNode2Mask -lif
ip_node2_iscsi_2 -home-node cvo-node2
```

- This iSCSI LIF is required to support LIF migration of the floating IPs in the storage VM. It doesn't have to be an iSCSI LIF, but it can't be configured to migrate between nodes.
- `-service-policy default-data-block` indicates that an IP address does not migrate between nodes.
- *private_ip* is an unused secondary private IP address on eth0 (e0a) of cvo_node2.

Manage storage VMs for disaster recovery

Cloud Manager doesn't provide any setup or orchestration support for storage VM disaster recovery. You must use System Manager or the CLI.

- SVM Disaster Recovery Preparation Express Guide
- SVM Disaster Recovery Express Guide