Manage storage VMs

Cloud Manager

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Manage storage VMs

Manage storage VMs in Cloud Manager

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.

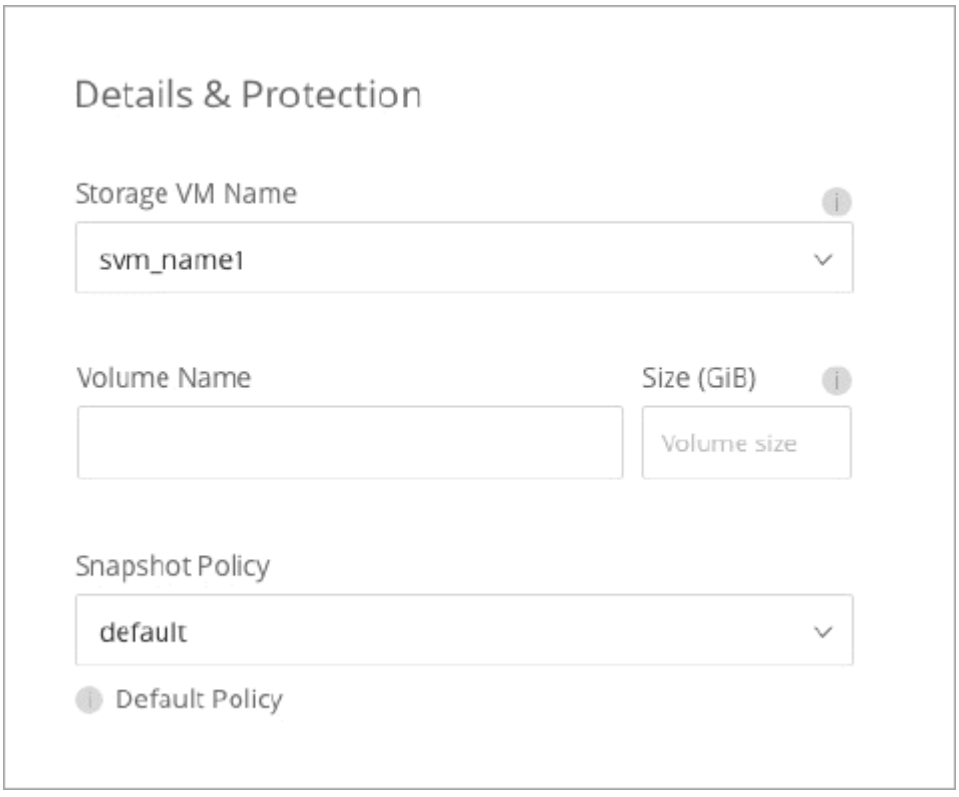
Supported number of storage VMs

Multiple storage VMs are supported with Cloud Volumes ONTAP in AWS and in Azure with certain configurations. Go to the Cloud Volumes ONTAP Release Notes to verify the supported number of storage VMs for your version of Cloud Volumes ONTAP.

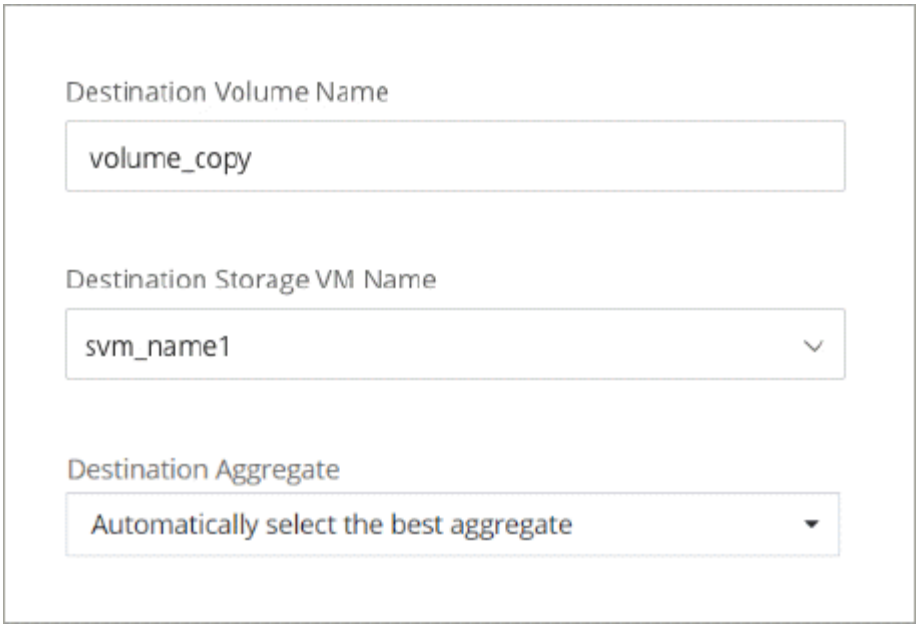
Work with multiple storage VMs

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.



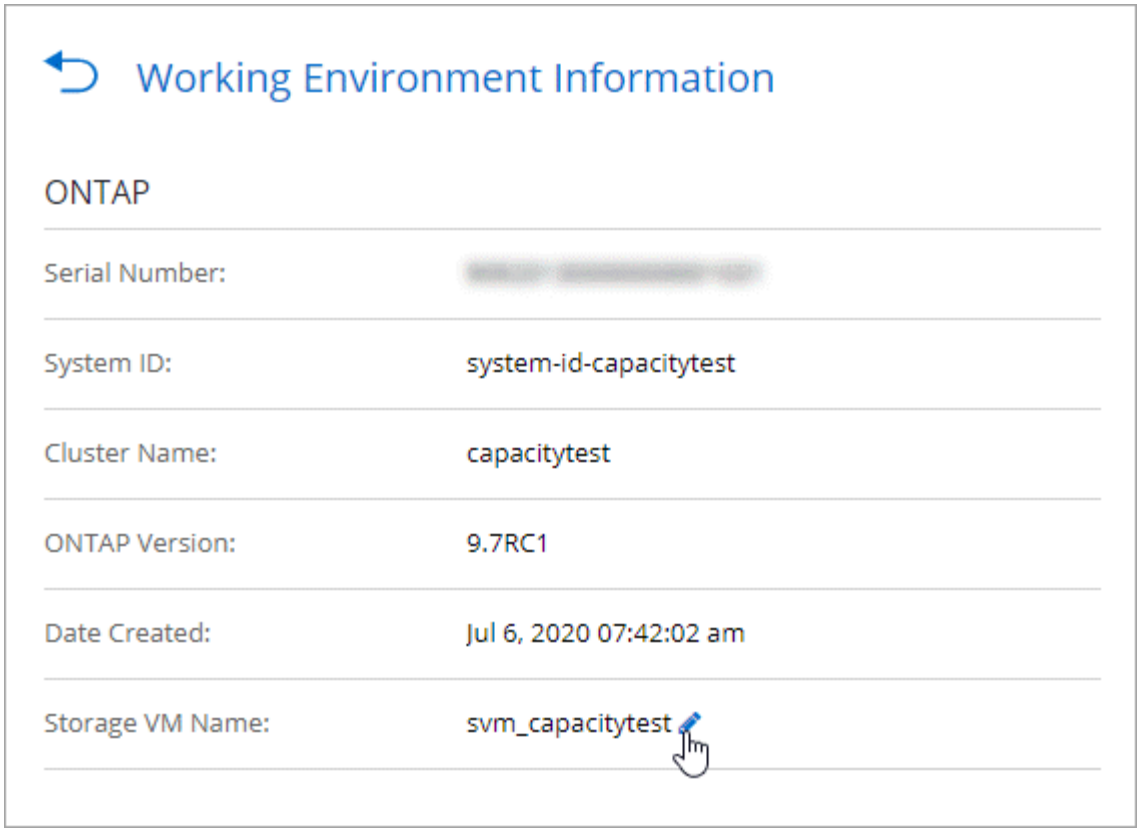
Modify the name of the default storage VM

Cloud Manager automatically names the single storage VM that it creates for Cloud Volumes ONTAP. You can modify the name of the storage VM if you have strict naming standards. For example, you might want the name to match how you name the storage VMs for your ONTAP clusters.

If you created any additional storage VMs for Cloud Volumes ONTAP, then you can't rename the storage VMs from Cloud Manager. You'll need to do so directly from Cloud Volumes ONTAP by using System Manager or the CLI.

Steps

1. From the working environment, click the menu icon, and then click **Information**.
2. Click the edit icon to the right of the storage VM name.



3. In the Modify SVM Name dialog box, change the name, and then click **Save**.

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

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

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.

To create additional data-serving storage VMs, you need to allocate IP addresses in AWS and then run ONTAP commands based on your Cloud Volumes ONTAP configuration.

Supported number of storage VMs

Multiple storage VMs are supported with Cloud Volumes ONTAP BYOL in AWS with an add-on license, starting with the 9.7 release. Go to the Cloud Volumes ONTAP Release Notes to verify the supported number of storage VMs for your version of Cloud Volumes ONTAP.

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.

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.

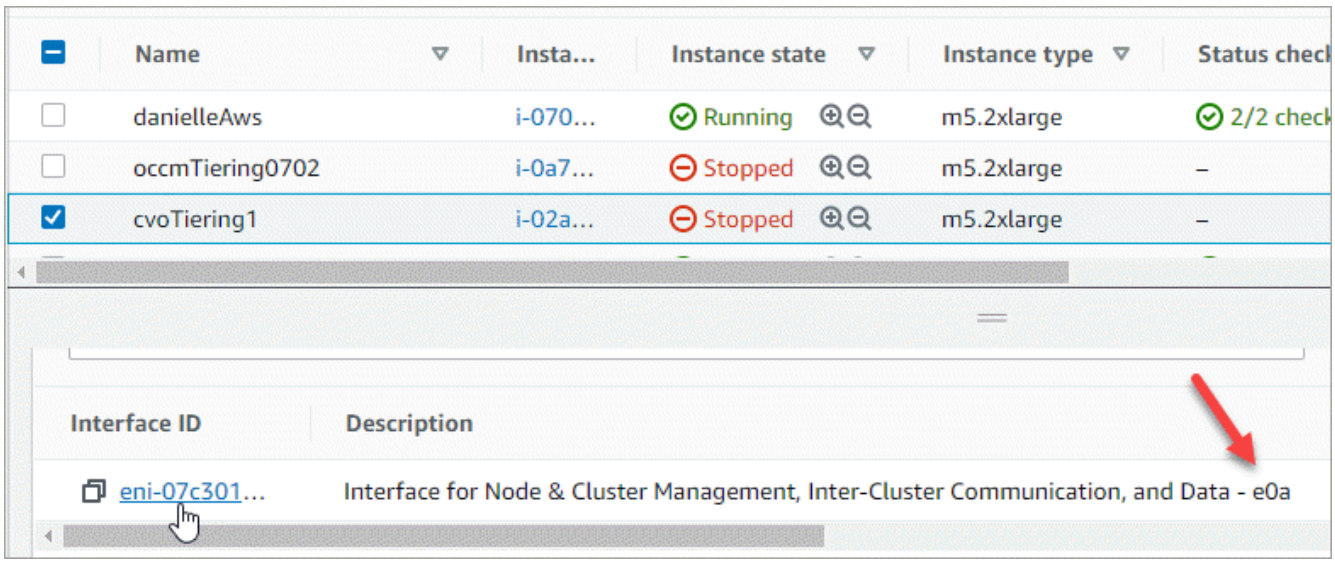
Note that an optional management LIF for a storage VM requires a private IP address on a single node system and on an HA pair in a single AZ. This management LIF provides a connection to management tools like SnapCenter.

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 unix -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 unix -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 unix -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.

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

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 additional storage VMs are supported when running Cloud Volumes ONTAP in Azure.

To create additional data-serving storage VMs, you need to allocate IP addresses in Azure and then run ONTAP commands to create the storage VM and data LIFs.

Supported number of storage VMs

Multiple storage VMs are supported with Cloud Volumes ONTAP BYOL in Azure with an add-on license starting with the 9.9.0 release. Go to the Cloud Volumes ONTAP Release Notes to verify the supported number of storage VMs for your version of Cloud Volumes ONTAP.

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.

Allocate IP addresses in Azure

Follow the steps below for your configuration: either a single node system, an HA pair using iSCSI, or an HA pair using NFS/SMB.

Single node

IP addresses must be assigned to nic0 in Azure before you create a storage VM and allocate LIFs.

You'll need to create an IP address for data LIF access and another optional IP address for a storage VM (SVM) management LIF. This management LIF provides a connection to management tools like SnapCenter.

Steps

1. Log in to the Azure portal and open the **Virtual machine** service.
2. Click the name of the Cloud Volumes ONTAP VM.
3. Click **Networking**.
4. Click the name of the network interface for nic0.
5. Under **Settings**, click **IP configurations**.
6. Click **Add**.
7. Enter a name for the IP configuration, select **Dynamic**, and then click **OK**.
8. Click the name of the IP configuration that you just created, change the **Assignment** to **Static**, and click **Save**.
9. If you want to create an SVM management LIF, repeat these steps on node 1.

After you finish

Copy the private IP addresses that you just created. You'll need to specify those IP addresses when you create LIFs for the new storage VM.

HA pair using iSCSI

iSCSI IP addresses must be assigned to nic0 in Azure before you create a storage VM and allocate LIFs. IPs for iSCSI are assigned to nic0 and not the load balancer because iSCSI uses ALUA for failover.

You'll need to create an IP address for data LIF access from node 1, another IP address for data LIF access from node 2, and another optional IP address for a storage VM (SVM) management LIF. This management LIF provides a connection to management tools like SnapCenter.

Steps

1. Log in to the Azure portal and open the **Virtual machine** service.
2. Click the name of the Cloud Volumes ONTAP VM for node 1.
3. Click **Networking**.
4. Click the name of the network interface for nic0.
5. Under **Settings**, click **IP configurations**.
6. Click **Add**.
7. Enter a name for the IP configuration, select **Dynamic**, and then click **OK**.
8. Click the name of the IP configuration that you just created, change the **Assignment** to **Static**, and click **Save**.
9. Repeat these steps on node 2.
10. If you want to create an SVM management LIF, repeat these steps on node 1.

After you finish

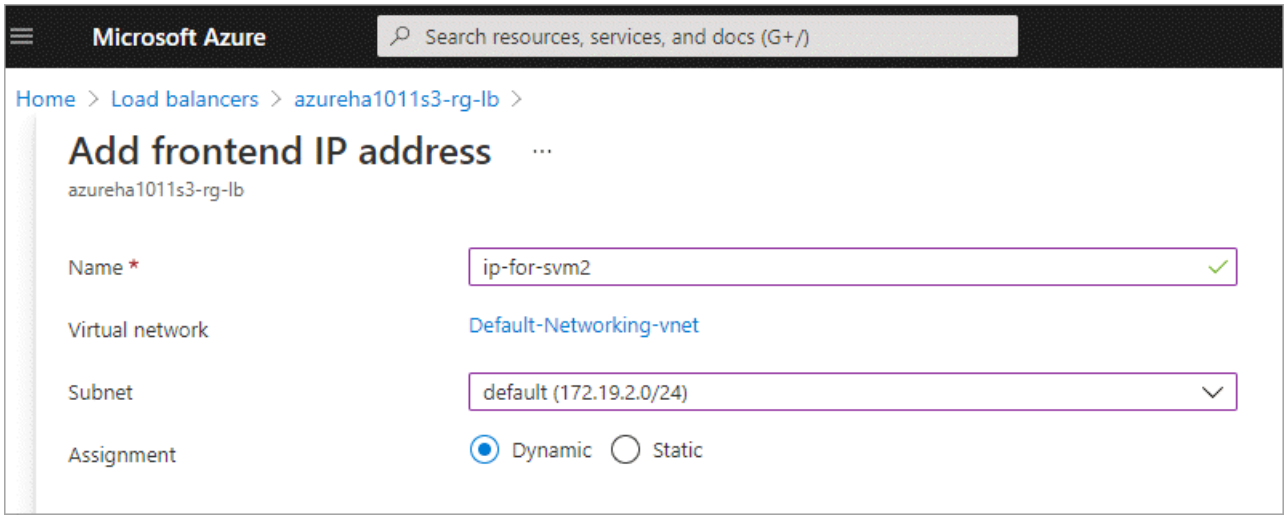
Copy the private IP addresses that you just created. You'll need to specify those IP addresses when you create LIFs for the new storage VM.

HA pair using NFS/SMB

IP addresses that you use for NFS and SMB data are allocated in the load balancer so that the IP addresses can migrate to the other node in case failover events occur.

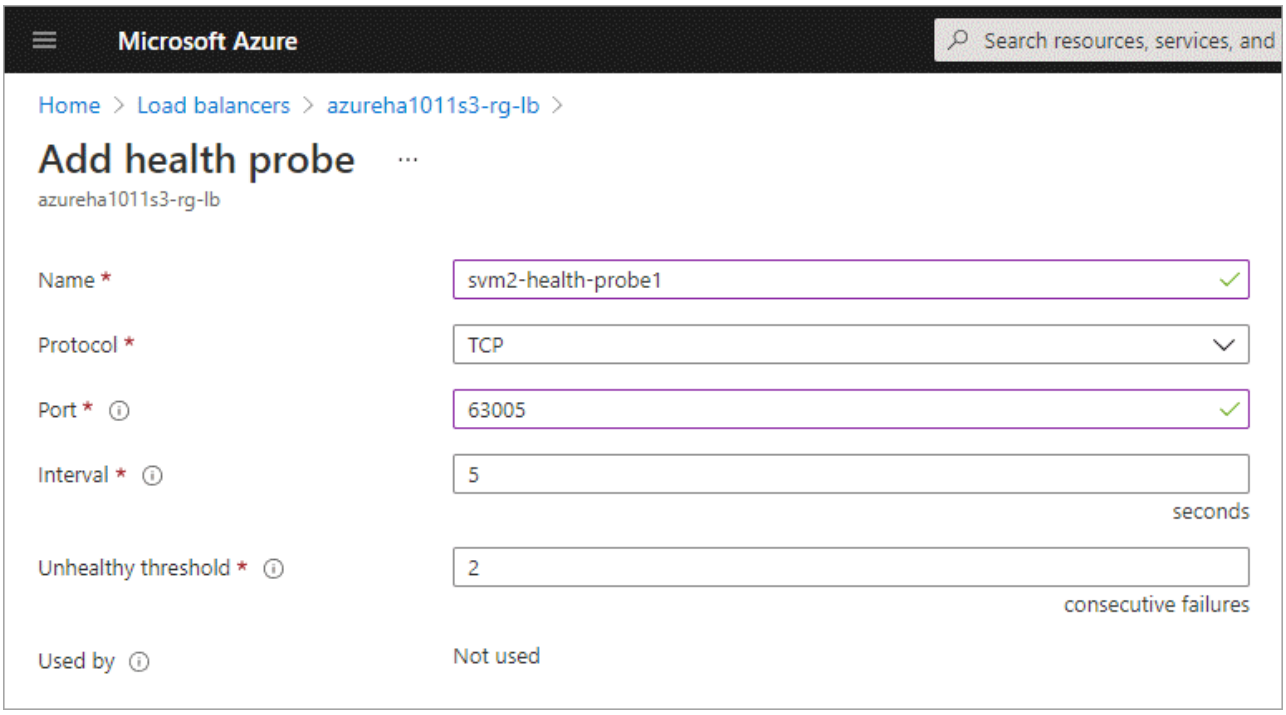
Steps

1. In the Azure portal, open the **Load balancers** service.
2. Click the name of the load balancer for the HA pair.
3. Create one frontend IP configuration for data LIF access from node 1, another for data LIF access from node 2 (HA pairs only), and another optional frontend IP for a storage VM (SVM) management LIF.
   a. Under **Settings**, click **Frontend IP configuration**.
   b. Click **Add**.
   c. Enter a name for the frontend IP, select the subnet for the Cloud Volumes ONTAP HA pair, and leave **Dynamic** selected.

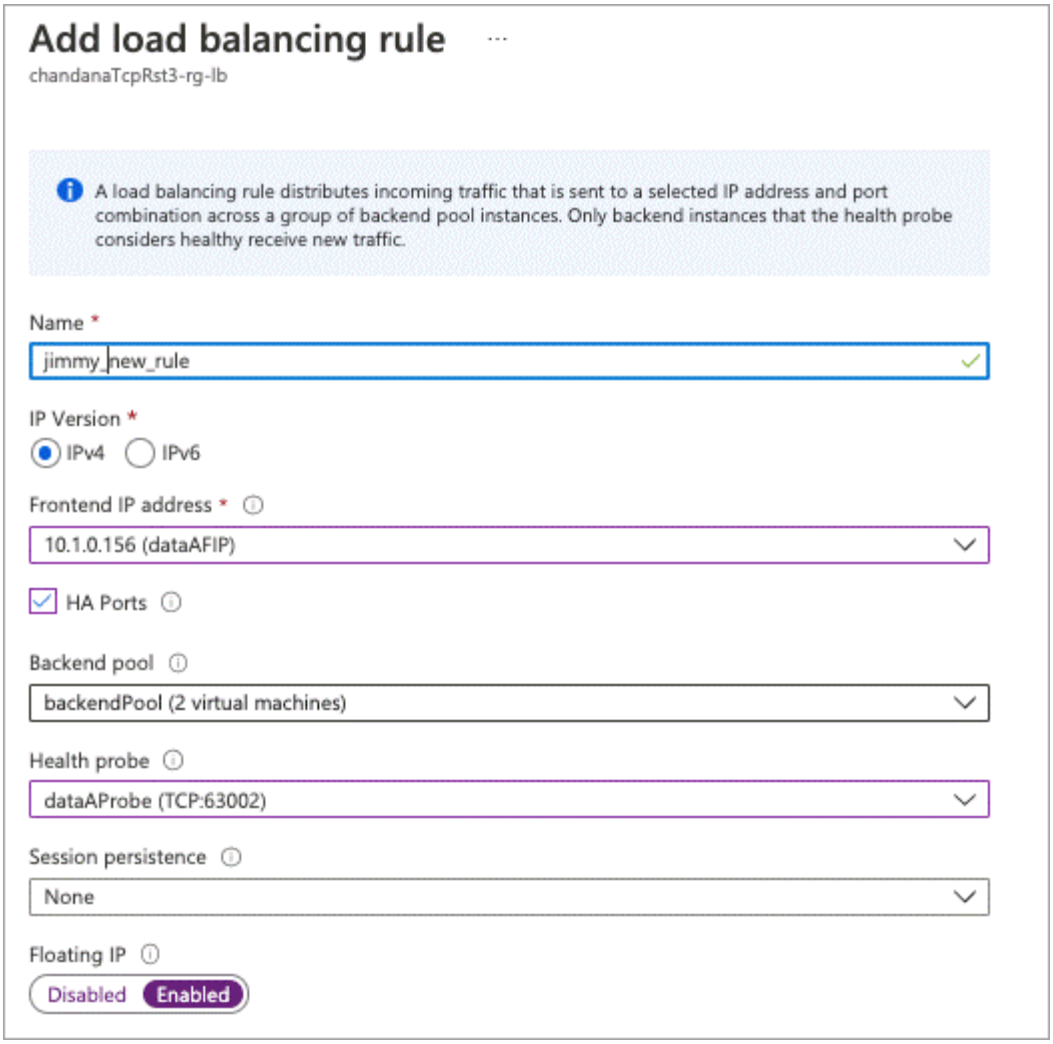


   d. Click the name of the frontend IP configuration that you just created, change the **Assignment** to **Static**, and click **Save**.
4. Add a health probe for each frontend IP that you just created.
   a. Under the load balancer's **Settings**, click **Health probes**.
   b. Click **Add**.
   c. Enter a name for the health probe and enter a port number that's between 63005 and 65000. Keep the default values for the other fields.

      It's important that the port number is between 63005 and 65000. For example, if you are creating three health probes, you could enter probes that use the port numbers 63005, 63006, and 63007.



5. Create new load balancing rules for each frontend IP.
   a. Under the load balancer's **Settings**, click **Load balancing rules**.
   b. Click **Add** and enter the required information:
      - **Name**: Enter a name for the rule.
      - **IP Version**: Select **IPv4**.
      - **Frontend IP address**: Select one of the frontend IP addresses that you just created.
      - **HA Ports**: Enable this option.
      - **Backend pool**: Keep the default Backend pool that was already selected.
      - **Health probe**: Select the health probe that you created for the selected frontend IP.
      - **Session persistence**: Select **None**.
      - **Floating IP**: Select **Enabled**.



After you finish

Ensure that the network security group rules for Cloud Volumes ONTAP allows the load balancer to send TCP probes for the health probes that were created in step 4 above. Note that this is allowed by default.

Create a storage VM and LIFs

These steps create a new storage VM on a single node system or on an HA pair. One IP address is required for data LIF access from node 1, another IP address for data LIF access from node 2 (HA pairs only), and another optional IP address for a storage VM (SVM) management LIF. This management LIF provides a connection to management tools like SnapCenter.

Use the commands below that match the data access protocol for the storage VM, which is either NAS or iSCSI.

Steps

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

```
vserver create -vserver <svm-name> -subtype default -rootvolume <root-volume-name> -rootvolume-security-style unix
```

```
network route create -destination 0.0.0.0/0 -vserver <svm-name> -gateway
<ip-of-gateway-server>
```

2. Create data LIFs:
   a. Use the following command to create a NAS LIF on node 1.

```
network interface create -vserver <svm-name> -lif <lif-name> -role
data -data-protocol cifs,nfs -address <nfs--ip-address> -netmask
-length <length> -home-node <name-of-node1> -status-admin up
-failover-policy system-defined -firewall-policy data -home-port e0a
-auto-revert true -failover-group Default -probe-port <port-number-
for-azure-health-probe1>
```

   If this is a single node system, then you should change the value of the -failover-policy parameter to *disabled*.

   b. Use the following command to create a NAS LIF on node 2 (for HA pairs only).

```
network interface create -vserver <svm-name> -lif <lif-name> -role
data -data-protocol cifs,nfs -address <nfs-cifs-ip-address> -netmask
-length <length> -home-node <name-of-node2> -status-admin up
-failover-policy system-defined -firewall-policy data -home-port e0a
-auto-revert true -failover-group Default -probe-port <port-number-
for-azure-health-probe2>
```

   c. Use the following command to create an iSCSI LIF on node 1.

```
network interface create -vserver <svm-name> -home-port e0a -address
<iscsi-ip-address> -lif <lif-name> -home-node <name-of-node1> -data
-protocol iscsi
```

   d. Use the following command to create an iSCSI LIF on node 2 (for HA pairs only).

```
network interface create -vserver <svm-name> -home-port e0a -address
<iscsi-ip-address> -lif <lif-name> -home-node <name-of-node2> -data
-protocol iscsi
```

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

```
network interface create -vserver <svm-name> -lif <lif-name> -role data
-data-protocol none -address <svm-mgmt-ip-address> -netmask-length
<length> -home-node node1 -status-admin up -failover-policy system-
defined -firewall-policy mgmt -home-port e0a -auto-revert false
-failover-group Default -probe-port <port-number-for-azure-health-
probe3>
```