



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

Cloud Manager

Ben Cammett
July 19, 2021

Table of Contents

- Create data-serving storage VMs for Cloud Volumes ONTAP in Azure 1
 - Supported number of storage VMs 1
 - Allocate IP addresses in Azure. 1
 - Create a storage VM and LIFs 4

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.

The screenshot shows the 'Add frontend IP address' page in the Microsoft Azure portal. The breadcrumb navigation is 'Home > Load balancers > azureha1011s3-rg-lb >'. The title is 'Add frontend IP address' with a three-dot menu icon. Below the title is the resource name 'azureha1011s3-rg-lb'. The form contains the following fields:

- Name ***: A text input field containing 'ip-for-svm2' with a green checkmark icon on the right.
- Virtual network**: A dropdown menu showing 'Default-Networking-vnet'.
- Subnet**: A dropdown menu showing 'default (172.19.2.0/24)' with a downward arrow icon on the right.
- Assignment**: Two radio buttons, 'Dynamic' (which is selected) and 'Static'.

- 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.

The screenshot shows the 'Add health probe' page in the Microsoft Azure portal. The breadcrumb navigation is 'Home > Load balancers > azureha1011s3-rg-lb >'. The title is 'Add health probe' with a three-dot menu icon. Below the title is the resource name 'azureha1011s3-rg-lb'. The form contains the following fields:

- Name ***: A text input field containing 'svm2-health-probe1' with a green checkmark icon on the right.
- Protocol ***: A dropdown menu showing 'TCP' with a downward arrow icon on the right.
- Port *** ⓘ: A text input field containing '63005' with a green checkmark icon on the right.
- Interval *** ⓘ: A text input field containing '5'. Below the field is the unit 'seconds'.
- Unhealthy threshold *** ⓘ: A text input field containing '2'. Below the field is the unit 'consecutive failures'.
- Used by** ⓘ: A dropdown menu showing 'Not used'.

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**.

Add load balancing rule

chandanaTcpRst3-rg-lb

i A load balancing rule distributes incoming traffic that is sent to a selected IP address and port combination across a group of backend pool instances. Only backend instances that the health probe considers healthy receive new traffic.

Name *

IP Version *
☒ IPv4 ☐ IPv6

Frontend IP address * ⓘ

☒ HA Ports ⓘ

Backend pool ⓘ

Health probe ⓘ

Session persistence ⓘ

Floating IP ⓘ

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>
```


Copyright Information

Copyright © 2021 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system-without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

Trademark Information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.