PowerProtect DD Virtual Edition in the Azure Cloud

Version DDVE 5.0

Installation and Administration Guide

REV 01
May 2020
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<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>May 2020</td>
<td>Initial Publication (with DD OS 7.2)</td>
</tr>
</tbody>
</table>
Preface

As part of an effort to improve its product lines, we periodically release revisions of its software and hardware. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features.

Purpose

This manual describes how to install, configure, and administer DD Virtual Edition (DDVE) systems.

Audience

This manual is intended for use by both system administrators and general users of DD Virtual Edition.

Related documentation

The following publications and websites provide additional information:

- **DD Operating System Release Notes**
- **DD Operating System Initial Configuration Guide**
  - This manual explains configuration steps that are common to hardware and virtual DD systems.
- **DD Operating System OS Command Reference Guide**
  - This manual explains how to administer DD systems from the command line.
- **DD Operating System OS Administration Guide**
  - This manual explains how to administer DD systems with the System Manager graphical user interface.
- **DD Boost for OpenStorage Administration Guide**
  - This manual explains how to use the DD Boost protocol for data transfer between backup software and DD systems.
  - This website lists Avamar and NetWorker software support for DDVE.

Where to get help

We support, product, and licensing information can be obtained as follows:

**Product information**

For documentation, release notes, software updates, or information about products, go to Online Support at [https://support.emc.com](https://support.emc.com).

**Technical support**

For technical support of this release of DDVE, go to Online Support at [https://support.emc.com](https://support.emc.com).

**Your comments**

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to [DPAD.Doc.Feedback@emc.com](mailto:DPAD.Doc.Feedback@emc.com).
CHAPTER 1

Getting Started

This chapter includes the following topics:

- Purpose of this guide ............................................................................................................. 10
- Audience ................................................................................................................................ 10
- Architecture overview ............................................................................................................10
Purpose of this guide

This installation guide is a supplement to the *DD Operating System Administration Guide*, which includes content for all DD systems. It describes upgrading the DDVE software and using the DD System Manager to monitor DD systems for errors, disk space, and service events.

This guide contains content specific to deploying DD Virtual Edition (DDVE) on Azure cloud. Use this guide with the *DD Operating System Administration Guide* and applicable Azure documentation. See *Azure documentation* for more information.

Audience

This document is intended for data protection and storage administrators who want to use Microsoft Azure Cloud to back up DD Virtual Edition (DDVE) content. Users should know about the following technology:

- Azure virtual machines
- Azure storage
- Azure virtual network

Architecture overview

DDVE is a virtual deduplication appliance that provides data protection for entry, enterprise, and service provider environments.

The following diagram represents the architecture of the DDVE on Microsoft Azure Cloud solution.

*Figure 1* Dell EMC Power Protect DD Virtual Edition (DDVE) on Azure

Legend:
1. To keep data traffic between DDVE and Azure storage within the Azure infrastructure, Dell EMC recommends that you create an Azure storage service endpoint. The service endpoint keeps DDVE from depending on a NAT Gateway or Public IP address to access the hot blob container.

2. To keep data transfers secure, Dell EMC recommends a VPN connection to replicate data from an on-premises host to DDVE in the cloud or the opposite way.

3. DDVE is categorized as a backend server. It must be kept in a private subnet with a private address. Never set a public IP address for DDVE.

4. The storage account must be in the same region where the DDVE instance is running. A separate hot blob container is required for each DDVE.

5. All DDVE instances must be secured with the appropriate security group entries. Typically SSH (Port 22) or HTTPS (Port 443) is used for DDVE inbound access. HTTPS (443) must be allowed for outbound Azure hot blob container access for DDVE. TCP ports 2049 and 2051 are used for DD Boost and replication purposes. See the DDVE documentation for more information and for a complete list of ports.
CHAPTER 2

Introducing DDVE

This chapter includes the following topics:

- Introducing DDVE ................................................................. 14
- DDVE features ................................................................. 14
- DDVE cloud features ...................................................... 14
Introducing DDVE

DD Virtual Edition (DDVE) is a software-only protection storage appliance: a virtual deduplication appliance that provides data protection for entry, enterprise and service provider environments. Like any DD system, DDVE is always paired with backup software.

DDVE runs the DD Operating System (DD OS), and includes the DD System Manager graphical user interface (GUI) and the DD OS command line interface (CLI) for performing system operations.

DDVE includes the following features:

- High-speed, variable length deduplication for a 10 to 30 times reduction in storage requirements
- Unparalleled data integrity to ensure reliable recovery, and seamless integration with leading backup and archiving applications
- DD Boost to speed backups by 50 percent
- DD Encryption for enhanced security of data
- DD Replicator for network efficient replication that enables faster time-to-DR readiness

DDVE runs on two types of platforms:

- On premises, DDVE supports VMware, Hyper-V, KVM, and VxRail.
- In the cloud, DDVE also runs in the Amazon Web Services (AWS) (cloud and gov cloud), Azure (cloud and gov cloud), VMware Cloud (VMC) on AWS cloud platforms, and Google Cloud Platform (GCP).

For more information about the features and capabilities of DD systems (both physical and virtual), see the **DD Operating System Administration Guide**.

DDVE features

Resource configurations depend on your DDVE configuration. For features for cloud configurations within the admin guide for your specific cloud provider, see **DDVE cloud features** on page 14.

The **DD OS Administration Guide**, **DD Boost OST Guide**, and **DD Boost for Partner Integration Administration Guide** provide additional information about the supported protocols and features.

DDVE cloud features

DDVE provides the capabilities of a cloud DD system using the following resource configuration sizes:

- DDVE supports:
  - Azure Standard Cloud
  - Azure Government Cloud
  - (DDVE does not support U.S. DoD Cloud)
- DDVE supports two types of data storage for Azure:
  - DDVE on Block storage
  - DDVE on Hot Blob storage (recommended)
Table 2 DDVE on Azure resource configuration size

<table>
<thead>
<tr>
<th>Type</th>
<th>Resource configuration size</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDVE on Block storage</td>
<td>• DDVE capacity is available in 1 TB increments starting at 512 GB, and up to 8 TB or 16 TB instance type.</td>
</tr>
<tr>
<td></td>
<td>• DDVE on Block storage: Up to 16 TB.</td>
</tr>
<tr>
<td>DDVE on Hot Blob storage (recommended)</td>
<td>• DDVE capacity is available up to 96 TB.</td>
</tr>
</tbody>
</table>

The following diagram shows the disk and container layouts for DDVE on block storage and Hot Blob storage.

**Figure 2** DDVE in Azure hot blob storage with managed disks (recommended)

**Hot Blob Storage**

**Managed Disk Storage**

The following sections list supported DD protocols and features in DDVE.

**Supported DD protocols**
- DD Boost over IP
- DD Boost FS

**Supported DD features**
- DD Boost managed file replication (MFR)
- Encryption
- MTree replication
- DD System Manager GUI for DDVE management
Secure multitenancy (SMT) with Network Isolation Support
DD Boost/BoostFS for Big Data
Key Management Interoperability Protocol (KMIP)
More restricted IPTables settings
Azure for Government Cloud

**Note:** DDVE supports these replication capabilities:
- Managed file replication and MTree replication
- Replication across availability zones and regions
- Bi-directional replication between on-premises and Azure

The *DD OS Administration Guide, DD Boost OST Guide, DD Boost for Partner Integration Administration Guide* provide additional information about supported protocols and features.
CHAPTER 3
Deploying DDVE

This chapter includes the following topics:

- Prerequisites for deploying DDVE on Azure ................................................................. 18
- Deploying DDVE from the Azure Marketplace ............................................................. 21
- Adding metadata disks in Azure .................................................................................... 22
- Resizing the DDVE instance in Azure ........................................................................... 23
- Converting metadata disk type ..................................................................................... 25
Prerequisites for deploying DDVE on Azure

While DDVE is running in Azure cloud, you can back up and restore your operational data from Azure hot blob storage.

The following sections provide general guidelines to deploy, configure, and run DDVE on Azure with Active Tier on Azure hot blob storage.

Set up the network environment

For secure access to the DDVE instance, Dell EMC recommends that you use the virtual network architecture that Azure provides.

About this task

Set up and configure the following components:

- Resource group
- Virtual network
- Subnets
- Network Security groups
- Service endpoint for connectivity to Microsoft.Storage

See Networking Best Practices for DDVE in the Cloud on page 59 for more information.

Enable VNet service endpoint to Azure storage

The DDVE object store solution requires network connectivity to the object storage container.

About this task

To route traffic directly from your virtual network to the storage service on the Microsoft Azure backbone network, you must enable Virtual Network (VNet) service endpoints to Azure storage. See Virtual Network service endpoints for more information.

By default, the Azure VNet service endpoints are disabled. You can enable them on the subnet in your virtual network.

Note: Dell EMC recommends that you enable the VNet service endpoint for security and efficiency. Never enable or attach a public IP address to DDVE in the cloud.

Procedure

1. In the VPC pane, click Service endpoint and + Add.
2. In the popup window, in the service column, select Microsoft.Storage.
3. In the subnet column, select the subnets.
Create a container in Azure hot blob storage

A storage account is required in the same region where DDVE is deployed.

Procedure

1. Create a StorageV2 account in the same region where DDVE is deployed. Select the following values:
   - Performance—Standard
   - Account kind—General-purpose V2
   - Access tier—Hot

   See Create an Azure Storage account for steps.

2. Create a new hot blob container as the backup storage for the DDVE. Ensure that the container is empty.

   a. Go to your new storage account and to the Blob service section.
   b. Select Containers, and click + Container. Type a name for the container.
   c. Set the public access level to Private (no anonymous access), and click Create.

For more information, see Manage blob in Azure Portal.

Get storage account access key

The access key of the storage account is required to configure the access from DDVE to Azure hot blob storage.

About this task

To view and copy your storage account access keys, see Manage storage account access keys.
Prepare the SSH key pair

For secure login to DDVE through SSH, you must create an SSH key pair.

About this task

To create an SSH key pair, see How to use SSH keys with Windows on Azure.

Understanding compute and storage requirements

Azure provides several types of disk storage with different performance characteristics such as IOPS, throughput, latency, and so on.

Standard HDD is recommended for the DDVE OS disk and the vNVRAM disk.

For the balance of cost and performance, standard HDD is recommended for metadata disks.

Note: Standard SSD is also supported for metadata disks. See also What disk types are available in Azure? for more details, and decide which type accommodates your needs.

Select the appropriate DDVE virtual machine instance type according to capacity and workload.

The metadata requirements that are listed in Table 3 on page 20 are based on 10X deduplication ratio and 2X compression. If your workload has a higher deduplication ratio, add more metadata disks as required.

Table 3 DDVE instance type, storage capacity, and metadata disks

<table>
<thead>
<tr>
<th>Instance type</th>
<th>Standard_F8s</th>
<th>Standard_DS4_v2</th>
<th>Standard_D16s_v3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard_F8</td>
<td>Standard_D4_v2</td>
<td>Standard_D16_V3</td>
</tr>
<tr>
<td>CPU</td>
<td>8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Memory (GiB)</td>
<td>16</td>
<td>28</td>
<td>64</td>
</tr>
<tr>
<td>System Disk</td>
<td>250 GiB Standard HDD Root disk</td>
<td>250 GiB Standard HDD Root disk</td>
<td>250 GiB Standard HDD Root disk</td>
</tr>
<tr>
<td></td>
<td>10 GiB Standard HDD NVRAM disk</td>
<td>10 GiB Standard HDD NVRAM disk</td>
<td>10 GiB Standard HDD NVRAM disk</td>
</tr>
<tr>
<td>Storage capacity</td>
<td>16 TB</td>
<td>32 TB</td>
<td>96 TB</td>
</tr>
<tr>
<td>Metadata disks</td>
<td>Standard HDD Up to 2 X 1 TiB</td>
<td>Standard HDD Up to 4 X 1 TiB</td>
<td>Standard HDD Up to 10 X 1 TiB</td>
</tr>
</tbody>
</table>

Table 4 Azure Hot Blob Storage Stream Counts

<table>
<thead>
<tr>
<th>Configuration (TB)</th>
<th>Number of metadata disks (each 1 TB)</th>
<th>Stream Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Read</td>
<td>Write</td>
</tr>
<tr>
<td>16 - standard F8s (16 GB)</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>24</td>
</tr>
</tbody>
</table>
Deploying DDVE from the Azure Marketplace

Use this procedure for initial deployment of DDVE from the Azure Marketplace.

**Procedure**

1. Log in to the Azure portal.
   - For Azure public cloud: https://portal.azure.com
   - For Azure Gov Cloud: https://portal.azure.us
3. Select a software plan (DDOS version) and begin the deployment.
4. On the **Basic** page, configure basic information for the DDVE:
   - **Resource Group**: Specify the resource group for your DDVE.
   - **Virtual machine name**: Enter a name for DDVE. Maximum length is ten characters. For Azure Gov Cloud, maximum length is six characters.
   - **Region**: For better performance, ensure that DDVE and the storage account are in the same region.
   - **Size**: Specify the DDVE instance type based on the capacity.
   - **Authentication type**: SSH public key and password authentication are supported. SSH public key authentication forces a password change at first login.
   - **Username**: Enter sysadmin.
   - **SSH public key**: Copy and paste the SSH public key.
   - **Password**: Enter the password for sysadmin.
   - **Public inbound ports**: Select Allow selected ports.
   - **Select inbound port**: According to your IT and networking practices, you can select "HTTP(80), HTTPS(443), SSH(22)" to enable the SSH and GUI access to your DDVE.
5. On the **Disks** page, configure the disk storage for the DDVE.
- **OS disk type**: Select *Standard HDD*.
- For Data Disks, NVRAM disk is added automatically during deployment. Metadata disks can be added after deployment.

6. On the **Networking** page, define network connectivity for the DDVE.
   - **Virtual network**: Specify the VNet for the DDVE.
   - **Subnet**: Specify the VNet for the DDVE.
   - **Public IP**: For security, deploying DDVE in a private subnet and leaving the public IP address as *None* is recommended.
   - **NIC network security group**: Configure it as your network setup.
   - **Public inbound ports**: Select *Allow selected ports*.
   - **Select inbound ports**: According to your IT and networking practices, you can select "HTTP(80), HTTPS(443), SSH(22)" to enable the SSH and GUI access to the DDVE.
   - **Accelerated networking**: Select *Off*.
     - **Note**: Azure accelerated networking is not supported in this version of the DDVE.

7. On the **Management** page, configure monitoring and management options for DDVE.
   - **Boot diagnostics**: Select *On* if you want to capture the serial console output of the DDVE to help diagnose a startup issue.
   - **System assigned managed Identify**: Select *Off*.
   - **Enable auto-shutdown**: Select *Off*.

8. On the **Advanced** page, this version of the DDVE does not support these options.

9. On the **Tags** page, you can create or assign a tag to the DDVE from a resource management and billing perspective.

10. On the **Review+Create** page, verify that the configuration summary for creating the DDVE is correct.

11. Click **Create**.
    - The Azure portal starts the DDVE deployment. When the deployment finishes, you can find the DDVE in your resource group.

### Adding metadata disks in Azure

DDVE uses disks to save the metadata. For the balance between cost and performance, Dell EMC recommends Standard HDD for metadata disks.

- Managed disk is recommended. Azure also enables you to convert unmanaged disks to managed disks.
- It is not necessary to shut down the virtual machine before adding metadata disks.
- The metadata disk is not usually resized. To add more storage to the virtual machine, you can create a new virtual disk.

#### Required capacity
- Metadata disk capacity—The required metadata capacity varies based on workload. Dell EMC recommends that metadata capacity be equal to 10% of the total DDVE capacity, which is sufficient for most workloads. If your workload is using a higher deduplication ratio, consider adding more metadata disks.
• Licensed capacity—Ensure that the DDVE instance can support the licensed capacity. If the new licensed capacity is more than the supported capacity of the DDVE instance, upgrade the DDVE instance.

**Metadata disk requirements**

• The minimum size of the metadata disk is 1 TiB.
• Azure limits metadata disks to a maximum of 4,095 GiB.
• The recommended size for all metadata disks is 1 TiB. For example, if 10 TiB of metadata capacity are required, configure ten 1-TiB metadata disks.

**Adding managed disks in Azure**

Use these procedures to add managed disks to DDVE in Azure.

**Procedure**

1. Allocate and attach managed disks to DDVE:
   a. Log in to the Azure portal.
   b. Search the name of the DDVE virtual machine.
   c. In the right pane under SETTINGS, select **Disks**.
   d. Click **Add data disk**.
   e. Select **Create disk** from the menu.
   f. In the popup window, enter values for the following:
      - **Disk name**: A name for the disk
      - **Resource group**: Specifies the resource group for the disk. Dell EMC recommends that you select the same resource group as the DDVE.
      - **Source Type**: Select **None**.
      - **Size**: Click **Change Size** to select a storage type of **Standard HDD** and size of **1024 GiB**.
      - **Host Caching**: Select **None**. Host caching is not supported in DDVE.

2. Click **Create**.
3. Repeat the steps above to add more metadata disks.
4. Click **Save** (disk icon in the upper left corner of the page) to add the data disks.
5. Display new disks with the **disk show hardware** command.
6. If the file system is already enabled, add the new disks with the **storage add tier active <disk>** command, and expand the file system with **filesys expand** command.

**Resizing the DDVE instance in Azure**

**About this task**

Follow these steps to resize the DDVE virtual machine instance.

**Procedure**

1. In the Azure portal, click **Stop** to stop the current DDVE instance.
2. Resize the virtual machine:
   a. Select **Settings > Size**.
   b. Select the new size for the DDVE instance, and then click **Select**.

   \[\text{Note: The DDVE instance type may only be upgraded in this direction: Standard\_F8s > Standard\_D8\_v2 \rightarrow Standard\_D16\_v3.}\]

   The Azure portal indicates that the DDVE virtual machine has been successfully resized.

3. Click **Start** to launch the resized DDVE instance.
Converting metadata disk type

Dell EMC recommends using Standard HDD for metadata disks for the balance between cost and performance. If you are using Standard HDD and want to convert to Standard SSD, follow the instructions in this section.

Observe the following:

- Do not use managed disks and unmanaged disks together.
- During the conversion, the DDVE is stopped and restarted.

Converting unmanaged to managed disks

If the DDVE is using unmanaged disks for metadata disks, convert the metadata disks into managed disks.

Procedure

1. Use SSH to log in to the DDVE.
2. Shut down the DDVE with this CLI command:
   ```
   System shutdown
   ```
4. Select the DDVE from the list of VMs in the portal.
5. If the DDVE is not in stopped (deallocated) status, click Stop in the VM Overview pane, and wait for the DDVE to stop.
6. In the blade for the VM, select Disks from the menu.
7. At the top of the Disks blade, select Migrate to managed disks.
8. If the DDVE is in an availability set, a warning on the Migrate to managed disks blade directs you to convert the availability set. To convert the availability set, click the link in the warning. Once the availability set is converted, or if your DDVE is not in an availability set, click Migrate to start migrating your disks to managed disks.
9. After migration is complete, restart the DDVE.
10. To convert all the metadata disks from unmanaged to managed disks, repeat these steps.
Converting disk storage type

Convert the metadata disks from Standard HDD disk to Standard SSD.

Before you begin

Do not convert the disk storage for OS disk or NVRAM disk.

Procedure

1. Use SSH to log in to the DDVE.
2. Shut down the DDVE with this CLI command:
   ```
   System shutdown
   ```
4. Select the DDVE from the list of VMs in the portal.
5. If the DDVE is not in stopped (deallocated) status, click Stop in the VM Overview pane, and wait for the DDVE to stop.
6. In the pane for the DDVE, select Disks from the menu.
7. Select the metadata disk that you want to convert.
8. Select Configuration from the menu.
9. Change the Account type from Standard HDD to Standard SSD.
10. Click Save, and close the disk pane.
11. To convert all the metadata disks to Standard SSD, repeat these steps.

Results

The update of the disk type is instantaneous. You can restart your DDVE after the conversion.

Note: The conversion requires some time to complete in the background. The change in performance can be observed in several hours.

Expand metadata storage

Expand metadata storage by adding new metadata disks.

Before you begin

It is recommended that you expand metadata storage by adding new metadata disks. When the total number of metadata disks reaches its limit, you can expand metadata storage by increasing the size of existing metadata disks.

- Before expanding metadata storage, disable the file system.
- You cannot expand the first metadata disk.
- Observe the recommended increment size of 1 TiB.
- Shrinking the metadata disk is not supported.

Procedure

1. Log in to the Azure portal, find your DDVE, and stop it.
2. In the blade for the VM, select Disks from the menu.
3. Select the metadata disk that you want to expand.

Note: The first metadata disk is not available for expansion.
4. Select **Configuration** from the menu.
5. Change the **Size (GiB)** of the disk (for example, from 1024 GiB to 2048 GiB).
6. Select **Save** and close the disk pane.
7. To increase the size of other metadata disks, if required, repeat Step 3 to Step 6.
8. Start the DDVE.
9. Disable the file system with the **filesys disable** command.
10. Expand metadata storage with the **filesys expand** command.
11. Enable file system with the **filesys enable** command, and check file system status with **filesys status** command to ensure that it is running.
12. To confirm the metadata storage expansion, use the **filesys show space tier active local-metadata** command.
CHAPTER 4
Completing Initial DDVE Configuration

This chapter includes the following topics:

- Initial system configuration ................................................................. 30
- Configuring DDVE on Azure hot blob storage using DD System Manager .......... 30
- Configuring DDVE in Azure using the CLI .............................................. 33
- Recovering DDVE with System Headswap .............................................. 37
- Using the system recovery command ..................................................... 38
- Configuring the system for data access ............................................... 40
Initial system configuration

You can perform the initial system configuration by using the DDSM Configuration Wizard or manually using the CLI.

DHCP is enabled on the DDVE system by default. If the DHCP service is available, the DDVE system receives IP addresses from the DHCP server.

1. **Note:** DHCP is only activated automatically for the first network interface card (NIC) which is built into the virtual machine template. Any extra NICs must be configured manually.

2. **Note:** The Microsoft article, Add network interfaces to or remove network interfaces from virtual machines provides instructions.

Using the CLI

Access the CLI by using `ssh` or a terminal emulator to access the DD OS command line. The CLI configuration utility contains four sections: Network, eLicense, System, and DD Boost.

Using the GUI

Access DDSM by entering the IP address of the DDVE into a web browser, and logging in. The GUI Configuration Wizard contains six sections: Networking, File System, System Settings, DD Boost, CIFS, and NFS.

Configuring DDVE on Azure hot blob storage using DD System Manager

You can configure DDVE on Azure Hot Blob Storage using the DD System Manager (DDSM) GUI.

**Before you begin**

- Review the metadata storage size and count requirements in the Storage Best Practices section.
- Create the storage account and container. Ensure that the container is empty and remember the container name (you use this name when you create the object-store profile).

**About this task**

This procedure configures Azure hot blob storage and creates a file system.

**Procedure**

1. Log in to the DD System Manager with the sysadmin credentials.
2. For **Apply your license**, select **Pre-installed evaluation license** with 500 GiB and click **Apply**.
3. Accept the End User License Agreement (EULA).
   - The Configuration wizard opens.
4. Select **File System** and click **Yes**.
5. Select **Configure Active Tier > Enable Object Store** to configure the Azure hot blob storage.
6. Enter the container name, storage account name, key, and passphrase.
You can create the container through the Azure portal. Ensure that the container is empty when enabling object store or the operation fails.

7. (Optional) Import the Baltimore CyberTrust Root certificate to communicate with Azure Object Store.

8. Add the metadata storage, as shown in the following figure.

9. Review the summary and click Submit to create the file system and enable it.
10. Review the **File System creation complete** list and click **OK**.

11. Select **Data Management > File System** to view space usage and availability details for the hot blob storage and the local metadata storage.

12. To configure or update the eLicense on DDVE, select **Licenses > Replace licenses**, as shown in the following figure.
13. To relaunch the configuration wizard, select **Maintenance > System > Configure System.**

## Configuring DDVE in Azure using the CLI

Use this procedure to configure DDVE in Azure with the Command Line Interface (CLI).

**Procedure**

1. Use SSH to log in to the DDVE instance with sysadmin credentials.
   
   If you did not specify a password during deployment, when you log in for the first time, you must change the password.
   
   The initial configuration wizard starts.

2. Press Enter to dismiss all wizard options, exit the wizard, and complete the configuration by using CLI commands.

3. Proceed as shown in the following figure:

   ```
   $ ssh -l sysadmin <DDVE ip address>
   
   The authenticity of host '**.**.**.** (**.**.**.**) can't be established. ECDSA key fingerprint is SHA256:evoXXGZgCzp/tmrtWRIaOWlpI7ymQg9mTwTBwH9J2bs. Are you sure you want to continue connecting (yes/no)? yes
   Warning: Permanently added '**.**.**.**' (ECDSA) to the list of known hosts.
   
   EMC DD Virtual Edition
   
   Password:
   Password:
   Welcome to DD OS *****
   --------------------------------------------
   Press any key then hit enter to acknowledge the receipt of EULA information:
   Press any key then hit enter to acknowledge the receipt of EULA information: q
   Do you want to configure system using GUI wizard (yes|no) [no]:
   
   Network Configuration
   Configure Network at this time (yes|no) [no]:
   
   eLicenses Configuration
   Configure eLicenses at this time (yes|no) [no]:
   
   System Configuration
   Configure System at this time (yes|no) [no]:
   
   Storage object-store profile Configuration
   Configure Storage object-store profile at this time (yes|no) [no]:
   
   Configuration complete.
   ```

4. To update the eLicense on DDVE, copy the license file to `/ddvar` and use the file name as follows: `# elicense update <filename>.lic`. 
# elicense update atos_cap_96_TB.lic

Existing licenses:

### Capacity licenses:

<table>
<thead>
<tr>
<th>Date</th>
<th>Feature</th>
<th>Capacity</th>
<th>Type</th>
<th>State</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAPACITY</td>
<td>0.45 TiB</td>
<td>unexpired evaluation</td>
<td>active</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### Feature licenses:

<table>
<thead>
<tr>
<th>Expiration Date</th>
<th>Feature</th>
<th>Count</th>
<th>Type</th>
<th>State</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>n/a</td>
<td>REPLICATION</td>
<td>1</td>
<td>unexpired evaluation</td>
<td>active</td>
<td>n/a</td>
</tr>
<tr>
<td>n/a</td>
<td>DDBOOST</td>
<td>1</td>
<td>unexpired evaluation</td>
<td>active</td>
<td>n/a</td>
</tr>
<tr>
<td>n/a</td>
<td>RETENTION-LOCK-GOVERNANCE</td>
<td>1</td>
<td>unexpired evaluation</td>
<td>active</td>
<td>n/a</td>
</tr>
<tr>
<td>n/a</td>
<td>ENCRYPTION</td>
<td>1</td>
<td>unexpired evaluation</td>
<td>active</td>
<td>n/a</td>
</tr>
</tbody>
</table>

New licenses:

### Capacity licenses:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Capacity</th>
<th>Type</th>
<th>State</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPACITY</td>
<td>87.31 TiB</td>
<td>permanent (int)</td>
<td>active</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### Feature licenses:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Count</th>
<th>Type</th>
<th>State</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDBOOST</td>
<td>1</td>
<td>permanent (int)</td>
<td>active</td>
<td>n/a</td>
</tr>
<tr>
<td>ENCRYPTION</td>
<td>1</td>
<td>permanent (int)</td>
<td>active</td>
<td>n/a</td>
</tr>
<tr>
<td>RETENTION-LOCK-GOVERNANCE</td>
<td>1</td>
<td>permanent (int)</td>
<td>active</td>
<td>n/a</td>
</tr>
</tbody>
</table>

** New license(s) will overwrite all existing license(s).

Do you want to proceed? (yes/no) [yes]: yes

eLicense(s) updated.

Use the `# elicense show` command to verify.

# elicense show

System locking-id: V4MXYV1STR6V2V5N6T9JTMPPBZE54CL25FSXP775WJC8GM6P57YKT2DG4Y66CSH152YJRS6UPHFU22PP6VATMY2FMWSSSKZ8SHD

System software-id: Not available

Instance software-id: Not available

Licensing scheme: EMC Electronic License Management System (ELMS) node-locked mode
### Capacity licenses:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Capacity</th>
<th>Type</th>
<th>State</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPACITY</td>
<td>87.31 TiB</td>
<td>permanent (int)</td>
<td>active</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### Feature licenses:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Count</th>
<th>Type</th>
<th>State</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPLICATION</td>
<td>1</td>
<td>permanent (int)</td>
<td>active</td>
<td>n/a</td>
</tr>
<tr>
<td>DDBOOST</td>
<td>1</td>
<td>permanent (int)</td>
<td>active</td>
<td>n/a</td>
</tr>
<tr>
<td>ENCRYPTION</td>
<td>1</td>
<td>permanent (int)</td>
<td>active</td>
<td>n/a</td>
</tr>
</tbody>
</table>

License file last modified at: 2018/05/07 18:56:36.

5. **Use** `# storage object-store enable` **to enable object store.**

```bash
# storage object-store enable
Object-store is enabled.
```

6. **Enter values for the following to create the Object store:**

   a. **System Passphrase**—Required to encrypt the object store credentials. It will also will be used to encrypt keys if file system encryption is enabled. If the passphrase has already been set, the user is not prompted to enter a passphrase.

   b. **Account Name**—If no account exists, create one first.

   c. **Primary Key**—Storage accounts>settings>access keys.

   d. **Container Name**—Create a container under the storage account. The container must be empty or the operation fails.

   e. **Baltimore Cyber Trust Root**—This certificate is required to communicate with the object store. Import it for the profile creation to succeed.

```bash
# storage object-store profile set
Object-store endpoint needs the Baltimore CyberTrust Root certificate to be imported.
Profile is set.
```

7. **Use** `# storage add tier active dev4` **to add the metadata storage.**

```bash
# storage add tier active dev4
Checking storage requirements...done
Adding dev4 to the active tier...done
```
Multiple devices can also be added as metadata storage using the `# storage add tier active dev4-6` command. This command is useful when adding dev4, dev5, and dev6 to the DDVE.

```
# storage add tier active dev4-6
```

Checking storage requirements...done

Adding dev5 to the active tier...done

Updating system information...done

dev5 successfully added to the active tier.

Checking storage requirements... done

Adding dev6 to the active tier...done

Updating system information...done

dev6 successfully added to the active tier.

**Note:** Use the `# storage show all` command to view the disks that are attached.

```
# storage show all
Active tier details:
  Device   Device   Device
  --------   ---------   ----------
  (available)  4         1023.0 GiB
  (available)  5         1023.0 GiB
  (available)  6         1023.0 GiB

Spindle   Devices   Count   Total Size
  Group
  -------   -------   -----   ----------
  2         4         1       1023.0 GiB
  3         5         1       1023.0 GiB
  4         6         1       1023.0 GiB

Current active tier size: 2.9 TiB
Active tier maximum capacity: 35.2 TiB**
** The maximum capacity supported by system memory.
```

```
Capacity License:
  License    Total       Used       Remaining
  --------   ---------   --------   ---------
  CAPACITY   87.31 TiB   2.70 TiB   84.61 TiB

8. Use `# filesys create` to create the file system.
  # filesys create
  A filesystem of approximate size 2.71 TiB will be created.
Do you want to continue? (yes|no) [yes]: yes
ok, continuing.
This will take 5 - 10 minutes.
Provisioning storage...
########################################### [100%]
Initializing filesystem...
########################################### [100%]
snapshot schedules deleted
You now have a freshly initialized filesystem.
Enable the filesystem using 'filesys enable'.

9. Use 
   `# filesys enable`
   to enable the file system.

   
   # filesys enable
   Please wait..............................
   The filesystem is now enabled.

Recovering DDVE with System Headswap

Use the system headswap command to recover a DDVE instance with a head unit failure.

About this task

To perform system headswap, ensure that vNVRAM disk and metadata disks from system A are available. These disks will be attached to the new instance, B. If either vNVRAM disk or any metadata disk is not available, use the system recovery operation from object-store instead.

Procedure

1. Create instance B with head unit (root disk only) with the same instance type as the original one.
2. Detach the vNVRAM and meta-data storage from the broken head unit and attach them to the instance B head unit.
3. Set the system passphrase.
Note: Set the passphrase to match system A, otherwise, headswap fails.

# system passphrase set
Enter new passphrase:
Re-enter new passphrase:
Passphrases matched.
The passphrase is set.

4. Ensure that system A is in Stopped (Deallocated) status.
   This step is required to detach the bucket from system A and make it available to be
   attached to system B.

5. Execute system headswap.
   Note: The system restarts during the headswap process.

# system headswap
This command returns the system back to its prior operational
conditions. The system will be rebooted before
resuming normal operations.

** If system passphrase was set on the old head, you will
need to do one of the following after headswap completes:
- unlock the filesystem if you have encrypted data, or
- set the system passphrase if you don't have encrypted data

Are you sure? (yes|no) [no]: yes
ok, proceeding.

Please enter sysadmin password to confirm 'system headswap':
Restoring the system configuration, do not power off / interrupt
process ....
Broadcast message from root (Mon Apr 30 13:44:10 2018):
The system is going down for reboot NOW!

6. Check filesys status after the headswap process is complete.

# filesys status
The filesystem is enabled and running.

Using the system recovery command

The system recovery command recovers DDVE when a failure occurs.

Before you begin

About this task
The system recovery command recovers DDVE with head unit, vNVRAM disk, metadata disk
failure, or any combination of the three. However, if both vNVRAM disk and Metadata disks are
available, then the system headswap command should be used instead.

Procedure
1. Create instance B with the same configuration as instance A, including instance type and
   metadata disk capacity.
2. Enable the object-store:

# storage object-store enable
3. Set the object-store profile:
   - Set the passphrase to match that of system A, otherwise, the recovery fails.
   - Set the storage account/container name to the same as system A.

Follow the CLI prompts:

```
# storage object-store profile set
A passphrase needs to be set on the system.
Enter new passphrase: <enter-passphrase-string-meeting-requirements>
Re-enter new passphrase: <re-enter-passphrase-string>
Passphrases matched.
The passphrase is set
Enter the account name: <name-of-the-storage-account>
Enter the primary key:
Enter the container name: <name-of-the-container-name>

Object-store endpoint needs the Baltimore CyberTrust Root certificate to be imported.
Do you want to import that certificate with below fingerprint?
(yes|no) [yes]:
Profile is set.
```

4. Add a metadata disk:
   - **Note**: Add a data disk with the capacity to match or exceed the capacity of system A.

   ```
   # storage add dev4
   ```

5. Run the system recovery precheck:

   ```
   # system recovery precheck from object-store
   ```

6. Execute the recovery:

   ```
   # system recovery start from object-store
   ```

7. Check the recovery status:

   ```
   # system recovery status
   ```
   - **Note**: The system restarts during the recovery process.

8. Check the file system status after the recovery process has completed:

   ```
   # filesys status
   ```
Configuring the system for data access

If you did not configure data access with the configuration wizard, use the procedures referenced in this section to configure one or more protocols.

Depending on your environment, you must configure one or more protocols and clients for data access. Clients enable access to the DDVE system with the configured protocol. The DDVE system provides the DD Boost protocol for cloud or on-premises systems.

- DD Boost—For setting up the DD Boost feature, see the *DD Boost for Open Storage Administration Guide* or *DD Boost for Partner Integration Administration Guide*, available at [https://support.emc.com](https://support.emc.com).
- Application integration—For information about how to integrate the DD system with backup software, see the documentation for the applicable application at the DD Integration Documentation section on the DD Support web site [https://support.emc.com](https://support.emc.com).
CHAPTER 5
Administering DDVE

This chapter includes the following topics:

- Upgrading M5 instance type ................................................................. 42
- Adding virtual storage ........................................................................ 42
- Extensions to DDOS for DDVE .......................................................... 42
- DDVE-only commands ...................................................................... 43
- Modified DD OS commands .............................................................. 44
- Unsupported DD OS commands ......................................................... 47
- Troubleshooting performance issues ................................................. 52
Upgrading M5 instance type

About this task
You can upgrade the DDVE instance from \textit{m5-xlarge} > \textit{m5.2xlarge} > \textit{m5.4xlarge}.

Procedure
1. Power off the system using the \texttt{system poweroff} command.
   From the AWS console, check that the DDVE instance is in the stopped state.
2. Select \textbf{Action} > \textbf{Instance Settings} > \textbf{Change Instance Type}.
3. Select the new instance type and click \textbf{Apply}.
4. Power on the DDVE from the AWS console.
5. Once the DDVE is powered on, run the command \texttt{system vresource show} to verify the new instance configuration.

Adding virtual storage

More virtual storage can be added to the DDVE using the GUI or the CLI.

\textbf{Using the GUI}
In DD SM, click \textbf{Hardware} > \textbf{Storage} > \textbf{Configure Storage} to add the additional devices to the DDVE active tier.

\textbf{Using the CLI}
When you add a new virtual data disk to an existing DDOS file system, use the \texttt{filesys expand} command instead of the \texttt{filesys create} command. For instructions and restrictions, see \textit{Adding disks in Azure}

Extensions to DDOS for DDVE

Several DDOS commands are supported on the DDVE platform only. This section describes these commands.

\texttt{perf}

Collect and show DDVE performance statistics.
\begin{verbatim}
perf disable trace event-regexp [module {default | ddfs}]
Disable tracing of specified events.
perf enable trace event-regexp [module {default | ddfs}]
Enable tracing of the specified events.
perf start histogram [module {default | ddfs}]
Start collecting performance histograms. This command may reduce performance marginally.
perf start stats
Start printing statistics. This command may reduce performance marginally.
perf start trace [allow-wrap] [module {default | ddfs}]
Start tracing events. This command may reduce performance marginally.
perf status trace event-regexp [module {default | ddfs}]
Shows whether tracing is enabled or disabled for the specified events.
\end{verbatim}
perf stop histogram histogram-filename [module {default | ddfs}]
Stop collecting histograms and write the collected histograms to the specified file.

perf stop stats
Stop printing statistics.

perf stop trace trace-filename [module {default | ddfs}]
Stop tracing events and write the collected traces to the specified file.

**system vresource**

Display details about the virtual CPU and memory resources on the DDVE.

system vresource show [current | requirements]

<table>
<thead>
<tr>
<th>Active Tier Capacity (TB)</th>
<th>Cloud Tier Capacity (TB)</th>
<th>Instance Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>n/a</td>
<td>Standard_F8s</td>
</tr>
<tr>
<td>32</td>
<td>n/a</td>
<td>Standard_DS4_v2</td>
</tr>
<tr>
<td>96</td>
<td>n/a</td>
<td>Standard_D16s_v3</td>
</tr>
</tbody>
</table>

** The maximum allowed system capacity for active tier on block storage is 16 TB

** DDVE-only commands**

The following commands only work on DDVE and are not supported on physical DD systems.

**Table 5 DDVE-only commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>elicense checkout feature-license &lt;feature-name-list&gt;</td>
<td>Allows user to check out the features of licenses for License Server installation</td>
</tr>
<tr>
<td>elicense checkout capacity-license &lt;feature-name&gt; value &lt;n&gt; {TB</td>
<td>GB}</td>
</tr>
<tr>
<td>elicense checkin [&lt;feature-name-list&gt;</td>
<td>all]</td>
</tr>
</tbody>
</table>
Table 5 DDVE-only commands (continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>elicense license-server set</code> `server {&lt;ipaddr&gt;</td>
<td>&lt;hostname&gt;}<code> </code>port &lt;port-number&gt;`</td>
</tr>
<tr>
<td><code>elicense license-server reset</code></td>
<td></td>
</tr>
<tr>
<td><code>elicense license-server show</code></td>
<td>Displays the usage for the metadata storage.</td>
</tr>
<tr>
<td><code>filesystem show space tier active local-metadata</code></td>
<td>Note: Some portion of the disk space is reserved for internal metadata, such as index. The amount of space is based on the maximum capacity of the platform and not on licensed capacity.</td>
</tr>
<tr>
<td><code>net hosts add</code></td>
<td>Two DDVEs in different regions cannot resolve each other’s hostname. Run this command to add a host list entry.</td>
</tr>
<tr>
<td><code>storage object-store enable</code></td>
<td>Enables the object-store feature for DDVE.</td>
</tr>
<tr>
<td><code>storage object-store disable</code></td>
<td>Disables the object-store feature for DDVE.</td>
</tr>
<tr>
<td><code>storage object-store profile set</code></td>
<td>Configures the object-store access profile.</td>
</tr>
<tr>
<td><code>storage object-store profile show</code></td>
<td>Displays the object-store access profile.</td>
</tr>
<tr>
<td><code>storage object-store profile status</code></td>
<td>This CLI lists the object-store profile information set on the DDVE.</td>
</tr>
<tr>
<td><code>system vresource show [requirements]</code></td>
<td>Displays the file system capacity, the number of virtual CPUs, and the amount of memory assigned to the virtual machine running the DDVE instance. The <code>requirements</code> option displays the physical storage requirements for DDVE.</td>
</tr>
</tbody>
</table>

Modified DD OS commands

The behavior of the following commands is modified on the DDVE platform:

Table 6 Modified DD OS commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>alert</code></td>
<td>The <code>tenant-unit</code> parameter is not supported.</td>
</tr>
<tr>
<td><code>compression</code></td>
<td>The <code>tenant-unit</code> parameter is not supported.</td>
</tr>
<tr>
<td>Command</td>
<td>Changes</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>config setup show</td>
<td>Arguments for configuring features not available in DDVE have been removed.</td>
</tr>
<tr>
<td>ddboost clients show active</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>ddboost file-replication show active</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>ddboost file-replication show detailed-file-history</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>ddboost file-replication show file-history</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>ddboost option reset</td>
<td>The fc parameter is not supported.</td>
</tr>
<tr>
<td>ddboost option show</td>
<td>The fc parameter is not supported.</td>
</tr>
<tr>
<td>ddboost storage-unit create</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>ddboost storage-unit modify</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>ddboost storage-unit show</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>ddboost streams show active</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>ddboost streams show history</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>disk rescan</td>
<td>The &lt;enclosure-ID&gt;.&lt;disk-ID&gt; parameter is not supported.</td>
</tr>
<tr>
<td>disk show state</td>
<td>DDVE system disks show the System Dev state.</td>
</tr>
<tr>
<td>disk show stats</td>
<td>The DDVE format for this command is disk show stats [dev &lt;n&gt;]</td>
</tr>
<tr>
<td>disk status</td>
<td>The Spare row has been removed from the output. The System row has been added.</td>
</tr>
<tr>
<td>enclosure show all</td>
<td>The [&lt;enclosure&gt;] parameter is not supported.</td>
</tr>
<tr>
<td>enclosure show controllers</td>
<td>The [&lt;enclosure&gt;] parameter is not supported.</td>
</tr>
<tr>
<td>enclosure show cpus</td>
<td>The [&lt;enclosure&gt;] parameter is not supported.</td>
</tr>
<tr>
<td>enclosure show io-cards</td>
<td>The [&lt;enclosure&gt;] parameter is not supported.</td>
</tr>
<tr>
<td>Command</td>
<td>Changes</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>enclosure show memory</td>
<td>The [enclosure] parameter is not supported.</td>
</tr>
<tr>
<td>filesystem encryption keyes delete</td>
<td>The [tier (active</td>
</tr>
<tr>
<td>filesystem encryption keys show</td>
<td>The [tier (active</td>
</tr>
<tr>
<td>filesystem fastcopy</td>
<td>The [retention-lock] parameter is supported with DDVE 5.0. Retention lock governance mode is supported for DDVE on premises. Retention lock compliance mode is not supported for any DDVE.</td>
</tr>
<tr>
<td>filesystem show compression</td>
<td>The [tier (active</td>
</tr>
<tr>
<td>filesystem show space</td>
<td>The [tier (active</td>
</tr>
<tr>
<td>mtree create</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>mtree list</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>mtree show compression</td>
<td>The tenant-unit and tenant-unit parameters are not supported.</td>
</tr>
<tr>
<td>mtree show performance</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>net create interface</td>
<td>The virtual-ifname parameter is not supported.</td>
</tr>
<tr>
<td>net destroy</td>
<td>The virtual-ifname parameter is not supported.</td>
</tr>
<tr>
<td>perf</td>
<td>The vtl option is not supported on any perf command.</td>
</tr>
<tr>
<td>storage add</td>
<td>The enclosure and disk parameters are not supported.</td>
</tr>
<tr>
<td>storage remove</td>
<td>The enclosure and disk parameters are not supported.</td>
</tr>
<tr>
<td>storage show</td>
<td>The archive option is not supported.</td>
</tr>
<tr>
<td>system show stats</td>
<td>NVRAM statistics are not reported, because DDVE systems do not have physical NVRAM.</td>
</tr>
</tbody>
</table>
## Table 6 Modified DD OS commands (continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>quota</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
<tr>
<td>replication</td>
<td>MTree replication is the only type of replication supported.</td>
</tr>
<tr>
<td>snapshot</td>
<td>The tenant-unit parameter is not supported.</td>
</tr>
</tbody>
</table>

## Unsupported DD OS commands

The following DD OS commands and command options are not supported on the DDVE platform.

## Table 7 Unsupported commands and command options

<table>
<thead>
<tr>
<th>Unsupported command or command option</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>adminaccess https generate certificate</td>
<td>Deprecated. Use adminaccess certificate generate instead.</td>
</tr>
<tr>
<td>alerts add</td>
<td>Deprecated. Use alerts notify-list add instead.</td>
</tr>
<tr>
<td>alerts del</td>
<td>Deprecated. Use alerts notify-list del instead.</td>
</tr>
<tr>
<td>alerts notify-list option set group-name tenant-alert-summary {enabled</td>
<td>disabled}</td>
</tr>
<tr>
<td>alerts notify-list option reset group-name tenant-alert-summary</td>
<td></td>
</tr>
<tr>
<td>alerts reset</td>
<td>Deprecated. Use alerts notify-list reset instead.</td>
</tr>
<tr>
<td>alerts show alerts-list</td>
<td>Deprecated. Use alerts notify-list show instead.</td>
</tr>
<tr>
<td>alerts test</td>
<td>Deprecated. Use alerts notify-list test instead.</td>
</tr>
<tr>
<td>archive</td>
<td></td>
</tr>
<tr>
<td>authorization</td>
<td></td>
</tr>
<tr>
<td>autosupport display</td>
<td>Deprecated. Use autosupport show report instead.</td>
</tr>
<tr>
<td>autosupport reset support-list</td>
<td>Deprecated. Use autosupport reset { all</td>
</tr>
<tr>
<td>autosupport show support-list</td>
<td>Deprecated. Use autosupport show { all</td>
</tr>
<tr>
<td>cifs set authentication nt4</td>
<td>Deprecated. Use cifs set authentication active-directory instead.</td>
</tr>
<tr>
<td>cluster</td>
<td></td>
</tr>
<tr>
<td>ddboost fc</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7 Unsupported commands and command options (continued)

<table>
<thead>
<tr>
<th>Unsupported command or command option</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ddboost option reset fc</code></td>
<td></td>
</tr>
<tr>
<td><code>ddboost option set distributed-segment-processing disabled</code></td>
<td>Turning off distributed segment processing (DSP) with this DDBoost command is not supported for DDVE on DD OS 6.1.2.x.</td>
</tr>
<tr>
<td><code>ddboost option show</code></td>
<td>Turning off DSP with this DDBoost command is not supported for DDVE on DD OS 6.1.2.x.</td>
</tr>
<tr>
<td><code>ddboost option show fc</code></td>
<td></td>
</tr>
<tr>
<td><code>ddboost show image-duplication</code></td>
<td>Deprecated. Use <code>ddboost file-replication show</code> instead.</td>
</tr>
<tr>
<td><code>ddboost user option set user default-tenant-unit tenant-unit</code></td>
<td></td>
</tr>
<tr>
<td><code>ddboost user option reset user [default-tenant-unit]</code></td>
<td></td>
</tr>
<tr>
<td><code>disk add dev disk-id [spindle-group 1-16]</code></td>
<td>Deprecated. Use <code>storage add</code> instead.</td>
</tr>
<tr>
<td><code>disk add enclosure enclosure-id</code></td>
<td>Deprecated. Use <code>storage add</code> instead.</td>
</tr>
<tr>
<td><code>disk benchmark start</code></td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td><code>disk benchmark show</code></td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td><code>disk benchmark stop</code></td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td><code>disk benchmark watch</code></td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td><code>disk expand</code></td>
<td>Deprecated. Use <code>storage add</code> instead.</td>
</tr>
<tr>
<td><code>disk failenclosure-id.disk-id</code></td>
<td></td>
</tr>
<tr>
<td><code>disk multipath</code></td>
<td></td>
</tr>
<tr>
<td><code>disk port</code></td>
<td></td>
</tr>
<tr>
<td><code>disk rescan [enclosure-id.disk-id]</code></td>
<td></td>
</tr>
<tr>
<td><code>disk show detailed-raid-info</code></td>
<td>Deprecated. Use <code>disk show state</code> and <code>storage show</code> instead.</td>
</tr>
<tr>
<td><code>disk show failure-history</code></td>
<td></td>
</tr>
<tr>
<td><code>disk show performance</code></td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td><code>disk show raid-info</code></td>
<td>Deprecated. Use <code>disk show state</code> and <code>storage show</code> instead.</td>
</tr>
<tr>
<td><code>disk show reliability-data</code></td>
<td></td>
</tr>
<tr>
<td><code>disk disk show stats</code></td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td><code>disk unfail</code></td>
<td></td>
</tr>
<tr>
<td><code>enclosure beacon</code></td>
<td></td>
</tr>
<tr>
<td><code>enclosure show all [enclosure]</code></td>
<td>This command is supported, but not with the <code>enclosure</code> argument.</td>
</tr>
<tr>
<td>Unsupported command or command option</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>enclosure show chassis</td>
<td></td>
</tr>
<tr>
<td>enclosure show controllers enclosure</td>
<td>This command is supported, but not with the enclosure argument.</td>
</tr>
<tr>
<td>enclosure show cpus [enclosure]</td>
<td>This command is supported, but not with the enclosure argument.</td>
</tr>
<tr>
<td>enclosure show fans</td>
<td></td>
</tr>
<tr>
<td>enclosure show io-cards [enclosure]</td>
<td>This command is supported, but not with the enclosure argument.</td>
</tr>
<tr>
<td>enclosure show memory [enclosure]</td>
<td>This command is supported, but not with the enclosure argument.</td>
</tr>
<tr>
<td>enclosure show nvram</td>
<td></td>
</tr>
<tr>
<td>enclosure show powersupply</td>
<td></td>
</tr>
<tr>
<td>enclosure show summary</td>
<td></td>
</tr>
<tr>
<td>enclosure show temperature-sensors</td>
<td></td>
</tr>
<tr>
<td>enclosure show topology</td>
<td></td>
</tr>
<tr>
<td>enclosure test topology</td>
<td></td>
</tr>
<tr>
<td>filesys archive</td>
<td></td>
</tr>
<tr>
<td>filesys clean update-stats</td>
<td>Deprecated. Use filesys show space instead.</td>
</tr>
<tr>
<td>filesys encryption</td>
<td></td>
</tr>
<tr>
<td>filesys encryption passphrase change</td>
<td>Deprecated. Use system passphrase change instead.</td>
</tr>
<tr>
<td>filesys retention-lock</td>
<td>Deprecated. Use mtree retention-lock instead.</td>
</tr>
<tr>
<td>filesys show compression tier</td>
<td>The tier option is not supported.</td>
</tr>
<tr>
<td>filesys show history</td>
<td>Deprecated. Use filesys show compression daily instead.</td>
</tr>
<tr>
<td>ha create</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>ha destroy</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>ha status</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>ha failover</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>ha online</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>ha offline</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>license</td>
<td>The license commands are not supported because DDVE uses new elicense commands.</td>
</tr>
<tr>
<td>mtree show compression mtree_path tier</td>
<td></td>
</tr>
<tr>
<td>net aggregate</td>
<td></td>
</tr>
<tr>
<td>Unsupported command or command option</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>net config ifname type cluster</td>
<td></td>
</tr>
<tr>
<td>net create interface virtual-ifname</td>
<td></td>
</tr>
<tr>
<td>net create interface physical-ifname vlan vlan-id</td>
<td></td>
</tr>
<tr>
<td>net create virtual vethid</td>
<td></td>
</tr>
<tr>
<td>net destroy virtual-ifname</td>
<td></td>
</tr>
<tr>
<td>net destroy vlan-ifname</td>
<td></td>
</tr>
<tr>
<td>net failover</td>
<td></td>
</tr>
<tr>
<td>net modify virtual-ifname bonding [aggregate</td>
<td>failover]</td>
</tr>
<tr>
<td>net set portnaming</td>
<td></td>
</tr>
<tr>
<td>ndmp</td>
<td></td>
</tr>
<tr>
<td>ndmpd</td>
<td></td>
</tr>
<tr>
<td>perf * module vtl</td>
<td></td>
</tr>
<tr>
<td>san</td>
<td></td>
</tr>
<tr>
<td>shelf migration start</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>shelf migration status</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>shelf migration suspend</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>shelf migration resume</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>shelf migration precheck</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>shelf migration option</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>shelf migration finalize</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>shelf migration show history</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>snapshot add schedule name [days days] time time [,time...][retention period]</td>
<td>Deprecated. Use snapshot schedule create instead.</td>
</tr>
<tr>
<td>snapshot add schedule name [days days] time time every mins [retention period]</td>
<td>Deprecated. Use snapshot schedule create instead.</td>
</tr>
</tbody>
</table>
Table 7 Unsupported commands and command options (continued)

<table>
<thead>
<tr>
<th>Unsupported command or command option</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>snapshot add schedule name [days days] time time-time [every hrs</td>
<td>mins] [retention period]</td>
</tr>
<tr>
<td>snapshot del schedule {name</td>
<td>all}</td>
</tr>
<tr>
<td>snapshot modify schedule name {{days days]</td>
<td>time time {[time...]</td>
</tr>
<tr>
<td>snapshot modify schedule name {{days days]</td>
<td>time time every {mins</td>
</tr>
<tr>
<td>snapshot modify schedule name {{days days]</td>
<td>time time-time every {hrs</td>
</tr>
<tr>
<td>snapshot reset schedule</td>
<td>Deprecated. Use <code>snapshot schedule reset</code> instead.</td>
</tr>
<tr>
<td>snapshot show schedule</td>
<td>Deprecated. Use <code>snapshot schedule show</code> instead.</td>
</tr>
<tr>
<td>storage add enclosure enclosure-id</td>
<td></td>
</tr>
<tr>
<td>storage add disk enclosure-id.disk-id</td>
<td></td>
</tr>
<tr>
<td>storage remove enclosure enclosure-id</td>
<td></td>
</tr>
<tr>
<td>storage remove disk enclosure_id.disk-id</td>
<td></td>
</tr>
<tr>
<td>system firmware</td>
<td></td>
</tr>
<tr>
<td>system option set console</td>
<td></td>
</tr>
<tr>
<td>system retention-lock</td>
<td></td>
</tr>
<tr>
<td>system sanitize</td>
<td></td>
</tr>
<tr>
<td>system show anaconda</td>
<td></td>
</tr>
<tr>
<td>system show controller-inventory</td>
<td></td>
</tr>
<tr>
<td>system show nvram</td>
<td></td>
</tr>
<tr>
<td>system show nvram-detailed</td>
<td></td>
</tr>
<tr>
<td>system show oemid</td>
<td></td>
</tr>
<tr>
<td>system upgrade continue</td>
<td></td>
</tr>
<tr>
<td>user</td>
<td></td>
</tr>
<tr>
<td>user change priv</td>
<td>Deprecated, with no replacement.</td>
</tr>
<tr>
<td>vserver config set host</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>vserver config reset</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>vserver config show</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>vserver config perf-stats start</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>Unsupported command or command option</td>
<td>Notes</td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>vserver config perf-stats stop</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>vserver config perf-stats status</td>
<td>Not supported by DDVE in cloud</td>
</tr>
<tr>
<td>vtl lunmask</td>
<td>Deprecated. Use vtl group instead.</td>
</tr>
<tr>
<td>vtl lunmask add</td>
<td>Deprecated. Use vtl group add instead.</td>
</tr>
<tr>
<td>vtl lunmask del</td>
<td>Deprecated.</td>
</tr>
<tr>
<td>vtl lunmask show</td>
<td>Deprecated. Use vtl group show instead.</td>
</tr>
</tbody>
</table>

### Troubleshooting performance issues

You can check DDVE performance statistics as follows:

- By monitoring the collection of diagnostics data using metrics in the Azure portal. [How to monitor virtual machines in Azure](#) provides more detailed information.

You can also use the following to monitor benchmark performance:

- `perf`

[Extensions to DDOS for DDVE on page 42](#) provides more information about commands.

#### CPU Performance

The two key statistics for CPU performance are:

- CPU usage—CPU usage as a percentage during the interval
- CPU ready—The percentage of time that the virtual machine was ready, but could not get scheduled to run on the physical CPU. This counter might not be displayed by default.

If these counters are high, there may be a performance problem on the hypervisor host.

#### Memory Performance

- Memory swapping—The key statistic for memory performance, which is the current amount of guest physical memory swapped out to the virtual machine’s swap file.

#### Virtual Disk Performance

The key statistics for virtual disk performance are:

- I/O throughput—A decrease in these values indicates a performance issue.
- I/O latency—An increase in read and write latency values indicates a performance problem.

Failed commands—An increase in the average number of outstanding read and write requests indicates a performance problem.
This chapter includes the following topics:

- Supportability ................................................................. 54
- Azure licensing ............................................................... 54
- Power control ................................................................. 54
- Storage best practices ...................................................... 54
- Security best practices .................................................... 55
Supportability

About this task

Azure supports interactive serial console, which can help to debug boot up and networking issues, troubleshoot malfunctioning instance, interact with Grand Unified Bootloader (GRUB), and perform other troubleshooting tasks. We recommend the following.

- Enable the "Boot Diagnostics" feature during deployment for troubleshooting.
- Enable ASUP in DDVE.

Azure licensing

The DDVE license is node locked, which means the same license cannot be used on multiple DDVE instances. To facilitate DDVE license management, we recommend using served-mode license if multiple DDVEs will be deployed.

Note:

- The DDVE license might become invalid after removing the first NIC ethV0.
- In the case of a head swap, a served-mode license will continue to work on the new DDVE instance. For other licenses, you must re-activate the license.

Power control

We recommend that you use DD OS interfaces to power-off or reboot the DDVE instance. If you power-off the virtual machine using the Azure interface, it might not shut down cleanly.

By Azure platform design, using the guest OS from inside Azure to shut down the system leaves the virtual machine in Stopped status. To ensure that the DDVE instance is Deallocated (Stopped), do the following:

1. From the DD OS interface, power off the DDVE instance.
2. Click the Stop button in the Azure Portal or execute stop-azvm in the Powershell command line.

Storage best practices

The virtual disk that is allocated to the virtual machine is discovered automatically. However, you must explicitly add it to the DDVE storage active tier and create or expand the file system.

Data disk limitations

https://docs.microsoft.com/en-us/azure/azure-subscription-service-limits provides details about Azure limitations. Observe the following requirements for planning storage expansion:

- The maximum size of each disk is 4 TB, the recommended size is 1 B for performance consideration.
- VM size determines the maximum number of data disks for the Azure VM instances that DDVE uses. See Virtual Machine Sizes for data disk limitations (the root disk and resource disk that Azure adds are not counted in this limitation). The NVRAM emulation disk is also counted as one data disk for Azure. For example, on one DDVE instance in Azure supporting up to 16 TB block storage, the maximum number of data disks (from the perspective of DDVE) = (32 - 1) = 31.
Expanding DDVE on block storage

DDVE capacity can be dynamically expanded by adding more data disks to the instance. Increments of 1 TB are recommended. When the maximum capacity that the instance supports is reached, you must upgrade the VM to a larger size before adding more storage to the system.

Do not manually set or change the spindle group setting when adding storage. DDVE automatically assigns the spindle group.

Expanding DDVE on hot blob storage

The local block storage is used for caching metadata. Based on different workloads, the needed metadata size varies. Dell EMC recommends that you configure the metadata storage size as 10% of total capacity, which is enough for most workloads. For workloads with a higher deduplication ratio, more metadata is needed.

Metadata storage can be dynamically expanded. When the metadata storage space usage exceeds 80%, an alert is raised. Immediately add a metadata disk to the DDVE to avoid running out of space. The *DD OS Administration Guide* provides a procedure for expanding storage. Dell EMC recommends that you always use a 1 TB disk.

Hot blob storage location

When you use DDVE on hot blob storage, ensure that your hot blob storage account and your DDVE instance are located in the same region. Configuring the VM and storage account in different regions can result in lower performance and higher costs.

Disk caching

Host-caching is not supported for data disks (DDVE on block storage) or metadata disks (DDVE on hot blob storage). Changing the cache setting of an Azure disk detaches and reattaches the target disk. For the operating system disk, the VM is restarted. Ensure that you stop all applications and services that this disruption might affect before changing the disk cache setting.

Converting from evaluation to production

Rather than convert an evaluation version of DDVE to a production version, Dell EMC recommends a fresh deployment. If you do decide to convert from an evaluation version to production version, Dell EMC recommends that you destroy the existing file system, delete small data disk (not the root, NVRAM disks), and configure new disks according to the recommendations in this guide.

Security best practices

Avoid Public IP address

To prevent brute force attacks on the DDVE, do not use a public IP address to configure your system.

Secure access

The following table illustrates the different authentication methods that are supported by DDVE.

*Table 8 Access Types and Authentication*

<table>
<thead>
<tr>
<th>Access Type</th>
<th>Authentication Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>GUI</td>
<td>username/password X509 certificates</td>
</tr>
<tr>
<td>SSH</td>
<td>username/password</td>
</tr>
<tr>
<td></td>
<td>SSH key pair</td>
</tr>
</tbody>
</table>
Table 8 Access Types and Authentication (continued)

<table>
<thead>
<tr>
<th>Access Type</th>
<th>Authentication Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>REST API</td>
<td>username/password X509 certificates</td>
</tr>
</tbody>
</table>

For better security, we recommend that you disable the authentication based on username and password. If you want to use the username/password-based authentication, we recommend that you configure a strong password.

**Note:** Do not disable password-based login if you want to configure Avamar Virtual Edition, NetWorker, or other backup software to connect to DDVE in Azure, because password authentication is used for communication between them.

Because Azure is a public cloud, pay attention to the security in your deployment. We suggest these best practices:

- Use public key based authentication for SSH access
- Use certificate based authentication for DDSM access
- Do not configure public IP for DDVE in Azure, unless necessary
- Use an external KMIP server to store encryption keys
- Enable encryption for DDFS and replication

When deploying DDVE from the market place, you can select one of the following authentication types. The username is always sysadmin.

- Password—The complexity of this password should meet the requirements for Azure.
- SSH Public Key—The default password for sysadmin is “changeme”. At the first login, you are required to change the password.

**IP Tables feature**

After protecting the DDVE using secure setup, within DDVE you can filter the network traffic that enters by using the `iptables` feature. The Net Filter section of the [DD OS Command Reference Guide](#) provides more configuration information.

**Security rules settings**

Because DDVE in Azure is always running in a VPC, the VPC should be configured so that only required and trusted clients have access to the DD system. The following tables show the TCP and UDP ports that are used by the DD system for inbound and outbound traffic, the services that make use of them. Consider the following information when configuring VPC firewall rules. For additional information, see Security Rules.

**Inbound rules**

The following are the inbound ports used by DDVE.

<table>
<thead>
<tr>
<th>Port</th>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP 22</td>
<td>SSH</td>
<td>Used for SSH (CLI) access and for configuring DDVE.</td>
</tr>
<tr>
<td>TCP 443</td>
<td>HTTPS</td>
<td>Used for DDSM (GUI) access and for configuring DDVE.</td>
</tr>
</tbody>
</table>
Table 9 Inbound ports used by DDVE (continued)

<table>
<thead>
<tr>
<th>Port</th>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP 2049</td>
<td>DD Boost/NFS</td>
<td>Main port used by NFS - can be modified using the nfs set server-port command which requires SE mode.</td>
</tr>
<tr>
<td>TCP 2051</td>
<td>Replication/DD Boost/ Optimized Duplication</td>
<td>Used only if replication is configured (run replication show config command on DD system to determine). This port can be modified using replication modify.</td>
</tr>
<tr>
<td>TCP 3009</td>
<td>SMS (system management)</td>
<td>Used for managing a system remotely using DDSM. This port cannot be modified. This port will also need to be opened if you plan to configure replication from within the DDSM, since the replication partner needs to be added to the DDSM.</td>
</tr>
</tbody>
</table>

Depending on the protocol that is used to backup data to DDVE, additional ports are enabled with inbound firewall rules.

Outbound rules

The following are the outbound ports that are used by DDVE.

Table 10 Outbound ports used by DDVE

<table>
<thead>
<tr>
<th>Port</th>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDP 123</td>
<td>NTP</td>
<td>Used by the DD system to synchronize to a time server.</td>
</tr>
<tr>
<td>TCP 443</td>
<td>HTTPS</td>
<td>Used for DDVE to be able to communicate with outside services.</td>
</tr>
<tr>
<td>TCP 2049</td>
<td>DD Boost/NFS</td>
<td>Main port used by NFS - can be modified using the nfs set server-port command which requires SE mode.</td>
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<tr>
<td>TCP 2051</td>
<td>SMS (system management)</td>
<td>Used for managing a system remotely using DDSM. This port cannot be modified. This port will also need to be opened if you plan to configure replication from within the DDSM, as the replication partner needs to be added to the DDSM.</td>
</tr>
</tbody>
</table>

Depending on the other applications/services that are being used, additional ports shall be enabled for outbound firewall rules.
Best Practices for Working with DDVE in the Cloud
This chapter includes the following topics:

- Network setup in Azure ................................................................. 60
- Setting up NTP time synchronization in Azure .............................. 61
Network setup in Azure

Virtual Private Cloud: Azure Virtual Network in the Cloud Architecture

Your virtual private cloud (VPC) in Azure is the Virtual Network (VNet). We recommend that you use public or private subnet architecture to deploy DDVE in a private subnet. The subnet secures the DDVE VMs with the appropriate use of various VNet service components, such as route tables, access control lists, and security groups.

Public IP address

For security and to protect DDVE from potential attacks over the open internet, never expose the DDVE using a Public IP address directly over internet. We strongly recommend that you use VPN connections between different geographical regions (VNets). For example, you can use secure VPN connections for replication between different VNets, different cloud regions, cloud to on-premises, and vice versa.

Object store connectivity

The DDVE object store feature needs connectivity to its object storage, such as to the Azure storage account container. Because the object store communication is over https, the outbound security group setting must allow communication over port 443. There are different ways to enable DDVE connectivity to the object store. Of the following three options, we recommend only the third option (Using a VNet service endpoint).

- Using the public IP from the public subnet—Should not be used.
- Using NAT (Network Address Translation)—If the private subnet is configured to use NAT, DDVE will be able to communicate to an object store over NAT.
- We strongly recommend using VNet service endpoint for accessing the Azure hot blob storage. It does not require the DDVE to have a public IP address to communicate to Azure blob storage but uses the private IP address instead. In this case, an internet gateway, NAT, or virtual private gateway are not needed to access Azure blob storage. This method also allows the traffic to the Azure endpoint to stay within the Azure network and is routed internally to Azure blob storage.

Note: When you use DDVE on hot blob storage, ensure that your hot blob storage account and your DDVE instance are located in the same region. Configuring the VM and storage account in different regions can result in lower performance and higher costs.
Note: To add a Service Endpoint in the VPC:
1. In the Service column, select Microsoft.Storage.
2. In the Subnets column, specify the subnet where DDVE is located so that DDVE can access blob storage through the Service Endpoint.

Setting up NTP time synchronization in Azure

It is important that the time on the DDVE instance is correctly synchronized. Any drift in time might impact the object store communication.

About this task
System time is required for secure communication. We recommend that you sync time with the NTP server for DDVE in Azure. While performing initial configuration of the DDVE system, you can enable NTP and configure the NTP server. If you do not use the CLI configuration wizard to perform initial configuration, you can use the ntp enable command on the DD OS command line. For more information about time sync for Linux VMs in Azure, refer to Time sync for Linux VMs in Azure.

Procedure
1. Under Administration, select Settings.
2. Select More Tasks > Configure Time Settings.
3. Under NTP, select Manually Configure and add your own NTP servers.
4. Using CLI, run the following commands to configure NTP on DDVE.
   - ntp add timeserver
   - ntp enable
   - ntp sync
Networking Best Practices for DDVE in the Cloud
This chapter includes the following topics:

- Deploying DDVE on Azure block storage

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Deploying DDVE on Azure block storage

Use the procedures in this section to use DDVE on Azure block storage.

We strongly recommend that you use the DDVE on hot blob storage solution. Prerequisites for deploying DDVE on Azure on page 18 provides more information.

Azure system configuration requirements

These are the system configuration requirements for configuring the DDVE on Azure block storage.

Table 11 Azure System Requirements on Block Storage

<table>
<thead>
<tr>
<th>Instance type</th>
<th>Standard_F4</th>
<th>Standard_F8</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Memory (GiB)</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>System disk</td>
<td>250 GiB standard root disk</td>
<td>250 GiB standard root disk</td>
</tr>
<tr>
<td></td>
<td>10 GiB standard NVRAM disk</td>
<td>10 GiB standard NVRAM disk</td>
</tr>
<tr>
<td>Storage capacity</td>
<td>8 TB</td>
<td>16 TB</td>
</tr>
</tbody>
</table>

Specifications for DDVE on Azure block storage

Table 12 Azure block storage stream counts

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Write Stream</th>
<th>Read Stream</th>
<th>Repl Source</th>
<th>Repl Dest</th>
<th>Mixed Stream</th>
<th>Max Mtree</th>
</tr>
</thead>
<tbody>
<tr>
<td>8TB</td>
<td>20</td>
<td>16</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>16TB</td>
<td>45</td>
<td>30</td>
<td>45</td>
<td>45</td>
<td>60</td>
<td>6</td>
</tr>
</tbody>
</table>

Creating DDVE from Azure Marketplace

DDVE is available in the Azure Marketplace.

About this task

Refer to Deploying DDVE from the Azure Marketplace on page 21 for details and Azure system requirements.

Adding disks in Azure

Before you begin

- Ensure that you have enough licensed capacity available to add new capacity to DDVE.
- Ensure that the DDVE instance can support the new capacity. If the new capacity is more than the DDVE instance supported capacity, you must upgrade the DDVE instance.
- New block storage for the DDVE must meet the following requirements:
  - The minimum size of the first data disk is 512 GiB.
- The minimum size of subsequent data disks is 1 TiB.
- The recommended size for all data disks is 1 TiB. For example, if 10 TiB of capacity are required, configure 10 x 1 TiB data disks.

**About this task**

Although DDVE supports Standard HDD and Standard SDD as data disks (for DDVE on block storage) or metadata disks (for DDVE on hot blob storage), Dell EMC recommends Standard HDD disks.

A 10 GiB vNVRAM disk is created automatically after you deploy DDVE in Azure.

**After you finish**

To add additional storage in the future, follow the requirements above. It is not necessary to shut down the virtual machine before adding storage.

ℹ️ **Note:** The virtual disk cannot be resized. Create a new virtual disk to add additional storage to the virtual machine.