

Data Domain Virtual Edition in Azure

Version DD VE 4.0 with DD OS 6.2.0.10

Installation and Administration Guide

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Revision history

Table 1 DD VE 4.0 in Azure Installation and Administration Guide revision history

Revision	Date	Description
02	March 2019	Editorial updates
01	December 2018	Initial Publication (with DD OS 6.2.0.5)

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 Data Domain Virtual Edition (DD VE) systems.

Audience

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

Related documentation

The following publications and websites provide additional information:

- *Data Domain Operating System Release Notes*
- *Data Domain Operating System Initial Configuration Guide*
This manual explains configuration steps that are common to hardware and virtual Data Domain systems.
- *Data Domain Operating System OS Command Reference Guide*
This manual explains how to administer Data Domain systems from the command line.
- *Data Domain Operating System OS Administration Guide*
This manual explains how to administer Data Domain systems with the System Manager graphical user interface.
- *Data Domain Boost for OpenStorage Administration Guide*
This manual explains how to use the DD Boost protocol for data transfer between backup software and Data Domain systems.
- *Avamar, Data Domain and NetWorker Compatibility Guide*: <http://compatibilityguide.emc.com:8080/CompGuideApp/>
This website lists Avamar and NetWorker software support for DD VE.

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>.

Technical support

For technical support of this release of DD VE, go to Online Support at <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.

CHAPTER 1

Introduction to DD VE

This chapter includes the following topics:

- [What is DD VE?](#) 10
- [DD VE capabilities](#) 10
- [DD VE cloud capabilities](#) 10

What is DD VE?

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

DD VE runs the Data Domain Operating System (DD OS), and provides the DD OS command line interface (CLI) and the Data Domain System Manager graphical user interface (GUI) for performing all system operations.

DD VE maintains the core Data Domain features that differentiate it as the industry-leading protection storage. This includes high-speed, variable length deduplication for a 10 - 30x reduction in storage requirements, unparalleled data integrity to ensure reliable recovery, and seamless integration with leading backup and archiving applications.

DD VE also comes with DD Boost, which speeds backups by 50%, DD Encryption for enhanced security of data, and DD Replicator, which enables network efficient replication for faster time-to-DR readiness.

DD VE runs on two types of platforms, on premises or in the cloud. On premises, DD VE supports VMware, Hyper-V, KVM, and VxRail. In the cloud, DD VE also runs in the Amazon Web Services (AWS) (cloud and gov cloud), Azure (cloud and gov cloud), VMware Cloud on AWS cloud platforms, and Google Cloud Platform (GCP). For more information about the features and capabilities of Data Domain systems (both physical and virtual), see the *Data Domain Operating System Administration Guide*.

DD VE capabilities

Resource configurations depend on your DD VE configuration. For capabilities for cloud configurations within the admin guide for your specific cloud provider, see [DD VE capabilities in the cloud providers](#).

Please see the DD OS Administration Guide, DD Boost OST Guide, DD Boost for Partner Integration Administration Guide for additional information about the supported protocols and features.

DD VE cloud capabilities

DD VE provides the capabilities of a cloud Data Domain system using the following resource configuration sizes.

- DD VE supports two types of data storage for Azure:
 - DD VE on Block storage.
 - DD VE on Hot Blob Storage

Note

Data Domain recommends Hot Blob storage

Table 2 DD VE on Azure Resource Configuration Size

Type	Resource Configuration Size
DD VE on Block Storage	<ul style="list-style-type: none"> DD VE on Block Storage: up to 16TB <hr/> <p>Note</p> <p>Actual DD VE capacity is available in 1TB increments starting at 512 GB, and up to 8TB or 16TB respectively for 8TB and 16TB type.</p> <hr/> <p>Note</p> <p>DD VE supports the used of managed or unmanaged disks. Data Domain recommends managed disks for the OS disk, NVRAM disk, and data disks.</p>
DD VE on Hot Blob Storage	<ul style="list-style-type: none"> Actual DD VE capacity is available up to 96TB <hr/> <p>Note</p> <p>DD VE supports the used of managed or unmanaged disks. Data Domain recommends managed disks for the OS disk, NVRAM disk, and metadata disks.</p> <hr/> <ul style="list-style-type: none"> Metadata consumes block storage of 10 percent of licensed capacity

The following diagrams show the disk and container layouts for DD VE on block storage and Hot Blob storage, using both managed and unmanaged disks.

Figure 1 DD VE in Azure block storage with managed disks



Figure 2 DD VE in Azure block storage with unmanaged disks

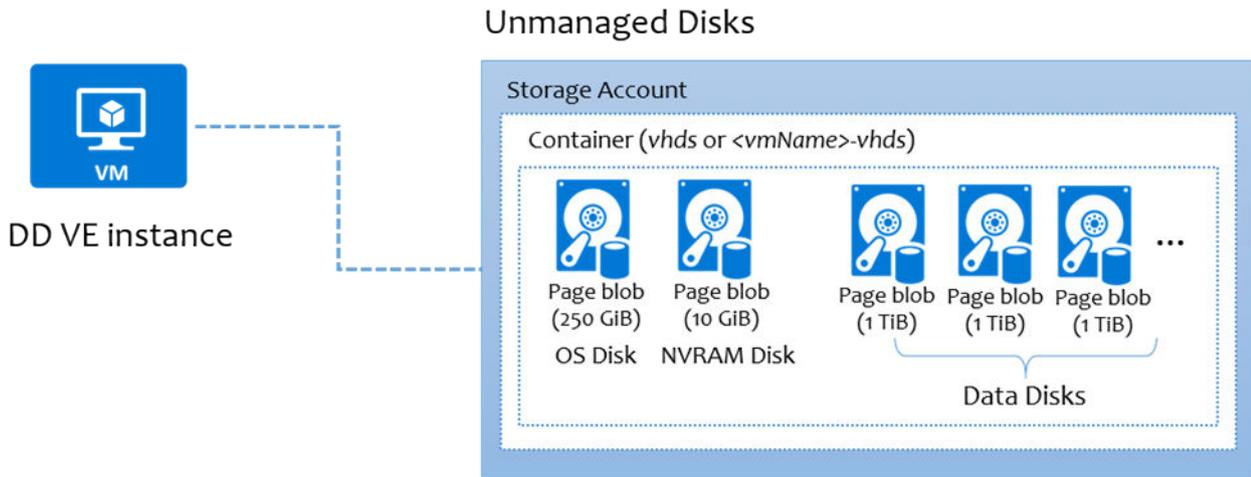


Figure 3 DD VE in Azure hot blob storage with managed disks

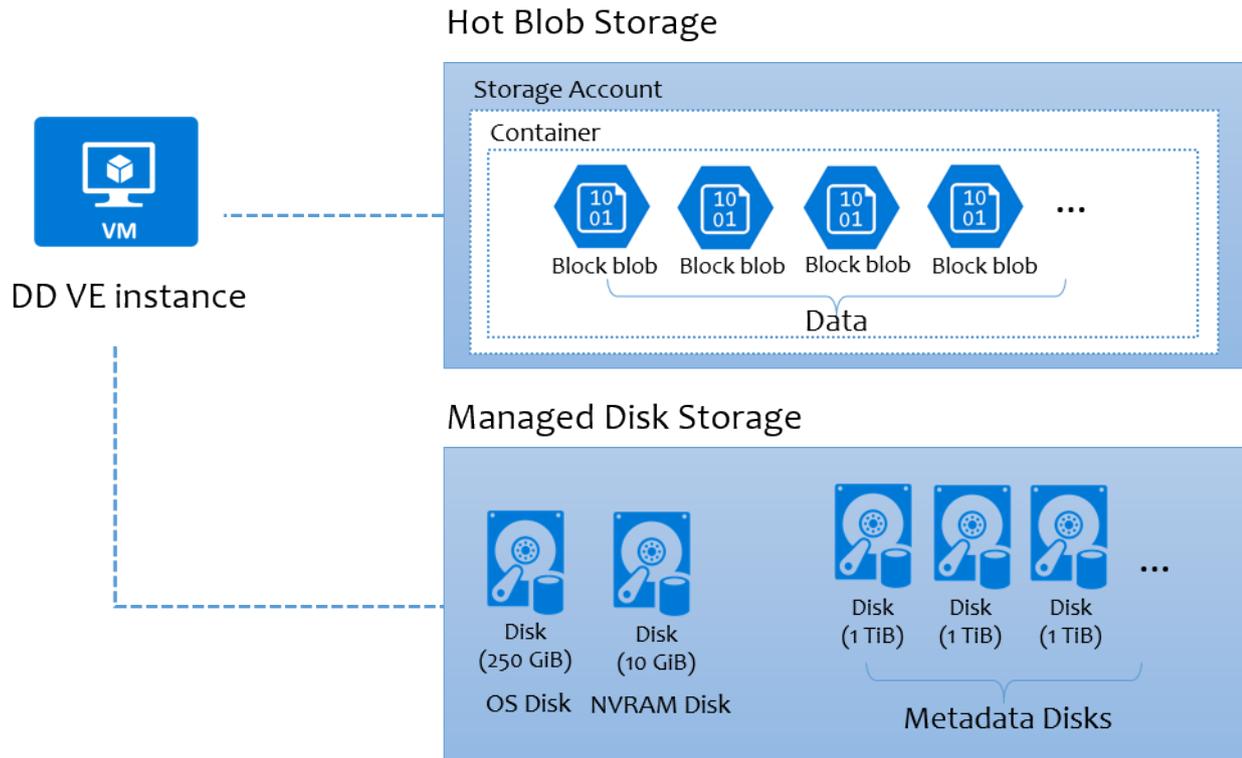
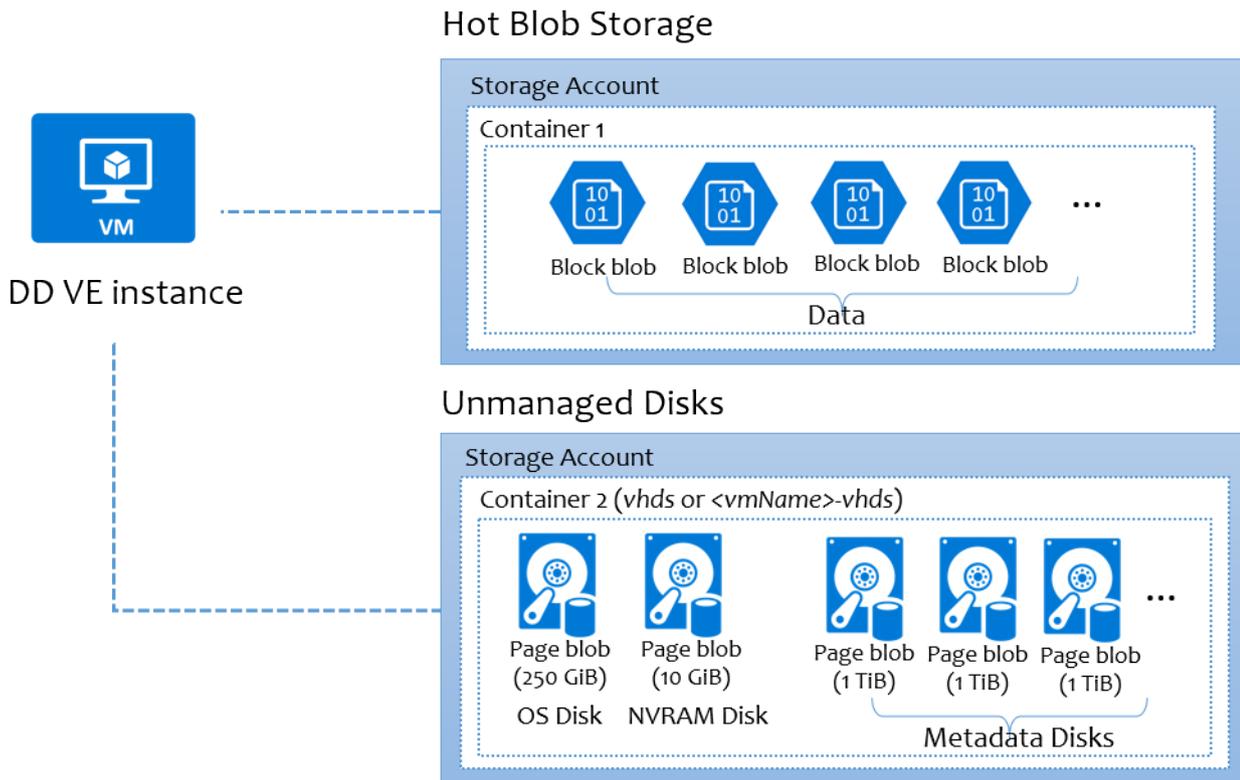


Figure 4 DD VE in Azure hot blob storage with unmanaged disks

The following sections list supported and unsupported Data Domain protocols and features in DD VE.

Supported Data Domain protocols

- DD Boost over IP
- DD Boost FS

Supported Data Domain features

- DD Boost managed file replication (MFR)
- Encryption
- MTree replication
- Data Domain System Manager GUI for DD VE management
- Secure multitenancy (SMT) with Network Isolation Support in 6.0
- DD Boost for Big Data
- Key Management Interoperability Protocol (KMIP)
- More restricted IPTables settings
- Azure for Government Cloud

Note

DD VE 4.0 supports these replication capabilities:

- Managed file replication and MTree replication
- Replication across availability zones and regions
- On-prem to cloud and converse replication
- Bidirectional replication between on-prem and Azure

Please see the DD OS Administration Guide, DD Boost OST Guide, DD Boost for Partner Integration Administration Guide for additional information about the supported protocols and features above.

CHAPTER 2

Deploy the DD VE

- [Deploying DD VE on Azure hot blob storage](#) 16
- [Azure System Configuration requirements](#) 16
- [Specifications for DD VE in Azure](#) 17
- [Creating DD VE from Azure Marketplace](#).....18
- [Adding disks in Azure](#).....19
- [Capacity expansion in Azure](#).....23
- [Configuring DD VE on Azure hot blob storage using the Data Domain System Manager interface](#).....24
- [Configuring DD VE in Azure using the Command Line Interface](#).....26
- [System Headswap - Azure](#).....31
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Deploying DD VE on Azure hot blob storage

DD VE on Azure hot blob storage provides a data protection solution that enables customers to protect their operational data in the cloud, to backup/restore the active tier's data into cloud object store, while the DD VE is running in the cloud. This section describes first-time setup procedures, and includes how to manage and monitor DD VE in an Azure environment.

Note

For DD VE on Block Storage see [Configuring DD VE on Block Storage using the DD SM Interface](#).

DD VE supports

- Azure Standard Cloud
- Azure Government Cloud
- (U.S. DoD Cloud is not supported by DD VE)

Azure Deployment Options

- Template deployment
- Marketplace deployment

Azure System Configuration requirements

These are the system configuration requirements for configuring DD VE on Azure.

System Configuration Requirements for Azure Meta data disk type: Standard

Table 3 Azure System Requirements

Instance Type	DD VE Capacity	#vCPU Memory
Standard_F8	16 TB	8, 16 GB
Standard_D4_v2	32 TB	8, 28 GB
Standard_D16_v3	96 TB	16,64 GB

Table 4 Azure System Requirements (cont.)

Instance type	Standard_F8	Standard_D4_v2	Standard_D16_v3
CPU	4	8	16
Memory (GiB)	16	28	64
System Disk	250 GiB Standard Root disk	250 GiB Standard Root disk	250 GiB Standard Root disk
	10 GiB Standard NVRAM disk	10 GiB Standard NVRAM disk	10 GiB Standard NVRAM disk
Storage capacity	16 TB	32 TB	96 TB

Specifications for DD VE in Azure

The tables show the instance types and storage volumes needed by DD VE in Azure. Standard HDD storage is used for all volumes. Azure DD VE has a different max capacity for optimizing the instance type cost.

Specifications for DD VE on Azure Hot Blob Storage

Table 5 Azure Hot Blob Storage Infrastructure requirements

Configuration	Instance Type	Block Storage Volumes			Object Storage Capacity	Network Interface
		Root Disk	vNVRAM Disk	Metadata Disk		
16TB	Standard_F8	Standard/250GiB	Standard/10GiB	Standard (1 - 2TiB)	0-16TB	Default = 1
32TB	Standard_D4_V2	Standard/250GiB	Standard/10GiB	Standard (1 - 4TiB)	0-32TB	
96TB	Standard_D16_V3	Standard/250GiB	Standard/10GiB	Standard (1 - 10TiB)	0-96TB	

Table 6 Azure Hot Blob Storage Stream Counts

Configuration (TiB)	Num of metadata disks (Each 1 TiB)	Stream Counts				
		Read	Write	Replication In	Replication Out	Combined
16 - standard F8 (16 GB)	1	12	36	36	24	36
	2	24	36	36	36	36
32 - standard_D4_v2 (28 GB)	1	12	48	48	24	48
	2	24	72	72	48	72
	>=3	40	72	72	72	72
96- Standard_D16_v3 (64 GB)	1	12	48	48	24	48
	2	24	96	96	48	96
	>=3	40	144	144	72	144

Note

Host cache will not be supported for DD VE on Azure hot blob storage.

Table 7 Azure Storage Accounts Storage URLs

	Azure Global Cloud	Azure Government Cloud
URLs for storage accounts and other services	*.blob.core. windows .net	*.blob.core. usgovcloudapi .net

Creating DD VE from Azure Marketplace

DD VE is available in the Azure Marketplace. This section lists the steps for deploying DD VE from the Azure Marketplace.

Creating the DD VE from the Marketplace

Procedure

1. Login to the Azure portal.

Note

For Azure Gov Cloud: <https://portal.azure.us>

- a. Login through Powershell: `Powershell> Login- AzureRmAccount - Environment azureusgovernment`
 - b. Set the correct subscription for the Powershell session: `Select AzureRmSubscription - SubscriptionId < subscription_id >`
-

2. Search for Dell EMC to find Data Domain Virtual Edition in Azure Marketplace.
3. Begin the deployment.
4. Configure basic settings.
 - Name: the name for DD VE. (Maximum length of the name is 10 characters)

Note

For Azure Gov Cloud, the maximum length allowed for the DD VE name is 6 characters. The maximum length of the fully qualified domain name (FQDN) can be no longer than 63 characters.

- VM disk type: only HDD is supported. Select Standard HDD.
 - Username: must be “sysadmin”
 - Authentication type: Both SSH publicKey and Password authentication are supported. (If this authentication type is selected, you will be forced to change the password at the first login.)
 - SSH public key: Copy and paste the SSH publicKey.
 - Password: the password for sysadmin
 - Subscription: specify a subscription
 - Resource group: specify or create a resource group
5. Choose VM size: Select the VM size according to the DD VE Specification table based on the DD VE capacity.

6. Configure option features

- Choose managed disk storage or un-managed disk storage

Note

Data Domain recommends managed disk storage.

- Storage account: Specify the storage account
 - Network: Specify the virtual network, subnet, network security group and public IP address. (Deployment of DD VE in private subnet and leave the public IP address as “None” is recommended for security consideration)
 - Extensions: no extensions
 - High availability: None
 - Monitoring
 - Boost Diagnostics: Enabled
 - Guest OS Diagnostics: Disabled
 - Diagnostics Storage Account: specify the storage account in which to save the diagnostics logs
7. Review the summary: Review the configuration summary for creating the DD VE and make changes if necessary.
8. Select the “Create ”button. The Azure portal will start the DD VE deployment.

Adding disks in Azure

Make sure you have enough licensed capacity available to add new capacity to DD VE. When adding additional capacity, make sure the DD VE instance can support the new capacity. If the new capacity is more than the DD VE instance supported capacity, please upgrade the DD VE instance.

Note

Azure provides two types of disk storage: Premium and Standard. DD VE only supports Standard HDD as data disks (DD VE on block storage) or metadata disks (DD VE on hot blob storage). Also, you won't need to add a vNVRAM disk. After deploying the DD VE in Azure, the 10 GiB vNVRAM disk will be automatically created.

New storage for the DD VE must meet the following requirements:

- **DD VE on hot blob storage**
 - The minimum size of the first metadata disk is 1 TiB.
 - The maximum size of a metadata disk is 4095 GiB, limited by Azure.
 - The recommended size for all metadata disks is 1 TiB. For example, if 10 TiB of metadata capacity are required, configure 10 x 1 TiB metadata disks.
 - For unmanaged metadata disks, separate containers are required for the metadata disks and the object-store profile. The two containers must have different names.
 - The object-store profile container must be empty when the profile is created, otherwise the operation will fail.
 - The minimum size of any subsequent metadata disks is 1 TiB.

- **DD VE on block storage**
 - 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.

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.

Note

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

For deployments with unmanaged disks:

- In template-based deployments, the default container name for data disks (DD VE on block storage) or metadata disks (DD VE on hot blob storage), is `<vmName>-vhds`.
- In marketplace deployments, the default container name for data disks (DD VE on block storage) or metadata disks (DD VE on hot blob storage), is `vhds`.

The required metadata capacity varies based on workload. Data Domain recommends metadata capacity equal to 10% of the total DD VE capacity. This is sufficient for most workloads. The addition of additional metadata disks may increase cost.

Adding unmanaged disks or managed disks in Azure

Use these procedures to add unmanaged or managed disks to DD VE in Azure.

Before you begin

Make sure you have enough licensed capacity available to add new capacity to DD VE. When adding additional capacity, make sure the DD VE instance can support the new capacity. If the new capacity is more than the DD VE instance's supported capacity, please upgrade the DD VE instance.

Note

- For template-based deployments, only unmanaged disks are supported.
- Use these same procedures to add additional storage in the future.
- It is not necessary to shut down the VM before adding storage.
- The virtual disk cannot be resized. Users must create a new virtual disk to add additional storage to the VM.

Adding managed disks in Azure

Use these procedures to add managed disks to DD VE in Azure.

Procedure

1. Allocate and attach managed disks to DD VE.
 - a. Log into the Azure portal.
 - b. Search the name of the DD VE VM.

- c. Navigate to the right pane, and click **SETTINGS > Disks**.
 - d. Click the **Add data disk** button.
 - e. Choose **Create disk** from the drop-down menu (red box).
 - f. A pop up window displays. Add the following:
 - A name for the data (DD VE on block storage) or metadata (DD VE on hot blob storage) disk
 - Specify the **Resource group**
 - Specify the **Location**
 - Specify the **Availability zone**
 - Specify the **Account type**
 - Specify the **Source Type**
 - Specify the **Size**
2. Click the **Create** button.
 3. Click **Save** (with disk icon) in the top left corner of the page to add the data disk.

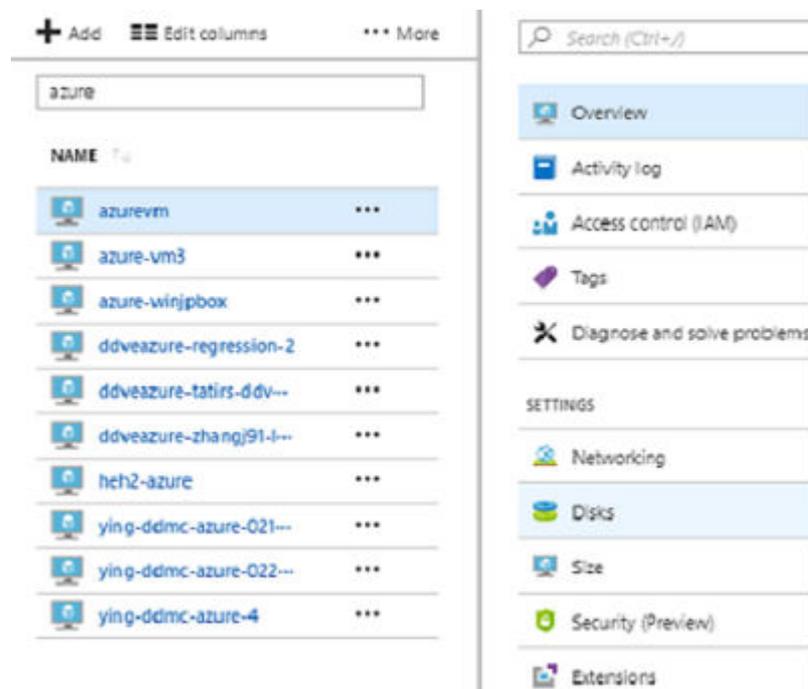
Adding unmanaged disks in Azure

Use these procedures to add unmanaged disks to DD VE in Azure.

Procedure

1. Allocate and attach unmanaged disks to DDVE:
 - a. Log into the Azure portal.
 - b. Search the name of the DD VE VM.
 - c. Navigate to the right pane, and click **SETTINGS > Disks**.

Figure 5 Login to the Azure portal and select SETTINGS > Disks



d. Click the **Add data disk** button.

e. A pop up window displays. Add the following:

- A name for the data (DD VE on block storage) or metadata (DD VE on hot blob storage) disk.
- Specify the **Source Type as New (empty disk)**.
- Specify the **Account type as Standard HDD**, and enter a size between 1024GiB and 4095 GiB.

Note

Data Domain recommends 1024 GiB disks.

- Navigate to the **Storage container** file path.
- Enter the **Storage blob** name.

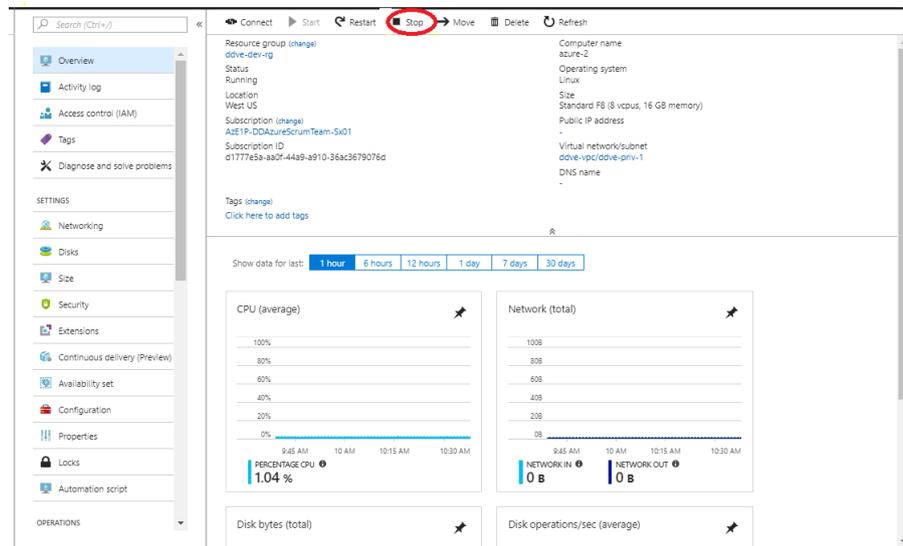
2. Click **Save** (with disk icon) in the top left corner of the page to add the data disk.

Resizing the DD VE instance in Azure

Follow these steps to resize the DD VE virtual machine instance.

Procedure

1. Stop the current DD VE instance.

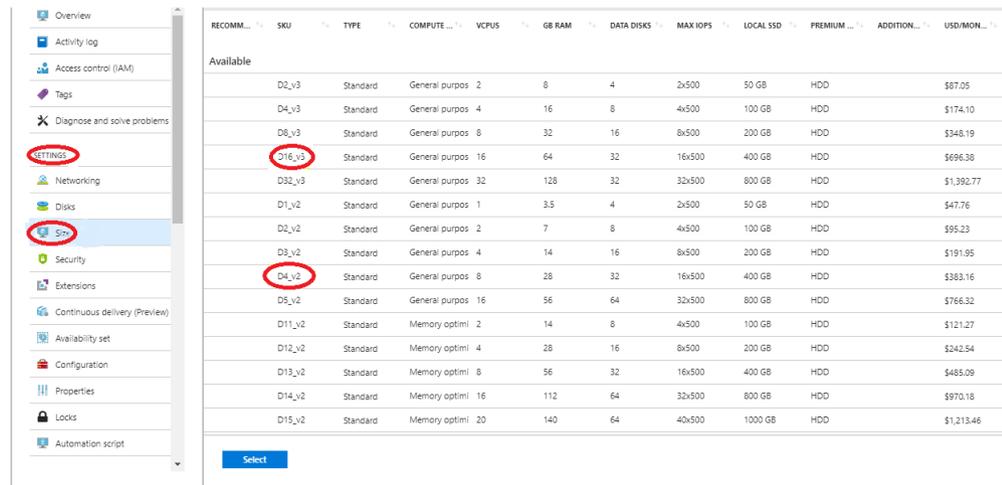


2. Resize the VM.

- Settings: In the Azure portal, click the DD VE instance settings option.
- Size: Select the new size to be upgraded for the DD VE instance.

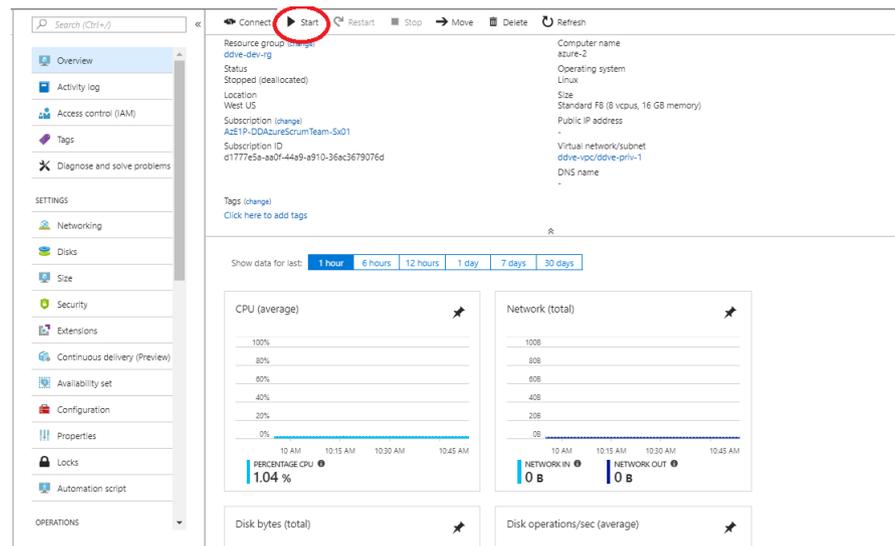
Note

The DD VE instance type may only be upgraded in this direction:
Standard_F8>Standard_D4_v2>Standard_D16_v3



RECOMM...	SKU	TYPE	COMPUTE...	VCPUS	GB RAM	DATA DISKS	MAX IOPS	LOCAL SSD	PREMIUM...	ADDITION...	USD/MON...
Available											
	D2_v3	Standard	General purpos	2	8	4	2x500	50 GB	HDD		\$87.05
	D4_v3	Standard	General purpos	4	16	8	4x500	100 GB	HDD		\$174.10
	D8_v3	Standard	General purpos	8	32	16	8x500	200 GB	HDD		\$348.19
	D16_v3	Standard	General purpos	16	64	32	16x500	400 GB	HDD		\$696.38
	D32_v3	Standard	General purpos	32	128	32	32x500	800 GB	HDD		\$1,392.77
	D1_v2	Standard	General purpos	1	3.5	4	2x500	50 GB	HDD		\$47.76
	D2_v2	Standard	General purpos	2	7	8	4x500	100 GB	HDD		\$95.23
	D3_v2	Standard	General purpos	4	14	16	8x500	200 GB	HDD		\$191.95
	D4_v2	Standard	General purpos	8	28	32	16x500	400 GB	HDD		\$383.16
	D5_v2	Standard	General purpos	16	56	64	32x500	800 GB	HDD		\$766.32
	D11_v2	Standard	Memory optimi	2	14	8	4x500	100 GB	HDD		\$121.27
	D12_v2	Standard	Memory optimi	4	28	16	8x500	200 GB	HDD		\$242.54
	D13_v2	Standard	Memory optimi	8	56	32	16x500	400 GB	HDD		\$485.09
	D14_v2	Standard	Memory optimi	16	112	64	32x500	800 GB	HDD		\$970.18
	D15_v2	Standard	Memory optimi	20	140	64	40x500	1000 GB	HDD		\$1,213.46

- The Azure portal indicates the DD VE VM has been successfully resized. Click the Start button to launch the resized DD VE instance.



Capacity expansion in Azure

Upgrading DD VE to a higher capacity

If the higher capacity is supported by the current DD VE configuration, follow these steps.

- Add the needed data disks (DD VE on block storage) or metadata disks (DD VE on hot blob storage) for the new capacity.
- Configure the newly added data disks using the CLI command `storage add tier active dev<device id>`(Or, use DD SM GUI).
- Expand the file system using the CLI command `filesystems expand`.

If the higher capacity is not supported by the VM size configuration of the current DD VE, you must upgrade to larger instance type from the current VM size to a higher VM size (see the tables in [Specifications for DD VE in Azure](#) on page 17).

Configuring DD VE on Azure hot blob storage using the Data Domain System Manager interface

DD VE can be configured on Azure Hot Blob Storage using one of the Data Domain System Manager (DD SM) interface options: GUI or CLI.

Before you begin

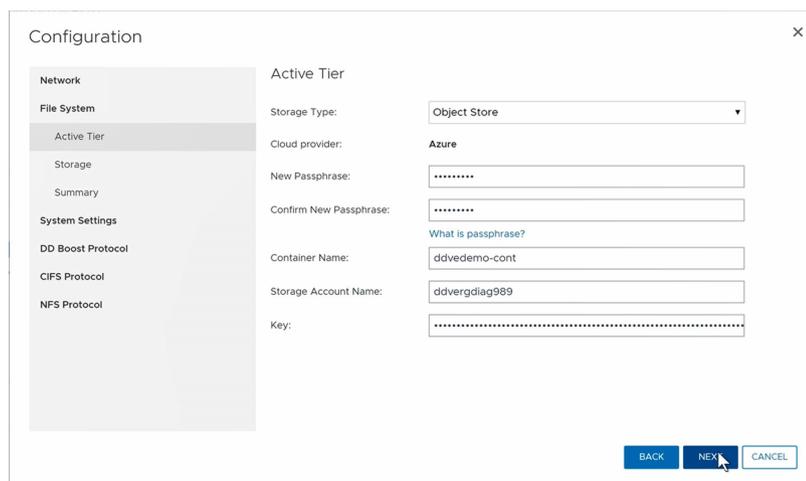
Recommended metadata storage is 10% of the total capacity.

Configuring DD VE on Azure hot blob storage using the DD SM interface (http/https)

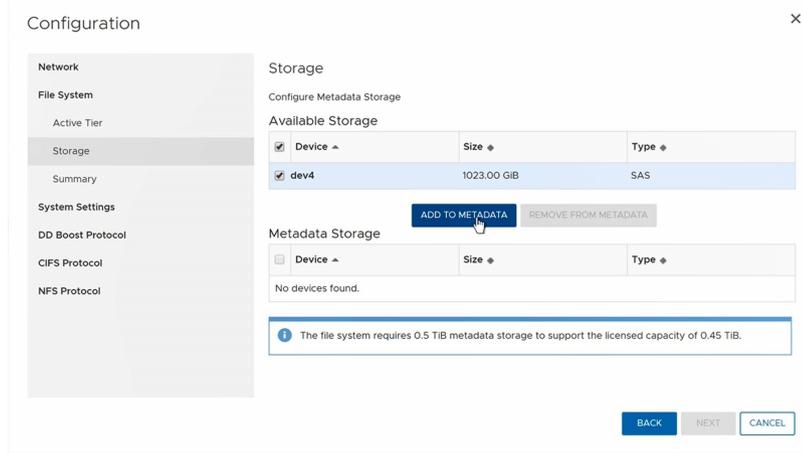
The UI configuration wizard helps go through the Azure hot blob storage configuration and file system creation on DD.

Procedure

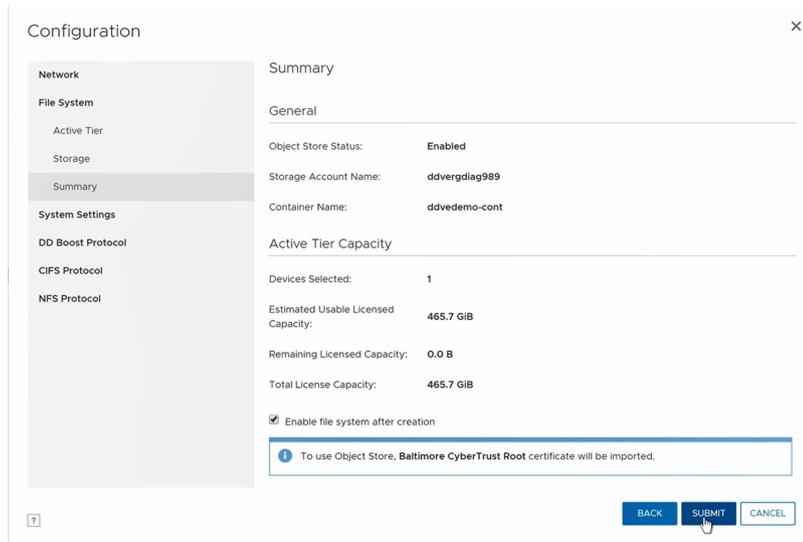
1. Log in to the Data Domain System Manager with the account name: sysadmin and the password specified at deployment.
2. For the “Apply your license” step: select “Pre-installed evaluation license” with 500 GiB. Then click “Apply”.
3. Accept the End User License Agreement (EULA) by clicking “I accept the terms of EULA”
4. Next, the “Configuration Wizard” will guide you through the Azure hot blob storage configuration and file system creation on the DD VE. Select “File System” and click “Yes”.
5. Select “Configure Active Tier”. Then, select “Enable Object Store”checkbox to configure the Azure hot blob storage system.
6. Enter the passphrase, account name, key, and container name. (The container may be created through the Azure portal.)



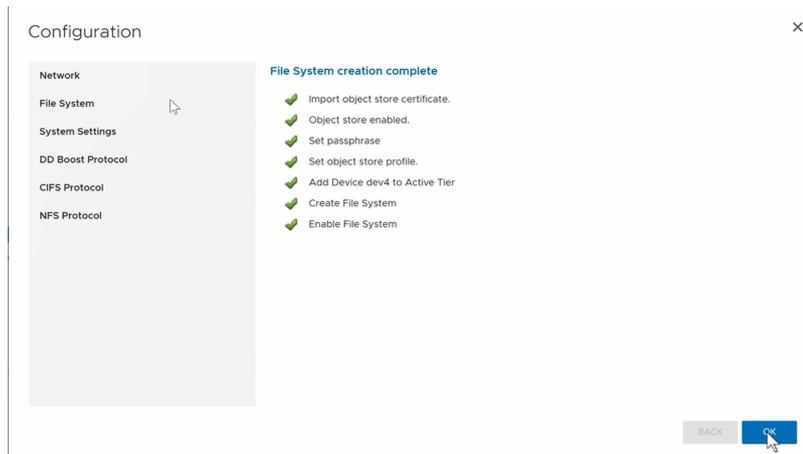
7. Import the Baltimore CyberTrust Root certificate to communicate with Azure Object Store.
8. Add the metadata storage.



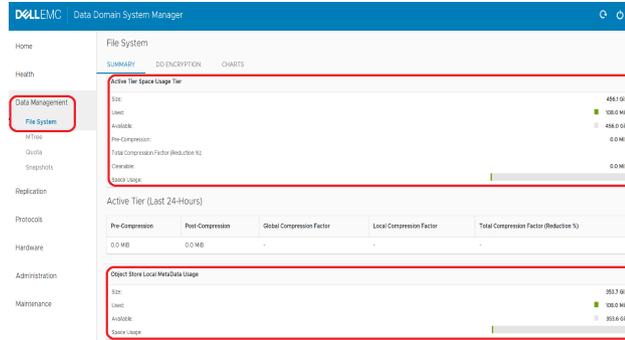
9. Review the summary and Click “Submit” to create the file system and enable it.



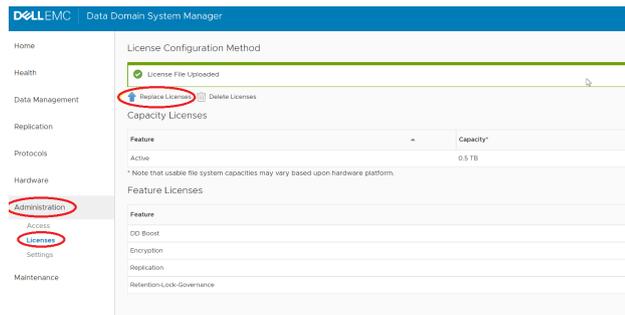
10. Review “File System Creation Complete” page.



11. The File System section under the Data Management tab has the space usage and availability details for the hot blob storage as well as the local metadata storage.



- To configure or update the eLicense on the DD VE, click “Replace licenses” button in the Licenses page as shown in this image.



- To relaunch the configuration wizard, select “System” under “Maintenance”, then “Configure System”

Configuring DD VE in Azure using the Command Line Interface

Before you begin

Recommended metadata storage is 10% of the total capacity.

Configuring the DD VE using the CLI

Procedure

- Log in the DD VE instance via SSH using the sysadmin account and password you specified during deployment.
 - When logging in for the first time, or if you don't specify password during deployment, when logging in you will be asked to change the password. Enter the new password. The initial configuration wizard will start.
 - This section uses CLI commands for all the configuration steps. Press **Enter** for all options to exit the wizard and proceed with the CLI commands.

```
$ ssh -l sysadmin <DDVE ip address>
The authenticity of host '***.***.***.***' (***.***.***.***) can't be
established.
ECDSA key fingerprint is SHA256:ev0XXGRgCzp/
tmrtWRIaEOWlpI7ymOq9mwTBwH9J2bs.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '***.***.***.***' (ECDSA) to the list of
known hosts.
EMC Data Domain Virtual Edition
```

```

Password:
Password:
Welcome to Data Domain 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.

```

2. To update the eLicense on DD VE, copy 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:
##  Feature      Capacity  Type      State
Expiration Date  Note
--  -
-----
1    CAPACITY    0.45 TiB  unexpired evaluation  active  n/a
--  -
-----

Feature licenses:
##  Feature      Count  Type
State  Expiration Date  Note
--  -
-----
1    REPLICATION    1    unexpired evaluation
active  n/a
2    DDBOOST        1    unexpired evaluation
active  n/a
3    RETENTION-LOCK-GOVERNANCE  1    unexpired evaluation
active  n/a
4    ENCRYPTION     1    unexpired evaluation
active  n/a
--  -
-----

New licenses:

Capacity licenses:
##  Feature      Capacity  Type      State
Expiration Date  Note
--  -
-----
1    CAPACITY    87.31 TiB  permanent (int)  active  n/a
--  -
-----

Feature licenses:
##  Feature      Count  Type      State

```

```

Expiration Date      Note
-----
1      DDBOOST          1      permanent (int)    active    n/a
2      ENCRYPTION       1      permanent (int)    active    n/a
3      REPLICATION       1      permanent (int)    active    n/a
-----

** 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:
V4MXYV1S7R6VZVRWW6T9JTMPPBZEGY4CL25FSPX775WJC8GM6P57YKTD
HGYDGR9AJZ4Y66CSH152YJRS6UPHFUZ2PP6VATMY2FMWSSKKZ8SHD

System software-id: Not available
Instance software-id: Not available

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

Capacity licenses:
##  Feature      Capacity  Type      State
Expiration Date  Note
-----
1      CAPACITY      87.31 TiB  permanent (int)  active    n/a
-----

Feature licenses:
##  Feature      Count  Type      State
Expiration Date  Note
-----
1      REPLICATION   1      permanent (int)  active    n/a
2      DDBOOST       1      permanent (int)  active    n/a
3      ENCRYPTION    1      permanent (int)  active    n/a
-----

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

```

3. Enable object store with # storage object-store enable

```

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

```

4. Create the Object store

- a. **System Passphrase** is required to encrypt the object store credentials. It will also be used to encrypt keys if file system encryption is enabled. If the passphrase has already been set, user will not be prompted to enter passphrase.
- b. **Account Name** if there is no account existed, create one first. Account kind is blob storage.
- c. **Primary Key storage** accounts>settings>access keys.
- d. **Container Name** create a container under storage account.

e. Baltimore Cyber Trust Root certificate is needed to communicate with object store and should be imported for the profile creation to succeed.

```
# storage object-store profile set
# 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-account-name>
    Enter the primary key: <name-of-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?
    D4:DE:20:D0:5E:66:FC:53:FE:1A:50:88:2C:78:DB:
28:52:CA:E4:74 (yes|no) [yes]: yes

    Profile is set.
```

5. Add the storage using # storage add tier active dev4

```
# storage add tier active dev4
Checking storage requirements...done
Adding dev4 to the active tier...done
Updating system information...done
dev4 successfully added to the active tier.
```

Multiple devices can also be added as metadata storage using the following CLI command. This will be useful in when adding dev4, dev5, and dev6 to the DD VE:

```
# storage add tier active dev4-6
Checking storage requirements...done
Adding dev4 to the active tier...done
Updating system information...done
dev4 successfully added to the active tier.

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 command below to see the disks that are attached.

```
# storage show all
# storage show all
Active tier details:
Device      Device  Device
Group      -----  -----
-----
(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
-----
```

6. Create the file system# fileys create

```
# fileys 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 'fileys enable'.
```

7. Enable file system# fileys enable

```
# fileys enable
Please wait.....
The filesystem is now enabled.
```

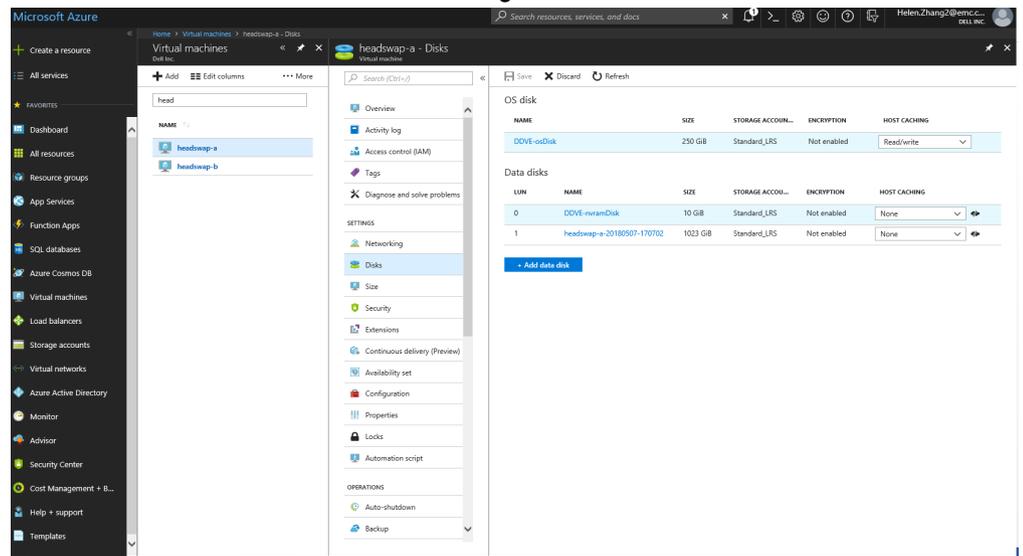
System Headswap - Azure

This section describes how the system headswap command recovers DD VE with head unit failure in Azure.

To perform system headswap, vNVRAM disk and metadata disks from system A should be available, and they will be attached to the new instance B. If either vNVRAM disk or any metadata disk is not available, the `system recovery` operation from object-store should be used 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.
3. Attach the vNVRAM and meta-data storage above to instance B head unit.



4. Set system passphrase.

Note

Please set the passphrase to match with system A, otherwise, headswap will fail to proceed.

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

5. **Note**

Before executing the headswap operation, please make sure that the system A is powered off. This step is required to detach the bucket from system A and make it available to be attached with system B.

Execute system headswap.

Note**System will reboot 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 fileys status after the headswap process is complete.

```
# fileys status
The filesystem is enabled and running.
```

System Recovery - Azure

This section describes how the system recovery command recovers DD VE with head unit, vNVRAM disk, Metadata disk, on failure .

Before you begin

The system recovery command recovers DD VE 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, metadata disk capacity.
2. Enable object-store

```
# storage object-store enable
```

3. Set object-store profile
 - a. Set the passphrase to match with system A, otherwise, the recovery will fail to proceed.
 - b. Set the same storage account/container name from system A.
 - c. Follow rest of 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?
    D4:DE:20:D0:5E:66:FC:53:FE:1A:50:88:2C:78:DB:
28:52:CA:E4:74 (yes|no) [yes]:

    Profile is set.

```

4. Add metadata disk

Note

Add data disk with the capacity to match or exceed the capacity of system A .

```
# storage add dev4
```

5. Run system recovery precheck

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

6. Execute the recovery

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

7. Check the status with recovery status

```
# system recovery status
```

Note

The system will reboot during the recovery process.

8. Check filesystem status after the recovery process completed.

```
# filesystem status
```

Deploy the DD VE

CHAPTER 3

DD VE Initial Configuration

- [Initial System Configuration](#) 36
- [Provisioning the storage with the CLI](#) 36
- [Configuring DD VE in Data Domain System Manager](#) 38
- [Configure the System for Data Access](#)44

Initial System Configuration

You can connect to the system to perform the initial system configuration with the DDSM Configuration Wizard or manually using the CLI.

DHCP is enabled on the DD VE system by default. If the DHCP service is available, the DD VE system will receive IP addresses from the DHCP server.

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 by following instructions here <https://docs.microsoft.com/en-us/azure/virtual-network/virtual-network-network-interface-vm>.

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

[Provisioning the storage with the CLI](#) on page 36 describes how to configure the DD VE manually with the CLI instead of using the configuration utility.

Provisioning the storage with the CLI

Before you begin

When configuring DD VE on Azure hot blob storage, verify that the maximum length of the container name when configuring the DD VE to ensure it does not exceed 48 characters. Setup will not complete if the names exceed 48 characters.

Procedure

1. Login to the system with the following credentials:
 - User name: `sysadmin`
 - Password:
 - **Azure default password:** `changeme` or specified during deployment.
-

Note

At the first login prompt, run the `elicense` command to add a DD VE license.

2. Type **Ctrl-C** to exit the configuration utility.
3. **Use these steps to provision storage for active tier on block storage:**
 - a. Confirm that `virtualdisk dev4exists`, and shows the expected size:

```
# disk show hardware
```

The output includes a line similar to the following example:

```
# dev4 3:1 Msft Virtual_disk n/a (unknown) 1023.0GiB SAS
```

Note

The first two virtual disks (`dev1` and `dev2`) are used for the system software and not for storage. Use the `disk show state` command to display `System Dev` details for these system disks.

b. Add the storage disk to the active storage tier:

```
# storage add dev4
```

If adding more than one virtual disk, repeat **step b.** for each virtual disk.

c. Create the file system:

```
# fileysys create
```

Note

The `fileysys create` command may take longer to complete if the hypervisor's storage is slow and does not meet the criteria.

d. Enable the file system:

```
# fileysys enable
```

4. Use these steps to provision object storage:

a. Enable object store capability on DD VE:

```
# storage object-store enable
```

b. Set up the object storage profile:

```
# storage object-store profile set
```

It is important to note that:

- **For Azure:** The user supplies the storage account name, primary key, container name, and certificate.

c. Add the metadata disk to the system:

```
# storage add dev4 tier active
```

If adding more than one virtual disk, repeat **step c.** for each virtual disk.

d. Create the file system:

```
# fileysys create
```

Note

The `fileysys create` command may take longer to complete if the hypervisor's storage is slow and does not meet the criteria.

e. Enable the file system:

```
# fileysys enable
```

Configuring DD VE in Data Domain System Manager

DD VE licensing and configuration can be accomplished through the Configuration Wizard in Data Domain System Manager (DD SM). After the initial installation of a DD VE instance, the Configuration Wizard automatically appears after the licensing screen on the first launch of DD SM.

Note

The DAT is not supported for cloud DD VE.

Enter the DD VE virtual machine IP address into a web browser to launch Data Domain System Manager. Log in with the following credentials:

- Username: sysadmin
- Default password: changeme (or password specified during deployment)
- **Azure:** Default password is defined in the template, or is specified from the input of Marketplace deployment.

DD VE licensing

The **Apply Your License** window is the first screen that appears when DD SM is launched for the first time. The DD VE instance is locked until a license file is applied.

Click **Browse**, locate the license file for a purchased capacity license or the evaluation license included with the DD VE download, then click **Apply**.

Note

If you begin the configuration with the evaluation license, but wish to purchase a license later, you will need the Node Locking ID for the DD VE instance. Click **Administration > Licenses** to view the Node Locking ID.

Figure 6 DD VE Node Locking ID

Apply Your License

Use: License File

License File:

Node Locking ID: 5H1XYV54N7XXZVR72UYW2BL2RNYWFAX
TS2CAFKZT854A3MUK6P5ECMTDHGYDGR9
AJZPLUPVFG3UZCYG42PZZH8U45GJDUV
WK2FMWAMMW9ASRY

i To get started, apply the evaluation license that came with the download. To obtain a production license for your system, use the node locking information given here with the instructions provided in the License Activation certificate (LAC) email. The LAC email was included with your order information.

[Learn more about License Activation Certification](#)

Note

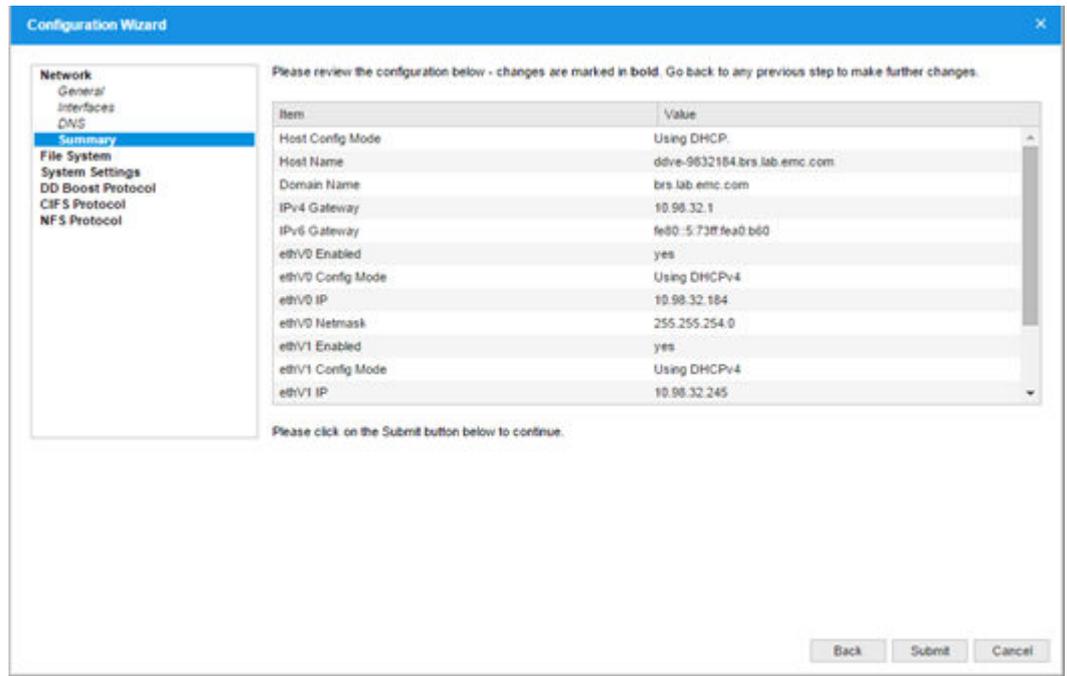
When you obtain the original license file name the server, do not enter the comma in the license file name. DD OS will not accept the name if the comma is used.

DD VE configuration

After applying the DD VE license, the Configuration Wizard begins automatically. The wizard assists in configuring the following aspects of the DD VE:

- Networking
 - DHCP or manual settings
 - Virtual interface ethV0 and ethV1 configuration
 - DHCP or manual DNS configuration

Figure 7 Configuration Wizard - Network

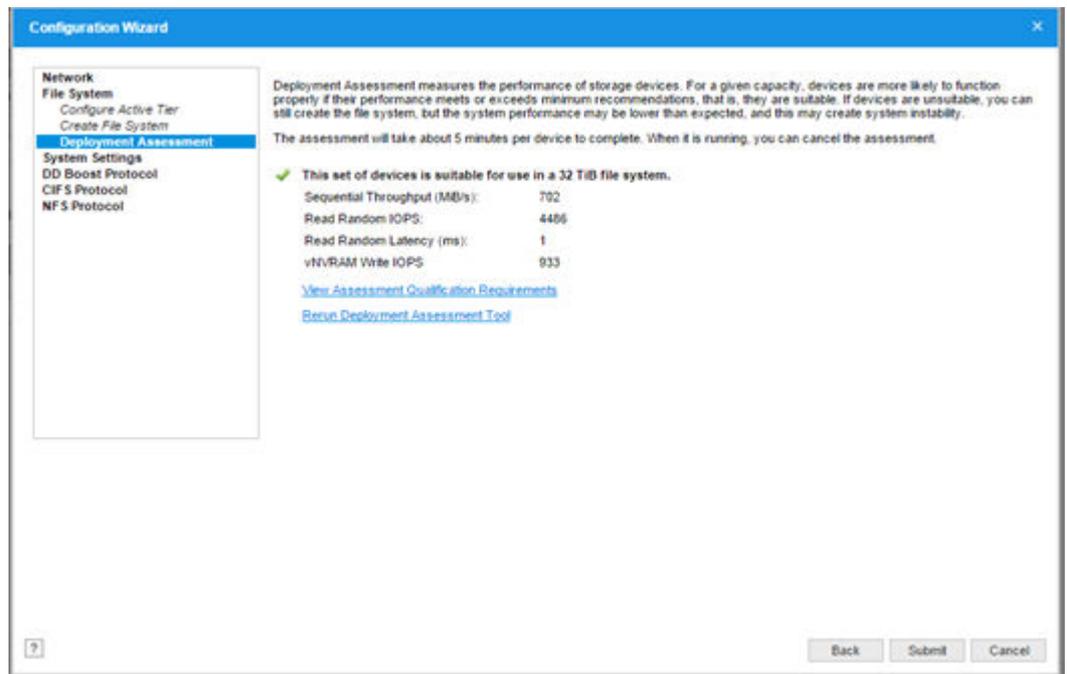


- File system

Note

DD VE supports a maximum of six MTrees active at a given time, however up to 100 MTrees can be created on DD VE.

Figure 8 Configuration Wizard - File System



- System settings
 - Update the sysadmin password

- Optionally configure alert and autosupport email settings

Figure 9 Configuration Wizard - System Settings

Please review the configuration below - changes are marked in bold. Go back to any previous step to make further changes.

Item	Value
Password	(Changed)
Admin Email	adminuser@emc.com
Mail Server	mail.emc.com
Vendor Support Notification Emails	Sending
Default Alert Notification Emails	adminuser@emc.com, autosupport-alert@autosupport.datadomain.com
Daily Alert Summary Emails	adminuser@emc.com
Detailed Autosupport Emails	adminuser@emc.com
Location	(None)

Please click on the Submit button below to continue.

Back Submit Cancel

- DD Boost
 - Create a Boost storage-unit, and assign a user ID to own it

Figure 10 Configuration Wizard - DD Boost Protocol

Please review the configuration below - changes are marked in bold. Go back to any previous step to make further changes.

Item	Value
DD Boost Status	Enabled
DD Boost User	DDBoostuser1 (New User)
Storage Unit Name	StorageUnit1

Please click on the Submit button below to continue.

Back Submit Cancel

Enabling the object store feature with DD SM

Use these steps to configure object store. Alternatively, see the next section to configure block storage.

Note

Before you begin, you will need the container name that was created using the portal.

1. Navigate to DD SM **Configuration Wizard** main menu.
2. Select **File System > Create File System**.
3. Select the **Enable Object Store** checkbox. If **Enable Object Store** is not enabled, block storage is configured (see the next section for steps).
4. Enter the following information under **General** as shown:
 - New Passphrase
 - Storage Account Name
 - Key
 - Container Name
5. Click **Next**.

Figure 11 Enable Object Store on Azure (example)

6. The **Manage CA Certificates** pane displays. Click **+ Add**, and click **Yes** to automatically import the CA Certificates.
7. Click **Next**.
8. The **Configure the Object Store Cache** pane displays. Select the appropriate devices to add the addable cache storage and the active tier cache storage.
9. Click **Next**.
10. The **File System Summary** displays. Select the **Enable the system after creation** checkbox.

11. Click **Finish** to create the File System.
Creating the File System takes several minutes to complete.
12. Verify that the File System confirmation prompts indicate these six tasks:
 - Object store enabled
 - Set passphrase
 - Set object store profile
 - Add device dev4
 - Create file system
 - Enable file system

Enabling the block store feature with DD SM

Use these steps to configure block storage. Alternatively, see the previous section to configure object storage.

1. Navigate to DD SM **Configuration Wizard** main menu.
2. Select **File System > Create File System**.
3. Do not select the **Enable Object Store**, the checkbox is unchecked by default.
4. Click **NEXT**.
5. Add data disks as shown.

Figure 12 Configure Block Storage Cache

Create File System X

Configure Object Storage Cache (Step 3 of 5)

Configure Block Storage Cache

Addable Storage

<input type="checkbox"/>	Device ▲	Size ◆	Type ◆
No devices found.			

Active Tier

<input type="checkbox"/>	Device ▲	Size ◆	Type ◆
<input type="checkbox"/>	dev4	500.00 GiB	SAS

Estimated Active Tier Capacity

Estimated Usable Licensed Capacity: 0.14 TiB
 Remaining Licensed Capacity: 0.32 TiB

Total Licensed Capacity: 0.45 TiB

6. Select **Enable file system after creation**, and click **Finish**.
7. Click **Close**.

Configure the System for Data Access

The DD VE system provides the DD Boost protocol. You need to configure one or more protocols for data access, depending on your environment. You also need to configure the clients for accessing the DD VE with the protocol of your choice.

If you did not configure data access with the configuration wizard, use the instructions in this section.

DD Boost (DD VE includes the DD Boost for cloud or on premises)

For setting up the Data Domain DD Boost feature, see the *Data Domain Boost for OpenStorage Administration Guide* or *Data Domain Boost for Partner Integration Administration Guide* available at <https://support.emc.com>.

Application Integration

For information about how to integrate the Data Domain system with backup software, see the documentation for the applicable application at the Data Domain Integration Documentation section on the Data Domain Support web site <https://support.emc.com>.

CHAPTER 4

DD VE Administration

This chapter covers the following topics:

- [DD VE Licensing](#).....46
- [Adding virtual storage](#) 47
- [Optional Additional System Configuration](#) 48
- [Extensions to DD OS for DD VE](#)..... 49
- [DD VE-only commands](#)..... 50
- [System Recovery CLI](#)..... 51
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- [Performance Troubleshooting](#)56
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- [Define the Data Domain System Information for Your Site](#)62
- [Setting Up NTP Time Synchronization](#)63
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DD VE Licensing

DD VE licensing may be via

- Served Licensing
- File based license

Licensing for DD VE is based on capacity, with the minimum purchased capacity being 1 TB and going up in 1 TB increments. There are no differences in the available features and functionality between any of the available resource configurations.

DD VE Served Licensing

DD VE 4.0 features the Served Licensing Model for DD VE which provides the solution for managing licensing for the deployment of DD VE(s). This licensing model is useful if you have multiple DD VE instances in your environment. This solution is only available for virtual systems, not physical systems at this time. The sales ordering process will remain the same. Licenses are retrieved, by the customer, from the Software Licensing Central (SLC) portal. This allows you to deploy the license server software (the hardware server is not provided) by downloading this license, loading it into the license server, and configuring the DD VE to talk to the license server. Refer to the applicable *Data Domain Operating System Release Notes* for the most up-to-date information on product features, software updates, software compatibility guides, and information about products, licensing, and service.

Note

When you obtain the original license file name the server, do not enter the comma in the license file name. DD OS will not accept the name if the comma is used. Please save the filename with a hyphen or underscore instead of a comma.

[Figure 13](#) on page 47 shows a sample email generated by the Software Licensing Central portal system.

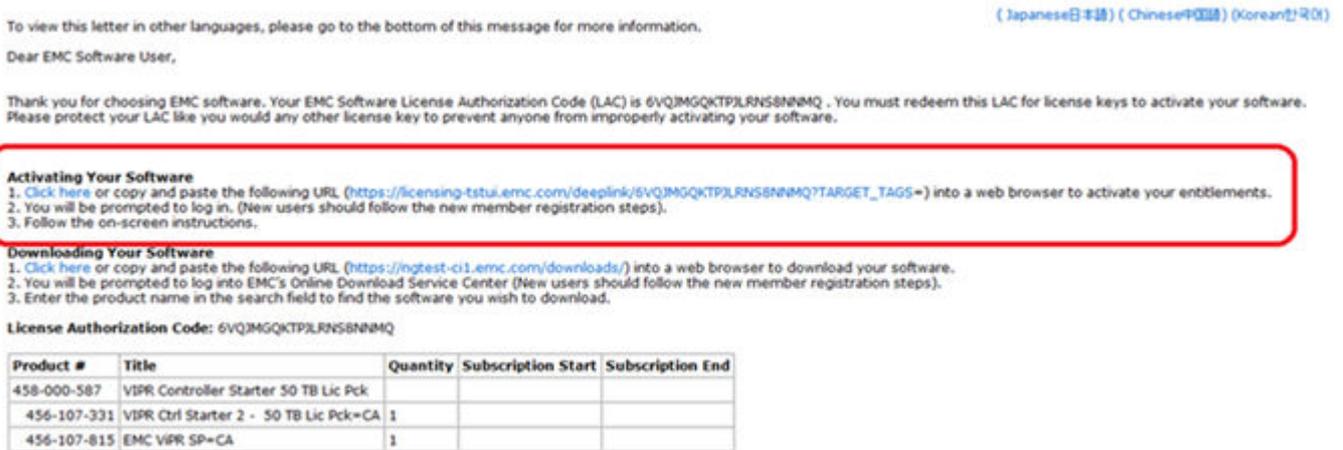
<https://support.emc.com/servicecenter/license/> provides additional information about software licensing. If you cannot find your License Authorization e-mail, contact your account representative or support.

- Up to 16 TB
- Up to 32 TB
- Up to 96 TB

File based license

DD VE is licensed through the Software Licensing Central portal. When you purchase DD VE, you receive an email which email contains a license authorization code (LAC) to redeem for the DD VE software license. Follow the instructions in the email to create the license for the DD VE instance.

Figure 13 Sample LAC email



How to configure: the served licensing model

Table 8 Existing license server information on license server supported platforms

Environment	System
vCloud	Linux
Azure	Linux
	Windows

Note

The CLIs `elicense checkout` and `elicense checkin` are used to obtain licenses from the DD VE.

- If you experience an "invalid key magic" issue after a headswap, set the passphrase on the new DD VE, then perform the headswap `ddboost user revoke token-access sysadmin`.
- If DD VE was attached to an AV-server and you experienced a certificate authentication issue after a headswap, detach and re-attach the DD from the AV-server. The AV-server will then regenerate the certificate and import it to DD.

Adding virtual storage

Additional virtual storage can be added using the GUI or the CLI.

Note

It is not possible to extend a virtual disk if it has already been used by the file system. Instead, expand the storage by adding a new virtual disk.

Using the GUI

In DD SM, click **Hardware > Storage > Configure Storage** to add additional devices to the DD VE active tier.

Using the CLI

When you add a new virtual data disk to an existing DD OS file system, use the `filesystems expand` command instead of the `filesystems create` command.

When you add a new virtual data disk to an existing DD OS file system, use the `filesystems expand` command instead of the `filesystems create` command. For instructions and restrictions, see [Adding disks in Azure](#)

Disk (Spindle Group) Configuration

DD VE 3.1 and above, support 16 spindle-groups. We recommend that virtual disks from the same storage be configured with same spindle-group number. Virtual disks with different storage should be configured with a different spindle-group number. By default, disks are assigned with different spindle-groups. The best practice is NOT to assign spindle-group manually.

Note

The `storage add` command does not support multiple devices in one command line. As a workaround you may:

- Use

```
# storage add dev3,dev4,dev5
```

or

- Use

```
# storage add dev3-5
```

Note

`storage add` command supports multiple devices in one command line.:

- Use

```
# storage add dev3,dev4,dev5
```

or

- Use

```
# storage add dev3-5
```

Optional Additional System Configuration

See the *Data Domain Operating System Initial Configuration Guide* for help performing typical but optional initial system configuration tasks. Below is a summary of the DD OS CLI commands for some common tasks.

Note

Any system command that accepts a list, such as a list of IP addresses, accepts entries separated by either commas or spaces. See the *Data Domain Operating System Command Reference Guide* for command details.

Add users to the email list that reports system problems:

```
# alerts notify-list add group-name
```

Add users to the system report email list:

```
# autosupport add {alert-summary|asup-detailed} emails email-list
```

Enable FTP or TELNET:

```
# adminaccess enable {ftp|telnet}
```

Add remote hosts to use FTP:

```
# adminaccess ftp add <host list>
```

Add a user:

```
# user add name [role {admin|user}]
```

Change a user's password:

```
# user change password username
```

To enable remote management, refer to the *Data Domain Operating System Administration Guide* for details.

To Shut Down The System:

```
# system poweroff
```

Extensions to DD OS for DD VE

Several DD OS commands are supported on the DD VE platform only. This section describes these commands.

perf

Collect and show DD VE performance statistics.

```
perf disable trace event-regex [module {default | ddfs}]
```

Disable tracing of specified events.

```
perf enable trace event-regex [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-regex [module {default | ddfs}]
```

Shows whether tracing is enabled or disabled for the specified events.

```
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 DD VE.

```
system vresource show [current | requirements]
```

```
# system vresource show requirements
Active Tier      Cloud
Tier
Capacity (TB)   Capacity
(TB)
-----
16              n/a   custom-4-16384 (Only block storage is
supported)
16              n/a   custom-4-16384
32              n/a   custom-8-32768
96              n/a   custom-16-65536
-----
** The maximum allowed system capacity for active tier on block
storage is 16 TB
```

DD VE-only commands

The following commands only work on DD VE, cloud provider systems.

Table 9 DD VE-only commands

Command	Description
<code>elicense checkout feature-license <feature-name-list></code>	Allows user to check out the features of licenses for License Server installation
<code>elicense checkout capacity-license <feature-name> value <n> {TB GB}</code>	Allows user to check out the capacity of licenses for License Server installation. Here is sample output: <pre>sysadmin@localhost# elic checkout capacity-license capacity value 10 TB Checking out CAPACITY license willll also checkout available feature licenses. An addition 10 TB CAPACITY license will be checked out.10 TB additional CAPACITY license has been checked out. License(s) have been checked out for REPLICATION, DDBOOST, ENCRYPTION. Total 10 TB CAPACITY license is now available on this system.</pre>

Table 9 DD VE-only commands (continued)

Command	Description
<code>elicense checkin {<feature-name-list> all}</code>	Allows user to check in features for licences for License Server installation.
<code>elicense license-server set server {<ipaddr> <hostname>} port <port-number></code>	
<code>elicense license-server reset</code>	Returns DD VE to factory license settings.
<code>elicense license-server show</code>	
<code>filesystem</code>	Shows space tier active local-metadata: Displays the usage for the metadata storage.
<code>storage object-store enable</code>	Enables the object-store feature for DD VE.
<code>storage object-store disable</code>	Disables the object-store feature for DD VE.
<code>storage object-store profile set</code>	Configures the object-store access profile.
<code>storage object-store profile show</code>	Displays the object-store access profile.
<code>storage object-store profile status</code>	Lists the object-store profile information set on the DD VE.
<code>system vresource show [requirements]</code>	Displays the file system capacity, the number of virtual CPUs, and the amount of memory assigned to the virtual machine running the DD VE instance. The <code>requirements</code> option displays the physical storage requirements for DD VE.
<code>storage object-store disable</code>	Disables the object-store feature for DD VE.

System Recovery CLI

The following system recovery commands are only applicable for the DD VE platform running on object store. These CLIs include:

1. `system recovery precheck from object-store`
2. `system recovery start from object-store`
3. `system recovery status`

Table 10 Object Store Command Descriptions

Command	Description
<code>system recovery precheck from object-store</code>	<p>This command checks if system configuration satisfies the requirement of system recovery. The same check will also be run for command <code>system recovery start from object-store</code></p> <ul style="list-style-type: none"> • <code>system recovery precheck from object-store</code> Role required: admin # <code>system recovery precheck from object-store</code> Recovery precheck passed. Use start command to start the recovery.

Table 10 Object Store Command Descriptions (continued)

Command	Description
	<ul style="list-style-type: none"> • Failure Cases <ul style="list-style-type: none"> ▪ Object-store is not enabled. # system recovery precheck from object-store **** Cannot run precheck: object-store is not enabled. ▪ Profile is not configured # system recovery precheck from object-store **** Cannot run precheck: object-store profile is not configured. ▪ Object store is not configured# system recovery precheck from object-store **** Cannot run precheck: object-store is not configured. ▪ Platform configuration doesn't match the original. # system recovery precheck from object-store Precheck found the following issues: <ol style="list-style-type: none"> 1. DD VE version <i>version</i> does not match the original version <i>version</i> 2. Instance type <i>instance</i> does not match the original instance type <i>instance</i> 3. Passphrase does not match the original passphrase 4. Active tier capacity <i>n</i> GiB is smaller than the original capacity <i>m</i>GiB 5. The object-store <i>name</i> does not have valid filesystem data 6. The filesystem already exists 7. The system recovery is already in progress
system recovery start from object-store	<p>This command starts system recovery from object-store. Since precheck is run again before recovery is actually started, all failure cases for system recovery start from object-store also apply for this command.</p> <ul style="list-style-type: none"> • system recovery start from object-store Role required: admin # system recovery start from object-store System recovery has started. Use status command to check the status. • Failure cases # system recovery start from object-store Precheck found the following issues: <ol style="list-style-type: none"> 1. DD VE version <i>version</i> does not match the original version <i>version</i> 2. Instance type <i>instance</i> does not match the original instance type <i>instance</i> 3. Passphrase does not match the original passphrase 4. Active tier capacity <i>n</i> GiB is smaller than the original capacity <i>m</i>GiB 5. The object-store <i>name</i> does not have valid filesystem data

Table 10 Object Store Command Descriptions (continued)

Command	Description
	<p>6. The filesystem already exists</p> <p>7. The system recovery is already in progress**** Failed to start system recovery.</p>
system recovery status	<p>This command shows the current system recovery status.</p> <ul style="list-style-type: none"> system recovery status Role required: anyone # system recovery status System recovery is running: stage x of 6 (<stage name>). <pre>where <stage name> := [starting attaching object-store formatting active tier restoring configurations rebooting system restoring filesystem]</pre> Cases <ul style="list-style-type: none"> Recovery has never run # system recovery status System recovery has never run. Recovery has completed # system recovery status System recovery completed on <date time>. where <date time> format is, for example, "Tue Feb 1 15:37:32 2018". Fail to create volume # system recovery status **** System recovery did not complete: failed to format active tier. Fail to restore configurations # system recovery status **** System recovery did not complete: failed to restore system configurations from object-store. Fail to restore filesystem # system recovery status **** System recovery did not complete: failed to restore the filesystem.

Modified DD OS commands

The behavior of the following commands has been modified on the DD VE platform:

Table 11 Modified DD OS commands

Command	Changes
alert	The tenant-unit parameter is not supported.
compression	The tenant-unit parameter is not supported.

Table 11 Modified DD OS commands (continued)

Command	Changes
<code>config setup show</code>	Arguments for configuring features not available in DD VE have been removed.
<code>ddboost clients show active</code>	The <code>tenant-unit</code> parameter is not supported.
<code>ddboost file-replication show active</code>	The <code>tenant-unit</code> parameter is not supported.
<code>ddboost file-replication show detailed-file-history</code>	The <code>tenant-unit</code> parameter is not supported.
<code>ddboost file-replication show file-history</code>	The <code>tenant-unit</code> parameter is not supported.
<code>ddboost option reset</code>	The <code>fc</code> parameter is not supported.
<code>ddboost option show</code>	The <code>fc</code> parameter is not supported.
<code>ddboost storage-unit create</code>	The <code>tenant-unit</code> parameter is not supported.
<code>ddboost storage-unit modify</code>	The <code>tenant-unit</code> parameter is not supported.
<code>ddboost storage-unit show</code>	The <code>tenant-unit</code> parameter is not supported.
<code>ddboost streams show active</code>	The <code>tenant-unit</code> parameter is not supported.
<code>ddboost streams show history</code>	The <code>tenant-unit</code> parameter is not supported.
<code>disk rescan</code>	The <code><enclosure-ID>.<disk-ID></code> parameter is not supported.
<code>disk show state</code>	DD VE system disks show the <code>System Dev</code> state.
<code>disk show stats</code>	The DD VE format for this command is <code>disk show stats [dev <n>]</code>
<code>disk status</code>	The <code>Spare</code> row has been removed from the output. The <code>System</code> row has been added.
<code>enclosure show all</code>	The <code>[<enclosure>]</code> parameter is not supported.
<code>enclosure show controllers</code>	The <code>[<enclosure>]</code> parameter is not supported.
<code>enclosure show cpus</code>	The <code>[<enclosure>]</code> parameter is not supported.
<code>enclosure show io-cards</code>	The <code>[<enclosure>]</code> parameter is not supported.

Table 11 Modified DD OS commands (continued)

Command	Changes
enclosure show memory	The [<i>enclosure</i>] parameter is not supported.
filesystem encryption keys delete	The [tier {active archive} archive-unit <unit-name>] parameter is not supported.
filesystem encryption keys show	The [tier {active archive} archive-unit <unit-name>] parameter is not supported.
filesystem fastcopy	The [retention-lock] parameter is supported with DD VE 4.0. Retention lock governance mode is supported for DD VE on premises. Retention lock compliance mode is not supported for any DD VE.
filesystem show compression	The [tier {active archive} archive-unit <unit-name>] parameter is not supported.
filesystem show space	The [tier {active archive} archive-unit <unit-name> arcjove-unit {all <unit-name>}] parameter is not supported.
mtree create	The tenant-unit parameter is not supported.
mtree list	The tenant-unit parameter is not supported.
mtree show compression	The tenant-unit and tenant-unit parameters are not supported.
mtree show performance	The tenant-unit parameter is not supported.
net create interface	The <virtual-ifname> parameter is not supported.
net destroy	The <virtual-ifname> parameter is not supported.
perf	The vtl option is not supported on any perf command.
storage add	The enclosure and disk parameters are not supported.
storage remove	The enclosure and disk parameters are not supported.
storage show	The archive option is not supported.
system show stats	NVRAM statistics are not reported, because DD VE systems do not have physical NVRAM.

Table 11 Modified DD OS commands (continued)

Command	Changes
quota	The <code>tenant-unit</code> parameter is not supported.
replication	MTree replication is the only type of replication supported.
snapshot	The <code>tenant-unit</code> parameter is not supported.

Performance Troubleshooting

You can check DD VE performance statistics:

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

You can also use the following to monitor benchmark performance:

- `perf`

See [Extensions to DD OS for DD VE](#) on page 49 for 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

- The key statistic for memory performance is memory swapping: 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.

Unsupported DD OS Commands

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

Table 12 Unsupported Commands and Command Options

Unsupported Command or Command Option	Notes
<code>adminaccess https generate certificate</code>	Deprecated. Use <code>adminaccess certificate generate</code> instead.
<code>alerts add</code>	Deprecated. Use <code>alerts notify-list add</code> instead.
<code>alerts del</code>	Deprecated. Use <code>alerts notify-list del</code> instead.
<code>alerts notify-list option set group-name tenant-alert-summary {enabled disabled}</code>	
<code>alerts notify-list option reset group-name tenant-alert-summary</code>	
<code>alerts reset</code>	Deprecated. Use <code>alerts notify-list reset</code> instead.
<code>alerts show alerts-list</code>	Deprecated. Use <code>alerts notify-list show</code> instead.
<code>alerts test</code>	Deprecated. Use <code>alerts notify-list test</code> instead.
<code>archive</code>	
<code>authorization</code>	
<code>autosupport display</code>	Deprecated. Use <code>autosupport show report</code> instead.
<code>autosupport reset support-list</code>	Deprecated. Use <code>autosupport reset { all alert-summary asup-detailed support-notify }</code> instead.
<code>autosupport show support-list</code>	Deprecated. Use <code>autosupport show { all asup-detailed alert-summary support-notify }</code> instead.
<code>cifs set authentication nt4</code>	Deprecated. Use <code>cifs set authentication active-directory</code> instead.
<code>cluster</code>	
<code>ddboost fc</code>	
<code>ddboost option reset fc</code>	
<code>ddboost option show fc</code>	
<code>ddboost show image-duplication</code>	Deprecated. Use <code>ddboost file-replication show</code> instead.
<code>ddboost user option set user default-tenant-unit tenant-unit</code>	
<code>ddboost user option reset user [default-tenant-unit]</code>	
<code>disk add devdisk-id [spindle-group 1-16]</code>	Deprecated. Use <code>storage add</code> instead.
<code>disk add enclosure enclosure-id</code>	Deprecated. Use <code>storage add</code> instead.
<code>disk benchmark start</code>	Not supported by DDVE in cloud
<code>disk benchmark show</code>	Not supported by DDVE in cloud

Table 12 Unsupported Commands and Command Options (continued)

Unsupported Command or Command Option	Notes
<code>disk benchmark stop</code>	Not supported by DDVE in cloud
<code>disk benchmark watch</code>	Not supported by DDVE in cloud
<code>disk expand</code>	Deprecated. Use <code>storage add</code> instead.
<code>disk failenclosure-id.disk-id</code>	
<code>disk multipath</code>	
<code>disk port</code>	
<code>disk rescan [enclosure-id.disk-id]</code>	
<code>disk show detailed-raid-info</code>	Deprecated. Use <code>disk show state</code> and <code>storage show</code> instead.
<code>disk show failure-history</code>	
<code>Disk show performance</code>	Not supported by DDVE in cloud
<code>disk show raid-info</code>	Deprecated. Use <code>disk show state</code> and <code>storage show</code> instead.
<code>disk show reliability-data</code>	
<code>disk disk show stats</code>	Not supported by DDVE in cloud
<code>disk unfail</code>	
<code>enclosure beacon</code>	
<code>enclosure show all [enclosure]</code>	This command is supported, but not with the <i>enclosure</i> argument.
<code>enclosure show chassis</code>	
<code>enclosure show controllers enclosure</code>	This command is supported, but not with the <i>enclosure</i> argument.
<code>enclosure show cpus [enclosure]</code>	This command is supported, but not with the <i>enclosure</i> argument.
<code>enclosure show fans</code>	
<code>enclosure show io-cards [enclosure]</code>	This command is supported, but not with the <i>enclosure</i> argument.
<code>enclosure show memory [enclosure]</code>	This command is supported, but not with the <i>enclosure</i> argument.
<code>enclosure show nvram</code>	
<code>enclosure show powersupply</code>	
<code>enclosure show summary</code>	
<code>enclosure show temperature-sensors</code>	
<code>enclosure show topology</code>	
<code>enclosure test topology</code>	

Table 12 Unsupported Commands and Command Options (continued)

Unsupported Command or Command Option	Notes
<code>filesystems archive</code>	
<code>filesystems clean update-stats</code>	Deprecated. Use <code>filesystems show space</code> instead.
<code>filesystems encryption</code>	
<code>filesystems encryption passphrase change</code>	Deprecated. Use <code>system passphrase change</code> instead.
<code>filesystems retention-lock</code>	Deprecated. Use <code>mtree retention-lock</code> instead.
<code>filesystems show compression tier</code>	The <code>tier</code> option is not supported.
<code>filesystems show history</code>	Deprecated. Use <code>filesystems show compression daily</code> instead.
<code>ha create</code>	Not supported by DDVE in cloud
<code>ha destroy</code>	Not supported by DDVE in cloud
<code>ha status</code>	Not supported by DDVE in cloud
<code>ha failover</code>	Not supported by DDVE in cloud
<code>ha online</code>	Not supported by DDVE in cloud
<code>ha offline</code>	Not supported by DDVE in cloud
<code>license</code>	The <code>license</code> commands are not supported because DD VE uses new <code>elicense</code> commands.
<code>mtree show compression mtree_path tier</code>	
<code>net aggregate</code>	
<code>net config ifname type cluster</code>	
<code>net create interface virtual-ifname</code>	
<code>net create interface physical-ifname vlan vlan-id</code>	
<code>net create virtual vethid</code>	
<code>net destroy virtual-ifname</code>	
<code>net destroy vlan-ifname</code>	
<code>net failover</code>	
<code>net modify virtual-ifname bonding {aggregate failover</code>	
<code>net set portnaming</code>	
<code>ndmp</code>	
<code>ndmpd</code>	
<code>nfs option disable report-replica-as-writable</code>	Deprecated. Use <code>filesystems option disable report-replica-as-writable</code> instead.
<code>nfs option enable report-replica-as-writable</code>	Deprecated. Use <code>filesystems option enable report-replica-as-writable</code> instead.

Table 12 Unsupported Commands and Command Options (continued)

Unsupported Command or Command Option	Notes
nfs option reset report-replica-as-writable	Deprecated. Use <code>filesystems option reset report-replica-as-writable</code> instead.
nfs option show report-replica-as-writable	Deprecated. Use <code>filesystems option show report-replica-as-writable</code> instead.
perf * module vtl	
san	
shelf migration start	Not supported by DDVE in cloud
shelf migration status	Not supported by DDVE in cloud
shelf migration suspend	Not supported by DDVE in cloud
shelf migration resume	Not supported by DDVE in cloud
shelf migration precheck	Not supported by DDVE in cloud
shelf migration option	Not supported by DDVE in cloud
shelf migration finalize	Not supported by DDVE in cloud
shelf migration show history	Not supported by DDVE in cloud
snapshot add schedule <i>name</i> [days <i>days</i>] time <i>time</i> [, <i>time</i> ...] [retention <i>period</i>]	Deprecated. Use <code>snapshot schedule create</code> instead.
snapshot add schedule <i>name</i> [days <i>days</i>] time <i>time</i> every <i>mins</i> [retention <i>period</i>]	Deprecated. Use <code>snapshot schedule create</code> instead.
snapshot add schedule <i>name</i> [days <i>days</i>] time <i>time-time</i> [every <i>hrs</i> <i>mins</i>] [retention <i>period</i>]	Deprecated. Use <code>snapshot schedule create</code> instead.
snapshot del schedule { <i>name</i> all}	Deprecated. Use <code>snapshot schedule destroy</code> instead.
snapshot modify schedule <i>name</i> {[days <i>days</i>] time <i>time</i> [, <i>time</i> ...] [retention <i>period</i>]}	Deprecated. Use <code>snapshot schedule modify</code> instead.
snapshot modify schedule <i>name</i> {[days <i>days</i>] time <i>time</i> every { <i>mins</i> none} [retention <i>period</i>]}	Deprecated. Use <code>snapshot schedule modify</code> instead.
snapshot modify schedule <i>name</i> {[days <i>days</i>] time <i>time-time</i> [every { <i>hrs</i> <i>mins</i> none}] [retention <i>period</i>]}	Deprecated. Use <code>snapshot schedule modify</code> instead.
snapshot reset schedule	Deprecated. Use <code>snapshot schedule reset</code> instead.
snapshot show schedule	Deprecated. Use <code>snapshot schedule show</code> instead.
storage add enclosure <i>enclosure-id</i>	
storage add disk <i>enclosure-id.disk-id</i>	
storage remove enclosure <i>enclosure-id</i>	
storage remove disk <i>enclosure_id.disk-id</i>	
system firmware	

Table 12 Unsupported Commands and Command Options (continued)

Unsupported Command or Command Option	Notes
<code>system option set console</code>	
<code>system retention-lock</code>	
<code>system sanitize</code>	
<code>system show anaconda</code>	
<code>system show controller-inventory</code>	
<code>system show nvram</code>	
<code>system show nvram-detailed</code>	
<code>system show oemid</code>	
<code>system upgrade continue</code>	
<code>user</code>	
<code>user change priv</code>	Deprecated, with no replacement.
<code>vserver config set host</code>	Not supported by DDVE in cloud
<code>vserver config reset</code>	Not supported by DDVE in cloud
<code>vserver config show</code>	Not supported by DDVE in cloud
<code>vserver config perf-stats start</code>	Not supported by DDVE in cloud
<code>vserver config perf-stats stop</code>	Not supported by DDVE in cloud
<code>vserver config perf-stats status</code>	Not supported by DDVE in cloud
<code>vtl lunmask</code>	Deprecated. Use <code>vtl group</code> instead.
<code>vtl lunmask add</code>	Deprecated. Use <code>vtl group add</code> instead.
<code>vtl lunmask del</code>	Deprecated.
<code>vtl lunmask show</code>	Deprecated. Use <code>vtl group show</code> instead.

Upgrade DD OS

The Data Domain Operating System can be upgraded using the rpm package file. For more information, refer to the Data Domain Operating System 6.2 Administration Guide.

DD VE system upgrade for higher capacity

1. Shutdown the DD VE using the command `system poweroff`
2. Upgrade the CPU and memory resources and add additional metadata disks that are required for the new configuration as per the following:

Table 13 Upgrade requirements

Instance Type (custom)	#vCPU	Memory	DD Storage Capacity	Metadata disks (num. of disks x size of each disk)
custom-4-16384	4	16 GiB	Up to 16 TB	2 x 1024 GiB
custom-8-32768	8	32 GiB	Up to 32 TB	4 x 1024 GiB
custom-16-65536	16	64 GiB	Up to 96 TB	10 x 1024 GiB

3. Power on the DD VE
4. Add the license for the new capacity
5. Configure the newly added metadata disks using the CLI command `storage add dev tier active<device ID>`
6. Expand the file system using the CLI command `filesystem expand`

Define the Data Domain System Information for Your Site

An installation requires information unique to your site. Before starting the installation, provide values for the system information listed below.

Note

Data Domain recommends that you print the tables in this section and record the information. Be sure to enter the serial number correctly to avoid DD VE issues.

Table 14 System Setup Worksheet for DD VE

Information	Your Values
A unique VM name for the system:	
The DNS domain name:	
A default gateway IP address (if you are not using DHCP):	
DNS server IP addresses (if you are not using DHCP): <ul style="list-style-type: none"> • Primary • Secondary • Tertiary 	
If you will enable CIFS access, enter the information for your CIFS authentication method: <ol style="list-style-type: none"> 1. For Workgroup authentication: <ul style="list-style-type: none"> • Workgroup name: 	

Table 14 System Setup Worksheet for DD VE (continued)

Information	Your Values
<ul style="list-style-type: none"> • Backup user name: • Password: 2. For Active Directory authentication: <ul style="list-style-type: none"> • Realm name: • Domain admin name: • Password 	
Host name from which to administer the system:	
Administrator's email address (or admin group alias):	
Mail server (SMTP) host name:	
Region: <ol style="list-style-type: none"> 1. Zone 2. VPC 3. subnet 	
Virtual machine unique ID (after initial configuration, use the <code>system show serialno</code> command to display this ID):	

Use this table to enter Ethernet connectivity information. By default, DHCP is enabled.

Table 15 Ethernet Connectivity Worksheet

Ethernet Connectivity	Enable	Use DHCP	IP Address (if no DHCP)	Netmask (if no DHCP)
ethV0				
ethV1				
ethV2				
ethV3				
ethV4				
ethV5				
ethV6				
ethV7				

Setting Up NTP Time Synchronization

By default, NTP is disabled on the DD VE system. If you need to enable NTP on the DD VE, follow these steps:

Note

Skip this task if you are going to join the DD VE to an Active Directory domain. Because the Windows domain controller obtains the time from an external source, NTP must be configured. See the cloud provider documentation on how to configure NTP for the Windows operating system version or service pack that is running on your domain controller. After joining the domain, the system time is periodically synchronized with the domain controller time. When the host joins the Active Directory, the DD VE displays a warning if multiple time sources are in use.

Later, while performing initial configuration of the DD VE system, enable NTP by selecting the appropriate options from the configuration wizards. If you do not use the wizards to perform initial configuration, you can use the `ntp enable` command on the DD OS command line. Enabling NTP with the `ntp enable` command automatically disables synchronizing the time on the guest to the host time.

To reenable synchronizing the guest time to the host time, run the `ntp disable` command.

Note

NTP is disabled by default. The `ntp reset` command also deactivates NTP on the guest.

Note

For more information about Azure time synchronization, see [Setting Up NTP Time Synchronization in Azure](#)

Configuration of optional software and internal licenses

If you need to configure optional software features, you need to install and activate those licenses before you configure those features. See [DD VE capabilities](#) for information about features and licenses that are available to for DD VE.

Information about installing licenses and configuring optional software can be found in the *Data Domain Administration Guide*. Refer to the applicable *Data Domain Operating System Release Notes* for the most up-to-date information on product features, software updates, software compatibility guides, and information about our products, licensing, and service. Access the latest documents at <https://support.emc.com>.

APPENDIX A

DD VE Cloud Workflow and Recommendations

- [Overview of DD VE on Block Storage](#).....66
- [Network setup recommendations](#).....67

Overview of DD VE on Block Storage

DD VE on block storage provides enterprise customers and service providers who are running applications in the public cloud with a dedupe data protection appliance that provides object storage efficiency and ease of management. Supported cloud platforms include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP). It is important to note that DD VE on block storage is deployed in these environments differently.

DD VE on block storage supports:

- Backup/restore using active tier's data into cloud block storage while DD VE is running in the cloud.
- DD SM to configure, manage, and monitor DD VE on block storage.
- DD MC for multisystem management of DD VE systems in the cloud on block storage.

Configuring DD VE on block storage using the DD SM interface

DD VE can be configured as an active tier on block storage system using the DD SM interface option.

Configuring DD VE on block storage using the DD SM interface (http/https)

Procedure

1. The GUI configuration wizard helps go through the active tier configuration and file system creation on DD VE. Login with the account name: sysadmin and the password specified at deployment.
2. Proceed without selecting the “Enable Object Store” checkbox to configure active tier on block storage. Click “Next”.
3. Add the block storage attached to the DD VE to the active tier.

Note

For block storage solution, the maximum supported storage capacity is 16 TB.

4. Review the summary and select “Submit” to create the file system and enable it.
5. The File System section under the Data Management tab has the space usage and availability details for block storage.
6. To configure or update the eLicense on the DD VE, select “Replace License” on the Licenses page.
7. To relaunch the configuration wizard, select “Configure System” under “Maintenance”, then select “Configure System”.

Network setup recommendations

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 you use public or private subnet architecture to deploy the DD VE in private subnet. It will secure the DD VEs (VMs) with the appropriate use of various VNet service components such as route tables, access control lists, security groups, etc.

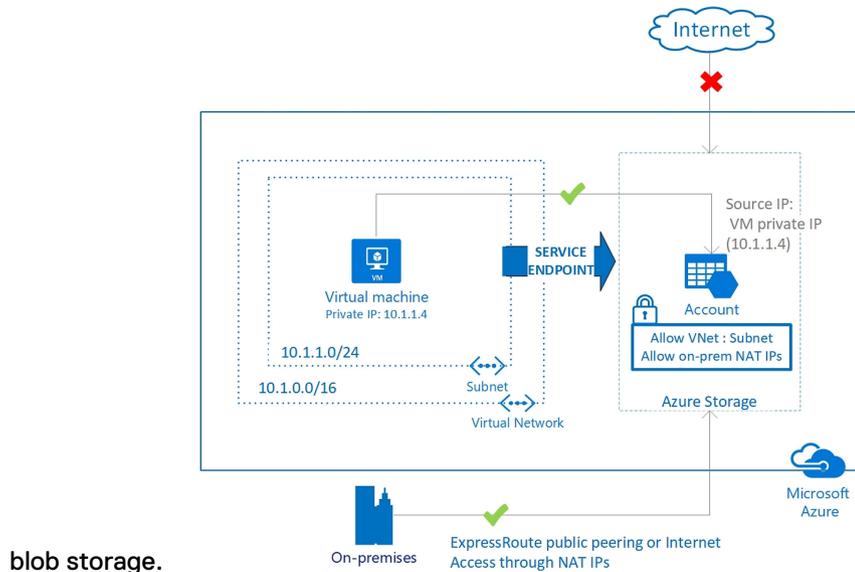
Public IP address

Due to security considerations and in order to protect the DD VE from potential attacks over open internet, the DD VE MUST NOT be exposed using Public IP directly over internet. It is highly recommended that you use VPN connections between different geographical regions (VNets). For example, the replication between different VNets, different cloud regions, cloud to on-premise and vice versa can be used via the secure VPN connection.

Object store connectivity

The DD VE object store feature needs connectivity to its object storage, such as to the Azure storage account container. The object store communication is over https, so the outbound security group setting must allow communication over port 443. There are different ways to enable DD VE connectivity to the object store. Out of the following three we recommend only the third option (Using 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, then DD VE will be able to communicate to object store over NAT.
- We strongly recommend using VNet service endpoint for accessing the Azure hot blob storage. It does not require the DD VE to have a public IP address to communicate to Azure blob storage, it 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 will be routed internally to Azure



Note

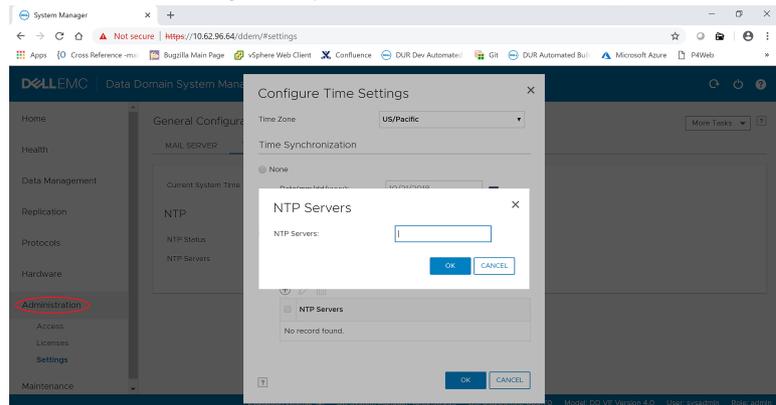
When you use DD VE on hot blob storage, please make sure the hot blob storage account you are using and your DD VE are located in the same region. Configuring VM and storage account in different regions may bring lower performance and higher costs.

Setting Up NTP Time Synchronization in Azure

It is important for the DD VE's time to be properly synchronized. Any drift in time might impact the object store communication. System time is one component required for secure communication. We recommend that you sync time with the NTP server for DD VE in Azure. While performing initial configuration of the DD VE 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, please refer to [Time sync for Linux VMs in Azure](#). Follow the steps below to configure NTP on the DD VE (using GUI).

Procedure

1. Select the settings under the Administration tab.
2. Select “Configure Time Settings” from the drop down menu of “More Tasks”.
3. Select the “Manually Configure” option under NTP and add your own NTP



servers.

4. Run the following commands to configure NTP on the DD VE (using CLI)
 - `ntp add timeserver`
 - `ntp enable`
 - `ntp sync`