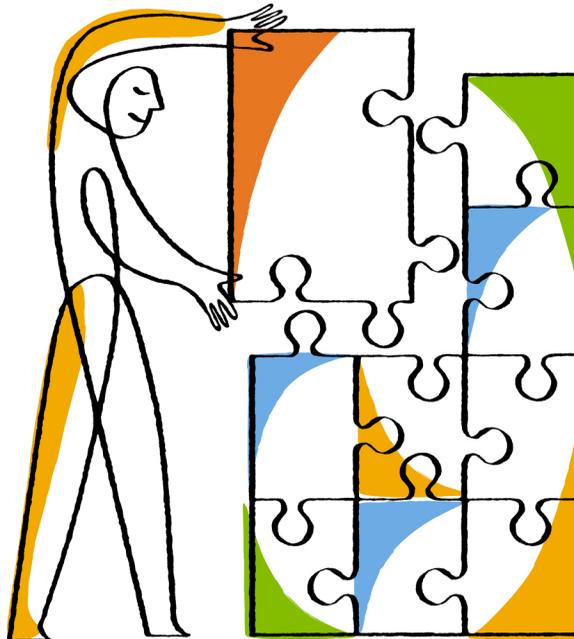




Data ONTAP[®] Edge 8.3

Installation and Administration Guide

For Clustered Data ONTAP



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Introduction to Data ONTAP Edge

The NetApp Data ONTAP Edge product is a storage solution designed for remote offices. In addition to managing local storage and protecting data, Data ONTAP Edge can be configured to use SnapVault and SnapMirror technology to automatically copy and move data to a central NetApp clustered Data ONTAP storage system where it can be archived or used for disaster recovery.

Data ONTAP Edge enables you to build a data center on an enterprise server using the VMware vSphere platform. It converts the server's internal disk drives into a flexible storage platform, providing most of the features of a dedicated NetApp storage system.

Data ONTAP Edge uses Data ONTAP-v technology to run Data ONTAP storage software in a virtual machine on a high-performance server. This enables Data ONTAP to manage the local storage for applications running on other virtual machines on the same server.

The term Data ONTAP Edge is used when describing functionality provided by the Data ONTAP Edge storage system. The term Data ONTAP-v is used when describing functionality provided by the underlying platform technology.

What Data ONTAP-v storage software is

Data ONTAP-v is a software version of a storage controller that executes Data ONTAP within a virtual machine. This enables Data ONTAP to run on servers supported by VMware vSphere so as to manage storage in virtualized environments.

By enabling Data ONTAP to run on standard servers, smaller data centers can achieve storage management and protection capabilities similar to those offered by hardware-based NetApp storage controllers.

To deploy Data ONTAP-v storage software on a host computer, and to manage it as a platform, NetApp has developed the Data ONTAP-v administration tool, called *dvadmin*. *dvadmin* must be used to install Data ONTAP Edge.

Data ONTAP Edge functionality

Data ONTAP Edge systems are configured with specific Data ONTAP features to provide a unique storage solution.

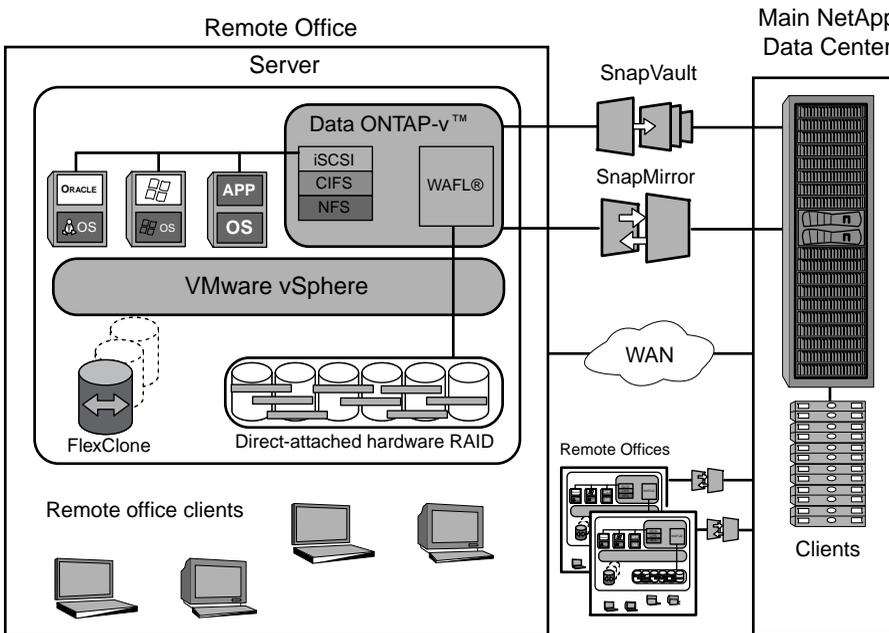
The Data ONTAP features provided with the Premium bundle include:

- SnapMirror
- SnapVault (both primary and secondary)
- SnapRestore

- FlexClone
- CIFS, iSCSI, and NFS

As shown in the figure below, Data ONTAP Edge systems use Data ONTAP-v to manage the local storage for applications running on other virtual machines on the same server. The Data ONTAP Edge systems use:

- SnapVault to backup data to the NetApp clustered Data ONTAP storage system at the main data center
- SnapMirror to replicate data from specified source volumes or qtrees to specified destination volumes or qtrees, respectively



See the *Clustered Data ONTAP Data Protection Guide* for information about SnapVault and SnapMirror functionality.

What is different in a Data ONTAP Edge storage system

A Data ONTAP Edge storage system runs Data ONTAP software on a virtual machine, so it can be looked at as a software controller. It is known as a single-node cluster because it runs clustered Data ONTAP software on a standalone node.

A software controller is different from a typical hardware controller in the following areas:

Environment

Data ONTAP Edge can be installed on an x86 computer server. It provides the storage solution for any server applications that can access the server, including virtual machines residing on the local server.

Storage

Storage is currently limited to the disks that are physically installed in the same server environment and that are available to VMware vSphere. Note that Data ONTAP Edge systems can be configured with a maximum of 10 TB total storage capacity.

Physical controller management

The Data ONTAP-v administration tool (called `dvadmin`) is used to manage the software controller. `dvadmin` provides the ability to:

- install Data ONTAP Edge (the Data ONTAP-v virtual machine)
- configure Data ONTAP setup values
- start the virtual machine (and boot Data ONTAP at the same time)
- monitor and report on the virtual machine operating state
- backup and restore Data ONTAP-v configuration information
- interact with and monitor activity on the Data ONTAP console
- create additional data disks to be managed by Data ONTAP

NVRAM

NVRAM (non-volatile random access memory) is used by Data ONTAP to store information that is expected to survive a power outage. The NVRAM implementation requires the availability of a hardware RAID controller with a battery-backed write cache instead of a physical NVRAM card. When used this way, it is referred to as "virtual" NVRAM.

Licensing

Unlike a hardware controller, a valid Data ONTAP-v platform license must be specified when you install the Data ONTAP Edge storage system. Depending on the platform license, certain Data ONTAP feature licenses are installed automatically. After installation, you can add additional Data ONTAP feature licenses just as you would on a hardware controller.

Because of the virtualized environment, there are some restrictions as to which Data ONTAP features can be used. See [Data ONTAP-v supported and unsupported functionality](#) on page 73 for a list of supported and unsupported Data ONTAP features.

How Data ONTAP Edge uses storage

Data ONTAP Edge virtualizes storage from the disks that are available to the host server. In a rack system this can be all the disks within the chassis, while in a blade system this could be one or more storage blades in the same blade server.

A brief description of the storage terminology used in the Data ONTAP Edge storage system environment is provided below:

- *physical disk* - the disk, or disks, that are available to the host server. The disks are assigned to RAID groups and presented to the host server as LUNs.
- *storage pool* - a collection of LUNs that hold virtual machine files. The space in the defined pool, or pools, can be used by Data ONTAP Edge for system information or for data storage. From the perspective of a VMware infrastructure, a storage pool is synonymous with a datastore.
- *virtual disk* - the defined space that Data ONTAP Edge sees as an actual disk. Multiple virtual disks can exist within a storage pool. These disks are formatted and managed by the hypervisor, for example, created as Virtual Machine Disks (VMDKs) when using VMware. The virtual disks are used by Data ONTAP Edge as either system disks or data disks:
 - *System disks* are used internally for the Data ONTAP and virtual machine installation, and for the virtual NVRAM, root aggregate, and system files. The system disks are created automatically when Data ONTAP Edge is installed.
 - *Data disks* are the disks that Data ONTAP Edge manages as application storage. Multiple data disks can be created within a storage pool.

See [RAID groups and LUN configuration](#) on page 15 for detailed information about the recommended RAID configuration for your system.

How to interface with Data ONTAP Edge

You use the Data ONTAP-v administration tool in order to install, configure, and manage the Data ONTAP Edge storage system.

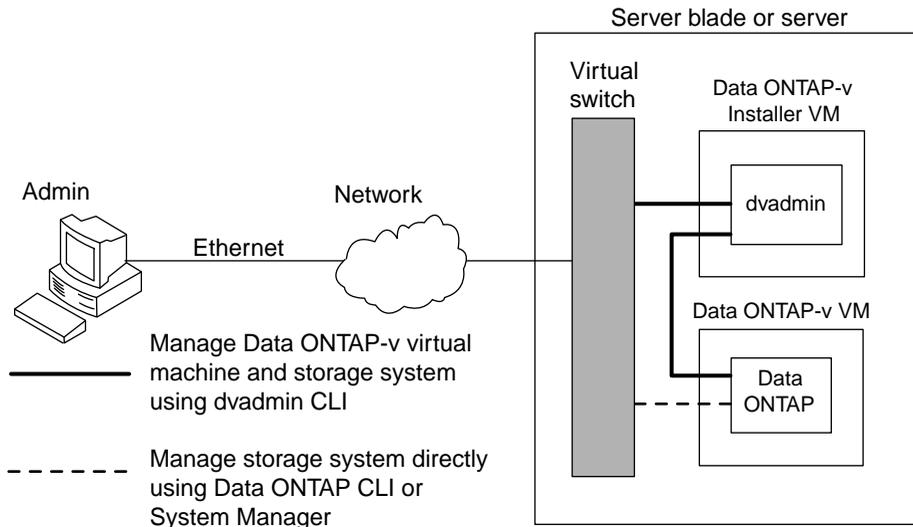
Because there is no physical serial port on the Data ONTAP-v virtual machine, you connect to both Data ONTAP Edge and Data ONTAP over the network.

There are multiple ways to configure and manage Data ONTAP Edge:

- Connect to `dvadmin` on the Data ONTAP-v Installer virtual machine. You can access `dvadmin` directly over the network using SSH, or you can use the Console tab in the vSphere Client. This enables you to use the `dvadmin` CLI to manage the virtual machine platform, and the system console to manage Data ONTAP.

- Connect to Data ONTAP directly over the network (using SSH, for example) and use the Data ONTAP command-line interface, or System Manager, to manage the storage system.

The figure below shows the two different ways to interface with the Data ONTAP Edge storage software.



Data ONTAP Edge and Data ONTAP administration

Management of your Data ONTAP Edge storage system is accomplished by using both the dvadmin command-line interface and the Data ONTAP management interfaces.

Data ONTAP is the operating system for all NetApp storage systems. It provides a complete set of storage management tools through its command-line interface and graphical OnCommand System Manager interface.

The management tasks that you can perform with each tool are described below.

dvadmin tasks:

- Installing Data ONTAP Edge (which creates the Data ONTAP-v virtual machine and installs Data ONTAP software)
- Licensing Data ONTAP-v as a platform
- Creating storage pools from the available LUNs
- Creating virtual data disks from the storage pools

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- Starting and stopping the Data ONTAP Edge virtual machine (this acts as an on/off switch for your storage system)
- Backing up and restoring Data ONTAP Edge system information
- Defining a destination where cluster configuration backups will be stored
- Connecting to the Data ONTAP system console to configure the storage system using Data ONTAP commands

Data ONTAP administration tasks:

- Configuring licensed Data ONTAP features
- Setting up the data disks, creating aggregates, Storage Virtual Machines (SVMs, formerly known as Vservers) , and volumes
- Backing up and restoring Data ONTAP information
- Upgrading Data ONTAP software
- All other Data ONTAP activities...

Typically you use `dvadmin` to install and configure Data ONTAP Edge, and then you use Data ONTAP administration tools to configure and manage Data ONTAP on the virtual machine platform.

Important: Because Data ONTAP Edge is only available as a single-node cluster, it cannot be joined to another Data ONTAP node to form a multi-node cluster.

Data ONTAP Edge licensing

Unlike a NetApp hardware controller, Data ONTAP Edge must be licensed separately as a platform. You must specify a valid Data ONTAP-v platform license when you first install Data ONTAP Edge onto a host server.

You receive the *platform license* with your Data ONTAP Edge order so it can be used during installation. The Data ONTAP-v platform license defines the Data ONTAP Edge storage system as having the Premium bundle (model FDvM200).

Data ONTAP *feature licenses* enable support for specific Data ONTAP features. Feature licenses for CIFS, NFS, iSCSI, FlexClone, SnapRestore, SnapVault, and SnapMirror are installed automatically when using the Premium bundle.

Because each Data ONTAP-v virtual machine is licensed separately and locked to a specific host server, no cloning or vMotion of the Data ONTAP-v virtual machine is allowed. If the Data ONTAP-v software is booted on a different virtual machine than the one on which it was initially installed, or if the license is not valid, Data ONTAP logs an error message and shuts down.

Note: Data ONTAP feature licenses provided with Data ONTAP Edge are valid only on Data ONTAP Edge systems. Those feature licenses cannot be used on hardware controllers. Similarly,

Data ONTAP feature licenses created for a hardware controller cannot be used on a Data ONTAP Edge system.

See the *Clustered Data ONTAP System Administration Guide for Cluster Administrators* for information about installing Data ONTAP feature licenses.

Viewing license and model information

You can view Data ONTAP Edge model and license information from the `dvadmin` console and from the Data ONTAP system console. The model is determined by the platform license key used during installation.

The Data ONTAP Edge platform license can be displayed from the `dvadmin` command line using the `vm prop show` command:

```
> vm prop show dotv1

checksum_type = zoned
gateway = 10.97.128.1
ipaddr = 10.97.131.27
license = XXXX-YYYY-ZZZZ-AAAA-BBBB
netmask = 255.255.248.0
password = *****
...
```

The Data ONTAP Edge Model Name, Serial Number, System ID, and other pertinent information can be displayed from the Data ONTAP console using the `sysconfig -av` command:

```
dotv1::> run local sysconfig -av
NetApp Release 8.x.x Cluster-Mode: Fri Feb 22 03:19:52 PDT 2013
System ID: 2194434981 (dotv1)
System Serial Number: 201000000032 (dotv1)
System Storage Configuration: Single Path
System ACP Connectivity: NA
slot 0: System Board 2.6 GHz (Virtual Machine)
      Model Name:          FDvM200
      Serial Number:        221901
      Loader version:       1.0
      Processors:           2
      Memory Size:          8192 MB
      Memory Attributes:    None
      Virtual NVRAM Size:   256 MB
...
```

The Serial Number and System ID can also be displayed using the `dvadmin vm show` command:

```
> vm show dotv1
VM Name      Power  CfgState  Heartbeat  Hostname  IP Address
dotv1        on    ready    green     dotv1-01  10.97.131.27
```

```
=====  
Detail information for vm dotv1:  
VM Version  Data ONTAP Version  Serial Number  System ID  
1.x.x       8.x.x                2010000000032  2194434981  
...  
...
```

Data ONTAP Edge support information

Not all Data ONTAP releases support the same Data ONTAP Edge features or configurations.

See the *Clustered Data ONTAP Release Notes* for complete information.

Data ONTAP Edge planning overview

Successful implementation of a Data ONTAP Edge installation requires careful planning and proper installation and configuration of all hardware and software components.

Overview of installation and configuration steps

This section describes the steps you need to follow to install and configure your Data ONTAP Edge storage system.

The table below provides a brief description of the tasks that you need to perform in order to install and configure your storage system.

Task	See the following section, chapter, or guide...
Make sure your hardware platform and server meet all the prerequisites, and that the server BIOS has been configured properly.	Data ONTAP Edge platform requirements on page 14
Create RAID groups from the available disks to provide the LUNs that will be managed by Data ONTAP Edge.	RAID group and LUN configuration on page 15
Download the Data ONTAP Edge software and licenses from NetApp. Then install dvadmin (the Data ONTAP-v administration tool) by deploying the Data ONTAP-v Installer virtual machine.	Data ONTAP-v Administration Tool Installation Guide on the NetApp Support Site at mysupport.netapp.com
Install and start Data ONTAP Edge using dvadmin.	Typical installation using the dvadmin setup wizard: Data ONTAP Edge setup and installation on page 18 Custom installation using individual dvadmin commands: Data ONTAP Edge advanced installation instructions on page 53
Connect to the Data ONTAP system console to complete the configuration of your storage system. This includes configuring Data ONTAP features such as SnapVault and SnapMirror.	Connecting to the Data ONTAP console on page 36 Also see the NetApp Support Site at mysupport.netapp.com for access to the full set of Data ONTAP documentation.

Data ONTAP Edge platform requirements

The hardware platform on which Data ONTAP Edge is installed must meet certain system requirements and virtual machine requirements to work properly.

Supported platforms, and other support requirements, are listed in the Interoperability Matrix at mysupport.netapp.com/matrix.

Server requirements

Your server should meet or exceed the following minimum requirements:

- Quad core, or two dual-core, 64-bit Intel x86 processors
- 2.27 GHz or greater processor speed
- 12 GB or greater memory
- 4 or more physical disks on the server
- Single Gigabit Ethernet network
- Hardware RAID: Must have a battery-backed write cache

Note: Data ONTAP Edge can be configured with a maximum of 10 TB total storage capacity, but the server can contain more than this amount of storage.

Important: The power management BIOS settings on the server where you are going to install Data ONTAP Edge must be disabled. If these BIOS settings are not set correctly, the virtual machine will install, but it will not start. See knowledgebase article 3013687 at <https://kb.netapp.com/support/> for the BIOS settings for the server you are using.

After the BIOS settings are set, they can be confirmed through the VMware vSphere Client under the Configuration tab. Active Policy must be listed as “Not supported”. If this value is not correct, check the BIOS settings and restart the server.

Virtualization requirements

The virtualization platform requirements include VMware vSphere; including ESXi and the VMware vSphere Client. A VMware vCenter Server is optional. The Interoperability Matrix (mysupport.netapp.com/matrix) includes all supported versions and required licenses. The VMware documentation contains installation instructions.

Important: The ESX firewall must be disabled, or the firewall rule for “remoteSerialPort” must be enabled. Using the VMware vSphere Client, you can select **Configuration > Security Profile > Firewall Properties** and ensure that the **VM Serial port connected over network** check box is selected.

The following recommendations apply if you plan to install other virtual machines on the server where Data ONTAP Edge is installed:

- Do not over-commit available memory or you will notice performance issues. Data ONTAP Edge reserves 8 GB of memory. Other virtual machines should not use memory that adds up to more than the total RAM available on the server.
- The Data ONTAP Edge virtual machine must be fully booted before any other virtual machines start booting. You can set the startup order on the host through the VMware vSphere Client under the Configuration tab.

Tip: You must enable VLAN tagging on the ESX server if you are planning to use VLAN tagging with Data ONTAP.

Data ONTAP Edge resource requirements

You can install only one Data ONTAP Edge storage system per ESX host. The Data ONTAP Edge virtual machine requires the following resources from the host server:

- 2 dedicated physical CPU cores
- 8 GB of dedicated memory
- 20 GB disk space for system disk images and virtual machine metadata

The Data ONTAP-v virtual machine reserves two CPU cores and 8 GB of RAM from the host. You *cannot* change these settings or the storage system will not boot. Limiting resources is not supported and has not been tested. It can negatively impact the I/O capability of the storage system and could risk data loss.

Note: Data ONTAP-v does not release the CPUs when idle, so VMware vSphere will report a high CPU warning because it sees 100% usage. You can ignore or clear the VMware vSphere alarm for CPU usage. The Data ONTAP `statistics` command displays the true usage of the CPUs.

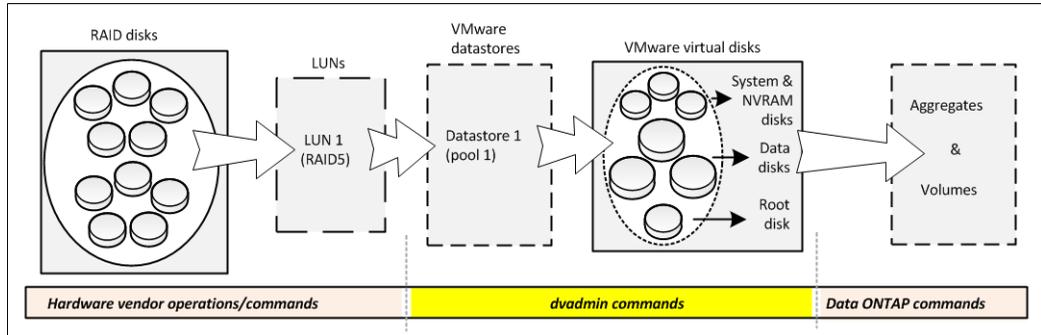
RAID group and LUN configuration

You must create RAID groups from the disks available to the server to provide the LUNs that Data ONTAP Edge will manage. Only disks local to the server platform can be used by Data ONTAP Edge.

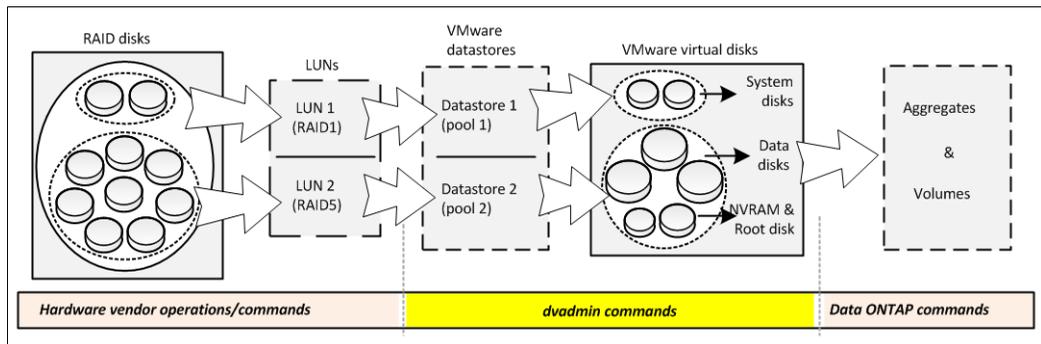
Because the disks are connected to the server, not directly to the Data ONTAP software, the virtual machine provides the storage status to Data ONTAP Edge. Data ONTAP uses RAID0 groups to optimize performance and storage utilization, therefore, the storage system must provide the parity protection for disks.

In a rack system with one set of physical disks, you can create a single datastore or two datastores for the installation of system disks and data disks. It is a best practice to create one LUN and one

datastore, as shown in the figure below. The virtual disks created on LUN 1 are used for the system installation, virtual NVRAM, root disk, and the data storage.



If you would rather create a two LUN system, the disks created on LUN 1 are used for system installation, and the disks created on LUN 2 are used for data storage, the virtual NVRAM, and the root disk.



Follow these recommendations when creating the RAID groups on your system:

- Using tools that came with your server, create LUNs from the RAID disks and add them to the ESX server. Ensure that the ESX server can properly see the LUNs before creating the Data ONTAP Edge system. The following is the recommended configuration for creating the LUNs:
 - In a one LUN system, make a RAID5 LUN from all the available disks. This LUN will contain the Data ONTAP Edge system disks, virtual NVRAM disk, data disks, and the Data ONTAP root disk.
 - In a two LUN system:
 - Create one LUN that will contain the Data ONTAP Edge system disks and configuration files. This is shown as LUN 1 in the figure. This can be a RAID1- or RAID5-backed LUN. This LUN will require a minimum of 2 or 3 disks, depending on the RAID level you decide to use.

- Create one LUN that will contain the Data ONTAP Edge data disks, NVRAM disk, and root disk. This is shown as LUN 2 in the figure. This should be a RAID5-backed LUN, and it should use all the remaining disks. The virtual NVRAM disk should be on this LUN because it contains more disks and provides better performance.

Data ONTAP Edge setup and installation

This section describes the prerequisites that must be met before installing Data ONTAP Edge, and the steps for installing Data ONTAP Edge. The Data ONTAP Edge installation deploys a complete storage appliance, including the virtual machine and Data ONTAP software, onto the host server.

Data ONTAP Edge can be installed after `dvadmin` has been installed and required storage pools have been created on the host server.

Note: Each Data ONTAP Edge system should be managed by only one instance of `dvadmin`.

Important: The VMware vSphere Client can be used to monitor the Data ONTAP-v virtual machine, but it should not be used to perform any configuration operations. If you select the Console tab, it displays a message that you must use the serial console for console access to the virtual machine.

The topics described in this section are:

- Data ONTAP Edge prerequisites
- Required configuration information
- Connecting `dvadmin` to the host server
- Creating required storage pools
- Installing Data ONTAP Edge using the `dvadmin` setup wizard
- Connecting to the Data ONTAP storage system

Data ONTAP Edge prerequisites

Before installing Data ONTAP Edge, the host server has to be prepared to host the Data ONTAP-v virtual machine.

Preparing the host includes the following steps:

- Create the virtual machine network (or networks) to which the Data ONTAP-v virtual machine network adapters will be connected.
- Create a LUN, or LUNs, from the RAID disks and add them to the ESX server as described in [RAID group and LUN configuration](#) on page 15. Ensure that the ESX server can properly see the LUNs before creating the Data ONTAP-v virtual machine.
- Create datastores (pools) on the LUNs for storing the Data ONTAP Edge system disks and data disks. See [Creating required storage pools](#) on page 25 for more details about this procedure:

- When using one RAID5 LUN, you create a single datastore from that LUN.
- When using both a RAID1 and RAID5 LUN, create one datastore on the smaller RAID1 LUN for the Data ONTAP-v virtual machine and system disks. Then create a second datastore on the large RAID5 LUN for the Data ONTAP Edge data disks, virtual NVRAM, and Data ONTAP root disk.

See [RAID group and LUN configuration](#) on page 15 for a diagram that shows how the RAID disks are separated into LUNs, datastores, and virtual disks.

Required configuration information for Data ONTAP Edge

Before starting the Data ONTAP Edge installation, you should complete the configuration worksheet. This information is required during the software setup process.

Some of this information is required for connecting to the host server, some is required for installing the Data ONTAP Edge system on the host server, and some is required for pre-configuring Data ONTAP when you initially start the Data ONTAP Edge system.

On a NetApp hardware platform, the Data ONTAP installation often requires a separate setup process. By providing the required setup information during the installation of Data ONTAP Edge, you do not need to perform the separate Data ONTAP setup steps. After you start the Data ONTAP Edge system, Data ONTAP boots normally using the values you provided.

Host server information

Host information	Your values
Name, or IP address, of the ESX host where Data ONTAP Edge will be installed.	
Name, or IP address, of the vCenter server if the ESX host is managed by a vCenter server. (optional)	
Admin login name for the vCenter server (or for the ESX host if the host is not managed by a vCenter server).	
Admin password for the vCenter server (or ESX host).	
Name of the datastore (or pool) on which the Data ONTAP Edge virtual machine system files will be installed. These files consume approximately 3.5 GB.	
Name of the datastore on which the Data ONTAP Edge virtual NVRAM disk will be installed. This disk is approximately 5 GB in size.	
Name of the datastore on which the Data ONTAP root aggregate disk will be installed. This disk is approximately 55 GB in size.	

Host information	Your values
Name of the datastore on which the Data ONTAP virtual data disks will be installed.	

Some datastores might already exist, but others are listed here so that you can define the name you will use when you create the datastore. The best practice is to install all Data ONTAP Edge components on the same RAID5-backed datastore.

Storage system networking information

Network information	Your values
Name of the vSphere virtual machine network that Data ONTAP Edge will use for its network ports.	
Cluster management interface (e0a) IP address. This is the address you will use to manage the system.	
Cluster management subnet mask.	
Cluster management default gateway for network connectivity.	
Node management interface (e0a) IP address. This address is used internally so the cluster administrator can manage the node.	
Node management subnet mask. Defaults to the same value as the “Cluster management subnet mask”. (optional)	
Node management gateway. Defaults to the same value as the “Cluster management gateway”. (optional)	
Domain Name System (DNS) domain name. (optional)	
DNS server address, or addresses. (optional)	

Data ONTAP information

Data ONTAP information	Your values
Storage system name. The name must begin with a letter, and it must be fewer than 44 characters. This value is also used as the cluster name and as the Data ONTAP Edge virtual machine name. It corresponds to the “Cluster management IP address”.	
Password for the Data ONTAP admin account. The password must be at least eight characters long, and it must contain at least one number and one letter.	

Data ONTAP information	Your values
Data ONTAP Edge platform license that you received when you placed your order.	
Time zone, specified in the Olson format (using the zoneinfo database). The default is GMT. (optional)	
Additionally purchased Data ONTAP feature licenses. (optional)	
Destination URL on which cluster configuration backups are stored. The destination must support file uploads using HTTP or FTP. If not specified, the URL of the Data ONTAP-v Installer virtual machine is selected using the FTP protocol. (optional)	
The user name required to log in to the destination URL. The user name “ftp” is used for the Data ONTAP-v Installer VM. (optional)	
The password for access to the destination URL. The password “ftp” is used for the Data ONTAP-v Installer VM. (optional)	

Default configuration properties

Some storage system properties that are not used frequently are set to default values when the Data ONTAP setup is performed through the Data ONTAP Edge installation. Additionally, features that are not supported by Data ONTAP Edge cannot be set as properties.

The configuration options that are set to default values are described below:

- IPv4 addresses are used.
- Interface groups are not created.
- The node management port is set to e0a and the remaining five ports are set as data ports.
- Network interface properties for the primary interface, and any interfaces defined in addition to the primary interface, are set to the following values:
 - Media type is set to "auto"
 - Flow control is set to "full"
 - Jumbo frames is set to "no"
- Filer location is set to the name of the ESX host on which it is installed.

If you want to change any of these default settings after the storage system and Data ONTAP have booted successfully, see the appropriate steps in the *Clustered Data ONTAP Network Management Guide*.

The configuration options that are unavailable are described below:

- Shelf Alternate Control Path Management interface for SAS shelves is set to "no". This property cannot be set to "yes" because Data ONTAP-v does not support alternate shelves.

Note that you can use the OnCommand System Manager graphical interface to manage the storage system *after* the Data ONTAP Edge installation is complete.

Connecting dadmin to the Data ONTAP Edge host server

You must connect dadmin to the ESXi host where Data ONTAP Edge will be installed before you can install the storage system.

Before you begin

The Data ONTAP-v Installer virtual machine must be installed before you can perform this task. See the *Data ONTAP-v Administration Tool Installation Guide* for installation information.

About this task

Depending on your configuration, there are three ways to connect dadmin to a VMware ESXi host:

If you plan to install Data ONTAP Edge...	Then you...
On a single ESXi host that is not being managed by a vCenter server.	Connect directly to the ESXi host.
On a single ESXi host that is being managed by a vCenter server.	Connect to the ESXi host through the vCenter server that is managing the host.
On multiple ESXi hosts that are being managed by the same vCenter server.	Connect to the vCenter server without specifying an ESXi host. Once logged in, you use the <code>dadmin host</code> command to connect to each ESXi host where you plan to install Data ONTAP Edge.

Important: VMware recommends against connecting directly to an ESXi host if it is being managed by a vCenter Server because that can result in corruption of virtual machine configuration data.

To connect to a vCenter server or an ESXi host, you specify the information you recorded in the configuration worksheet found in [Required configuration information](#) on page 19. The Data ONTAP-v Installer provides different prompts depending on whether you are connected to the ESXi host through a vCenter server or connected directly to the ESXi host.

If you want to save the server login information so that you do not need to re-enter it every time you connect, answer **y** to the final prompt `Do you want to save this vCenter server login information [y]:`. This option writes the server name, host name, and user name to the startup

file `$HOME/.dvsadmin`. The password, once correctly entered, will be stored in the VMware credential store.

Steps

1. If you are not already running `dvsadmin`, log in to the Data ONTAP-v Installer now. Using SSH, you specify the Data ONTAP-v Installer IP address, and then enter the default user ("netapp") and default password ("netapp"):

See the *Data ONTAP-v Administration Tool Installation Guide* for more information.

```
$ ssh 10.10.10.09
login as: netapp
netapp@10.10.10.09's password: *****
```

2. The Data ONTAP-v Installer displays the following prompt:

```
The following prompts define the connection to the vCenter server
or ESX host.
Is the ESX host managed by a vCenter server? [y]:
```

3. Enter **y** if the ESXi host is managed by a vCenter server, or **n** if it is not managed by a vCenter server.

The following prompts are displayed if you connect to the ESXi host through a vCenter server:

```
Enter vCenter server name or IP address:
Enter ESX host name or IP address (optional):
Enter vCenter server username:
Enter vCenter server password:
```

The following prompts are displayed if you connect directly to the ESXi host:

```
Enter ESX host name or IP address:
Enter ESX host username:
Enter ESX host password:
```

4. Enter the vCenter server and/or ESXi host information to define the server to which you want to connect.

The following prompt is displayed:

```
Do you want to save this server login information [y]:
```

5. If you want to save the server login information so that you do not need to re-enter it every time you connect, answer **y**, otherwise, enter **n**.

You are logged into the server and the dvadmin prompt is displayed:

```
NetApp Data ONTAP-v Administration Tool 1.x.x
Copyright (C) 1992-2013 NetApp.
All rights reserved.
Logging in Administrator@vcenter_server1
VMware SDK version: 5.0
Console escape key: ^]
Host: host_system1
Installer Version: 8.x.x.1yy
ESX License: VMware vSphere 5 Enterprise

dvadmin host host_system1>
```

Note: As listed in the NetApp Interoperability Matrix, Data ONTAP Edge is supported only with specific VMware licenses. You will receive a warning message when connecting to a vCenter Server or ESXi host that has an unsupported license. You can continue to use the system, but it may run with reduced functionality.

Examples of logging into a server

The following command logs you into the ESXi server named "host_system1" through the vCenter server named "vcenter_server1".

```
Is the ESX host managed by a vCenter server? [y]: y
Enter vCenter server name or IP address: vcenter_server1
Enter ESX host name or IP address (optional): host_system1
Enter vCenter server username: vcenteruser
Enter vCenter server password: *****
Do you want to save this vCenter server login information [y]: y
```

The following example shows how you might log into the vCenter server named "vcenter_server1" without specifying an ESXi host.

```
Is the ESX host managed by a vCenter server? [y]: y
Enter vCenter server name or IP address: vcenter_server1
Enter ESX host name or IP address (optional): <Enter>
Enter vCenter server username: esxuser
Enter vCenter server password: *****
Do you want to save this vCenter server login information [y]: y
```

The following command logs you into the ESXi server with the IP address 126.127.128.129.

```
Is the ESX host managed by a vCenter server? [y]: n
Enter ESX host name or IP address: 126.127.128.129
Enter ESX host username: esxuser
Enter ESX host password: *****
Do you want to save this ESX server login information [y]: y
```

After you finish

After you are logged into the host server, you can use the `dvadmin` command line interface (CLI) to install and manage the Data ONTAP Edge system.

Note: If the remote host key for SSH access to the ESXi server is not cached in your `known_hosts` file, it will be added automatically the first time you connect to the server.

Creating required storage pools

A storage pool is equivalent to a VMware datastore; it is a storage container for files. You create a storage pool for installing Data ONTAP Edge components from the RAID-backed LUN you created previously.

Before you begin

You must know the canonical names of the available LUNs before you can create the storage pool. You can use the `pdisk show` command if you do not know the canonical name. The canonical name is typically in a format such as "naa.60a9800043346c422f34627876694542", but the command examples in this topic use simpler names.

Important: The datastore (pool) on which you plan to deploy Data ONTAP Edge must have a unique name within the vCenter Server. If the name is not unique, you will receive an "HTTP lease" error during installation.

About this task

If you have created a single RAID5-backed LUN from the server storage disks, you will create a single pool from that LUN. You will install the Data ONTAP Edge system files, virtual NVRAM disk, Data ONTAP root aggregate disk, and data disks in that pool.

If you have created a RAID1-backed LUN and a RAID5-backed LUN from the server storage disks, you will create a pool for each LUN:

- One of the pools will be used as the location where the Data ONTAP Edge virtual machine and system disks will be installed. This pool must exist on the smaller RAID1/RAID5 LUN that you created. If a pool (datastore) with adequate space (for example, the pool where ESX was installed) already exists, you can use that pool.
- The other pool will be used as the location where the Data ONTAP Edge virtual NVRAM system disk, Data ONTAP root aggregate disk, and data disks will be installed. Core dumps will also be written to this location. This pool must be created on a storage device that consists of a battery-backed write cache. You should use the large RAID5 LUN you created on the RAID disks for this purpose. Because the virtual NVRAM disk, Data ONTAP root aggregate disk, and core dumps can take up to 64 GB, you can use the remainder of this pool as a data disk (or disks).

If you created other LUNs that you plan to use for Data ONTAP Edge data disks, you should also create pools on those LUNs at this time.

Note: You can create the storage pools (datastores) using the vSphere Client instead of using the `dvadmin` commands described in this topic.

Steps

1. `dvadmin` must be connected to the ESXi host before creating a pool. The command prompt should include the host name, for example, `dvadmin host host_system`. If `dvadmin` is not connected to the host, then you must connect to the host using the following command:

```
host <hostname>
```

2. Create a storage pool on a LUN using the following command:

```
pool create <pool_name> <canonical_name>
```

- `<pool_name>` is the name of storage pool you want to create.
- `<canonical_name>` is the canonical name of the LUN that will be used for the storage pool.

Examples of adding storage pools

The following command adds the storage pool "nvram_data_pool" using storage from the RAID LUN named "LUN_xyz". This pool name is being used because it is the pool in which the virtual NVRAM and the data disks will be created.

```
> pool create nvram_data_pool LUN_xyz
```

The following command adds the storage pool "datastore1" using storage from the RAID LUN named "LUN_abc". If a pool for system files already exists, you do not need to create a second pool.

```
> pool create datastore1 LUN_abc
```

After you finish

After you have defined the storage pools, you can install Data ONTAP Edge.

Installing Data ONTAP Edge using the dvadmin setup wizard

The dvadmin setup wizard provides an easy way to create and start a Data ONTAP Edge storage system.

Before you begin

You should have completed the [Required configuration information](#) on page 19 before starting the setup wizard so that you have all the necessary configuration elements written down.

About this task

The dvadmin setup wizard prompts you for all the configuration information that will define your Data ONTAP Edge storage system. The setup wizard replaces many individual dvadmin commands that you could use to create the virtual machine, set Data ONTAP properties, define the data disks that Data ONTAP Edge will manage, and start the storage system. See [Data ONTAP Edge advanced installation instructions](#) on page 53 for information about installing your storage system manually using dvadmin commands.

Note: When the wizard presents a default value in square brackets, such as [Y], pressing Enter accepts the default value, and typing “n” and then pressing Enter enables you to specify a different value.

Steps

1. Use the `vm setup` command to start the setup wizard.

```
> vm setup
Welcome to the VM setup wizard!
This wizard will take you step-by-step through the process of
creating a Data ONTAP virtual machine.
Use ^C at any prompt to exit the wizard.

Loading existing VMs...
VM Name      Power  CfgState  Heartbeat  Hostname  IP Address
dvadmin_VM   on    -         green     dvspecial 10.97.131.24
Enter a name for the Data ONTAP-v Appliance:
```

2. Enter the name you want to use for the Data ONTAP Edge virtual machine, for example, “dotv1”, and then press Enter.

This name is also used as the cluster name and as the storage system name you see when managing the system using Data ONTAP commands.

```
Enter your Data ONTAP-v platform license:
```

3. Enter the unique 24-character Data ONTAP-v platform license, for example, “ABCD-1234-EFGH-5678-IJKL”, and then press Enter.

The platform license defines the product that runs on top of the Data ONTAP-v platform; for example, a Data ONTAP Edge storage system.

```

Loading Storage Pools...
Pool Name           Type      Access  Capacity  Available  Backing
Store
1) datastore1      VMFS     Online  881111333  826152128  LUN_abc
2) nvrām_data_pool VMFS     Online  251441213  40584192   LUN_xyz

Enter the number corresponding to the pool where you want the virtual
machine system files to be installed:

```

4. Enter the number that corresponds to the storage pool in which you want to install the Data ONTAP Edge virtual machine and system files, and then press Enter.

For example, type “1” to select the pool named “datastore1”.

```

Would you like to use the same pool (datastore1) for the NVRAM disk?
[n]:

```

5. Following the best practice of having a single RAID5-backed LUN and one datastore, type “y”, and then press Enter to use the same pool.

For best performance, the Data ONTAP Edge virtual NVRAM disk should be installed on a storage pool that is created on a storage device that includes a battery-backed write cache.

```

Data ONTAP requires 55296 MB for the root aggregate and volume.
Would you like to use the same pool (datastore1) for the root
aggregate disk? [y]:

```

6. Following the best practice, press Enter to accept the default setting of [y] to use the same storage pool as the virtual NVRAM disk.

Typically, the Data ONTAP Edge root aggregate disk is installed on the same storage pool as the virtual NVRAM disk.

```

Loading Networks...
Network Name           Virtual Switch
1) Lab7-10.97.105      vSwitch0 (804)
2) network_1           vSwitch0 (828)

Enter the number corresponding to the network you wish to use:

```

7. Enter the number that corresponds to the network to which the Data ONTAP-v virtual machine interfaces should be connected (typically your management network), and then press Enter.

```
Clustered Data ONTAP requires two management interfaces:  
- The Cluster Management interface is used for managing the system.  
- The Node Management interface is used internally by Data ONTAP.
```

```
Enter the Cluster Management IP address:
```

8. Enter the Cluster Management interface IP address that you will use to communicate with your storage system, for example “10.10.10.10”, and then press Enter.

```
Enter the Cluster Management netmask:
```

9. Enter the Cluster Management subnet mask, for example “255.255.255.0”, and then press Enter.

```
Enter the Cluster Management gateway:
```

10. Enter the Cluster Management gateway that is used for network connectivity, for example “10.10.10.1”, and then press Enter.

```
Enter the Node Management IP address:
```

11. Enter the Node management interface IP address that you will use to communicate with your storage system, for example “10.10.10.12”, and then press Enter.

```
Enter the Node Management netmask [255.255.255.0]:
```

12. Press Enter to use the same netmask that the Cluster Management interface uses, or enter a different Node management subnet mask, and then press Enter.

```
Enter the Node Management gateway [10.10.10.1]:
```

13. Press Enter to use the same gateway that the Cluster Management interface uses, or enter a different Node management gateway, and then press Enter.

```
Enter the password for the VM:
```

14. Enter the administrative password that you want to use for the Data ONTAP admin account, and then press Enter.

The password must be at least eight characters long, and it must contain at least one number and at least two alphabetic characters. You use this password whenever you log in to the storage system console.

```
Confirm the password: *****
```

15. Enter the password again, and then press Enter.

```
Would you like to enter vSphere host information? [y]:
```

16. Choose whether to enter VMware vSphere host information, which consists of the user name and password for the ESX host.

When you provide this information, Data ONTAP can access the host to display physical host information through the Data ONTAP `run local sysconfig -p` command.

If you...	Then...
Do not want to enter this information	Type “n”, and then press Enter to skip this step.
Want to enter this information	Press Enter, and then define the values at the prompts: <div data-bbox="530 591 1239 694" style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <pre>Enter the vSphere username: Enter the vSphere password: Confirm the password:</pre> </div>

After you define or skip defining the vSphere host information, the wizard displays the current virtual machine parameters:

```
Loading Data ONTAP-v virtual machine parameters...
VM Name: dotv1
System Pool: datastore1
NVRAM Pool: datastore1
Root Aggregate Pool: datastore1
Network Name: network1
License Key: ABCD-1234-EFGH-5678-IJKL
Cluster Management IP: 10.10.10.10
Cluster Management Netmask: 255.255.255.0
Cluster Management Gateway: 10.10.10.1
Node Management IP Address: 10.10.10.12
Node Management Netmask: 255.255.255.0
Node Management Gateway: 10.10.10.1
Password: *****
vSphere Username: esxuser
vSphere Password: *****

Would you like to create a VM with these parameters? [y]:
```

17. Review the parameters.

If...	Then...
All of the information is correct	Press Enter to create the Data ONTAP-v virtual machine. Creating the virtual machine can take a few minutes.

If...	Then...
Any information is incorrect	<ol style="list-style-type: none"> a. Type “n”, and then press Enter to halt the wizard. b. Start the wizard again to correct any erroneous values.

The previous steps take the place of the `dvadmin` command `vm create dotv1 datastore1 datastore1 datastore1 network_1 license=ABCD-1234-EFGH-5678-IJKL clustermgmt_ipaddr=10.10.10.10 clustermgmt_netmask=255.255.255.0 clustermgmt_gateway=10.10.10.1 password=xxxxyy111 nodemgmt_ipaddr=10.10.10.12 vsphere_username=esxuser vsphere_password=pswd1234.`

```
Creating VM...
Extracting and validating OVF package contents.
Creating VM dotv1 on name.company.com.
Uploading disks to VM dotv1
Marked VM disks independent-persistent
Added 55296 MB disk [0:0] backed by [datastore1] dotv1/dotv1_3.vmdk
Added serial console and gdb ports
Created VM dotv1 on host name.company.com.
```

The following settings are optional.

```
The default time zone is GMT. Would you like to select a different
time zone? [n]:
```

18. Press Enter to accept the default GMT setting, or type “y”, and then press Enter to specify a different time zone.

```
Enter the time zone [GMT]:
```

19. Enter the time zone for your storage system using the Olson format, for example, “America/New_York”.

This step takes the place of the `dvadmin` command `vm prop set tmz "America/New_York".`

```
Data ONTAP-v will be configured with the following feature licenses:
CIFS, NFS, iSCSI, FlexClone, SnapRestore, SnapVault, SnapMirror
Would you like to add any additional feature licenses? [n]:
```

20. Press Enter if you have no other feature licenses to add, or type “y”, and then press Enter to specify additional licenses.

The standard Data ONTAP feature licenses for a Data ONTAP Edge system are installed automatically. If you have purchased other Data ONTAP licenses, you can enter them now.

This step takes the place of the `dvadmin` command `vm prop set feature_licenses=ABCD,WXYZ,LMNO.`

```
Would you like to configure DNS? [n]:
```

21. Press Enter if you do not need to configure DNS information, or type “y”, press Enter, and specify a DNS domain name and up to three DNS servers.

This step takes the place of the `dvadmin` commands `vm prop set dns_domainname` and `vm prop set dns_ipaddr`.

```
When deploying a single-node cluster, you should define a remote location to store cluster configuration backups. Valid backup destinations must support file uploads using one of the following protocols: HTTP, HTTPS, FTP, FTPS, or TFTP. It is recommended that you define a custom destination, but if you do not have one, the Data ONTAP-v Installer virtual machine will be used.
```

```
Would you like to configure a custom backup destination? [y]:
```

22. Press Enter if you want to specify a destination for configuration backups, or type “n”, and then press Enter if you want your configuration backups to be stored on the Data ONTAP-v Installer virtual machine using the FTP protocol.

If you pressed Enter to specify a destination for configuration backups, the following prompts appear:

```
Enter the destination [ftp://10.97.131.24]:
Enter the destination username:
Enter the destination password:
Confirm the password:
```

23. Enter the destination URL, user name, and password, and confirm the password.

This step takes the place of the `dvadmin` commands `vm prop set systemconfigbackup_destination`, `vm prop set systemconfigbackup_username`, and `vm prop set systemconfigbackup_password`.

```
You have set the following parameters:
Set tmz = America/New_York
Set systemconfigbackup_destination = ftp://10.97.131.24
Set systemconfigbackup_username = ftp
Set systemconfigbackup_password = ***
```

```
Would you like to define the data disks that the VM will manage? [y]:
```

24. Press Enter to define the data disks that the Data ONTAP Edge system will manage.

A data disk can consume the entire space in a storage pool, or multiple data disks can be created in a single storage pool.

```

Loading Storage Pools...
Pool Name           Type      Access  Capacity  Available  Backing
1) datastore1      VMFS     Online  881111333  826152128  LUN_abc
2) nvram_data_pool VMFS     Online  251441213  40584192   LUN_xyz

Enter the number corresponding to the pool where you want the data
disk to be created:

```

25. Enter the number that corresponds to the storage pool in which you want to create the data disk, and then press Enter.

Frequently, this is the same storage pool “datastore1” in which you created the virtual NVRAM disk.

```

Supported disk size for this pool: 1024 MB - 826152 MB
Would you like the disk to span the available free space (826152 MB)?
[y]:

```

26. If you want the disk to use all the available free space in the specified pool the number in the parentheses), press Enter.

Note that a single virtual disk cannot be larger than 2 TB. If the space available in the pool is larger than 2 TB, you need to define two or more similar-size disks (up to a maximum of 10 TB for Data ONTAP Edge systems). Because the pool in this example is only 800 GB, it is OK to press Enter to create a disk of the full size.

```

Creating disk...
Added 826152 MB disk [0:1] backed by [datastore1] dotv1/dotv1_4.vmdk

Would you like to add another disk? [n]:

```

27. Press Enter when you do not need to create any more data disks.

Steps 27 through 29 take the place of the `dvadmin` command `vm disk create dotv1 datastore1 800g`.

```

Would you like to enable automatic backup of your VM's configuration?
[y]:

```

28. Press Enter to enable the “monitor” feature available through `dvadmin`.

You should use this functionality because it makes troubleshooting and repair of the system much easier.

You can type “n”, and then press Enter if you do not want to enable this functionality, but it provides the capability to automatically back up the Data ONTAP-v system disks (not data disks) and configuration information. It also enables the collection of logs of input and output from the Data ONTAP system console.

This step takes the place of the `dvadmin` command `vm monitor start --no-watchdog dotv1`.

```
vm monitor for dotv1 is running with options --no-watchdog
Your VM has been configured. Would you like to see a summary? [y]:
```

29. Press Enter to see a summary of the current storage system settings. This display is generated from the `dvadmin` command `vm show dotv1`.

```
VM Name      Power  CfgState  Heartbeat  Hostname  IP Address
dotv1       off    new       -          -         -

=====
Detail information for vm dotv1:
VM Version  Data ONTAP Version  Serial Number  System ID
1.x.x      8.x.x              -             -

Disk Name   Ctrl:Unit  Size (MB)  UUID          Backing
Hard disk 1 ide0:0     1943      -             datastore1
Hard disk 2 ide0:1     1542      -             datastore1
Hard disk 3 idel:0     5121      -             datastore1
Hard disk 4 scsi0:0    55296    <uuid-string>  datastore1
Hard disk 5 scsi0:1    826152   <uuid-string>  datastore1

Adapter Name      MAC Address          Network Name
Network adapter 1  00:50:56:97:08:62   VM Network
Network adapter 2  00:50:56:97:08:63   VM Network
Network adapter 3  00:50:56:97:08:64   VM Network
Network adapter 4  00:50:56:97:08:65   VM Network
Network adapter 5  00:50:56:9c:3b:a2   VM Network
Network adapter 6  00:50:56:9c:34:f5   VM Network

Serial Name      Port  Conn  Status      Details
Serial port 1    0     N     untried     Remote tcp://:7209
Serial port 2    1     N     untried     Pipe dotv1_serial_1

Resource      Reservation
CPU           5332 MHz
Memory        8192 MB

Would you like to start the VM? [y]:
```

30. If the disk values you defined are correct, press Enter to start the Data ONTAP Edge storage system.

The “scsi0:1” disk size should match the size of the data disk, or disks, that you defined earlier.

This step takes the place of the `dvadmin` command `vm start dotv1`.

Important: If you do not start the storage system using the setup wizard, make sure you use the `dvadmin vm start` command to start the system the first time. **Do not** start the system the first time using VMware commands or the VMware vSphere Client.

```
start VM dotv1
```

```
VM wizard is now complete! You can connect to your VM by typing
'vm console connect dotv1', or type 'help' to view the available
commands.
>
```

The storage system will be available to use after it has completed booting up.

If you want to connect to the Data ONTAP console to watch the storage system startup process, you can use the `vm console connect dotv1` command.

Verifying system settings after startup

You should verify that the virtual machine and Data ONTAP have started successfully before continuing to configure your storage system.

Use the `vm show` command to display the Data ONTAP Edge configuration information.

The following example displays detailed information for the Data ONTAP Edge system "dotv1" after Data ONTAP has started.

```
> vm show dotv1
```

VM Name	Power	CfgState	Heartbeat	Hostname	IP Address
dotv1	on	ready	green	dotv1-01	10.10.10.10

```
=====
```

```
Detail information for vm dotv1:
```

VM Version	Data ONTAP Version	Serial Number	System ID
1.x.x	8.x.x	2010002345678	2147483903

Disk Name	Ctrl:Unit	Size (MB)	UUID	Backing
Hard disk 1	ide0:0	1943	-	datastore1
Hard disk 2	ide0:1	1542	-	datastore1
Hard disk 3	idel:0	5121	-	datastore1
Hard disk 4	scsi0:0	55296	<uuid-string>	datastore1
Hard disk 5	scsi0:1	826152	<uuid-string>	datastore1

Adapter Name	MAC Address	Network Name
Network adapter 1	00:50:56:9c:28:2d	VM Network
Network adapter 2	00:50:56:9c:7e:77	VM Network
Network adapter 3	00:50:56:9c:3b:a2	VM Network
Network adapter 4	00:50:56:9c:34:f5	VM Network
Network adapter 5	00:50:56:9c:3b:23	VM Network
Network adapter 6	00:50:56:9c:34:5e	VM Network

Serial Name	Port	Conn	Status	Details
Serial port 1	0	Y	ok	Remote tcp://:7200
Serial port 2	1	Y	ok	Pipe dotv1_serial_1

Resource	Reservation
CPU	5332 MHz
Memory	8192 MB

The important entries to verify include:

- Cfgstate – When Data ONTAP has successfully completed startup, this value will be "ready". If the value is "new" or "init", you may need to wait a few more minutes for startup to complete. If the value is "failed", use the `vm state show` command to view the reason for the failure.
- Power – This value should be "on". If it is "off", run the `vm start` command to start the Data ONTAP Edge system.
- Heartbeat – This value should be "green" when Data ONTAP has completed startup. It may go through "gray", "yellow", and "red" stages during the boot and initialization process.
- Hostname and IP Address – These fields are empty during the boot process. They are populated with real values when Data ONTAP is powered on and fully set up.
- VM Version – The version of the Data ONTAP-v OVF package used when installing the Data ONTAP Edge system.
- Data ONTAP Version – The version of Data ONTAP software that is installed.
- Serial Number and System ID – These values are the serial number and system ID of the storage system.
- Serial ports – The "Conn" and "Status" fields will be "Y" and "ok", respectively, when Data ONTAP has completed startup.

You can re-enter the `vm show` command to refresh this information. After Data ONTAP Edge has completed startup, you can access the system console to configure the storage system.

Note: You do not have to wait for the system to have finished startup before accessing the system console.

Connecting to the Data ONTAP Edge storage system console

You connect to the Data ONTAP Edge console to communicate with Data ONTAP as you administer your storage system. The console enables you to use the Data ONTAP command line interface.

About this task

You can connect to your Data ONTAP Edge storage system by using the `dvadmin vm console connect` command, but it is recommended that you use an SSH client, such as PuTTY, to connect directly to the Cluster Management interface of the storage system.

NetApp OnCommand System Manager also can be used to administer the storage system using the Cluster Management interface IP address.

You can have only one `dvadmin` console connection to a storage system at a time. However, you can have a `dvadmin` console connection and an SSH or System Manager connection concurrently.

The SSH command could fail with `Error: [85] VmSerialConnectErr` depending on the ESX firewall setting. The ESX firewall either needs to be disabled, or the firewall rule for “remoteSerialPort” needs to be enabled. For example, in VMware vSphere 5, select the host through the VMware vSphere Client and select **Configuration > Security Profile > Firewall Properties** and the **VM Serial port connected over network** check box must be selected.

Steps

1. Using SSH, specify the Data ONTAP Edge storage system Cluster Management interface IP address:

Example

```
$ ssh 10.10.10.10
```

2. Enter the Data ONTAP admin login name and password.

Example

```
login as: admin
admin@10.10.10.10's password: *****
dotv1::>
```

The storage system prompt appears.

3. Confirm that Data ONTAP has started successfully by running the following Data ONTAP command:

Example

```
dotv1::> version
NetApp Release 8.x.x: Wed Aug 27 23:38:30 PDT 2014
```

This command displays the version of Data ONTAP software that is installed.

Verifying storage system setup

Many of the values that you defined for your storage system during installation are used to configure Data ONTAP settings. You can verify that these values were set correctly by running some Data ONTAP commands.

Steps

1. Enter the following command to verify that the node is healthy:

Example

```
dotv1::> node show
Node      Health Eligibility Uptime      Model      Owner      Location
-----
dotv1-01 true   true           1 days 23:37 FDvM200      host_system1
```

The Health field should be “true”.

2. Enter the following commands to verify that the cluster management and node management logical interfaces (LIFs) are configured correctly:

Example

```
dotv1::> network interface show
Logical      Status      Network      Current      Current      Is
Vserver     Interface   Admin/Oper   Address/Mask Node          Port         Home
-----
dotv1       cluster_mgmt up/up        10.10.10.10/21 dotv1-01     e0a          true
dotv1-01   dotv1-01_mgmt1 up/up        10.10.10.12/21 dotv1-01     e0a          true

dotv1::> network port show
Node      Port      IPspace      Broadcast Domain Link      MTU      Speed (Mbps)
Admin/Oper
-----
dotv1-01
e0a      Default  Default      up        1500     auto/1000
e0b      Default  Default      up        1500     auto/1000
e0c      Default  Default      up        1500     auto/1000
e0d      Default  Default      up        1500     auto/1000
e0e      Default  Default      up        1500     auto/1000
e0f      Default  Default      up        1500     auto/1000
```

Port e0a is used as the cluster management and node management port. The other ports can be used to serve data.

3. Enter the following commands to verify that the storage has been configured correctly. These commands show that the root volume (vol0) has been created in the root aggregate (aggr0), and that the 800 GB virtual data disk you created is a spare disk:

Example

```
dotv1::> storage disk show
          Usable
Disk      Size  Shelf Bay  Disk  Container  Container
-----
VMw-1.1   53.15GB  -    0  VMDISK aggregate  aggr0  dotv1-01
VMw-1.2   800.00GB  -    1  VMDISK spare      spare  dotv1-01

dotv1::> storage aggregate show
Aggregate  Size Available Used% State  #Vols  Nodes  RAID Status
-----
aggr0      47.82GB  2.74GB  94% online  1  dotv1-01  raid0,
normal

dotv1::> volume show
Vserver  Volume  Aggregate  State  Type  Size  Available Used%
-----
dotv1-01  vol0    aggr0      online RW    44.82GB  42.17GB  5%
```

You use the space from the spare data disk to create a data aggregate in which your Storage Virtual Machines (SVMs) and volumes will be created. Do not include or create data volumes in the root aggregate.

4. Enter the following command to verify that the correct Data ONTAP feature licenses are installed on your system, as shown below:

Example

```
dotv1::> system license show
Serial Number: 1-80-000023
Owner: dotv1
Package      Type      Description      Expiration
-----
Base         license   Cluster Base License  -

Serial Number: 1-81-000000000000000000000000
Owner: none
Package      Type      Description      Expiration
-----
NFS          license   NFS License      -
CIFS         license   CIFS License     -
iSCSI        license   iSCSI License    -
SnapRestore  license   SnapRestore License  -
FlexClone    license   FlexClone License  -
SnapVault    license   SnapVault License  -
SnapMirror   license   SnapMirror License  -
8 entries were displayed.
```

5. If you defined a destination for cluster configuration backups, enter the following commands to verify that the location is set correctly:

Example

```
dotv1::> set -privilege advanced

Warning: These advanced commands are potentially dangerous; use them only
        when directed to do so by NetApp personnel.
Do you want to continue? {y|n}: y

dotv1::*> system configuration backup settings show
Backup Destination URL      Username
```

```
-----
ftp://10.97.131.24                               ftp
dotv1::*> set -privilege admin
dotv1::>
```

What to do after the Data ONTAP Edge system is running

After you have installed and started the Data ONTAP Edge system, you can configure the Data ONTAP storage settings and perform administrative tasks.

- You must create at least one Storage Virtual Machine (SVM) to serve data to your clients. See the *Clustered Data ONTAP System Administration Guide for SVM Administrators* for information about creating SVMs.
- To configure SnapVault and SnapMirror technologies on your storage system, see the *Clustered Data ONTAP Data Protection Guide*.

Data ONTAP documentation is available on the NetApp Support Site at mysupport.netapp.com. See the documentation listed in the table below to perform specific tasks.

For information about...	Go to the NetApp Support Site for the...
New features, enhancements, and known issues for your version of Data ONTAP software	<i>Clustered Data ONTAP Release Notes</i> for your version of Data ONTAP
Managing all aspects of your system, and information about using OnCommand System Manager	<i>Clustered Data ONTAP System Administration Guide for SVM Administrators</i> and the <i>Clustered Data ONTAP System Administration Guide for Cluster Administrators</i>
Managing the iSCSI protocols for SAN environments	<i>Clustered Data ONTAP SAN Administration Guide</i>
Managing file access for NFS, CIFS, HTTP, FTP, and WebDAV protocols	<i>Clustered Data ONTAP File Access Management Guide for CIFS</i> or the <i>Clustered Data ONTAP File Access Management Guide for NFS</i>
Enabling data protection features of Data ONTAP, such as SnapVault and SnapMirror	<i>Clustered Data ONTAP Data Protection Guide</i>
Managing storage resources using aggregates, creating Storage Virtual Machines (SVMs), managing data using volumes, qtrees, and quotas, and increasing storage efficiency using deduplication	<i>Clustered Data ONTAP Logical Storage Management Guide</i> and the <i>Clustered Data ONTAP Physical Storage Management Guide</i>

For information about...	Go to the NetApp Support Site for the...
Setting up and managing configurations of networked storage systems	<i>Clustered Data ONTAP Network Management Guide</i>
Upgrading the version of Data ONTAP software	<i>Clustered Data ONTAP Upgrade and Revert/Downgrade Guide</i>

Data ONTAP Edge administration tasks

You can perform administration operations using `dvadmin` after the Data ONTAP Edge system is installed. Typical operations include monitoring system and disk status. Other operations include creating configuration backups, adding more storage, starting the monitor, and stopping and starting the Data ONTAP Edge system.

Note that any Data ONTAP configuration or monitoring operations must be performed using the Data ONTAP interface, available through the system console and OnCommand System Manager.

The sections that follow define some of the administration tasks. In some cases only the `dvadmin` commands that enable you to perform administrative functions are listed. See the *Data ONTAP-v Administration Tool Command Reference* for complete command details.

Viewing system information

The commands described in this section enable you to view a variety of Data ONTAP Edge configuration settings.

The initial Data ONTAP Edge configuration is defined based on the properties you specified during the installation using the `vm setup` command (or the `vm create` and `vm prop set` commands).

The table below lists the `dvadmin` commands you use to view system information.

Command	Description
<code>host show</code>	When <code>dvadmin</code> is connected to a vCenter Server, this command shows the available ESX hosts. When connected to a host, it shows details about the host server.
<code>network show</code>	Displays the networks that are available to the host server through the virtual switch.
<code>status</code>	Displays the current <code>dvadmin</code> version and host server connection status.
<code>vm network show</code>	Displays the Data ONTAP-v virtual machine network adapters and the networks to which they are attached.
<code>vm prop show</code>	Displays the value of properties you have set to define Data ONTAP startup parameters.
<code>vm serial show</code>	Displays the available Data ONTAP-v virtual machine serial ports.
<code>vm show</code>	Displays detailed information about the Data ONTAP Edge system configuration and operating state.
<code>vm state show</code>	Displays the current Data ONTAP Edge configuration state.

There are other `dvadmin` commands that show system information, but they are discussed in other sections of this chapter. For example, showing the console log is discussed in [Logging operations](#) on page 51.

The table below lists the Data ONTAP commands you use to view system information.

Command	Description
<code>storage aggregate show</code>	Displays the data disks that Data ONTAP Edge is managing and details about the aggregate.
<code>storage disk show</code>	Displays the data disks that Data ONTAP Edge is managing.
<code>system license show</code>	Displays the Data ONTAP feature licenses that are currently enabled on the system.
<code>run local sysconfig</code>	Displays the Data ONTAP Edge system serial number, number of CPUs and RAM being used, and the number and size of the data disks. Using the options <code>-av</code> or <code>-p</code> provides additional details about the host ESX server. Note: If the <code>sysconfig -p</code> command displays an error about not having the appropriate vSphere credentials, use the <code>vmervices vsphere credential modify</code> command to enter the credentials for the vCenter Server or ESX host.
<code>version</code>	Displays the Data ONTAP release version.

Virtual machine operations

The tasks described in this section enable you to change the operating state of the Data ONTAP Edge system.

Some of the operations described in this section can be performed using standard VMware ESX controls, for example, powering on and off the virtual machine. While these operations typically will not damage the Data ONTAP Edge system or Data ONTAP, you should use `dvadmin` for operations that directly affect the Data ONTAP-v virtual machine.

For example, the initial startup of the Data ONTAP Edge system *must be* performed using the `dvadmin vm start` command because initial configuration parameters are passed to Data ONTAP by `dvadmin` at that time.

The table below lists the commands you use to change the operating state of the Data ONTAP Edge system.

Command	Description
<code>vm console connect</code>	Connects to the Data ONTAP Edge system console to administer your storage system using the Data ONTAP command line interface.

Command	Description
<code>vm console disconnect</code>	Disconnects another session from the Data ONTAP Edge system console.
<code>vm destroy</code>	Deletes the Data ONTAP Edge system from the host server.
<code>vm network connect</code>	Connects a Data ONTAP-v virtual machine network adapter to a network that is available on the host server through the virtual switch.
<code>vm prop set</code>	Defines or changes Data ONTAP-v properties that will be passed to Data ONTAP at initial startup.
<code>vm prop unset</code>	Clears Data ONTAP-v properties that will be passed to Data ONTAP at initial startup.
<code>vm restart</code>	Restarts the Data ONTAP Edge system.
<code>vm start</code>	Starts the Data ONTAP Edge system. This starts the virtual machine and the Data ONTAP storage system.
<code>vm stop</code>	Stops the Data ONTAP Edge system. This stops the virtual machine and the Data ONTAP storage system.

Storage operations

The storage operations you can perform include viewing physical disk information, managing storage pools, and managing virtual disks.

A brief description of these storage terms is provided below:

- A *physical disk* is the disk or disks available to the host server. The space from disks is presented to the host server as LUNs.
- A *storage pool* is a logical container within a LUN that holds virtual machine files. The space in the pools can be used by Data ONTAP Edge for system information or for data storage.
- A *virtual disk* is the defined space that Data ONTAP Edge sees as an actual disk. Multiple virtual disks can exist within a storage pool. These disks are formatted and managed by the virtualization hypervisor. The virtual disks are used by Data ONTAP Edge as either system disks or data disks:
 - *System disks* are used internally for the Data ONTAP and virtual machine installation, and for the virtual NVRAM and system files. The system disks are created automatically when Data ONTAP Edge is installed.
 - *Data disks* are the disks that Data ONTAP Edge manages as application storage. Multiple data disks can be created within a storage pool.

The table below lists the commands you use to manage the storage pools and data disks that Data ONTAP Edge uses.

Command	Description
<code>pdisk show</code>	Displays the LUNs that are available to the host server.
<code>pool create</code>	Creates storage pools on both local storage and on attached SCSI LUNs.
<code>pool destroy</code>	Destroys a storage pool from a disk.
<code>pool show</code>	Displays the storage pools that are available to the host server.
<code>vm disk create</code>	Creates a virtual data disk that Data ONTAP Edge will manage as application storage.
<code>vm disk destroy</code>	Destroys a data disk that was being managed by Data ONTAP Edge.
<code>vm disk show</code>	Displays the virtual disks that Data ONTAP Edge is using and managing.
<code>vm headswap</code>	Moves data disks from one Data ONTAP Edge system to another Data ONTAP Edge system.

Adding a new data disk to an existing system

You can add data disks to your storage system either by using available space from an existing storage pool or by adding new physical disks. The new data disks can be made into active or a spare disks in a Data ONTAP aggregate.

Before you begin

The Data ONTAP Edge system must be powered off for a short time while the virtual disk is added to the system.

About this task

The Data ONTAP Edge storage system has four SCSI disk controllers: 0 through 3. Each controller can manage up to 15 virtual data disks - for a maximum of 60 disks. As you add data disks to the system, they are allocated to each controller.

Data disks are created using the default checksum type. This is the checksum type used to create the initial data disks on the system. For new Data ONTAP Edge storage systems, the default is "zoned".

The process of adding a new virtual data disk to the system requires using both `dvadmin` and Data ONTAP commands. The first four steps apply only in the case where you have added a new physical disk to the system. You can start with step 5 if you are adding a new disk from storage space that is available on an existing pool.

Steps

1. Install a new disk into the system, create a RAID group, and then define a LUN or LUNs.
2. Add the LUN, or LUNs, to the host server and verify that the server can see the LUN.

3. Using `dvadmin`, enter the `pdisk show` command to display the canonical name of the new physical disk (LUN).
4. Create a storage pool from the new physical disk using the `pool create` command.
5. Power off the Data ONTAP Edge system using the `vm stop` command.
6. Create one or more new virtual disks in the storage pool using the `vm disk create` command.
7. Power on the Data ONTAP Edge system using the `vm start` command.
8. Connect to the Data ONTAP Edge system console using the `vm console connect` command in order to interface with Data ONTAP.

When the **admin:** and **Password:** prompts appear, enter the Data ONTAP admin name and password.

9. Use the `storage disk show` command to see the currently owned and unowned disks.
New disks that require a new Data ONTAP-v controller to be initialized will come up as "Not Owned".
10. Use the `storage disk assign` command to assign the new virtual disk to the storage system. If you added multiple virtual disks, use the `storage disk assign -all true` command.
This makes the disk into a "spare" disk.
11. Enter the `storage aggregate create -aggregate <aggr_name> -diskcount <num_disks>` command to create a new aggregate and add the specified number of spare disks to that aggregate. You can also add the new disks to an existing aggregate using the `storage aggregate add-disks` command.

The disks need to be zeroed before they are added to the aggregate. That process starts automatically, and you will be notified by the system log as the disks are added.

After you finish

After the disks have been zeroed, you can create volumes and perform other operations to use the newly added capacity. See the Clustered Data ONTAP Storage Management Guides for more information on creating and expanding aggregates.

Replacing a Data ONTAP Edge system while preserving data disks

In certain situations, you may need to replace an existing Data ONTAP Edge system, but keep the data disks that Data ONTAP was managing. In these cases, you can create a new Data ONTAP Edge

system, and then reassign the disks from the old virtual machine to the new virtual machine (this is known as a *head swap*).

Before you begin

Part of this task requires that you are running in maintenance mode on the storage system console. Note that the disks cannot be active when running this procedure.

About this task

One situation where you may want to perform this task is if there is a problem updating Data ONTAP software using the `software update` command. In this case, you can create a new Data ONTAP Edge system with an updated Data ONTAP image, and then reassign the data disks to the new system. You might also want to perform this task if you need to move the Data ONTAP Edge system onto a different storage pool.

Follow the steps below to redeploy a Data ONTAP Edge system and preserve the existing data disks:

Steps

1. Shut down the existing Data ONTAP Edge system by entering the `vm stop` command.

The virtual machine should completely shut down in about a minute. If it does not shut down in a reasonable amount of time, use the `--force` option of the `stop` command.

2. If all the space on the defined pools (datastores) is already reserved for data disks and the virtual NVRAM disk, you will need to manually move the existing NVRAM VMDK file before you can create the replacement Data ONTAP Edge system. See [Moving the NVRAM VMDK file](#) on page 48 for instructions.
3. Create the new Data ONTAP Edge system with a unique name using the `vm create` command. Note that the options you specify when creating the replacement virtual machine are slightly different than what you used to create the original Data ONTAP Edge system. The full syntax for creating a replacement Data ONTAP Edge system is as follows:

```
vm create --headswap vm_name pool_name nv_pool_name network_name  
license=license_string
```

This command creates the new Data ONTAP Edge system. Note that the *license string* can be the same as, or different, from the platform license used when installing the original system.

4. Set any additional Data ONTAP-v properties for this virtual machine to match the original configuration using the `vm prop set` command, if required.
5. Reassign the SCSI data disks from the old Data ONTAP Edge system to the new Data ONTAP Edge system using the `vm headswap` command.

```
vm headswap old_vm_name new_vm_name
```

6. Start the new Data ONTAP Edge system by entering the `vm start` command.

7. Connect to the system console on the new Data ONTAP Edge system in order to interface with Data ONTAP using the `vm console connect` command.
8. When prompted, press Ctrl-C during Data ONTAP startup to bring up the boot menu.

Note the new System ID that is displayed:

```
Skipping automatic setup and entering boot menu.
Choose 'Maintenance mode boot' and execute 'disk reassign'
to reassign disks to the new system id (2185014502)
```

9. Select option 5 for "Maintenance mode boot".
10. When the "*" prompt appears, enter the `disk show -a` command to display the old System ID.
11. Enter the following command to reassign the disks to the new Data ONTAP system:


```
disk reassign -s old_sysid -d new_sysid
```

 Press "y" to confirm that you want to move the disks from the old system to the new system.
12. Enter the `halt` command, and then boot the Data ONTAP storage system normally.

Data ONTAP should now power up normally and recognize the assigned data disks.

After you finish

After you have verified that the new Data ONTAP Edge system is operating as expected, you can destroy the old Data ONTAP Edge system by entering the `vm destroy` command from `dvadmin`.

Moving the virtual NVRAM VMDK file

To make space available for a new virtual NVRAM VMDK that will be created as part of a new Data ONTAP Edge system, you must move or delete the existing virtual NVRAM VMDK using the vSphere Client graphical user interface.

About this task

This task should be performed only as part of the process for replacing a Data ONTAP Edge system while preserving data disks.

Steps

1. Launch the VMware vSphere Client to access the host server on which the Data ONTAP Edge system is installed.
2. Navigate to **Inventory** > **Datastores**.
3. On the Summary tab, click **Browse Datastore...**

4. In the Folder view of the Datastore Browser window, select the datastore (pool) where you created the NVRAM disk (when you issued the `vm create` command).
5. Right-click the NVRAM VMDK (for example, `dotv1_2.vmdk`) and select **Move to...** to move the `.vmdk` file to the local datastore (pool) where you installed the Data ONTAP Edge system. The NVRAM VMDK file should be approximately 5 GB.

Data ONTAP-v administration tool monitor operations

The Data ONTAP-v administration tool monitor is used to enable functionality that support personnel can use to help diagnose and repair issues on the Data ONTAP Edge storage system. It is also used to perform automatic backups of the Data ONTAP Edge configuration.

The monitor provides the following functionality:

- logging of all Data ONTAP system console operations
- automatic offline backup of Data ONTAP Edge system disks and configuration information (not data disks)
- a "watchdog" that monitors the health of the Data ONTAP Edge virtual machine and restarts a failed system (optionally producing a core file that can be used to diagnose the system)

The table below lists the commands that are available for using the monitor tool.

Command	Description
<code>vm monitor start</code>	Starts the <code>dvadmin</code> monitor.
<code>vm monitor show</code>	Displays whether or not the <code>dvadmin</code> monitor is running.
<code>vm monitor stop</code>	Stops the <code>dvadmin</code> monitor.
<code>vm monitor log show</code>	Displays a log of the <code>dvadmin</code> monitor activity.
<code>vm monitor log clear</code>	Renames the existing monitor log and starts a new, empty monitor log.

Because the monitor provides other Data ONTAP Edge functionality, such as console logging and automatic backups, see [Backup and restore tasks](#) on page 50 and [Logging operations](#) on page 51 for tasks associated with those operations.

Backup and restore operations

Backup and restore operations are provided with `dvadmin` to protect Data ONTAP Edge system files and configuration information. Data ONTAP Edge system information is *not* backed up or restored during Data ONTAP backup or restore operations.

The backup image includes the virtual machine configuration (excluding data disks) and all of the information on the Data ONTAP Edge system disks, including:

- the Data ONTAP software image
- the `cfcard` file
- the swap and `/var` contents

When the `dvadmin monitor` is running, a backup of all Data ONTAP Edge configuration information is created automatically when any Data ONTAP Edge configuration change is made. For extra safety, you can perform manual backups to save specific snapshot copies of your configuration.

`dvadmin` restricts the number of backup files to three. Using the "name rotation" mechanism, as each new backup is made, the previous backup file is renamed. When a fourth backup file is made, the oldest backup file is automatically deleted.

For example, the automatic backup that the `dvadmin monitor` creates is called "monitor-backup". When the next automatic backup is created, the original file "monitor-backup" is renamed to "monitor-backup.1", and the new backup is named "monitor-backup". When the next automatic backup is created, "monitor-backup.1" is renamed to "monitor-backup.2", "monitor-backup" is renamed to "monitor-backup.1", and the new backup is named "monitor-backup". The next automatic backup will delete "monitor-backup.2" and then rename the other files as described above.

This "name rotation" mechanism also applies to backups made manually using the `vm config backup` command.

The backups are stored on the pool where the Data ONTAP-v virtual machine is installed. This pool should have at least 2 GB of available space for holding up to a maximum of three complete automatic backups.

Note: If the Data ONTAP image itself is updated (by using the `Data ONTAP software update` command), the first backup made after the update will occupy up to a maximum of 0.5 GB.

The table below lists the commands you use to manage Data ONTAP Edge system backups.

Command	Description
<code>vm config backup</code>	Creates a backup of Data ONTAP Edge system information.
<code>vm config remove</code>	Deletes old Data ONTAP Edge backup images when they are no longer needed.

Command	Description
<code>vm config restore</code>	Restores a backed up Data ONTAP Edge configuration.
<code>vm config show</code>	Displays a list of the backup images that are available for the current Data ONTAP Edge storage system.

Because Data ONTAP Edge systems are single-node clusters, a cluster configuration backup file should be stored at a remote URL. This backup file ensures that you can recover the cluster's configuration even if the node becomes inaccessible. During Data ONTAP Edge installation, the Data ONTAP-v Installer virtual machine is configured as the remote location. You can change this location to a different URL using two methods:

- Use the `dvadmin vm prop set` command and configure values for the properties `systemconfigbackup_destination`, `systemconfigbackup_username`, and `systemconfigbackup_password`.
- Use the Data ONTAP `system configuration backup settings modify` and `system configuration backup settings set-password` commands to configure the URL, user, and password.

For more information about managing cluster configuration backups, see the *Clustered Data ONTAP System Administration Guide for Cluster Administrators*.

Logging operations

Logs are used to capture system and user actions in order to help resolve issues.

The logs discussed in this section are the following:

- Data ONTAP Edge system console log - A log of all interactions with the storage system through the system console. This includes all entered Data ONTAP commands and their results.
- VMware virtual machine log - A log of all virtual machine operations. This is the `vmware.log` file that VMware creates.
- Data ONTAP-v core dump - A core file that technical support personnel can use to help troubleshoot specific hardware or software failures.

Note: The `dvadmin monitor` collects the console log information, so the monitor must be running in order to have data in the console log.

There is also a monitor log that tracks all Data ONTAP-v administration tool activity. See [Data ONTAP-v administration tool monitor operations](#) on page 49 for information about this log file.

The table below lists the commands you use to view and save Data ONTAP-v system logs.

Command	Description
<code>vm console log show</code>	Shows the captured storage system console output from the connected Data ONTAP Edge system.
<code>vm console log clear</code>	Saves the existing console log to a file and then starts a new, empty console log.
<code>vm log show</code>	Displays the VMware virtual machine log file from the connected Data ONTAP-v virtual machine.
<code>vm log save</code>	Saves the VMware virtual machine log to a file.
<code>vm coredump</code>	Forces Data ONTAP Edge system to dump a core file and resets the storage system.
<code>vm savecore</code>	Extracts the contents of a coredump from a Data ONTAP Edge storage system and writes it to a core file.
<code>ssh setup</code>	Enables SSH connectivity to the ESX host to allow the collection of a core file.
<code>ssh status</code>	Displays whether there is SSH connectivity between Data ONTAP Edge system and the connected ESX host.

Data ONTAP Edge advanced installation instructions

Manually entering `dvadmin` commands instead of using the `dvadmin` setup wizard to create and start your Data ONTAP Edge storage system provides some installation flexibility.

The following table compares advanced and standard (wizard-driven) installations.

Feature	Advanced installation	<code>dvadmin</code> setup wizard
Ease of use	Depends on the experience and care of the technician performing the installation	Provides an interview-based, guided setup that is less error-prone than the manual data entry required by advanced installations
Monitor settings	The <code>dvadmin</code> monitor can be set to: <ul style="list-style-type: none"> • enable or disable automatic backups • enable or disable console logging • enable or disable the watchdog 	The <code>dvadmin</code> monitor is set to: <ul style="list-style-type: none"> • enable automatic backups • enable Data ONTAP system console logging • disable the watchdog
Scripting support	Provides the ability to execute multiple <code>dvadmin</code> commands to script installation or other operations. This functionality is provided by using the <code>source</code> command.	Not applicable

If you do not need the flexibility provided by entering the individual commands, follow the steps in [Installing Data ONTAP Edge using the `dvadmin` setup wizard](#) on page 27.

Follow the steps in this section to create and start your Data ONTAP Edge storage system by manually entering the required commands. See the *Data ONTAP-v Administration Tool Command Reference* for complete command details.

The topics described in this section are:

- Installing Data ONTAP Edge
- Configuring additional Data ONTAP Edge properties
- Creating virtual data disks
- (optional) Creating additional network connections
- (optional) Starting the `dvadmin` monitor

- Starting Data ONTAP Edge for the first time
- Connecting to the Data ONTAP storage system console

Installing Data ONTAP Edge

You install Data ONTAP Edge on a server using `vdadmin`. The Data ONTAP Edge software package is contained within the Data ONTAP-v Installer virtual machine.

Before you begin

`vdadmin` must be connected to the host server before you issue the command described in this task. If you connected `vdadmin` to a vCenter Server, you must issue the `host <hostname>` command before installing Data ONTAP Edge. Additionally, the two storage pools (datastores) that you plan to use must already exist.

About this task

Installing Data ONTAP Edge requires that you specify many variables; including the Data ONTAP Edge virtual machine name, the storage pool name, the platform license, and more. These are the items you recorded earlier in the configuration worksheet.

Make sure that the name of the ESX host you are running on is known to the virtual machine either through the DNS service or through an entry in the virtual machine's `/etc/hosts` file.

Step

1. Enter the following command to install Data ONTAP Edge:

```
vm create <vm_name> <pool_name> <nv_pool_name> <root_disk_pool_name>  
<network_name> <propertyN=valueN>
```

There are two types of values that you must enter in this command:

- Data ONTAP-v configuration values that define the Data ONTAP Edge storage system
- Data ONTAP values that Data ONTAP-v passes through to set Data ONTAP properties.

The required Data ONTAP-v variables are described in the table below. These variables must be entered in the listed order, and the value should be enclosed in quotation marks if it contains spaces or special characters:

Variable name	Type	Description
<i>vm_name</i>	string	The name you have defined for the Data ONTAP Edge virtual machine. The name must start with a letter and it should use ASCII characters only. This name is also used as the cluster name and as the storage system name you will see when managing the system using Data ONTAP commands.
<i>pool_name</i>	string	The name of the storage pool backing the Data ONTAP Edge virtual machine. This pool must already exist. Use the <code>pool show</code> command to view the available pools.
<i>nv_pool_name</i>	string	The name of the pool backing the virtual NVRAM. This can be the same as <i>pool_name</i> , but it is highly recommended that it is a separate pool that is backed by a storage device with a battery-backed write cache.
<i>root_disk_pool_name</i>	string	The name of the pool on which the Data ONTAP root aggregate disk will be installed. This is typically the same storage pool as the virtual NVRAM disk.
<i>network_name</i>	string	The name of the network to which the virtual machine adapter should be connected. This is typically your management network. Use the <code>network show</code> command to view the available networks.

The required Data ONTAP properties are described in the table below. These properties must be entered in the format `property=value`, each property should be separated by a space, and `value` should be enclosed in quotation marks if it contains spaces:

Property name	Type	Description
<i>license</i>	string	The unique 24-character Data ONTAP Edge platform license.
<i>clustermgmt_ipaddr</i>	ip	The cluster management interface IP address. This is the address you will use to manage the system.
<i>clustermgmt_netmask</i>	ip	The cluster management netmask.
<i>clustermgmt_gateway</i>	ip	The cluster management default gateway.
<i>nodemgmt_ipaddr</i>	ip	The node management interface IP address. This is used internally so the cluster administrator can manage the node.

Property name	Type	Description
<i>password</i>	string	The password for the Data ONTAP admin account. The password must be at least eight characters long, and it must contain at least one number and at least two alphabetic characters.
<i>vsphere_username</i>	string	The username for read-only access to the virtual machine host (the ESX server).
<i>vsphere_password</i>	string	The password for read-only access to the virtual machine host (the ESX server).

The `vm create` command verifies the values you enter to make sure they are valid. For example, it checks that the pool names exist, that the license has the correct number of characters and hyphens, and that the gateway exists. If this command encounters an error during creation of the Data ONTAP Edge system, it stops the installation and undoes any changes before returning control to the command line.

Example for creating a Data ONTAP Edge system

The following command creates a Data ONTAP Edge system that will be named "dotv1", and installs it into the storage area defined by "system_pool". The space for the virtual NVRAM and the root aggregate disk will be from the pool "nvram_data_pool":

```
> vm create dotv1 system_pool nvram_data_pool nvram_data_pool
network_1 license=XXXX-YYYY-XXXX-YYYY-ZZZZ password=xxxxyy11
clustermgmt_ipaddr=10.10.10.10 clustermgmt_netmask=255.255.255.0
clustermgmt_gateway=10.10.10.1 nodemgmt_ipaddr=10.10.10.12
vsphere_username=esxuser vsphere_password=pswd1234
```

```
Extracting and validating OVF package contents.
Creating VM dotv1 on host name.company.com.
Uploading disks to VM dotv1
Marked VM disks independent-persistent
Added 55296 MB disk [0:0] backed by [nvram_data_pool] dotv1/
dotv1_3.vmdk
Created VM dotv1 on host name.company.com.
```

After you finish

Do not start the Data ONTAP Edge system at this point. You must create the virtual data disks that Data ONTAP will manage (in the "nvram_data_pool" storage pool), and possibly set some optional parameters as described in the next few pages.

Note: You can also define some additional Data ONTAP properties before starting Data ONTAP Edge. This includes the time zone, DNS values, and more. These properties are also set using the

vm prop set command, and they must be defined before starting Data ONTAP Edge for the first time.

You can run the `vm show` and `vm prop show` commands to verify that all the Data ONTAP-v property settings are correct. If you notice that a property value is incorrect, you can change it using the `vm prop set` command. The `prop set` command can be used *only before* you have started the Data ONTAP Edge system. After you have started the virtual machine and it has reached the "ready" state, you can change Data ONTAP properties only by using the Data ONTAP `setup` command.

For example, the following `vm prop show` command shows the current system property settings.

```
> vm prop show dotv1

checksum_type = zoned
clustermgmt_gateway = 10.10.10.1
clustermgmt_interface = 1
clustermgmt_ipaddr = 10.10.10.10
clustermgmt_netmask = 255.255.255.0
clustername = dotv1
nodemgmt_gateway = 10.10.10.1
nodename = dotv1-01
nodemgmt_ipaddr = 10.10.10.12
license = XXXX-YYYY-XXXX-YYYY-ZZZZ
nodemgmt_netmask = 255.255.255.0
nodemgmt_interface = 1
password = *****
raidtype = RAID0
tmz = GMT
vsphere_hostname = dsmnn0.company.com
vsphere_password = *****
vsphere_username = esxuser
```

Configuring additional Data ONTAP Edge property settings

You can define additional Data ONTAP properties that will be passed to Data ONTAP at initial startup. You can also change some of the Data ONTAP Edge and Data ONTAP properties that you defined when you initially issued the `vm create` command.

Before you begin

These properties must be set (or changed) before you power on (start) the Data ONTAP Edge system for the first time. After Data ONTAP Edge has been started and has reached the "ready" state (see the `vm state show` command), these commands can no longer be used. Any changes to Data ONTAP properties must be made directly using the Data ONTAP interface.

About this task

There are two commands you can use to change Data ONTAP Edge property values:

- `vm prop set` sets or changes the property.
- `vm prop unset` unsets, or clears, the property.

Steps

1. Enter the following command to set or change one or more Data ONTAP Edge properties:

```
vm prop set <vm_name> <propertyN=valueN ...>
```

2. Enter the following command to unset one or more Data ONTAP Edge properties:

```
vm prop unset <vm_name> <propertyN ...>
```

There are two types of properties that can be entered in *propertyN* for these commands:

- Required properties that you defined in the `vm create` command.
- Optional properties that customize Data ONTAP settings. These properties cannot be defined using the `vm create` command. If you want to configure an optional property, it must be set before the initial Data ONTAP Edge startup.

Note that you must place quotes around property values that contain spaces.

The required properties are listed in the table below.

Required property name	Type	Description
<i>license</i>	string	The unique 24-character Data ONTAP Edge platform license.
<i>clustermgmt_ipaddr</i>	ip	The cluster management interface IP address. This is the address you will use to manage the system.
<i>clustermgmt_netmask</i>	ip	The cluster management netmask.
<i>clustermgmt_gateway</i>	ip	The cluster management default gateway.
<i>nodemgmt_ipaddr</i>	ip	The node management interface IP address. This is used internally so the cluster administrator can manage the node.
<i>password</i>	string	The password for the Data ONTAP admin account. The password must be at least eight characters long, and it must contain at least one number and at least two alphabetic characters.
<i>vsphere_username</i>	string	The username for read-only access to the virtual machine host (the ESX server).
<i>vsphere_password</i>	string	The password for read-only access to the virtual machine host (the ESX server).

The optional properties are listed in the table below.

Optional property name	Type	Description
<code>checksum_type</code>	string	The checksum type that will be used when creating data disks using the <code>vm disk create</code> command: <ul style="list-style-type: none"> "zoned" is the default setting, and it stands for Advanced Zone Checksum Scheme. "block" stands for Block Checksum Scheme. See the <i>Clustered Data ONTAP Physical Storage Management Guide</i> for more information about checksums.
<code>clustername</code>	string	The name of the cluster. By default, the cluster name is the same as the <code><vm_name></code> property specified in the <code>vm create</code> command. You can change the name using this property.
<code>clustermgmt_interface</code>	integer	Interface number to assign the cluster management port. By default, cluster management is assigned to interface 1.
<code>dns_domainname</code>	string	The name of the Domain Name System (DNS) domain.
<code>dns_ipaddr</code>	ip	The IP addresses of the DNS servers you want to use, separated by commas. You can identify a maximum of three servers.
<code>feature_licenses</code>	string	A comma-delimited list of the Data ONTAP feature licenses you want to use, in addition to the default licenses that are installed automatically. For Data ONTAP Edge with the Premium bundle, this includes CIFS, NFS, iSCSI, FlexClone, SnapRestore, SnapVault, and SnapMirror.
<code>iface1_ipaddr</code>	ip	The IP address of the first interface (e0a).
<code>iface1_netmask</code>	ip	The netmask of the first interface (e0a).
<code>nodename</code>	string	The name of the node. By default, the node name is the same as the <code><clustername></code> , but with "-01" appended, for example "dotv1-01". You can change the name using this property.
<code>nodemgmt_interface</code>	integer	Interface number to assign the node management port. By default, node management is assigned to interface 1.

Optional property name	Type	Description
<i>nodemgmt_netmask</i>	ip	The node management netmask. By default, this is the same value as <i><clustermgmt_netmask></i> .
<i>nodemgmt_gateway</i>	ip	The node management default gateway. By default, this is the same value as <i><clustermgmt_gateway></i> .
<i>systemconfigbackup_destination</i>	string	Destination URL on which cluster configuration backups are stored. The destination must support file uploads using one of the following protocols: HTTP, HTTPS, FTP, FTPS, or TFTP. By default, the URL of the Data ONTAP-v Installer virtual machine is used.
<i>systemconfigbackup_username</i>	string	The user name required to log in to the URL and upload the configuration backup file. The default user name is "ftp" when using the Data ONTAP-v Installer VM.
<i>systemconfigbackup_password</i>	string	The password for access to the destination URL. The default password is "ftp" when using the Data ONTAP-v Installer VM. Note that the destination URL and user name must be set before you can set the password.
<i>tmz</i>	string	The time zone in which the storage system resides. GMT is the default setting if you do not enter a value. The time zone is specified in the Olson format.

Note: The DNS and interface properties must be set in pairs. This means that if you set a DNS domain name, you must set at least one DNS server IP address.

Examples of changing Data ONTAP Edge properties

The following command changes the license value because you noticed that it was incorrect when entered in the `vm create` command:

```
> vm prop set dotv1 license=XXXX-YYYY-ZZZZ-AAAA-BBBB
Set license = XXXX-YYYY-ZZZZ-AAAA-BBBB (XXXX-YYYY-ZZZZ-AAAA-CCCC)
```

Note that the value in parentheses (XXXX-YYYY-ZZZZ-AAAA-CCCC) is the old value that is being replaced.

The following command unsets the DNS domain name and the DNS IP address settings:

```
> vm prop unset dotv1 dns_domainname dns_ipaddr

Unset dns_domainname (mydomain.mycompany.com)
Unset dns_ipaddr (123.123.123.123,123.123.123.124)
```

The following command changes the destination URL, user name, and password for cluster configuration backups. When set, all three of these values must be set at the same time:

```
> vm prop set dotv1 systemconfigbackup_destination=ftp://
www.example.com/config/uploads/

Set systemconfigbackup_destination = ftp://www.example.com/config/
uploads/

> vm prop set dotv1 systemconfigbackup_username=admin

Set systemconfigbackup_username = admin

> vm prop set dotv1 systemconfigbackup_password=passwd123

Set systemconfigbackup_password = passwd123
```

The following command shows the system response if you attempt to specify the DNS domain after Data ONTAP Edge has been started and has reached the "ready" state:

```
> vm prop set dotv1 dns_domainname=mydomain.mycompany.com

[15] CmdFailed: Cannot set/change property, VM 'dotv1' is in
'ready' state
```

After you finish

You can start the Data ONTAP Edge system once you have set the properties to the values you require, and after you have created data disks.

Creating virtual data disks

You must define one or more virtual data disks that Data ONTAP Edge will be responsible for managing. The data disks are created within the storage pools (datastores) you defined with the `pool create` command, or by using the vSphere Client.

Before you begin

The Data ONTAP Edge system must not be powered on when executing this command.

About this task

A virtual disk can consume the entire space from the specified storage pool, or multiple virtual disks can be created in a single storage pool. Note that a virtual disk can be no larger than 2 TB, so if your pool contains more than 2 TB, you will need to create multiple disks. Keep track of the size of each data disk you create on a pool to make sure you use the maximum amount of storage.

Data disks are created using the default checksum type. When creating a new Data ONTAP Edge system, the "zoned" checksum type is selected by default. You can change this setting to the "block" checksum type using the `vm prop set checksum_type` command if required. Zoned disks provide more usable storage space, so this default setting is recommended.

Note: If you do not create data disks that consume all the space in the storage pool before starting the Data ONTAP Edge system the first time, then you need to follow a separate procedure to add the data disks later. See [Adding a new disk to the system](#) on page 45 for details about adding data disks to an existing system.

Step

1. Define a virtual disk using the following command:

```
vm disk create <vm_name> <pool_name> [size <k/m/g/t>]
```

- <vm_name> is the name of the Data ONTAP Edge system.
- <pool_name> is the name of storage pool that will host the virtual disk.
- [**size** <k/m/g/t>] is a whole number followed by a byte unit character. If the size is not specified, a virtual disk that spans all the space available on the storage pool will be created. The minimum disk size is 1 GB, and the maximum disk size is 2 TB. The byte unit character is one of the following values:
 - *k* - kilobyte
 - *m* - megabyte
 - *g* - gigabyte
 - *t* - terabyte

Each virtual disk you add is given the name of the next virtual hard disk, for example, "Hard disk 4", "Hard disk 5", and so on. See the `vm disk show` command for more information.

Example of creating a virtual disk

The following command creates an 800 GB virtual data disk from the storage pool named "nvram_data_pool".

```
> vm disk create dotv1 nvram_data_pool 800g
Adding disk [0:1] backed by [nvram_data_pool] dotv1/dotv1_3.vmdk
```

After you finish

You can enter the `vm disk show` or `vm show` command to verify that the correct size disk was added. For example, the following `vm disk show` command shows the three system disks, the root disk, and 800 GB data disk.

```
> vm disk show dotv1
```

Disk Name	Ctrl:Unit	Size (MB)	UUID	Backing
Hard disk 1	ide0:0	1057	-	system_pool
Hard disk 2	ide0:1	1542	-	system_pool
Hard disk 3	ide1:0	5152	-	nvram_data_pool
Hard disk 4	scsi0:0	55296	<uuid-string>	nvram_data_pool
Hard disk 5	scsi0:1	826152	<uuid-string>	nvram_data_pool

Connecting the Data ONTAP Edge system to additional networks

There are six network adapters on the Data ONTAP Edge virtual machine. By default, all of these adapters are connected to the network you specified in the `vm create` command. Optionally, you can connect one or more network adapters to different networks that are available on the host server.

Before you begin

The Data ONTAP Edge system must be powered off to run this command. Use the `network show` and `vm network show` commands to get the name of the adapter and the name of the network to which you want to connect.

About this task

Connecting additional networks is useful if you want to serve data over multiple networks, or manage your Data ONTAP system from multiple networks.

Step

1. Specify the network to which you want to connect the adapter using the following command:

```
vm network connect <vm_name> <adapter_name> <network_name>
```

- `<vm_name>` is the name of the Data ONTAP-v virtual machine.

- `<adapter_name>` is the name of the Data ONTAP-v network adapter.
- `<network_name>` is the name of the network.

The specified adapter is connected to the specified network.

Example of connecting a virtual machine adapter to another network

The following command connects Network adapter 2 to network "Network5".

```
> vm network connect dotv1 "Network adapter 2" Network5
Network adapter 2 connected to Network5
```

After you finish

You can enter the `vm network show` or `vm show` command to verify that the adapter was connected to the network.

Starting the Data ONTAP-v administration tool monitor

The `dvadmin` virtual machine monitor is an optional background process for monitoring the Data ONTAP Edge storage system. It also provides for automatic system configuration backups and logging functionality.

About this task

It is recommended that you start the monitor before you start the Data ONTAP Edge system so that a log is recorded from initial startup. The log can help support personnel diagnose and repair issues on the Data ONTAP-v storage system.

The `dvadmin` monitor provides the following functionality:

- logging of Data ONTAP system console output
- automatic offline backup of Data ONTAP Edge system disks and configuration information (*not* data disks)
- a "watchdog" that monitors the health of the Data ONTAP-v virtual machine and restarts a failed system (optionally producing a core file that can be used to diagnose the system)

Note: The monitor will stop running if the virtual machine on which `dvadmin` is installed fails. The monitor will be restarted automatically once the virtual machine is restarted.

See [Data ONTAP-v administration tool monitor operations](#) on page 49 for more information about the monitor functionality.

Step

1. Start the `vdadmin` monitor by entering the following command:

```
vm monitor start [--no-backup] [--no-console-log] [--no-watchdog] [--watchdog-no-coredump] <vm_name>
```

- `[--no-backup]`, if used, does not make automatic Data ONTAP Edge configuration backups.
- `[--no-console-log]`, if used, does not log console output from the Data ONTAP Edge system.
- `[--no-watchdog]`, if used, does not run the watchdog.
- `[--watchdog-no-coredump]`, if used, starts the watchdog, but disables the creation of coredump files.

The monitor is launched in the background and you are returned to the command prompt.

Examples of starting the monitor

The following command starts the monitor with all features enabled:

```
> vm monitor start dotv1
vm monitor for dotv1 is running with no options
```

The following command starts the monitor, but does not enable watchdog functionality:

```
> vm monitor start --no-watchdog dotv1
vm monitor for dotv1 is running with options --no-watchdog
```

After you finish

You can enter the `vm monitor show` command to view the current state of the monitor.

Verifying system settings before startup

It is very important that all the Data ONTAP-v and Data ONTAP settings are correctly set before you start the Data ONTAP Edge system for the first time.

There are two commands you can use to verify Data ONTAP Edge property settings:

- The `vm show` command displays the current Data ONTAP Edge system name, the hard disk where the Data ONTAP Edge system files reside, and so on.

- The `vm prop show` command displays all the Data ONTAP properties that will be passed through to Data ONTAP during its initial startup.

The following example displays the value of any Data ONTAP property you set with the `vm create` and `vm prop set` commands.

```
> vm prop show dotv1

checksum_type = zoned
dns_domainname = dns_server12
dns_ipaddr = 123.123.123.123,123.123.123.124
clustermgmt_gateway = 10.10.10.1
clustermgmt_interface = 1
clustermgmt_ipaddr = 10.10.10.10
clustermgmt_netmask = 255.255.255.0
clustername = dotv1
nodemgmt_gateway = 10.10.10.1
nodename = dotv1-01
nodemgmt_ipaddr = 10.10.10.12
license = XXXX-YYYY-XXXX-YYYY-ZZZZ
nodemgmt_netmask = 255.255.255.0
nodemgmt_interface = 1
password = *****
raidtype = RAID0
tmz = America/New_York
vsphere_hostname = dsmn0.company.com
vsphere_password = *****
vsphere_username = esxuser
```

Make sure these settings are correct before you continue. Use the `vm prop set` command if you need to change any values.

Starting Data ONTAP Edge for the first time

You must start the Data ONTAP-v virtual machine for your Data ONTAP Edge system to be operational. The first time you power on Data ONTAP Edge it passes configuration properties to Data ONTAP so that Data ONTAP can configure itself correctly.

Before you begin

Do not start Data ONTAP Edge using VMware commands or the VMware vSphere Client. The Data ONTAP Edge system must be started the first time using the `dvadmin vm start` command. Failing to do so will result in Data ONTAP being misconfigured.

About this task

During the initial power-on sequence, the Data ONTAP Edge system initiates an auto-setup process that performs the following operations:

- validates the license and system resources (2 physical CPU cores and 8 GB of RAM)
- accesses and verifies the properties passed from the `vm create` and `vm prop set` commands
- initializes the data disks
- creates serial ports
- configures the hostname, network, and administrator account

It will reboot once during the setup process. Note that complete startup can take five or more minutes.

Note: If the property verification or configuration of Data ONTAP fails, the startup process stops and logs a message to the console and to the VMware logs. Use the `vm state show` command to display the reason for the failure. After you fix the condition that caused the error (in some cases by changing a property value using the `vm prop set` command), restart the Data ONTAP Edge system so that it can go through the auto-setup process again.

Step

1. Enter the following command to start the Data ONTAP Edge system.

```
vm start <vm_name>
```

Result

In addition to configuring Data ONTAP with the settings you specified and starting Data ONTAP, the auto-setup process also creates a single aggregate (aggr0) from the 54 GB root disk, and creates a single volume (vol0) within that aggregate. The data disks you defined with the `vm disk create` command are available as spare disks.

Example of starting Data ONTAP Edge

The following command starts virtual machine "dotv1":

```
> vm start dotv1  
start VM dotv1
```

After you finish

After the Data ONTAP Edge system is running, you can connect to the Data ONTAP system console (or OnCommand System Manager) to further configure your storage settings. See the Data ONTAP software documentation for more information.

Verifying system settings after startup

You should verify that the virtual machine and Data ONTAP have started successfully before continuing to configure your storage system.

Use the `vm show` command to display the Data ONTAP Edge configuration information.

The following example displays detailed information for the Data ONTAP Edge system "dotv1" after Data ONTAP has started.

```
> vm show dotv1
```

VM Name	Power	CfgState	Heartbeat	Hostname	IP Address
dotv1	on	ready	green	dotv1-01	10.10.10.10

```
=====
Detail information for vm dotv1:
VM Version   Data ONTAP Version   Serial Number   System ID
1.x.x        8.x.x                2010002345678  2147483903

Disk Name    Ctrl:Unit   Size (MB)   UUID                Backing
Hard disk 1  ide0:0     1943        -                   datastore1
Hard disk 2  ide0:1     1542        -                   datastore1
Hard disk 3  idel:0     5121        -                   datastore1
Hard disk 4  scsi0:0    55296       <uuid-string>      datastore1
Hard disk 5  scsi0:1    826152      <uuid-string>      datastore1

Adapter Name      MAC Address      Network Name
Network adapter 1  00:50:56:9c:28:2d  VM Network
Network adapter 2  00:50:56:9c:7e:77  VM Network
Network adapter 3  00:50:56:9c:3b:a2  VM Network
Network adapter 4  00:50:56:9c:34:f5  VM Network
Network adapter 5  00:50:56:9c:3b:23  VM Network
Network adapter 6  00:50:56:9c:34:5e  VM Network

Serial Name      Port   Conn  Status   Details
Serial port 1    0      Y     ok       Remote tcp://:7200
Serial port 2    1      Y     ok       Pipe dotv1_serial_1

Resource          Reservation
CPU               5332 MHz
Memory           8192 MB
```

The important entries to verify include:

- **Cfgstate** – When Data ONTAP has successfully completed startup, this value will be "ready". If the value is "new" or "init", you may need to wait a few more minutes for startup to complete. If the value is "failed", use the `vm state show` command to view the reason for the failure.
- **Power** – This value should be "on". If it is "off", run the `vm start` command to start the Data ONTAP Edge system.
- **Heartbeat** – This value should be "green" when Data ONTAP has completed startup. It may go through "gray", "yellow", and "red" stages during the boot and initialization process.

- Hostname and IP Address – These fields are empty during the boot process. They are populated with real values when Data ONTAP is powered on and fully set up.
- VM Version – The version of the Data ONTAP-v OVF package used when installing the Data ONTAP Edge system.
- Data ONTAP Version – The version of Data ONTAP software that is installed.
- Serial Number and System ID – These values are the serial number and system ID of the storage system.
- Serial ports – The "Conn" and "Status" fields will be "Y" and "ok", respectively, when Data ONTAP has completed startup.

You can re-enter the `vm show` command to refresh this information. After Data ONTAP Edge has completed startup, you can access the system console to configure the storage system.

Note: You do not have to wait for the system to have finished startup before accessing the system console.

Connecting to the Data ONTAP Edge storage system console

You connect to the Data ONTAP Edge console to communicate with Data ONTAP as you administer your storage system. The console enables you to use the Data ONTAP command line interface.

About this task

You can connect to your Data ONTAP Edge storage system by using the `dvadmin vm console connect` command, but it is recommended that you use an SSH client, such as PuTTY, to connect directly to the Cluster Management interface of the storage system.

NetApp OnCommand System Manager also can be used to administer the storage system using the Cluster Management interface IP address.

You can have only one `dvadmin console` connection to a storage system at a time. However, you can have a `dvadmin console` connection and an SSH or System Manager connection concurrently.

The SSH command could fail with `Error: [85] VmSerialConnectErr` depending on the ESX firewall setting. The ESX firewall either needs to be disabled, or the firewall rule for “remoteSerialPort” needs to be enabled. For example, in VMware vSphere 5, select the host through the VMware vSphere Client and select **Configuration > Security Profile > Firewall Properties** and the **VM Serial port connected over network** check box must be selected.

Steps

1. Using SSH, specify the Data ONTAP Edge storage system Cluster Management interface IP address:

Example

```
$ ssh 10.10.10.10
```

2. Enter the Data ONTAP admin login name and password.

Example

```
login as: admin
admin@10.10.10.10's password: *****
dotv1::>
```

The storage system prompt appears.

3. Confirm that Data ONTAP has started successfully by running the following Data ONTAP command:

Example

```
dotv1::> version
NetApp Release 8.x.x: Wed Aug 27 23:38:30 PDT 2014
```

This command displays the version of Data ONTAP software that is installed.

Verifying storage system setup

Many of the values that you defined for your storage system during installation are used to configure Data ONTAP settings. You can verify that these values were set correctly by running some Data ONTAP commands.

Steps

1. Enter the following command to verify that the node is healthy:

Example

```
dotv1::> node show
Node      Health Eligibility Uptime      Model      Owner      Location
-----
dotv1-01 true    true          1 days 23:37 FDvM200    host_system1
```

The Health field should be “true”.

- Enter the following commands to verify that the cluster management and node management logical interfaces (LIFs) are configured correctly:

Example

```
dotv1::> network interface show
Logical      Status      Network      Current      Current      Is
Vserver     Interface   Admin/Oper   Address/Mask Node         Port         Home
-----
dotv1       cluster_mgmt  up/up       10.10.10.10/21 dotv1-01    e0a         true
            dotv1-01_mgmt1 up/up       10.10.10.12/21 dotv1-01    e0a         true

dotv1::> network port show
Node  Port  IPspace  Broadcast Domain Link  MTU  Speed (Mbps)
Admin/Oper
-----
dotv1-01
e0a   Default  Default  up    1500  auto/1000
e0b   Default  Default  up    1500  auto/1000
e0c   Default  Default  up    1500  auto/1000
e0d   Default  Default  up    1500  auto/1000
e0e   Default  Default  up    1500  auto/1000
e0f   Default  Default  up    1500  auto/1000
```

Port e0a is used as the cluster management and node management port. The other ports can be used to serve data.

- Enter the following commands to verify that the storage has been configured correctly. These commands show that the root volume (vol0) has been created in the root aggregate (aggr0), and that the 800 GB virtual data disk you created is a spare disk:

Example

```
dotv1::> storage disk show
Usable      Disk      Container      Container
Disk        Size     Shelf Bay   Type   Type         Name         Owner
-----
VMw-1.1     53.15GB -    0   VMDISK aggregate  aggr0       dotv1-01
VMw-1.2     800.00GB -    1   VMDISK spare    spare       dotv1-01

dotv1::> storage aggregate show
Aggregate   Size Available Used% State  #Vols  Nodes          RAID Status
-----
aggr0      47.82GB  2.74GB  94% online  1     dotv1-01      raid0,
normal

dotv1::> volume show
Vserver    Volume      Aggregate      State      Type        Size Available Used%
-----
dotv1-01  vol0        aggr0          online     RW          44.82GB  42.17GB  5%
```

You use the space from the spare data disk to create a data aggregate in which your Storage Virtual Machines (SVMs) and volumes will be created. Do not include or create data volumes in the root aggregate.

- Enter the following command to verify that the correct Data ONTAP feature licenses are installed on your system, as shown below:

Example

```
dotv1::> system license show
Serial Number: 1-80-000023
Owner: dotv1
Package           Type      Description           Expiration
-----
Base              license  Cluster Base License -

Serial Number: 1-81-000000000000000000000023
Owner: none
Package           Type      Description           Expiration
-----
NFS               license  NFS License          -
CIFS              license  CIFS License         -
iSCSI             license  iSCSI License        -
SnapRestore       license  SnapRestore License  -
FlexClone         license  FlexClone License    -
SnapVault         license  SnapVault License    -
SnapMirror        license  SnapMirror License   -
8 entries were displayed.
```

5. If you defined a destination for cluster configuration backups, enter the following commands to verify that the location is set correctly:

Example

```
dotv1::> set -privilege advanced

Warning: These advanced commands are potentially dangerous; use them only
        when directed to do so by NetApp personnel.
Do you want to continue? {y|n}: y

dotv1::*> system configuration backup settings show
Backup Destination URL           Username
-----
ftp://10.97.131.24                ftp

dotv1::*> set -privilege admin

dotv1::>
```

Data ONTAP-v supported and unsupported functionality

The Data ONTAP-v storage software running on a virtual machine (for example, the Data ONTAP Edge product) does not support all the functionality of Data ONTAP when it is running on a hardware controller.

Data ONTAP-v supported functionality

A Data ONTAP-v storage system supports a subset of Data ONTAP functionality when running on a virtual machine with virtual disks.

The following tables list the supported and unsupported Data ONTAP functionality when using Data ONTAP-v storage software.

Protocol support

Protocol	Supported?
iSCSI	Yes
NFS	Yes
CIFS	Yes
FC	No

Data ONTAP features

Feature	Supported?
Deduplication	Yes
FlexClone	Yes
SnapRestore	Yes
Snapshot copies	Yes
SnapVault (primary)	Yes
SnapVault (secondary)	Yes
SnapMirror	Yes
FlexVol volumes	Yes

Feature	Supported?
Infinite Volumes	No
Compression	No
MultiStore / vFiler	No
SyncMirror	No
FlexShare	No
SnapLock and SnapLock Enterprise	No
SnapProtect	No
Cluster HA	No
Storage failover	No
Software RAID	No
Disk sanitization	No
MetroCluster	No
VTL	No
Disk Maintenance Center	No
Tape device	No

Client software support

Feature	Supported?
SnapManager for Microsoft Exchange Server	Yes
SnapManager for Hyper-V	Yes
SnapManager for SharePoint	Yes
SnapManager for Microsoft SQL Server	Yes
SnapManager for Oracle	Yes
SnapManager for SAP	Yes
Virtual Storage Console (VSC)	Yes
Single Mailbox Recovery	Yes
SnapDrive for Windows	Yes

Feature	Supported?
SnapDrive for UNIX	Yes

OnCommand Management software support

Feature	Supported?
System Manager	Yes
Unified Manager <ul style="list-style-type: none"> • Operations Manager • Protection Manager • Provisioning Manager 	supports monitoring of Data ONTAP-v storage systems.
OnCommand Insight family	No
OnCommand Balance	No
Virtual File Manager	No

Unsupported licenses

Data ONTAP feature license keys are available only for those features that are supported on the Data ONTAP-v storage system.

The following licenses are not available when running Data ONTAP on the Data ONTAP-v platform:

- FCP: Fiber channel controllers
- Insight_Balance: The OnCommand Balance and OnCommand Insight products
- SnapLock, SnapLock_Enterprise: SnapLock compliance and enterprise products
- SnapProtectApps: SnapProtect product
- V_StorageAttach: For access to LUNs on storage arrays, which is not possible within a virtual machine.

Unsupported commands

Some Data ONTAP commands are not supported on the Data ONTAP-v storage platform.

These commands are unavailable for a variety of reasons:

- Lack of license support
- Lack of hardware support
- Lack of support for physical disks (Data ONTAP-v uses virtual disks)

Commands disabled due to lack of license support

The following commands are disabled due to lack of license support:

- `fcv`: Fails with `fcv: FCP is not licensed.`
- `fcadmin`: Fails with `Error: fcadmin is not supported on this platform.`
- `fcstat`: Requires an adapter; fails with `Error: fcstat is not supported on this platform.`
- `snaplock`: Volumes cannot be configured for SnapLock, so the commands fail when given a non-SnapLock volume.

Commands disabled due to lack of hardware support

The following commands are disabled because required hardware is not available on a Data ONTAP-v storage system:

- `cf`: Fails with `Controller is in non-HA mode.`
- `partner`: Fails with `partner: command not supported -- non-HA mode.`
- `sp`: There is no SP (Service Processor) present on a Data ONTAP-v system.
This family of commands fails with `There is no SP (Service Processor) in this system.`
- `environment`: There are no hardware sensors on a Data ONTAP-v storage system.
This command fails with `The 'environment' command is not supported on this platform.`
- `portset`: There are no Fibre Channel ports on a Data ONTAP-v storage system.
This command fails with `portset: WARNING: portset commands are not allowed on filers with no fcp ports.`
- `shelfchk`: There are no shelves supported on a Data ONTAP-v storage system.
This command fails with `No disk enclosure services active on this system.`
- `mt` and `tape.reservations`: These commands and options are not supported because tape devices are not supported on a Data ONTAP-v storage system.

Commands disabled due to using virtual disks

The following commands and options perform operations on a disk level and are not supported because the Data ONTAP-v storage system uses virtual disks:

- `disk_fw_update`: Performs a disk firmware update
- `disk maint start`: This command, and the `disk.maint_center.*` options, control the Disk Maintenance Center, which is not supported
- `disk simpull` and `disk simpush`: Simulates a disk uninstall or install
- `vol media_scrub`: Performs a VERIFY scrub of disks used for trad volumes
- `aggr media_scrub`: Performs a VERIFY scrub of disks used for flex volumes
- `raid.media_scrub.*`: Options for performing VERIFY scrubs of disks
- `raid.background_disk_fw_update.enable`: Performs automatic disk firmware updates
- All `sasadmin` subcommands, except `dev_stats`, `adapter_reset`, `adapter_zombie`, `adapter_offline`, `adapter_online`, `adapter_state`, and `channel`
- `sasstat` subcommands that are specific for disk shelves and expanders: `shelf`, `expander_map`, and `expander_phy_state`

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